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Go Beyond Cure of Breast Cancer

GBCC 2026

Abstract Book

April 23 (Thu.) – 25 (Sat.), 2026
Grand Walkerhill Seoul, Korea

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한국유방암학회
Korean Breast Cancer Society

Table of Contents

Program at a Glance ..... (3)

Program Details ..... (4)

Plenary Lecture 1

Symposium 10

Panel Discussion 58

Education Session 82

Endoscopic and Robotic Breast Surgery Session 101

Multidisciplinary Session 106

Special Session 127

GBCC-JBCS-TBCS Joint Session 152

GBCC-SSO Joint Session 158

GBCC-CACA Joint Session 162

Junior Doctors Forum 171

Nursing Session 175

Satellite Symposium 183

Mini Oral Presentation 203

Poster Discussion 250

Poster Presentation 262

Author Index 584

Program at a Glance

April 22 Wed.

Time	Program
08:00-18:00	GBCC Robotic Surgery Workshop

April 23 Thu.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
07:30-08:15					
08:15-08:30	Opening				
08:30-09:45	Symposium 1 Expanding the Role of Genomic Assays	Panel Discussion 1 Personalized Immunotherapy in Breast Cancer	Symposium 2 Next-Generation Radiotherapy in Breast Cancer: Biomarkers, Risk Stratification and Toxicity Mitigation	Special Session KBCSG with International Collaboration (AI)	Mini Oral Presentation 1
09:45-10:00	Break				
09:45-10:00	Poster Discussion 1 *(Exhibition (Grand))*				
10:00-11:15	General Session 1	Multidisciplinary Session Molecular Tumor Board: How Does ctDNA Add to the Real-World Practice?	Symposium 3 Advances in Asian Breast Cancer Screening: From Evidence to Personalization	Special Session Policy on Breast Cancer 1: Advancing Equity in Breast Cancer Care (AI)	Mini Oral Presentation 2
11:15-11:30	Break				
11:30-12:15	Plenary Lecture 1 Modern Axillary Surgery in Node-positive Breast Cancer - Where Are We Going? (OH)	Plenary Lecture 1 Q&A is available through the GBCC 2026 App.			
12:15-12:30	Break				
12:30-13:15	Satellite Symposium 1 MSD Korea (OH)	Satellite Symposium 2 Lilly Korea (OH)	Satellite Symposium 1 (OH)	Satellite Symposium 2 (OH)	
13:15-13:30	Break				
13:30-14:15	Plenary Lecture 2 Precision Oncology in Motion: Evolutionary Insights, Clinical Impact and Future Directions in Breast Cancer (OH)	Plenary Lecture 2 Q&A is available through the GBCC 2026 App.			
14:15-14:30	Break				
14:15-14:30	Poster Discussion 2 *(Exhibition (Grand))*				
14:30-15:45		Panel Discussion 2 Intraoperative Margin & Lymph Node Assessment: Evidence, Strategy and Debate	Symposium 4 Breast Cancer Related Lymphedema	Special Session Policy on Breast Cancer 2: Asian Real-World Breast Cancer Care and Policy (AI)	GBCC-SSO Joint Session Contralateral Prophylactic Mastectomy (CPM) in Breast Cancer Patients: Global Controversies, Indications, and the Surgeon's Role
15:45-16:00	Break				
16:00-17:15		Panel Discussion 3 Optimizing Endocrine Therapy for Luminal Early Breast Cancer: How Far Might We Go?	Education Session 1 Can We Treat Early Breast Cancer Without Surgery?	ABCN Business Meeting *Invited Only (AI)	Multidisciplinary Session New Trend for Breast Physicians
17:15-18:00			KBCS General Assembly (17:20-17:50)		
18:00-20:00	Welcome Dinner				

April 24 Fri.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
07:30-08:15	Satellite Symposium 3 Novartis Korea Ltd.				
08:15-08:30	Break				
08:30-09:45	Symposium 5 Biomarker-Driven Adaptive Surgery in the Era of Neoadjuvant Therapy	Panel Discussion 4 Current Landscapes and Future Prospectives of HER2 low/ultralow Breast Cancer	Symposium 6 AI Across Breast Imaging	Nursing Session 1 From Surgery to Systemic Therapy: Managing Physical Complication in Breast Cancer Care KOR (AI)	GBCC-JBCS-TBCS Joint Session Current Evidence of Ovarian Function Suppression and Real-World Practice in Asia
09:45-10:00	Break				
09:45-10:00	Poster Discussion 3 *(Exhibition (Grand))*				
10:00-11:15	General Session 2	Multidisciplinary Session Integrating AI into Cancer Treatment	Education Session 2 Modern Axillary Care in Breast Cancer: Integrating Surgical, Imaging and Pathologic Insights	Nursing Session 2 Unmet Needs and Holistic Care in Patient with Metastatic or Recurrent Breast Cancer KOR (AI)	Mini Oral Presentation 3
11:15-11:30	Break				
11:30-12:15	Plenary Lecture 3 Next Generation ADCs (OH)	Plenary Lecture 3 Q&A is available through the GBCC 2026 App.			
12:15-12:30	Break				
12:30-13:15	Satellite Symposium 4 Daiichi-Sankyo Korea (OH)	Satellite Symposium 5 Roche Korea Co., Ltd. (OH)	Satellite Symposium 4 (OH)	Satellite Symposium 5 (OH)	
13:15-13:30	Break				
13:30-14:15	Plenary Lecture 4 What Does it Take to Make Precision Oncology Precise? (OH)	Plenary Lecture 4 Q&A is available through the GBCC 2026 App.			
14:15-14:30	Break				
14:15-14:30	Poster Discussion 4 *(Exhibition (Grand))*				
14:30-15:45	Symposium 7 Evolving Landscape of HR+/HER2- Metastatic Breast Cancer Treatment	Panel Discussion 5 Modern Axillary Management in Breast Cancer with Regional Nodal Involvement	Education Session 3 Breast Cancer Related Lymphedema: Etiologic Factors and Risk Stratification	Junior Doctors Forum (14:30-15:20) (AI)	Mini Oral Presentation 4
15:20-15:45				Break	
15:45-16:00	Break				
16:00-17:15	Symposium 8 De-escalation of Breast Cancer Surgery: What We Know vs. What We Actually Do	Symposium 9 Shaping the Future of Breast Cancer Treatment with Antibody Drug Conjugates	Education Session 4 Locoregional Management for Lymph Node Positive Breast Cancer	Junior Doctors Debate (15:35-17:15) (AI)	Education Session 5 Enhancing and Optimizing Survivorship Throughout Cancer Treatment
17:15-18:00					
18:00-21:00		Presidential Dinner (Aston House) *Invited Only			

April 25 Sat.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
07:30-08:15	Satellite Symposium 6 Pfizer Korea				
08:15-08:30	Break				
08:30-09:45	Symposium 10 Advances and Challenges in the Management of HER2-Positive Metastatic Breast Cancer	Multidisciplinary Session Does Treatment Have to be Different in Very Young Age Breast Cancer Patients?	Endoscopic and Robotic Breast Surgery Session Innovations and Global Trends in Robotic and Minimally Invasive Breast Surgery	Multidisciplinary Session Incorporating Circulating Tumor DNA (ctDNA) in Clinic and Beyond (AI)	GBCC-CACA Joint Session Guidelines and Current Status of Regional Lymph Node Metastasis Beyond Axillary Lymph Node
09:45-10:00	Break				Break
10:00-11:15	Symposium 11 Precision Medicine in Breast Cancer	Panel Discussion 6 Optimizing Treatment for N3 Nodal Disease in Breast Cancer: Axilla and Beyond	Multidisciplinary Session Bridging Evidence and Practice in Hereditary Breast Cancer: A Multidisciplinary Perspective	Symposium 12 Advances and Clinical Application of Digital Pathology (AI)	Session for Breast Cancer Survivors 1 (10:20-11:15) (AI)
11:15-11:30	Break				
11:30-12:15	Plenary Lecture 5 Moderately Hypofractionated Locoregional Radiation Therapy of High-risk Breast Cancer, Results from the Phase III Randomized DBCG Skagen Trial 1 and HYPO G-01 Trial (OH)	Plenary Lecture 5 Q&A is available through the GBCC 2026 App.			Session for Breast Cancer Survivors 2 (11:30-12:25) (AI)
12:15-13:00	Taste of Korea: K-Food DOSIRAK				Break
13:00-13:15	Break				Session for Breast Cancer Survivors 3 (12:40-13:35) (AI)
13:15-14:00	Plenary Lecture 6 Advancing Endocrine Based Therapy to Treat Breast Cancer (OH)	Plenary Lecture 6 Q&A is available through the GBCC 2026 App.			Break
14:00-14:15	Break				Session for Breast Cancer Survivors 4 (13:50-14:45) (AI)
14:15-15:30	Insights of GBCC 2026		Practicing Breast Surgeons Session 1 Innovations and Imaging Challenges in Modern Breast Practice KOR (AI)		Break
15:30-15:45	Break				Session for Breast Cancer Survivors 5 (15:00-15:50) (AI)
15:45-17:00	GBCC Consensus Session Management of Early Breast Cancer in Premenopausal Women: How Different Is It?		Practicing Breast Surgeons Session 2 Contemporary Management of High-risk Breast Lesions KOR (AI)		
17:00-17:15					
17:15-17:45	Beer Party				
17:45-18:15	Closing Ceremony				

Q&A is available for all sessions through the GBCC 2026 App.
Meals provided
한국어 통역이 제공되는 세션입니다.
(OH) Sessions marked with a video icon will be live-streamed in other session rooms.
KOR Korean Session (발표언어: 한국어)
(AI) Sessions marked with an AI icon will provide AI (Artificial Intelligence) interpretation.

Day 1 April 23 (Thu)

08:30-09:45 Symposium 1 RM 1 (Vista 1+2)

Expanding the Role of Genomic Assays

Moderator **Sang Uk Woo**
Korea Univ. Guro Hospital, Korea

Moderator **Otto Metzger**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Eleftherios (Terry) Mamounas** *11*
Challenging Decisions: Interpreting Genomic Assays in Premenopausal and Node-Positive Patients
AdventHealth Cancer Center, U.S.A.

Speaker **Otto Metzger** *12*
Genomic Assays in ER-Positive Breast Cancer: From Prognosis to Endocrine Activity Assessment and Therapeutic Decision-Making
Dana-Farber Cancer Institute, U.S.A.

Speaker **Airi Han** *13*
Emerging Roles of Genomic Assays in Non-Luminal Breast Cancer: Beyond Hormone Receptor Positivity
Yonsei Univ. Wonju College of Medicine, Korea

08:30-09:45 Panel Discussion 1 RM 2 (Grand 1)

Personalized Immunotherapy in Breast Cancer

Moderator **Sung-Bae Kim**
ASAN Medical Center, Korea

Moderator **Marleen Kok**
Netherlands Cancer Institute, Netherlands

Speaker **Marleen Kok** *59*
Biomarker Guided Immunotherapy in Breast Cancer
Netherlands Cancer Institute, Netherlands

Speaker **Soo-Chin Lee** *60*
Novel Combinations and Optimal Immunotherapy Strategies in Metastatic Breast Cancer
National Univ. Cancer Institute, Singapore

Speaker **In Hae Park** *61*
Tailoring Immunotherapy in Early Breast Cancer: Right Balance with Escalation and De-escalation
Korea Univ. Guro Hospital, Korea

All Discussion

08:30-09:45 Symposium 2 RM 3 (Walker 1)

Next-Generation Radiotherapy in Breast Cancer: Biomarkers, Risk Stratification and Toxicity Mitigation

Moderator **Su Ssan Kim**
ASAN Medical Center, Korea

Moderator **C. Jillian Tsai**
Univ. of Toronto, Canada

Day 1 April 23 (Thu)

Speaker **Yeon-Joo Kim** 15
Biomarker-driven Radiotherapy in Early Breast Cancer
National Cancer Center, Korea

Speaker **C. Jillian Tsai** 17
Biology-guided Radiotherapy in Oligometatatic Breast Cancer
Univ. of Toronto, Canada

Speaker **Birgitte Offersen** 18
Cardiac Risk Mitigation in Breast Cancer Radiotherapy
Aarhus Univ. Hospital, Denmark

08:30-09:45 Special Session — RM 4 (Walker 2)

KBCSG with International Collaboration

Moderator **Jong Han Yu**
Samsung Medical Center, Korea

Moderator **Bruce Mann**
The Royal Melbourne Hospital, Australia

Speaker **Kaori Terata** 128
Tailored Axillary Surgery (TAS) in Patients with Clinically Node-Positive Breast Cancer
Akita Univ. Hospital, Japan

Speaker **Bruce Mann** 129
PROSPECTIVE – Finding the Missing Piece in Tailored Local Therapy
The Royal Melbourne Hospital, Australia

Speaker **Toralf Reimer** 130
EUBREAST - Introduction of EUBREAST and MELODY (KBCSG-31)
Univ. of Rostock, Germany

Speaker **Jana de Boniface** 131
SENOMAC Ultra - Collaboration with KBCSG, JCOG, Taiwan Breast Cancer Society
Capio Saint Göran's Hospital, Sweden

All Discussion

08:30-09:45 Mini Oral Presentation 1 — RM 5 (Art Hall)

Moderator **Hee Jin Lee**
ASAN Medical Center, Korea

Moderator **Hye Sung Won**
The Catholic Univ. of Korea, Uijeongbu St. Mary's Hospital, Korea

Presenter **Byung-Kwan Jeong** 204
Elucidating the Roles of Intra-tumoral Macrophage Subtypes That Drive Immune Exclusion in Triple-negative Breast Cancer
ASAN Medical Center, Korea

Presenter **Lohita Krishna Kanyadhara** 205
Stromal ECM Remodeling Drives Aggressive Biology in Young Women with Breast Cancer: Identifying New Therapeutic Targets for an Underserved Population
Sri Shankara Cancer Hospital and Research Centre, India

Day 1 April 23 (Thu)

Presenter **Eun Young Kim** *207*
Predicting pCR in Breast Cancer via Integrated ctDNA and AI-based TIL Analysis
Kangbuk Samsung Hospital, Korea

Presenter **Alvin Luk** *209*
Early Clinical Activity of the Novel SIRPαIgG4 Fc Fusion Protein HCB101 in Combination with AntiPD-1 and Nab-Paclitaxel in Advanced Triple-Negative Breast Cancer
HanchorBio Inc, U.S.A.

Presenter **Tilanka Kalanapriya Dahanayake** *210*
Antigen Presentation Loss Under Neoadjuvant Pembrolizumab in Triple-Negative Breast Cancer and Strategies to Mitigate Acquired Resistance Through Evolutionary Modeling
Univ.of Sri Jayewardenepura, Sri Lanka

Presenter **Jeongshin An** *211*
Enhancing CDK4/6 Inhibitor Efficacy Using Bacteria-Derived Extracellular Vesicles in Breast Cancer
Ewha Womans Univ. Mokdong Hospital, Korea

09:45-10:00 Poster Discussion 1 — Grand Hall Lobby

Moderator **Ji Shin Lee**
Chonnam National Univ. Hwasun Hospital, Korea

Moderator **Ju Won Kim**
Korea Univ. Anam Hospital, Korea

Presenter **Seul Gi Kim** *251*
Integrative Clinical and Transcriptomic Analysis Reveals Prognostic Impact of HER2-Low Expression in ER-Positive Early Breast Cancer
CHA Bundang Medical Center, Korea

Presenter **Hee Yeon Kim** *252*
Type I Interferon-β Mediates Radiation-Induced Abscopal Effects in TUBO Breast Cancer: Synergistic Enhancement with Anti-PD-L1 Immune Checkpoint Inhibition
Inje Univ. Busan Paik Hospital, Korea

10:00-11:15 Special Session — RM 1 (Vista 1+2)

General Session 1

Moderator **Hee Jeong Kim**
ASAN Medical Center, Korea

Moderator **Kyung-Hun Lee**
Seoul National Univ. Hospital, Korea

Presenter **Ee Jin Kim** *141*
(GS-01) Long-term Outcome Analysis of Extended Endocrine Therapy (EET) and Ovarian Function Suppression (OFS) in Multigene Assay (MGA)-Tested HRpos/HER2neg Early Breast Cancer(EBC): A Multicenter Real-world Retrospective Study
ASAN Medical Center, Korea

Presenter **Masanori Oshi** *142*
(GS-02) Germline Background Redefines the Clinical Meaning of Somatic BRCA Alterations in Breast Cancer
Yokohama City Univ. Hospital, Japan

Day 1 April 23 (Thu)

Presenter **Wonshik Han** *143*
(GS-03) Omission of Sentinel Lymph Node Biopsy in HER2+/TNBC Patients with Pathologic Complete Response after Neoadjuvant Systemic Therapy: 3-Year Interim Analysis of the Prospective ASLAN Trial (KBCSG-28)
Seoul National Univ. Hospital, Korea

Discussant **Marios Konstantinos Tasoulis**
Discussant for GS-03
The Royal Marsden NHS Foundation Trust, U.K.

Presenter **Tae-Kyung Robyn Yoo** *144*
(GS-04) A Randomized Controlled Trial for Doing vs. Omitting Intraoperative Frozen Section Biopsy for Resection MArgin Status in Selected Patients Undergoing Breast Conserving Surgery (OFF-MAP trial, KBCSG-17)
ASAN Medical Center, Korea

10:00-11:15 Multidisciplinary Session 1 RM 2 (Grand 1)

Molecular Tumor Board: How Does ctDNA Add to the Real-World Practice?

Moderator **Kyong Hwa Park**
Korea Univ. Anam Hospital, Korea

Moderator **David Cescon**
Univ. of Toronto, Canada

Discussant **David Cescon**
Case Presentation
Univ. of Toronto, Canada

Discussant **Kyong Hwa Park**
Case Presentation
Korea Univ. Anam Hospital, Korea

Discussant **Sangwon Han**
Case Presentation
ASAN Medical Center, Korea

Discussant **Jisun Kim**
Case Presentation
ASAN Medical Center, Korea

Discussant **In Hye Song**
Case Presentation
ASAN Medical Center, Korea

Discussant **Jessica Leung**
Case Presentation
MD Anderson Cancer Center, U.S.A.

10:00-11:15 Symposium 3 RM 3 (Walker 1)

Advances in Asian Breast Cancer Screening: From Evidence to Personalization

Moderator **Bo Kyoung Seo**
Korea Univ. Ansan Hospital, Korea

Moderator **Narumi Harada-Shoji**
Tohoku Univ. Graduate School of Medicine, Japan

Day 1 April 23 (Thu)

Speaker **Yun-Woo Chang** 19
AI-Augmented Mammography in Population Screening: Real-world Results from Korea
Soonchunhyang Univ. Hospital Seoul, Korea

Speaker **Narumi Harada-Shoji** 21
J-START Follow-up: Long-Term Outcomes of Combined Mammography Plus Ultrasound Screening
Tohoku Univ. Graduate School of Medicine, Japan

Speaker **Woo Kyung Moon** 23
Risk-Based Screening and Emerging Biomarkers: The Glandular Tissue Component (GTC)
Seoul National Univ. Hospital, Korea

10:00-11:15 Special Session RM 4 (Walker 2)

Policy on Breast Cancer 1: Advancing Equity in Breast Cancer Care

Moderator **Airi Han**
Yonsei Univ. Wonju College of Medicine, Korea

Moderator **Huang Jian**
The Second Affiliated Hospital, Zhejiang Univ. School of Medicine, China

Speaker **Mikael Hartman** 134
Global Breast Cancer Burden and Health System–Based Breast Cancer Care
National Univ. of Singapore, Singapore

Speaker **Paul Cornes** 135
Overcoming Breast Cancer Treatment Inequity
Comparative Outcomes Group - Europe, U.K.

Speaker **Chihwan David Cha** 136
Achieving Equity in Hereditary Breast Cancer Care: From Genetic Testing to Prevention for All
Hanyang Univ. College of Medicine, Korea

All Discussion

10:00-11:15 Mini Oral Presentation 2 RM 5 (Art Hall)

Moderator **Yoo Seok Kim**
Chosun Univ. Hospital, Korea

Moderator **Sang Eun Nam**
Konkuk Univ. Medical Center, Korea

Presenter **Leslie Kim** 213
Mammographic Screening Delays And Higher Breast Cancer Stage at Presentation Observed in a New York City Health System after the Acute Phase of the COVID Pandemic: Effects of Socioeconomic Factors
Mount Sinai West, U.S.A.

Presenter **Jeffrey Johnson** 215
Safety and Conspicuity of a Nonmetallic Ultrasound Twinkling Marker Observed for Sonographic Targeting (UTMOST Trial)
Mayo Clinic, U.S.A.

Day 1 April 23 (Thu)

Presenter **Lester Leong** *217*
A Temporal Attention-Based Deep Learning Model for Breast Cancer Risk Prediction from Longitudinal Screening Mammograms
Khoo Teck Puat Hospital Singapore, Singapore

Presenter **Jong-Ho Cheun** *218*
Clinical Performance Evaluation of Tumor-Educated Platelet (TEP)-Based Blood Test for Breast Cancer Detection
SMG-SNU Boramae Medical Center, Korea

Presenter **Bom-Yi Lee** *220*
Clinical Performance of International and Korean Genetic Testing Criteria for Hereditary Breast Cancer: A Large-Scale Cohort Analysis of 2,188 Individuals
Daerim St. Mary's Hospital, Korea

Presenter **Zhuohang Yu** *221*
ProMeta-BC: An Integrated Plasma ProteomeMetabolome Framework for Early Detection and Lymph Node Risk Assessment in Breast Cancer
Zhejiang Cancer Hospital, China

Presenter **Chi Wei Mok** *222*
Who Really Needs Staging? Using a Simple Blood Test to Guide Care in Clinically Early Breast Cancer
Changi General Hospital, Singhealth Duke-NUS Breast Centre, Singapore

Presenter **Eun-Jung Yang** *223*
MCODE KG-Enhanced LLM for Integrating Cancer Data and Improving Outcome Prediction
Yonsei Univ. College of Medicine, Korea

11:30-12:15 Plenary Lecture 1 RM 1 (Vista 1+2)

Moderator **Jeong Eon Lee**
Samsung Medical Center, Korea

Speaker **Jana de Boniface** *2*
Modern Axillary Surgery in Node-positive Breast Cancer - Where Are We Going?
Capio Saint Göran's Hospital, Sweden

12:30-13:15 Satellite Symposium 1 RM 1 (Vista 1+2)

MSD Korea

Moderator **Kyong Hwa Park**
Korea Univ. Anam Hospital, Korea

Speaker **Hee Kyung Ahn** *185*
Pembrolizumab in TNBC - Realizing a New Era of Care
Samsung Medical Center, Korea

Day 1 April 23 (Thu)

12:30-13:15 **Satellite Symposium 2** **RM 2 (Grand 1)**

Lilly Korea

Moderator **Jin-Hee Ahn**
ASAN Medical Center, Korea

Speaker **Paolo Tarantino** *187*
Optimizing Care in High-Risk HR+/HER2-eBC: Preventing Recurrence and Improving Survival with Adjuvant Abemaciclib
Dana-Farber Cancer Institute, U.S.A.

13:30-14:15 **Plenary Lecture 2** **RM 1 (Vista 1+2)**

Moderator **Wonshik Han**
Seoul National Univ., Korea

Speaker **Masakazu Toi** *3*
Precision Oncology in Motion: Evolutionary Insights, Clinical Impact and Future Directions in Breast Cancer
Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital, Japan

14:15-14:30 **Poster Discussion 2** **Grand Hall Lobby**

Moderator **Kwan Ho Lee**
Kangbuk Samsung Hospital, Korea

Moderator **Eun-Shin Lee**
Korea Univ. Anam Hospital, Korea

Presenter **Dahn Byun** *253*
Tamoxifen with Versus Without Ovarian Function Suppression in Premenopausal HR-Positive/HER2-Negative Breast Cancer: A Real-World Cohort Study
Samsung Medical Center, Korea

Presenter **Dasom Noh** *254*
Machine LearningBased Individualized Treatment Effect Analysis to Identify Premenopausal Breast Cancer Patients Who Benefit from Extended Endocrine Therapy
Pusan National Univ., Korea

14:30-15:45 **Panel Discussion 2** **RM 2 (Grand 1)**

Intraoperative Margin & Lymph Node Assessment: Evidence, Strategy and Debate

Moderator **Sung Yong Kim**
Soonchunhyang Univ. Hospital Cheonan, Korea

Moderator **Tae-Kyung Robyn Yoo**
ASAN Medical Center, Korea

Speaker **Tae-Kyung Robyn Yoo** *63*
Clinical Evidence Supporting the Use and Omission of Intraoperative Margin and Sentinel Lymph Node Frozen Section
ASAN Medical Center, Korea

Day 1 April 23 (Thu)

Speaker **Jung Eun Choi** *64*
Optimal Margin Width of BCS
Yeungnam Univ. Medical Center, Korea

Speaker **Puay Hoon Tan** *65*
Intraoperative Frozen Section: A New Era of Pathological Precision
Luma Medical Centre Singapore, Singapore

All Discussion

14:30-15:45 **Symposium 4** **RM 3 (Walker 1)**

Breast Cancer Related Lymphedema

Moderator **Kyong-Je Woo**
Samsung Medical Center, Korea

Moderator **Akitatsu Hayashi**
Kameda Medical Center, Japan

Speaker **Jae-Ho Chung** *24*
Prophylactic Lymhovenous Anastomosis (Immediate Lymphatic Reconstruction)
Korea Univ. Anam Hospital, Korea

Speaker **Akitatsu Hayashi** *26*
Lymphovenous Anastomosis for Treatment of Breast Cancer Related Lymphedema (BCRL)
Kameda Medical Center, Japan

Speaker **Deok-Woo Kim** *27*
Vascularized Lymph Node Transfer for the Treatment of Breast Cancer Related Lymphedema (BCRL)
Korea Univ. Ansan Hospital, Korea

14:30-15:45 **Special Session** **RM 4 (Walker 2)**

Policy on Breast Cancer 2: Asian Real-World Breast Cancer Care and Policy

Moderator **Airi Han**
Yonsei Univ. Wonju College of Medicine, Korea

Moderator **Hesham Elghazaly**
Ain Shams Univ., Egypt

Speaker **Felicidad Claudia Ordonez** *137*
Current Status, Key Gaps and Policy Priorities in Philippines
Philippine Society of Breast Surgeons, Philippines

Speaker **Abdul Rachman** *138*
Current Status, Key Gaps and Policy Priorities in Indonesia
Indonesian Society of Surgical Oncology (ISSO), Indonesia

Speaker **Tuan Anh Pham** *139*
Current Status, Key Gaps and Policy Priorities in Vietnam
K Hospital, Vietnam

All Discussion

Day 1 April 23 (Thu)

14:30-15:45 **GBCC-SSO Joint Session** **RM 5 (Art Hall)**

Contralateral Prophylactic Mastectomy (CPM) in Breast Cancer Patients: Global Controversies, Indications, and the Surgeon's Role

Moderator **Tae Hyun Kim**
Inje Univ. Busan Paik Hospital, Korea

Moderator **Shayna Showalter**
Univ. of Virginia, U.S.A.

Speaker **Shayna Showalter** 159
Contralateral Prophylactic Mastectomy: The U.S. Experience
Univ. of Virginia, U.S.A.

Speaker **Sang Yull Kang** 160
Contralateral Prophylactic Mastectomy: The Korean Perspective
Jeonbuk National Univ. Hospital, Korea

Speaker **Sang-Ah Han** 161
Who Truly Benefits From CPM?
Kyung Hee Univ. School of Medicine, Korea

All Discussion

16:00-17:15 **Panel Discussion 3** **RM 2 (Grand 1)**

Optimizing Endocrine Therapy for Luminal Early Breast Cancer: How Far Might We Go?

Moderator **Keun Seok Lee**
National Cancer Center, Korea

Moderator **Hiroji Iwata**
Nagoya City Univ., Japan

Speaker **Takashi Ishikawa** 66
Tailoring Endocrine Treatment and Duration for Early Luminal Breast Cancer
Tokyo Medical Univ., Japan

Speaker **Hiroji Iwata** 67
Expanding Adjuvant Options: Integrating CDK4/6 Inhibitors and PARP Inhibitors in Luminal Breast Cancer
Nagoya City Univ., Japan

Speaker **Nadia Harbeck** 68
Overcoming Endocrine Resistance: Adjuvant Strategies for High-Risk Luminal Breast Cancer
LMU Univ. Hospital, Munich, Germany

All Discussion

16:00-17:15 **Education Session 1** **RM 3 (Walker 1)**

Can We Treat Early Breast Cancer Without Surgery?

Moderator **Hyukjai Shin**
Myongji Hospital, Korea

Moderator **Tristen Park**
Mount Sinai Hospital, U.S.A.

Day 1 April 23 (Thu)

Speaker **Hung-Wen Lai** 83
Cryoablation without Excision for Early-Stage Breast Cancer
Changhua Christian Hospital, Taiwan

Speaker **Tomomi Fujisawa** 84
Radiofrequency Ablation without Excision for Early Stage Breast Cancer
Gunma Prefectural Cancer Center, Japan

Speaker **Tristen Park** 85
Is Surgery Always Needed in Small Breast Tumors?
Mount Sinai Hospital, U.S.A.

16:00-17:15 **ABCN Business Meeting** *(Invited Only)* **RM 4 (Walker 2)**

16:00-17:15 **Multidisciplinary Session 2** **RM 5 (Art Hall)**

New Trend for Breast Physicians

Moderator **Sang Seol Jung**
Kyung Hee Univ. Humanitas Cancer Center, Korea

Moderator **Hyun Jo Youn**
Jeonbuk National Univ. Hospital, Korea

Speaker **Kimberly Hoggatt Krumwiede** 108
Medical Professionalism and Virtual Reality for Patients with Breast Cancer
The Univ. of Texas MD Anderson Cancer Center, U.S.A.

Speaker **Serene Si Ning Goh** 110
Real World Challenges of AI in Breast Cancer Care
National Univ. Hospital, Singapore

Speaker **Sun Kim** 111
Deep Learning Frameworks for Patient-Level Drug Response Prediction, Patient Survival, and Biomarker Discovery by Modeling Transcriptome
Seoul National Univ., Korea

Day 2 April 24 (Fri)

07:30-08:15 **Satellite Symposium 3** **RM 1 (Vista 1+2)**

Novartis Korea Ltd.

Moderator **Jee Hyun Kim**
Seoul National Univ. Bundang Hospital, Korea

Speaker **Giuseppe Curigliano** 189
NATALEE 5 Year Outcomes: Guiding Patient Selection for Adjuvant Ribociclib in HR+/HER2- Early Breast Cancer
Univ. of Milano, Italy

08:30-09:45 **Symposium 5** **RM 1 (Vista 1+2)**

Biomarker-Driven Adaptive Surgery in the Era of Neoadjuvant Therapy

Moderator **Joon Jeong**
Gangnam Severance Hospital, Korea

Moderator **Laura Esserman**
Univ. of California, San Francisco, U.S.A.

Speaker **Laura Esserman** 28
Surgical Decision-Making of Axilla Response After Neoadjuvant Therapy: The Role of Biomarkers
Univ. of California, San Francisco, U.S.A.

Speaker **Sung Gwe Ahn** 30
Surgical Decision-Making of Breast Response After Neoadjuvant Therapy: The Role of Biomarkers
Gangnam Severance Hospital, Korea

Speaker **Peter C. Dubsky** 32
Surgical Planning for Special Subtypes of Breast Cancer After Neoadjuvant Therapy: Beyond Ductal Carcinoma
Hirslanden Klinik St. Anna in Lucerne, Switzerland

08:30-09:45 **Panel Discussion 4** **RM 2 (Grand 1)**

Current Landscapes and Future Prospectives of HER2 low/ultralow Breast Cancer

Moderator **Keun Seok Lee**
National Cancer Center, Korea

Moderator **Giuseppe Curigliano**
Univ. of Milano, Italy

Speaker **Giuseppe Curigliano** 69
Biomarkers in ADC, Unmet Needs and Future Directions: Oncologist's View
Univ. of Milano, Italy

Speaker **Jiwon Koh** 70
ADC Biomarkers and Diagnosis of HER2-low/ultralow Breast Cancer: Pathologist's View
Seoul National Univ. Hospital, Korea

Speaker **Paolo Tarantino** 72
Optimizing ADC Treatment for HER2-low/ultralow Metastatic Breast Cancer in the Real World Clinic
Dana-Farber Cancer Institute, U.S.A.

All Discussion

Day 2 April 24 (Fri)

08:30-09:45 **Symposium 6** **RM 3 (Walker 1)**

AI Across Breast Imaging

Moderator **Hee Jung Shin**
ASAN Medical Center, Korea

Moderator **Katja Pinker-Domenig**
Columbia Univ., U.S.A.

Speaker **Jung Hyun Yoon** 33
Mammography AI 2025: What We Know—and What's Next
Severance Hospital, Korea

Speaker **Won Hwa Kim** 34
Ultrasound CAD/CADx in Practice: HHUS Now, ABUS on the Horizon
Kyungpook National Univ. Hospital, Korea

Speaker **Katja Pinker-Domenig** 35
MRI with AI in Practice: From Faster Scans to Smarter Reads
Columbia Univ., U.S.A.

08:30-09:45 **Nursing Session 1 (Kor.)** **RM 4 (Walker 2)**

From Surgery to Systemic Therapy: Managing Physical Complication in Breast Cancer Care

Moderator **Nayeon Kim**
Samsung Medical Center, Korea

Moderator **Insook Lee**
Changwon National Univ., Korea

Speaker **Byonghee Jeon** 176
Patient Education on Capsular Contracture and Early Rehabilitation After Implant-Based Breast Reconstruction: A Case-Based Approach
Yonsei Univ. Severance Hospital, Korea

Speaker **Dakyung Lee** 177
Clinical Management of Immediate Hypersensitivity Reactions in Breast Cancer Patients with Chemotherapy
Yonsei Univ. Health System, Korea

Speaker **Hyejin Cho** 178
Bone Health and Weight Control in Young Breast Cancer Undergoing Endocrine Therapy
Ewha Womans Univ. Seoul Hospital, Korea

08:30-09:45 **GBCC-JBCS-TBCS Joint Session** **RM 5 (Art Hall)**

Current Evidence of Ovarian Function Suppression and Real-World Practice in Asia

Moderator **Kyung-Hun Lee**
Seoul National Univ. Hospital, Korea

Moderator **Fumikata Hara**
Aichi Cancer Center, Japan

Moderator **Yen-Shen Lu**
National Taiwan Univ. Hospital, Taiwan

Day 2 April 24 (Fri)

Speaker	**Hee Jeong Kim** Cutting-Edge Insights: The Latest Evidence on Ovarian Function Suppression *ASAN Medical Center, Korea*	*153*
Speaker	**Chi-Cheng Huang** Real-World Practice of Ovarian Function Suppression: Taiwanese Perspective *Taipei Veterans General Hospital, Taiwan*	*154*
Speaker	**Tomoyuki Aruga** Real-World Practice of Ovarian Function Suppression: Japanese Perspective *Institute of Science Tokyo, Japan*	*155*
Speaker	**Eun Young Kim** Real-World Practice of Ovarian Function Suppression: South Korean Perspective *Kangbuk Samsung Hospital, Korea*	*157*
All	Discussion	

09:45-10:00 Poster Discussion 3 — Grand Hall Lobby

Moderator	**Heejung Chae** *Seoul National Univ. Bundang Hospital, Korea*	
Moderator	**Soo Jung Lee** *Kyungpook National Univ. Chilgok Hospital, Korea*	
Presenter	**Kyoo Hyun Kim** Subtype-Specific Risk and Temporal Dynamics of Brain Metastases in Metastatic Breast Cancer *Yonsei Univ. College of Medicine, Korea*	*102*
Presenter	**Seok-Joo Chun** Impact of Trastuzumab Deruxtecan (T-DXd) and Brain Stereotactic Radiosurgery on Intracranial Control and Radionecrosis Risk in HER2-Positive or -Low Breast Cancer Brain Metastases *Dongguk Univ. Ilsan Hospital, Korea*	*102*

10:00-11:15 Special Session — RM 1 (Vista 1+2)

General Session 2

Moderator	**Byung Joo Chae** *Samsung Medical Center, Korea*	
Moderator	**In Hae Park** *Korea Univ. Guro Hospital, Korea*	
Presenter	**Wonseok Choi** (GS-05) Clinical Effect of Bisphosphonate in Patients with Hormone Receptor-positive Early Breast Cancer: A Nationwide Real-world Data Analysis *Korea Univ. Guro Hospital, Korea*	*145*
Presenter	**Seung Mi Yeo** (GS-06) A Multidisciplinary Digital Platform to Support Breast Cancer Patients During Adjuvant Treatment: A Pilot Randomized Controlled Trial *Pusan National Univ. Yangsan Hospital, Korea*	*146*

Day 2 April 24 (Fri)

Presenter **Seock-Ah Im** 148
(GS-07) Efficacy and Patient-reported Outcomes (PROs) of Ribociclib (RIB) + Nonsteroidal Aromatase Inhibitor (NSAI) in Younger Patients (pts) with HR+/HER2-early Breast Cancer (EBC) in NATALEE: a 5-y update
Seoul National Univ. Hospital, Korea

Discussant **Shigehira Saji**
Discussant for GS-07
Fukushima Medical Univ., Japan

Presenter **Woong Ki Park** 150
(GS-08) Chemotherapy-Induced Amenorrhea Duration Modifies the Benefit of Ovarian Function Suppression: A Substudy of the ASTRRA Trial
Samsung Medical Center, Korea

10:00-11:15 Multidisciplinary Session 3 RM 2 (Grand 1)

Integrating AI into Cancer Treatment

Moderator **Dong-Young Noh**
CHA Gangnam Medical Center, Korea

Moderator **Nadia Harbeck**
LMU Univ. Hospital, Munich, Germany

Speaker **Jinsoo Rhu** 112
AI in Surgery: From Planning to Precision
Samsung Medical Center, Korea

Speaker **Nadia Harbeck** 113
AI in Medical Oncology: Artificial Intelligence in Patient Care
LMU Univ. Hospital, Munich, Germany

Speaker **Jee Suk Chang** 114
AI in Radiotherapy: AI-Driven Personalization and Accuracy in Breast Radiation Therapy
Yonsei Cancer Center, Korea

10:00-11:15 Education Session 2 RM 3 (Walker 1)

Modern Axillary Care in Breast Cancer: Integrating Surgical, Imaging and Pathologic Insights

Moderator **Jong Han Yu**
Samsung Medical Center, Korea

Moderator **Jessica Leung**
MD Anderson Cancer Center, U.S.A.

Speaker **Jai Min Ryu** 87
De-escalating Axillary Intervention in Breast Cancer: Concepts, Trials and Future Directions
Samsung Medical Center, Korea

Speaker **Jessica Leung** 89
Imaging of Axillary Lymph Nodes: Accuracy, Challenges and Evolving Tools
MD Anderson Cancer Center, U.S.A.

Speaker **Eun Yoon Cho** 91
Pathologic Evaluation of Axillary Nodes: Performance, Pitfalls and Clinical Implications
Samsung Medical Center, Korea

Day 2 April 24 (Fri)

10:00-11:15 **Nursing Session 2 (Kor.)** **RM 4 (Walker 2)**

Unmet Needs and Holistic Care in Patient with Metastatic or Recurrent Breast Cancer

Moderator **Hye Sung Moon**
Ewha Womans Univ. Mokdong Hospital, Korea

Moderator **Mi Young Kang**
Daerim St. Mary's Hospital, Korea

Speaker **Seo Jung Park** *179*
Unmet Needs in Patients with Metastatic or Recurrent Breast Cancer
National Cancer Center, Korea

Speaker **Eunkyung Hwang** *180*
Psychosocial Support for Patients Living with Metastatic or Recurrent Breast Cancer
Seoul National Univ. Hospital, Korea

Speaker **Namgyo Lee** *181*
Integrating Early Palliative Care: The Expanding Role of Breast Cancer Nurse Specialist
Ewha Womans Univ. Mokdong Hospital, Korea

10:00-11:15 **Mini Oral Presentation 3** **RM 5 (Art Hall)**

Moderator **Jin Seok Ahn**
Samsung Medical Center, Korea

Moderator **Hyeong-Gon Moon**
Seoul National Univ. Hospital, Korea

Presenter **Jiwon Koh** *102*
Pathologic Heterogeneity of Breast and Nodal Response to Neoadjuvant Pembrolizumab-based Chemoimmunotherapy in Early Triple-negative Breast Cancer
Seoul National Univ. Hospital, Korea

Presenter **Dahn Byun** *102*
Validation of the ASTRRA-derived Composite Risk Model for Ovarian Function Suppression Benefit in Premenopausal HR-Positive Breast Cancer
Samsung Medical Center, Korea

Presenter **Su Min Lee** *102*
Limited Benefit of Adjuvant Ovarian Function Suppression in Premenopausal HR+/HER2+ Breast Cancer Patients Achieving Pathologic Complete Response After Neoadjuvant Therapy
Samsung Medical Center, Korea

Presenter **Young-Jin Lee** *102*
Extended Endocrine Therapy for Premenopausal Invasive Lobular Carcinoma: Integrating a 10-year Exploratory Analysis of the ASTRRA Trial with Multicenter Retrospective Data
ASAN Medical Center, Korea

Presenter **Yeon Hee Park** *102*
TroFuse-011: A Phase 3, Randomized, Open-Label Study of Sacituzumab Tirumotecan With or Without Pembrolizumab vs Treatment of Physician's Choice for Previously Untreated Locally Recurrent Unresectable
Samsung Medical Center, Korea

Day 2 April 24 (Fri)

Presenter **Huihui Li** 102
Pyrotinib plus Albumin-Bound Paclitaxel as First-Line Treatment for HER2-Positive Metastatic Breast Cancer in Patients Previously Treated with Trastuzumab: Updated Phase II Results
Shandong Cancer Hospital & Institute, China

Presenter **Kyung Hae Jung** 102
Giredestrant vs Standard-of-care Endocrine Therapy as Adjuvant Treatment for Patients with Estrogen Receptor-positive, HER2-negative Early Breast Cancer: Results from the Global PhaseIII lidERA BC Trial
ASAN Medical Center, Korea

Presenter **Keun Seok Lee** 102
Giredestrant, an oral selective oestrogen receptor antagonist and degrader, plus everolimus in ER-positive, HER2-negative advanced breast cancer treated with CDK4/6 inhibitor: Phase III evERA BC trial
National Cancer Center, Korea

Presenter **Ee Jin Kim** 102
Long-term Outcomes of Hormone Receptor (HR)-positive/HER2-negative Invasive Lobular Carcinoma (ILC) Based on Multigene Assay (MGA): A Multicenter Real-world Retrospective Study
ASAN Medical Center, Korea

11:30-12:15 **Plenary Lecture 3** **RM 1 (Vista 1+2)**

Moderator **Seock-Ah Im**
Seoul National Univ. Hospital, Korea

Speaker **Giuseppe Curigliano** 102
Next Generation ADCs
Univ. of Milano, Italy

12:30-13:15 **Satellite Symposium 4** **RM 1 (Vista 1+2)**

Daiichi-Sankyo Korea

Moderator **Min-Ho Park**
Chonnam National Univ. Hwasun Hospital, Korea

Speaker **Junghoon Shin** 102
Beyond Conventional Sequencing in HR+ MBC : Establishing a New Standard through Early and Deep Response with HER2-targeted ADC
Samsung Medical Center, Korea

12:30-13:15 **Satellite Symposium 5** **RM 2 (Grand 1)**

Roche Korea Co., Ltd.

Moderator **Keun Seok Lee**
National Cancer Center, Korea

Day 2 April 24 (Fri)

Speaker **Nadia Harbeck** 102
Decades of Evidence, Minutes of Delivery: The Paradigm Shift in HER2+ eBC Management
LMU Univ. Hospital, Munich, Germany

13:30-14:15 Plenary Lecture 4 RM 1 (Vista 1+2)

Moderator **Woochul Noh**
Konkuk Univ. Medical Center, Korea

Speaker **Laura Esserman** 102
What Does it Take to Make Precision Oncology Precise?
Univ. of California, San Francisco, U.S.A.

14:15-14:30 Poster Discussion 4 Grand Hall Lobby

Moderator **Kyubo Kim**
Seoul National Univ. Bundang Hospital, Korea

Moderator **Kyong-Je Woo**
Samsung Medical Center, Korea

Presenter **Hae Jin Park** 259
Identification of Continuous Positive Airway Pressure (CPAP)-unfavorable Geometry in Left-sided Breast Radiotherapy Using Free-breathing CT
Hanyang Univ. College of Medicine, Korea

Presenter **Tae Hwan Park** 260
Comparison of Physical and Functional Recovery and Quality of Life Between Mini- and Extended Latissimus Dorsi Breast Reconstruction
Kyungpook National Univ. School of Medicine, Korea

14:30-15:45 Symposium 7 RM 1 (Vista 1+2)

Evolving Landscape of HR+/HER2- Metastatic Breast Cancer Treatment

Moderator **Kyung Hae Jung**
ASAN Medical Center, Korea

Moderator **Yen-Shen Lu**
National Taiwan Univ. Hospital, Taiwan

Speaker **Nicholas Turner** 37
Precision Pathway Inhibition: Targeting PI3K, mTOR and AKT to Optimize Endocrine Therapy
Royal Marsden Hospital, U.K.

Speaker **Yen-Shen Lu** 38
Next-Generation Endocrine Agents: SERDs, PROTACs and Innovative Strategies in HR+/HER2- mBC
National Taiwan Univ. Hospital, Taiwan

Speaker **Pedram Razavi** 39
Evolving Translational Landscape of Resistance to CDK4/6i
Memorial Sloan Kettering Cancer Center, U.S.A.

Day 2 April 24 (Fri)

14:30-15:45 **Panel Discussion 5** **RM 2 (Grand 1)**

Modern Axillary Management in Breast Cancer with Regional Nodal Involvement

Moderator **Woochul Noh**
Konkuk Univ. Medical Center, Korea

Moderator **Toralf Reimer**
Univ. of Rostock, Germany

Speaker **Toralf Reimer** 73
Upfront Surgery in cN1 Patients: Current Evidence and Future Perspectives
Univ. of Rostock, Germany

Speaker **Giacomo Montagna** 74
Residual Nodal Disease After Neoadjuvant Therapy: Optimal Surgical Strategy
Memorial Sloan Kettering Cancer Center, U.S.A.

Speaker **Han-Byoel Lee** 75
Three or More Positive Nodes: ALND Alone or ALND Plus Regional Nodal Irradiation?
Seoul National Univ. Hospital, Korea

All Discussion

14:30-15:45 **Education Session 3** **RM 3 (Walker 1)**

Breast Cancer Related Lymphedema: Etiologic Factors and Risk Stratification

Moderator **Haeyoung Kim**
Samsung Medical Center, Korea

Moderator **So-Youn Jung**
National Cancer Center, Korea

Speaker **Hyunjong Lee** 92
Lymphoscintigraphy and Beyond: Nuclear Medicine Approaches to Lymphedema Diagnosis
Samsung Medical Center, Korea

Speaker **Hwa Kyung Byun** 93
Radiation-Induced Lymphatic Injury in Breast Cancer: Dose-Volume Correlates and Predictive Modeling
Yongin Severance Hospital, Korea

Speaker **Jina Yoon** 94
Integrative Rehabilitation Approaches to Breast Cancer-Related Lymphedema: The Role of ICG Lymphography
Pusan National Univ. Hospital, Korea

14:30-15:20 **Junior Doctors Forum** **RM 4 (Walker 2)**

Moderator **Yoo Seok Kim**
Chosun Univ. Hospital, Korea

Speaker **Isabel T. Rubio** 172
Building Bridges: How Junior Doctors Can Engage in Global Research Collaboration
Clinica Universidad de Navarra, Spain

Speaker **Yeon Hee Park** 174
The Power of Partnerships in Cancer Research: Driving Growth and Innovation
Samsung Medical Center, Korea

Day 2 April 24 (Fri)

15:35-17:15 Junior Doctors Debate RM 4 (Walker 2)

Moderator **Tae-Kyung Robyn Yoo**
ASAN Medical Center, Korea

Moderator **Tristen Park**
Mount Sinai Hospital, U.S.A.

Team 1 vs. Team 2
52 yo F History of IDC ER-/PR-/HER2- cT1N0 (1.5 cm /negative margins) 8 Years Ago Now Wants HRT for Menopause

Team 1 vs. Team 2
preMP (42Y), IDCa, HG 2, T2(3.5cm) N1(2/3) NASSM with SNB and Immediate Reconstruction with DTI

14:30-15:45 Mini Oral Presentation 4 RM 5 (Art Hall)

Moderator **Hyun Yul Kim**
Pusan National Univ. Yangsan Hospital, Korea

Moderator **Seungpil Jung**
Korea Univ. Anam Hospital, Korea

Presenter **Nandhini Srinivasan** *238*
Effect of Microporous Polysaccharide Haemospheres (Arista™ AH) on Seroma-Related Outcomes Following Mastectomy: A Randomized Controlled Trial
National Univ. of Singapore, Singapore

Presenter **Rohit Rajput** *239*
Decoding Nutrition Linked Epigenetic States in Early-Stage Breast Cancer Using Deep Learning
Univ. College of Medical Sciences, India

Presenter **Serene Si Ning Goh** *240*
Oncological Outcomes of Axillary Surgery in Patients with Residual Nodal Disease After Neoadjuvant Chemotherapy
National Univ. of Singapore, Singapore

Presenter **Yoonwon Kook** *242*
High TIL Levels Predict Excellent Axillary Nodal Pathologic Complete Response in Triple-negative Breast Cancer Treated with Pembrolizumab-based Neoadjuvant Chemotherapy
Gangnam Severance Hospital, Korea

Presenter **Hongjin Liu** *243*
Optimization of Sentinel Lymph Node Biopsy Using a Radiation-Free Dual-Tracer Protocol: A Large-Scale Analysis of 834 Patients Addressing Access Barriers in Asia
Peking Univ. First Hospital, China

Presenter **Jae Young Lee** *244*
Association of Blood Count-Derived Inflammatory Indices with Capsular Contracture After Post-Mastectomy Radiotherapy in Breast Cancer Patients Undergoing Direct-to-Implant Reconstruction
Yonsei Cancer Center, Korea

Presenter **Eunhye Kang** *246*
Age-stratified Cardiovascular Risk After Breast Cancer Treatment: A Korean Nationwide Cohort Study
Seoul National Univ. Hospital, Korea

Day 2 April 24 (Fri)

Presenter **Akihiko Shimomura** 247
Clinicopathological Characteristics and Outcomes of Male Breast Cancer in Japan: A part of the OASIS male BC project
National Center for Global Health and Medicine, Japan

Presenter **Yen-Jen Chen** 249
Clinical Presentations and Prognostication of HER2-low and HER2-zero Early Breast Cancer in Taiwan
Taipei Veterans General Hospital, Taiwan

16:00-17:15 **Symposium 8** **RM 1 (Vista 1+2)**

De-escalation of Breast Cancer Surgery: What We Know vs. What We Actually Do

Moderator **Wonshik Han**
Seoul National Univ., Korea

Moderator **Henry Kuerer**
MD Anderson Cancer Center, U.S.A.

Speaker **Toralf Reimer** 40
From ALND to SLNB Omission: Historical View of Barriers for Clinical Application
Univ. of Rostock, Germany

Speaker **Henry Kuerer** 41
Neoadjuvant-driven De-escalation of Surgery: Are We Ready to Skip Breast Surgery?
MD Anderson Cancer Center, U.S.A.

Speaker **Jeong Eon Lee** 43
SLNB Omission for cN0 Patients in the Post-neoadjuvant Setting: Is it Feasible?
Samsung Medical Center, Korea

16:00-17:15 **Symposium 9** **RM 2 (Grand 1)**

Shaping the Future of Breast Cancer Treatment with Antibody Drug Conjugates

Moderator **Jee Hyun Kim**
Seoul National Univ. Bundang Hospital, Korea

Moderator **Janice Tsang**
The Univ. of Hong Kong, Hong Kong

Speaker **Kan Yonemori** 45
ADC: The Emerging Role and Future Perspectives in Early Breast Cancer
National Cancer Center Hospital, Japan

Speaker **Janice Tsang** 46
Optimizing ADCs in Metastatic Triple Negative Breast Cancer
The Univ. of Hong Kong, Hong Kong

Speaker **Paolo Tarantino** 47
Understanding ADC Mechanism of Action and Implications on Better Efficacy and Safety
Dana-Farber Cancer Institute, U.S.A.

Day 2 April 24 (Fri)

16:00-17:15 **Education Session 4** **RM 3 (Walker 1)**

Locoregional Management for Lymph Node Positive Breast Cancer

Moderator **Seho Park**
Yonsei Univ. College of Medicine, Korea

Moderator **Jana de Boniface**
Capio Saint Göran's Hospital, Sweden

Speaker **Jana de Boniface** *95*
Axillary Lymph Node Dissection and Targeted Axillary Dissection in Node-Positive Breast Cancer Patients Undergoing Upfront Surgery: Current Evidence and Clinical Perspectives
Capio Saint Göran's Hospital, Sweden

Speaker **Marios Konstantinos Tasoulis** *96*
Various Axillary Lymph Node Localization Techniques and Oncologic Outcomes After Neoadjuvant Chemotherapy in Node-Positive Patients with Excellent Response
The Royal Marsden NHS Foundation Trust, U.K.

Speaker **Won Kyung Cho** *97*
De-escalation of Axillary Surgery and Escalation of Radiotherapy
Samsung Medical Center, Korea

16:00-17:15 **Education Session 5** **RM 5 (Art Hall)**

Enhancing and Optimizing Survivorship Throughout Cancer Treatment

Moderator **Omalkhair Abulkhair**
Specialized Medical Center Hospital, Saudi Arabia

Moderator **Matteo Lambertini**
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

Speaker **Yukinori Ozaki** *98*
Long Term Care After Primary Breast Cancer Treatment
Cancer Institute Hospital of JFCR, Japan

Speaker **Kabsoo Shin** *99*
Management of Toxicities Associated with Endocrine Therapy for HR-positive Breast Cancer
The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

Speaker **Matteo Lambertini** *100*
Fertility Preservation and Pregnancy After Breast Cancer
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

Day 3 April 25 (Sat)

07:30-08:15 **Satellite Symposium 6** **RM 1 (Vista 1+2)**

Pfizer Korea

Moderator **Nam-Sun Paik**
Pohang SM Christianity Hospital, Korea

Speaker **Jee Hung Kim** 195
A Decade of Palbociclib and the Next Chapter in HR+ mBC
Gangnam Severance Hospital, Korea

08:30-09:45 **Symposium 10** **RM 1 (Vista 1+2)**

Advances and Challenges in the Management of HER2-Positive Metastatic Breast Cancer

Moderator **Yeon Hee Park**
Samsung Medical Center, Korea

Moderator **Junji Tsurutani**
Showa Medical Univ., Japan

Speaker **Otto Metzger** 48
Evolving Treatment Landscape in the First-line Treatment of HER2+mBC
Dana-Farber Cancer Institute, U.S.A.

Speaker **Koung Jin Suh** 49
Future Treatment Strategy After Progression on T-DXd in HER2+mBC
Seoul National Univ. Bundang Hospital, Korea

Speaker **Junji Tsurutani** 51
Management of CNS Metastasis in HER2+mBC
Showa Medical Univ., Japan

08:30-09:45 **Multidisciplinary Session 4** **RM 2 (Grand 1)**

Does Treatment Have to be Different in Very Young Age Breast Cancer Patients?

Moderator **Hee Jeong Kim**
ASAN Medical Center, Korea

Moderator **Isabel T. Rubio**
Clinica Universidad de Navarra, Spain

Speaker **Isabel T. Rubio** 115
Does Surgery Have to be Different?
Clinica Universidad de Navarra, Spain

Speaker **Yoon-Sim Yap** 117
Does Adjuvant Endocrine Therapy have to be Different?
National Cancer Centre Singapore, Singapore

Speaker **Vivian Youngjean Park** 118
Does Imaging Surveillance have to be Different? More MRI? Less Mammography?
Yonsei Univ. College of Medicine, Korea

Day 3 April 25 (Sat)

08:30-09:45 **Endoscopic and Robotic Breast Surgery Session** **RM 3 (Walker 1)**

Innovations and Global Trends in Robotic and Minimally Invasive Breast Surgery

Moderator **Hyung Seok Park**
Yonsei Univ. College of Medicine, Korea

Moderator **Hung-Wen Lai**
Changhua Christian Hospital, Taiwan

Speaker **Hung-Wen Lai** *102*
Endoscopic Breast Mastectomy: Technique, Benefits, and Future Directions
Changhua Christian Hospital, Taiwan

Speaker **Ahmad Matalkah** *103*
Robotic Breast Surgery in Middle East Asia – From Observation to Cadaveric Workshops and Proctorship
Cleveland Clinic Abu Dhabi, U.A.E.

Speaker **Hee Jun Choi** *105*
Minimal Access Approaches in Breast-Conserving Surgery: Techniques and Outcomes
Samsung Changwon Hospital, Korea

08:30-09:45 **Multidisciplinary Session 5** **RM 4 (Walker 2)**

Incorporating Circulating Tumor DNA (ctDNA) in Clinic and Beyond

Moderator **Jisun Kim**
ASAN Medical Center, Korea

Moderator **Nicholas Turner**
Royal Marsden Hospital, U.K.

Speaker **David Cescon** *120*
Understanding ctDNA: It's Biology and Methodology
Univ. of Toronto, Canada

Speaker **Pedram Razavi** *121*
ctDNA-guided Precision Medicine for Early and Metastatic Breast Cancer
Memorial Sloan Kettering Cancer Center, U.S.A.

Speaker **Samir M. Hanash** *122*
Liquid Biopsy for Early Detection and Screening (Multi Cancer Early Detection)
The Univ. of Texas MD Anderson Cancer Center, U.S.A.

Speaker **Nicholas Turner** *123*
Incorporating ctDNA in Clinical Trials and Biomarker Discovery
Royal Marsden Hospital, U.K.

08:30-09:45 **GBCC-CACA Joint Session** **RM 5 (Art Hall)**

Guidelines and Current Status of Regional Lymph Node Metastasis Beyond Axillary Lymph Node

Moderator **Hyukjai Shin**
Myongji Hospital, Korea

Moderator **Yongsheng Wang**
Shandong Cancer Hospital, China

Day 3 April 25 (Sat)

Speaker	**Soo Yeon Baek** Guidelines of Regional Lymph Node Metastasis Beyond Axillary Lymph Node *Ajou Univ. Hospital, Korea*	*163*
Speaker	**Yongsheng Wang** Surgical and Staging Considerations for Regional Nodes Beyond the Axilla *Shandong Cancer Hospital, China*	*164*
Speaker	**Hanxiang An** Systemic Therapy in the Era of Escalation and De-escalation *Shanxi Bethune Hospital, China*	*165*
Speaker	**Haeyoung Kim** Risk-Adapted Radiotherapeutic Strategies for Non-Axillary Regional Nodes: Current Evidence and Practice Patterns in Korea *Samsung Medical Center, Korea*	*166*
Speaker	**Soong June Bae** Current Status on Regional Lymph Node Management Beyond the Axilla in Breast Cancer in Korea *Gangnam Severance Hospital, Korea*	*168*
Speaker	**Chunhua Xiao** Current Status on Regional Lymph Node Management Beyond the Axilla in Breast Cancer in China *Tianjin Medical Univ. Cancer Institute & Hospital, China*	*169*
Panelist	**Peng Yuan** Discussion *Chinese National Cancer Center, China*	
Panelist	**Xianfu Sun** Discussion *Henan Cancer Hospital, China*	
All	Discussion	

10:00-11:15 **Symposium 11** **RM 1 (Vista 1+2)**

Precision Medicine in Breast Cancer

Moderator	**Kyong Hwa Park** *Korea Univ. Anam Hospital, Korea*	
Moderator	**Antonio Marra** *European Institute of Oncology, Italy*	
Speaker	**Antonio Marra** Biologic Implications and Therapeutic Targeting of Homologous Recombination Deficiency in Breast Cancer *European Institute of Oncology, Italy*	*52*
Speaker	**Yeon Hee Park** Integrating Multi-omics and Clinical Data into Practice *Samsung Medical Center, Korea*	*53*
Speaker	**Ding Ma** Multiomic Biomarkers of Breast Cancer *Fudan Univ. Shanghai Cancer Center, China*	*54*

Day 3 April 25 (Sat)

10:00-11:15 **Panel Discussion 6** **RM 2 (Grand 1)**

Optimizing Treatment for N3 Nodal Disease in Breast Cancer: Axilla and Beyond

Moderator **Sang Uk Woo**
Korea Univ. Guro Hospital, Korea

Moderator **Henry Kuerer**
MD Anderson Cancer Center, U.S.A.

Speaker **Henry Kuerer** *77*
Tailoring Surgery in Extensive Nodal Disease
MD Anderson Cancer Center, U.S.A.

Speaker **Jong Hoon Lee** *78*
Optimization of RT in N+ or High-Risk Breast Ca.
The Catholic Univ. of Korea, St. Vincent's Hospital, Korea

Speaker **Jieun Lee** *80*
Optimizing Systemic Therapy in N3 Breast Cancer
The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

All Discussion

10:00-11:15 **Multidisciplinary Session 6** **RM 3 (Walker 1)**

Bridging Evidence and Practice in Hereditary Breast Cancer: A Multidisciplinary Perspective

Moderator **Sung-Won Kim**
Daerim St. Mary's Hospital, Korea

Moderator **Tibor Gyorgy Kovacs**
American Hospital Dubai, U.A.E.

Speaker **Tibor Gyorgy Kovacs** *124*
Surgical Personalization: Surgical Decision-Making in Hereditary Breast Cancer: Balancing Risk, Benefit, and Patient Preference
American Hospital Dubai, U.A.E.

Speaker **Matteo Lambertini** *125*
Medical Treatment Consideration: PARP Inhibitors in Early Hereditary Breast Cancer: Optimizing Adjuvant Therapy According to Subtype
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

Speaker **Seock-Ah Im** *126*
Regional Implementation: Genetic Testing Guidelines and Clinical Application in Asia: Bridging the Gap
Seoul National Univ. Hospital, Korea

10:00-11:15 **Symposium 12** **RM 4 (Walker 2)**

Advances and Clinical Application of Digital Pathology

Moderator **Chan Kwon Jung**
The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

Moderator **Junya Fukuoka**
Nagasaki Univ., Japan

Day 3 April 25 (Sat)

Speaker **Junya Fukuoka** 55
Introduction of Digital Pathology
Nagasaki Univ., Japan

Speaker **Sangjeong Ahn** 56
Application of Digital Pathology in Precision Oncology
Korea Univ. Anam Hospital, Korea

Speaker **David Joon Ho** 57
Foundation Models in Digital Pathology: Now and Future
The State Univ. of New York, Korea, Korea

10:00-11:15 Session for Breast Cancer Survivors 1 RM 5 (Art Hall)

Guide to Breast Cancer: Understanding the Essentials
유방암 길잡이: 꼭 알아야 할 핵심 정보

Moderator **Sungmin Park**
Chungbuk National Univ. Hospital, Korea

Speaker **Zisun Kim**
Facing Breast Cancer: Trends and Survival
유방암, 어디까지 왔을까? 통계로 보는 현실과 희망
Soonchunhyang Univ. Hospital Bucheon, Korea

Speaker **Hee Yeon Kim**
The Spectrum of Breast Cancer: Understanding Subtypes
유방암도 종류가 있다? 맞춤형 치료를 위한 기본 이해
Inje Univ. Busan Paik Hospital, Korea

Speaker **Sung-Won Kim**
BRCA1/2 and Genetic Counseling: Unveiling Your Genetic Risk
BRCA1/2 유전자 검사와 유전 상담이 필요한 환자와 그 이유
Daerim St. Mary's Hospital, Korea

Speaker **Sungmin Park**
Follow-Up After Breast Cancer: Understanding Your Surveillance Plan
유방암 치료 후 추적검사법
Chungbuk National Univ. Hospital, Korea

All Q&A

11:30-12:15 Plenary Lecture 5 RM 1 (Vista 1+2)

Moderator **Yong Bae Kim**
Yonsei Cancer Center, Korea

Speaker **Birgitte Offersen** 7
Moderately Hypofractionated Locoregional Radiation Therapy of High-risk Breast Cancer, Results from the Phase III Randomized DBCG Skagen Trial 1 and HYPO G-01 Trial
Aarhus Univ. Hospital, Denmark

Day 3 April 25 (Sat)

11:30-12:25 **Session for Breast Cancer Survivors 2** **RM 5 (Art Hall)**

Early Breast Cancer: Optimizing Treatment
조기 유방암: 최적의 치료

Moderator **Jeeyeon Lee**
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Jeeyeon Lee**
Surgical Options for Breast Cancer: What Are My Choices?
유방암 수술, 나에게 맞는 방법은?
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Hae Jin Park**
Radiation Therapy for Breast Cancer: Benefits and Side Effects
방사선 치료, 효과와 부작용은?
Hanyang Univ. College of Medicine, Korea

Speaker **Seul Gi Kim**
Chemotherapy and Targeted Therapy in Early Breast Cancer: Who, When, and How?
항암 및 표적치료: 누구에게, 언제, 어떻게?
CHA Bundang Medical Center, Korea

Speaker **Hee Jeong Kim**
Personalizing Endocrine Therapy in Early Breast Cancer
나에게 맞는 항호르몬치료 전략
ASAN Medical Center, Korea

All Q&A

12:40-13:35 **Session for Breast Cancer Survivors 3** **RM 5 (Art Hall)**

Metastatic Breast Cancer: Evolving Treatment Strategies
전이성 유방암: 치료 전략의 진화

Moderator **Ji Hyung Hong**
National Cancer Center, Korea

Speaker **Joo-Hwan Park**
Personalized Treatment Strategies According to Breast Cancer Subtypes
아형에 따른 치료 전략
Gachon Univ. Gil Medical Center, Korea

Speaker **In Hee Lee**
Recent Advances and Updates in Hormonal Therapy for Metastatic Breast Cancer: Evidence and Practice
전이성 유방암 항호르몬 치료의 최신 지견
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Junghoon Shin**
Recent Advances and Updates in Immunotherapy for Metastatic Breast Cancer: Evidence and Practice
전이성 유방암 면역치료의 최신 지견
Samsung Medical Center, Korea

Day 3 April 25 (Sat)

Speaker **Ji Hyung Hong**
Recent Advances and Updates in Targetherapy for Metastatic Breast Cancer: Evidence and Practice
전이성 유방암 표적치료의 최신 지견
National Cancer Center, Korea

All Q&A

13:15-14:00 **Plenary Lecture 6** **RM 1 (Vista 1+2)**

Moderator **Sung-Bae Kim**
ASAN Medical Center, Korea

Speaker **Nicholas Turner** 9
Advancing Endocrine Based Therapy to Treat Breast Cancer
Royal Marsden Hospital, U.K.

13:50-14:45 **Session for Breast Cancer Survivors 4** **RM 5 (Art Hall)**

Redesigning Life After Breast Cancer
유방암과 다시 그리는 나의 삶: 회복과 지속 가능한 건강

Moderator **Hyun Jo Youn**
Jeonbuk National Univ. Hospital, Korea

Speaker **Jae Eun Shin**
My Journey to Overcoming Breast Cancer: Perspectives from a Young Survivor
유방암 극복기, 젊은 유방암 환우
Breast Cancer Survivor, Korea

Speaker **Ka Ryeong Bae**
Back to Work, Back to Life: Finding Strength Beyond Cancer
삶의 원동력, 일을 지속하기 위한 준비
Eulji Univ., Korea

Speaker **Mihyang Kim**
Healthy Eating While Living with Breast Cancer
유방암과 함께하는 건강한 식탁
Ajou Univ. Hospital, Korea

Speaker **Dongwook Shin**
Obesity, Breast Cancer, and New Therapies: How Weight Management Shapes Outcomes
비만과 유방암, 그리고 최신 치료제: 체중 조절이 바꾸는 것들
Samsung Medical Center, Korea

All Q&A

Day 3 April 25 (Sat)

14:15-15:30 **Special Session** **RM 1 (Vista 1+2)**

Insights of GBCC 2026

Moderator **Tae Hyun Kim**
Inje Univ. Busan Paik Hospital, Korea

Moderator **Jee Hyun Kim**
Seoul National Univ. Bundang Hospital, Korea

Speaker **Peter C. Dubsky**
Surgery
Hirslanden Klinik St. Anna in Lucerne, Switzerland

Speaker **Yeon Hee Park**
Early Breast Cancer
Samsung Medical Center, Korea

Speaker **Nadia Harbeck**
Advanced Breast Cancer
LMU Univ. Hospital, Munich, Germany

Speaker **Pedram Razavi**
Translational Research
Memorial Sloan Kettering Cancer Center, U.S.A.

14:15-15:30 **Practicing Breast Surgeons Session 1 (Kor.)** **RM 4 (Walker 2)**

Innovations and Imaging Challenges in Modern Breast Practice

Moderator **Sang Hoon Hahn**
Venus Breast & Thyroid Clinic, Korea

Speaker **Jeeyeon Lee**
The Next-Generation AI Solution for Breast Cancer Diagnosis
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Jigwang Jung**
Early Detection or Overdiagnosis? The Role of 3D Mammography and Stereotactic Biopsy for Microcalcifications in Clinical Practice
U've Clinic, Korea

Speaker **Jae Hong Kim**
Understanding Breast Changes Related to Implant Rupture and Autologous Fat Insertion
The W Clinic, Korea

15:00-15:50 **Session for Breast Cancer Survivors 5** **RM 5 (Art Hall)**

Patient Advocacy in Breast Cancer: Voices, Impact, and Global Collaboration
유방암 환자 지지 활동: 환우의 목소리와 그 영향, 국제적 협력

Moderator **Sung-Bae Kim**
ASAN Medical Center, Korea

Speaker **Fatima Cardoso**
Patient Advocacy as a Driver of Change in Breast Cancer Care: A Global Perspective
유방암 치료를 변화시키는 환자 지지 활동: 글로벌 관점에서의 역할
Centre Antoine Lacassagne and Advanced Breast Cancer (ABC) Global Alliance, France

Day 3 April 25 (Sat)

Speaker **Tanja Spanic**
Building a Unified Voice: Patient Advocacy in Europe and Its Impact on Policy and Care
유럽의 유방암 환자 지지 활동: 하나의 목소리가 정책과 치료를 바꾸는 과정
Europa Donna Slovenia, Slovenia

Speaker **Barbara Segarra-Vazquez**
Advocacy in Action: Patient Engagement and Empowerment in the United States
미국의 유방암 환자 지지 활동: 환자 참여와 역량 강화의 경험
Univ. of Puerto Rico, Puerto Rico

15:45-17:15 **Special Session** **RM 1 (Vista 1+2)**

GBCC Consensus Session: Management of Early Breast Cancer in Premenopausal Women: How Different Is It?

Moderator **Hee Kyung Ahn**
Samsung Medical Center, Korea

Moderator **Han-Byoel Lee**
Seoul National Univ. Hospital, Korea

Panelist **Jana de Boniface**
Capio Saint Göran's Hospital, Sweden

Panelist **Giuseppe Curigliano**
Univ. of Milano, Italy

Panelist **Laura Esserman**
Univ. of California, San Francisco, U.S.A.

Panelist **Wonshik Han**
Seoul National Univ. Hospital, Korea

Panelist **Seock-Ah Im**
Seoul National Univ. Hospital, Korea

Panelist **Joon Jeong**
Gangnam Severance Hospital, Korea

Panelist **Sung-Bae Kim**
ASAN Medical Center, Korea

Panelist **Henry Kuerer**
MD Anderson Cancer Center, U.S.A.

Panelist **Matteo Lambertini**
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

Panelist **Jeong Eon Lee**
Samsung Medical Center, Korea

Panelist **Soo-Chin Lee**
National Univ. Cancer Institute, Singapore (NCIS), Singapore

Panelist **Yen-Shen Lu**
National Taiwan Univ. Hospital, Taiwan

Panelist **Otto Metzger**
Dana-Farber Cancer Institute, U.S.A.

Panelist **Birgitte Offersen**
Aarhus Univ. Hospital, Denmark

Day 3 April 25 (Sat)

Panelist	**Yeon Hee Park** *Samsung Medical Center, Korea*	*102*
Panelist	**Toralf Reimer** *Univ. of Rostock, Germany*	*102*
Panelist	**Kyung Hwan Shin** *Seoul National Univ. Hospital, Korea*	*102*
Panelist	**Janice Tsang** *The Univ. of Hong Kong, Hong Kong*	*102*

15:45-17:00 **Practicing Breast Surgeons Session 2 (Kor.)** **RM 4 (Walker 2)**

Contemporary Management of High-risk Breast Lesions

Moderator **Jun Ho Kim**
Joeun Breast Clinic, Korea

Speaker **Jong-Ho Cheun**
Low-grade DCIS Diagnosed After CNB or VAB: Traditional Treatment Planning vs. Active Surveillance
SMG-SNU Boramae Medical Center, Korea

Speaker **Young San Jeon**
Management of Multiple Papillomas and Small ADH in Elderly Patients
Goo Hospital, Korea

Speaker **Seungpil Jung**
ALH & LCIS: Understanding Atypical Lobular Lesions in the Modern Era
Korea Univ. Anam Hospital, Korea

Oral Presentation

MOP1-01 **Elucidating the Roles of intra-tumoral macrophage subtypes that Drive Immune Exclusion in Triple-negative Breast Cancer** *204*
Byung-Kwan Jeong, Sowon Choi, Minsik Oh, Hyun Je Kim, Hee Jin Lee

MOP1-02 **Stromal Extracellular Matrix (ECM) Remodeling Drives Aggressive Biology in Young Women with Breast Cancer: Identifying New Therapeutic Targets for an Underserved Population** *205*
Lohita Krishna Kanyadhara, Aruna Korlimarla, Hari P S, Guruguhan S, Ashitha N N, Durgadevi Veeraiyyan, Keerthi Shetty, Megha Sarvottama, Srinath B S

MOP1-03 **Predicting pCR in Breast Cancer via Integrated ctDNA and AI-based TIL Analysis** *207*
Eun Young Kim, Jiyeong Kim, Minjung Kwon, In Gu Do, Seoung Wan Chae

MOP1-04 **Early Clinical Activity of the Novel SIRPαIgG4 Fc Fusion Protein HCB101 in Combination with AntiPD-1 and Nab-Paclitaxel in Advanced Triple-Negative Breast Cancer** *209*
Alvin Luk, Langtian Yu, Fangling Ning, Peijian Peng, Fei Mo, David Sun

MOP1-05 **Antigen Presentation Loss Under Neoadjuvant Pembrolizumab in Triple-Negative Breast Cancer and Strategies to Mitigate Acquired Resistance Through Evolutionary Modeling** *210*
Tilanka Kalanapriya Dahanayake, Heeju Ryu, Tae Jin Kim

MOP1-06 **Enhancing CDK4/6 Inhibitor Efficacy Using Bacteria-Derived Extracellular Vesicles in Breast Cancer** *211*
Jeongshin An, Ji Eun Hong, Se-Young Oh

MOP2-01 **Mammographic Screening Delays And Higher Breast Cancer Stage at Presentation Observed in a New York City Health System after the Acute Phase of the COVID Pandemic: Effects of Socioeconomic Factors** *213*
Leslie Kim, Erin Moshier, Tristen Park, Borna Mohabbatizadeh, Elisa Port, Stephanie Bernik, Tara Balija

MOP2-02 **Safety and Conspicuity of a Nonmetallic Ultrasound Twinkling Marker Observed for Sonographic Targeting (UTMOST Trial)** *215*
Jeffrey Johnson, Gina Hesley, Blake Kassmeyer, Abdullah Al Masud, Nicholas Larson, Matthew Urban, Christine Lee, Mara Piltin

MOP2-03 **A Temporal Attention-Based Deep Learning Model for Breast Cancer Risk Prediction from Longitudinal Screening Mammograms** *217*
Lester Leong, Xiaohong Wang, Weimin Huang, Zhongkang Lu, Kaishen He, Hengji Yao, Zhiping Lin, Engracia Loh, Ryan Tan

MOP2-04 **Clinical Performance Evaluation of Tumor-Educated Platelet (TEP)-Based Blood Test for Breast Cancer Detection** *218*
Jong-Ho Cheun, Sarah Kim, Dong Seung Shin, Eunyong Ahn, Taejin Ahn, Wonshik Han, Hong-Kyu Kim

MOP2-05 **Clinical Performance of International and Korean Genetic Testing Criteria for Hereditary Breast Cancer: A Large-Scale Cohort Analysis of 2,188 Individuals** *220*
Bom-Yi Lee, Hyun Jeong Lee, Jiyoung Kim, Dongwon Kim, Jiwon Jeong, Kyungah Yoh, Eunyoung Kang, Sung-Won Kim

MOP2-06 **ProMeta-BC: An Integrated Plasma ProteomeMetabolome Framework for Early Detection and Lymph Node Risk Assessment in Breast Cancer** *221*
Zhuohang Yu, Chao Ni, Yao Yao, Jinhua Ding, Yuxuan Zhu, Jun Zhou, Hengyu Li, Jun Shen, Jun Zhou, Xidong Gu

MOP2-07 **Who Really Needs Staging? Using a Simple Blood Test to Guide Care in Clinically Early Breast Cancer** *222*
Chi Wei Mok, Zar Chi Lin, Chin Mui Jaime Seah, Su-Ming Tan

Oral Presentation

MOP2-08 **MCODE KG-Enhanced LLM for Integrating Cancer Data and Improving Outcome Prediction** *223*
Eun-Jung Yang, Jiwoo Choi, Se-Ho Park, Sihyun Sung, Yelin Choi, Yunjung Yang

MOP3-01 **Pathologic Heterogeneity of Breast and Nodal Response to Neoadjuvant Pembrolizumab-based Chemoimmunotherapy in Early Triple-negative Breast Cancer** *224*
Jiwon Koh, Koung Jin Suh, Hye Yeon Park, Hyun Jung Kwon, Hyun-Jung Sung, Han Suk Ryu, Jung Ho Kim, Jaemoon Koh, Kyung-Hun Lee, Dae-Won Lee, Changhee Park, Jeongmin Seo, Heejung Chae, Woochan Hwang, Ye Yoon Suh, Chang Ho Ahn, Seock-Ah Im, Jee Hyun Kim, So Yeon Park

MOP3-02 **Validation of the ASTRRA-derived Composite Risk Model for Ovarian Function Suppression Benefit in Premenopausal HR-Positive Breast Cancer** *226*
Dahn Byun, Jihoon Lee, Ki Beom Kim, Ki Jo Kim, Seungah Lee, Do Youn Woen, Su Min Lee, Kawon Oh, Cho Eun Lee, Woong Ki Park, Se Kyung Lee, Byung Joo Chae, Jonghan Yu, Jeong Eon Lee, Seok Won Kim, Seok Jin Nam, Soong June Bae, Eun Young Kim, Jai Min Ryu

MOP3-03 **Limited Benefit of Adjuvant Ovarian Function Suppression in Premenopausal HR+/HER2+ Breast Cancer Patients Achieving Pathologic Complete Response After Neoadjuvant Therapy** *227*
Su Min Lee, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jonghan Yu, Byung Joo Chae, Jai Min Ryu, Woong Ki Park, Sae Byul Lee, Se Kyung Lee

MOP3-04 **Extended Endocrine Therapy for Premenopausal Invasive Lobular Carcinoma: Integrating a 10-year Exploratory Analysis of the ASTRRA Trial with Multicenter Retrospective Data** *228*
Young-Jin Lee, Jee Hyun Ahn, Dong Seung Shin, Eunhye Kang, Janghee Lee, Jong-Ho Cheun, Jun-Hee Lee, Soong June Bae, Han-Byoel Lee, Sung Gwe Ahn, Hee Jeong Kim, Jai Min Ryu

MOP3-05 **TroFuse-011: A Phase 3, Randomized, Open-Label Study of Sacituzumab Tirumotecan With or Without Pembrolizumab vs Treatment of Physician's Choice for Previously Untreated Locally Recurrent Unresectable** *230*
Yeon Hee Park, Peter Schmid, Javier Cortes, Toshimi Takano, Peter A. Fasching, Giampaolo Bianchini, Sandra Ximena Franco, Cynthia M. Villarreal-Garza, Olivier Tredan, Yongmei Yin, Romualdo Barroso-Sousa, Xuan Peng, Usha Malhotra, Karen L. Smith, Aditya Bardia, Hope S. Rugo

MOP3-06 **Pyrotinib Plus Albumin-Bound Paclitaxel as First-Line Treatment for HER2-Positive Metastatic Breast Cancer in Patients Previously Treated with Trastuzumab: Updated Phase II Results** *232*
Huihui Li, Baoxuan Zhang, Kaiyu Song, Dongdong Zhou, Fangchao Zheng, Ruimin Hua, Xin Du, Fei Pan, Jiale Zhang

MOP3-07 **Giredestrant vs Standard-of-care Endocrine Therapy as Adjuvant Treatment for Patients with Estrogen Receptor-positive, HER2-negative Early Breast Cancer: Results from the Global Phase III lidERA BC Trial** *233*
Kyung Hae Jung, Aditya L Bardia, Peter Schmid, Miguel Martin, Sara A. Hurvitz, Mothaffar F. Rimawi, Shigehira Saji, Gustavo Werutsky, Nadia Harbeck, Sherene Loi, Akiko Ogiya, Manuel Ruiz-Borrego, Ahmet Alacacoglu, Jiong Wu, Chenglin Ye, Mario Liste-Hermoso, Nimali P. Withana, Tanja Badovinac Crnjevic, Mona D. Shah, Pablo Perez-Moreno, Charles E. Geyer, Jr

MOP3-08 **Giredestrant, an Oral Selective Oestrogen Receptor Antagonist and Degrader, Plus Everolimus in ER-positive, HER2-negative Advanced Breast Cancer Treated with CDK4/6 Inhibitor: Phase III evERA BC Trial** *235*
Keun Seok Lee, Erica L Mayer, Sara M Tolaney, Miguel Martin, Gregory A Vidal, Luca Moscetti, Komal L Jhaveri, Adam Brufsky, William J Gradishar, Andreas Schneeweiss, Naoki Niikura, Anne Favret, Margarita Alfie, Sarah Khan, Merilin Feldman, Bann-Mo Day, Lisa H Lam, Walter C Darbonne, Pablo Perez-Moreno, Hope S Rugo

Oral Presentation

MOP3-09 **Long-term Outcomes of Hormone Receptor (HR)-positive/HER2-negative Invasive Lobular Carcinoma (ILC) Based on Multigene Assay (MGA): A Multicenter Real-world Retrospective Study** *237*
Ee Jin Kim, Seung Ho Baek, Ki Jo Kim, Soong June Bae, Joon Jeong, Tae Kyung Yoo, Sae Byul Lee, Il-Yong Chung, Hee Jeong Kim, Beom Seok Ko, Jong Won Lee, Byung Ho Son, Jai Min Ryu, Sung Gwe Ahn, Jisun Kim

MOP4-01 **Effect of Microporous Polysaccharide Haemospheres (Arista^{TM} AH) on Seroma-Related Outcomes Following Mastectomy: A Randomized Controlled Trial** *238*
Nandhini Srinivasan, Su Ann Lui, Mikael Hartman, Shaik Ahmad Buhari, Philip Iau, Celene Ng

MOP4-02 **Decoding Nutrition Linked Epigenetic States in Early-Stage Breast Cancer Using Deep Learning** *239*
Rohit Rajput, Parul Singh, Guru Prakash, Anjali Kanojia

MOP4-03 **Oncological Outcomes of Axillary Surgery in Patients with Residual Nodal Disease After Neoadjuvant Chemotherapy** *240*
Serene Si Ning Goh, Madhumitha Ravichandran, Vesa Gashi, Rebekah Law, Lucy Aitchison, Nanda Akriti, Evelyn Marshall, Mohamed Attia, Dalal Alaradi, Victoria Sinnett, Katherine Krupa, Marios Tasoulis, Peter Barry, Gerald Gui, Jennifer Rusby, Rachel O'connell

MOP4-04 **High TIL Levels Predict Excellent Axillary Nodal Pathologic Complete Response in Triple-Negative Breast Cancer Treated with Pembrolizumab-Based Neoadjuvant Chemotherapy** *242*
Yoonwon Kook, Ah Yoon Kim, Sung June Bae, Joon Jeong, Sung Gwe Ahn

MOP4-05 **Optimization of Sentinel Lymph Node Biopsy Using a Radiation-Free Dual-Tracer Protocol: A Large-Scale Analysis of 834 Patients Addressing Access Barriers in Asia** *243*
Hongjin Liu, Jingming Ye

MOP4-06 **Association of Blood Count-Derived Inflammatory Indices with Capsular Contracture After Post-Mastectomy Radiotherapy in Breast Cancer Patients Undergoing Direct-to-Implant Reconstruction** *244*
Jae Young Lee, Seung Yong Song, Dong Won Lee, Eun-Jung Yang, Jee Ye Kim, Jungwook Shin, Nalee Kim, Jin Sung Kim, Jee Suk Chang

MOP4-07 **Age-Stratified Cardiovascular Risk after Breast Cancer Treatment: A Korean Nationwide Cohort Study** *246*
Eunhye Kang, Hyeonggeun Cho, Changhoon Lee, Hong-Kyu Kim, Han-Byoel Lee, Hyeong-Gon Moon, Wonshik Han, Hoyoun Won

MOP4-08 **Clinicopathological Characteristics and Outcomes of Male Breast Cancer in Japan: A part of the OASIS male BC Project** *247*
Akihiko Shimomura, Ayumi Saito, Takehiko Sakai, Yoichi Naito, Yuichiro Kikawa, Koichiro Tsugawa, Mina Takahashi, Kumiko Kida, Ken-Ichi Watanabe, Tomomi Fujisawa, Yasuaki Sagara, Takashi Kuwayama, Yuko Takano, Mai Okazaki, Toru Hanamura, Shinsuke Sasada, Akiko Ebata, Kosuke Kawaguchi, Fumikata Hara, Takashi Hojo, Chihwan-David Cha, Hiroji Iwata, Tadahiko Shien

MOP4-09 **Clinical Presentations and Prognostication of HER2-Low and HER2-Zero Early Breast Cancer in Taiwan** *249*
Yen-Jen Chen, Chih-Yi Hsu, Chi-Cheng Huang, Ling-Ming Tseng

Poster Discussion

POD1-01 **Integrative Clinical and Transcriptomic Analysis Reveals Prognostic Impact of HER2-Low Expression in ER-Positive Early Breast Cancer** *251*
Seul Gi Kim, Gae Hoon Jo, Joohyuk Sohn, Hyung Seok Park, Seho Park, Seung-Il Kim, Seung Ki Kim, Seung Ah Lee, Isaac Kim, Kwanbum Lee, Mithun Ghosh, Sa Deok Hong, Seong Min Park, Hee-Jung Ahn, Taewoo Kang, Wonshik Han, Eun-Kyu Kim, Hyun Jo Youn, Ki-Tae Hwang, Korean Breast Cancer Society Kbcs, Sohyun Hwang, Yong Wha Moon

POD1-02 **Type I Interferon-β Mediates Radiation-Induced Abscopal Effects in TUBO Breast Cancer: Synergistic Enhancement with Anti-PD-L1 Immune Checkpoint Inhibition** *252*
Hee Yeon Kim, Jin Hee Park, Sae Gwang Park

POD2-01 **Tamoxifen with Versus Without Ovarian Function Suppression in Premenopausal HR-Positive/ HER2-Negative Breast Cancer: A Real-World Cohort Study** *253*
Dahn Byun, Jihoon Lee, Ki Beom Kim, Ki Jo Kim, Seungah Lee, Doyoun Woen, Su Min Lee, Kawon Oh, Cho Eun Lee, Woong Ki Park, Se Kyung Lee, Byung Joo Chae, Jonghan Yu, Jeong Eon Lee, Seok Won Kim, Seok Jin Nam, Jai Min Ryu

POD2-02 **Machine Learning Based Individualized Treatment Effect Analysis to Identify Premenopausal Breast Cancer Patients Who Benefit from Extended Endocrine Therapy** *254*
Dasom Noh, Dong Seung Shin, Janghee Lee, Eunhye Kang, Jong-Ho Cheun, Jun-Hee Lee, Soong June Bae, Jee Hyun Ahn, Young-Jin Lee, Han-Byoel Lee, Sung Gwe Ahn, Jai Min Ryu, Sunyoung Kwon

POD3-01 **Subtype-Specific Risk and Temporal Dynamics of Brain Metastases in Metastatic Breast Cancer** *255*
Kyoo Hyun Kim, Joohyuk Sohn, Min Hwan Kim, Jee Hung Kim, Jee Hyun Ahn, Jee Ye Kim, Hyung Seok Park, Seho Park, Seung-Il Kim, Joon Jeong, Gun Min Kim

POD3-02 **Impact of Trastuzumab Deruxtecan (T-DXd) and Brain Stereotactic Radiosurgery on Intracranial Control and Radionecrosis Risk in HER2-Positive or -Low Breast Cancer Brain Metastases** *257*
Seok-Joo Chun, Kyubo Kim, Won Ick Chang, Yong Bae Kim, Sun Ha Paek, Kyung-Hun Lee, Jin-Ho Song, Ji Hyun Hong, Jieun Lee, Won Il Jang, Tae Hyun Kim, Kyung Hwan Shin

POD4-01 **Identification of Continuous Positive Airway Pressure (CPAP)-unfavorable Geometry in Left-sided Breast Radiotherapy Using Free-breathing CT** *259*
Hae Jin Park, Joo-Hyun Chung

POD4-02 **Comparison of Physical and Functional Recovery and Quality of Life between Mini- and Extended Latissimus Dorsi Breast Reconstruction** *260*
Tae Hwan Park, Jong Ho Lee, Jeong Yeop Ryu, Joon Seok Lee, Mansoo Suh, Tae-Du Jung, Kang Young Choi, Ho Yun Jung, Jung Dug Yang

Poster Presentation

PO001 **Breast Cancer Mortality and Years of Life Lost in China: An Analysis of Trends from 2013 to 2021** *263*
Xiao Niu, Fulei Han, Yue Zhang, Shenghua Wang, Minjun Shen

PO002 **An Understudied Disease: Male Breast Cancer Characteristics and Survival from the National Cancer Center of Indonesia** *264*
Alif Rizky Soeratman, Nia Novianti Siregar, Maria Angelika Setiadi

PO003 **Clinicopathological Characteristics of Young Versus Older Breast Cancer Patients in Indonesia: A Large Real-World Cohort Highlighting Global Disparities** *266*
Aslesa Wangpathi Pagehgiri, I Wayan Sudarsa, I Gede Budhi Setiawan, Putu Anda Tusta Adiputra, Ni Gusti Ayu Agung Manik Yuniawaty Wetan, I Putu Ari Gunawan

PO004 **Disparities of Breast Cancer Mortality and the Associated Risk Factors Across Provinces in Indonesia: Temporospatial Trends from 1990 to 2023** *267*
Sumadi Lukman Anwar, Roby Cahyono, Jimmy Pranata Sumbayak

PO005 **Nationwide Analysis of Male Breast Cancer: Incidence Trends, Treatment Disparities, and Survival Compared With Female Patients** *268*
Chihwan David Cha, Jiyeong Kim, Shin Jeong Pak, Min Sung Chung

PO006 **Association Between BRCA1/2 Mutation Loci and Breast Cancer Recurrence in a Korean Multicenter Cohort** *269*
Eun-Shin Lee, Janghee Lee, Jai Min Ryu, Hong Kyu Kim, Hyung Seok Park, Byeongju Kang, Eun Young Kim, Young-Joon Kang, Sun Young Min, Moohyun Lee, Sae Byul Lee, Chihwan David Cha

PO007 **Incidence and Risk Factors for Stroke Among Breast Cancer Survivors: A Nationwide Population-Based Study in Korea** *270*
Harim Ahn, Hyeong Eun Jeong, Sang Yull Kang, Hyun Jo Youn

PO008 **Breast Cancer Risk According to Metabolic Dysfunction-Associated Steatotic Liver Disease in Korean Women: A Nationwide Population-Based Cohort Study** *271*
Jin Ah Lee, Hye Sun Lee, Soyoung Jeon, Dooreh Kim, Young Joo Lee, Soo Youn Bae, Woo Chan Park, Chang Ik Yoon

PO009 **Characteristics and Treatments of Adenoid Cystic Carcinoma: A Multi-center Retrospective Cohort Study** *272*
Kawon Oh, Ki Jo Kim, Cho Eun Lee, Seung Ah Lee, Do Youn Woen, Su Min Lee, Woong Ki Park, Jai Min Ryu, Se Kyung Lee, Byung Joo Chae, Jonghan Yu, Seok Won Kim, Seok Jin Nam, Jeong Eon Lee, Dahn Byun, Ki Bum Kim, Chi Hoon Lee

PO010 **Long-Term Locoregional Recurrence in Young Asian Women with Breast Cancer in the Modern Treatment Era: a Retrospective Cohort Study** *274*
Kyung-Hwak Yoon, Seungmin Lee, Yena Yoon, Jeong Hun Oh, Eun-Kyu Kim, Hee-Chul Shin

PO011 **Two Decades of De-escalation and Remaining Overtreatment: Axillary Surgery Trends in 191,000 Korean Breast Cancer Patients** *275*
Young-Joon Kang, Dabin Kim, Zisun Kim

PO012 **Survival Changes in Breast Cancer Subtypes According to Immunohistochemical Markers: A Comparison of Two Peruvian Cohorts (2000–2002 and 2010–2012)** *276*
Leny Bravo, Zaida Morante, Yomali Ferreyra, Natalia Valdiviezo, Carlos Castaneda, Tatiana Vidaurre, Guillermo Valenica, Patricia Rioja, Hugo Fuentes, Silvia Neciosup, Henry Gomez

Poster Presentation

PO013 **Hidden in Plain Sight: A Retrospective and Literature Review of High-Risk Lesions in Gynaecomastia and Management** *277*
Fang Yi Lim, Cathy Po Ching Ng

PO014 **Cancer risk management in HBOC and Lynch syndrome: Findings from the Swiss, Korean, and Israeli CASCADE cohorts** *278*
Maria C. Katapodi, Bardha Citaku Qerimi, Jeanne Lemant, Laura Werlen, Sue Kim, Ronit Tsemach, Sivia Barnoy, Efrat Dagan, Souria Aissaoui, Fulvia Brugnoletti, Nicole Buerki, Pierre O. Chappuis, Rosella Graffeo-Galbiati, Joon Jeong, So-Youn Jung, Ji Hyun Kim, Jisun Kim, Sung Won Kim, Jeong Eon Lee, Myong Cheo Lim, Christian Monnerat, Eun Ji Nam, Hyung Seok Park, Ji Soo Park, Manuela Rabaglio, Jai Min Ryu, Ursina Zuerrer-Haerdi, Elizabeth Half, Hagit Baris-Feldman, Karl Heinimann

PO015 **A Case Series of Male Breast Cancer in Thammasat University Hospital** *280*
Sasithorn Sujarittanakarn, Wanwisa Himakhun, Wilairat Thoviriyavej, Nantawan Ponsuwan

PO016 **A Rare Metastatic Journey from Thyroid to Breast 18 Years Post-thyroidectomy: A Case Report** *282*
Juliana Jee Binti Jeffri Jee, Yang Yang Huang, David Leong, Thomas Digan

PO017 **Metabolic Enzyme PHGDH Acts as an RNA-binding Protein to Directly Promotes Oncogenic Translation** *283*
Qingqing Zhang

PO018 **Exploring the Role of S100A11 as an Oncogene in Triple-Negative Breast Cancer Progression and Metastasis** *284*
Tao Zou, Szekeong Tey, Ava Kwong, Ho-Hung Cheung

PO019 **Deciphering the Role of Nidogen-1 in Breast Cancer Tumorigenesis and Metastasis** *285*
Wei Yi Ooi, Ava Kwong, Sze Keong Tey

PO020 **Long-term European Validation of a 179-gene NGS-based Gene Expression Risk Score in Early Breast Cancer** *286*
Orsolya Buzas-Bereczki, Marcell Attila Szasz, Woosung Chung, Magdolna Dank, Magdolna Herold, Zoltan Herold, Istvan Kenessey, Janina Kulka, Bernadett Csanyi, Marton Enyedi, Katalin Priskin, Hee-Chul Shin, Han-Byoel Lee, Lajos Haracska

PO021 **Tumour-associated Macrophage Profiling Predicts Recurrence in Post-neoadjuvant Residual Breast Cancer Disease: A Biomarker for Treatment Intensification** *287*
Lohita Krishna Kanyadhara, Aruna Korlimarla, Hari P S, Chandana Sri S, Sandhya Appachu, Durgadevi Veeraiyyan, Sulakshana Srihari, Srinath B S

PO022 **Mutation of BRCA1/2 Gene in Premenopausal Triple-negative Breast Cancer Patients** *289*
Daan Khambri, Wirsma Arif Harahap, Muhammad Zaki Abdul Hafiz, Sonar Soni Panigoro

PO023 **High Minichromosome Maintenance 2 (MCM2) and Low E-Cadherin Expression as Risk Factors for Distant Metastasis in Breast Cancer Patients** *290*
Putu Anda Tusta Adiputra, Pande Made Krisna Ekassiana, Ida Bagus Made Suryawisesa, I Wayan Juli Sumadi, I Wayan Sudarsa

PO024 **A Transcriptional Axis Defines Lobular-like Breast Cancer Biology Beyond CDH1 Mutation** *291*
Masanori Oshi, Sasagu Kurozumi, Mayu Hizume, Akimitsu Yamada, Kazutaka Narui, Itaru Endo, Takashi Ishikawa, Kazuaki Takabe

PO025 **Longitudinal Trajectories of Menopausal Symptoms in Women Receiving Endocrine Therapy for Breast Cancer Compared With Natural Menopause** *292*
Dami An, Se Kyung Lee, Hyerin Choi, Danbee Kang, Yoonyoung Jang, Seungho Ryu, Jeong Eon Lee, Seok Jin Nam, Seok Won Kim, Byung Joo Chae, Jai Min Ryu, Yoosoo Chang, Jonghan Yu

Poster Presentation

PO026 **Functional Role of CD29 in Modulating Intracellular Signaling Cascades of Breast Cancer Stem Cells: Insights from TNBC Organoid and MDA-MB-468 Models** *294*
Hyeeun Jeon, Ju Hee Kim, Han-Byoel Lee, Wonshik Han

PO027 **PAK4-Driven Chromosomal Instability as a Subtype-Specific Mediator of Breast Cancer Recurrence: A Multi-Omic Clinical Investigation** *295*
Hyoung Won Koh, Eun-Kyu Kim, Hee-Chul Shin

PO028 **Simvastatin Induces a Hot Tumor Phenotype and Synergizes With Immune Checkpoint Blockade in TNBC** *296*
Sangeun Lee, Ju Hee Kim, Han-Byoel Lee, Wonshik Han

PO029 **Neutrophil Extracellular Traps Drive ICAM-1-Dependent CTC-Cluster Formation and Invasion in Triple-Negative Breast Cancer** *297*
Seonyoung Lee, Ju Hee Kim, Han-Byoel Lee, Wonshik Han

PO030 **Exploring the Association between GPX4 A-to-I RNA Editing and Ferroptosis in Triple-Negative Breast Cancer** *298*
Seungyeon Ryu, Sangeun Lee, Yejoo Lee, Hyeeun Jeon, Seonyoung Lee, Minkyoung Choi, Dayeong Choi, Sehee Jung, Juhee Kim, Han-Byoel Lee, Wonshik Han

PO031 **Triple-negative Breast Cancer Is Independently Associated With Lower Femoral Neck T-score at the Time of Bone Metastasis** *299*
Young-Jin Suh, Jean Schneider, Hyunjung Kang, Yeong Yi An, Hyun Joo Choi

PO032 **The Missense Mutation in BRCA2 Suppressed Its Degradation and Caused an Increase in ATP Production and Cell Proliferation** *300*
Enkhbat Gerelmaa, Hiroyuke Uetake, Akira Nakanishi

PO033 **Cell Tumor in a BI-RADS 5 Breast Lesion: A Diagnostic Pitfall in Surgical Decision-making** *301*
Cenk Yazkan, Funda Dinc, Leyla Tekin, Onder Ozcan

PO034 **Glycosylation Determinants of Clinical Heterogeneity and Aggressive Outcomes in Nottingham Histologic Grade II Breast Cancer** *302*
Chiao Lo, Ying-Yu Liao, Min-Chuan Huang

PO035 **MicroRNA Expression Signatures Associated with ER and HER2 Status in Breast Cancer** *303*
Chieh-Ning Hsi, Chi-Cheng Huang, Ling-Ming Tseng

PO036 **Diverse anti-cancer functions of STING pathway activation in ER-positive breast cancer** *304*
Chun-Yu Liu, Ji-Lin Chen, Chun-Teng Huang, Pei-Yi Chu, Mei-Fang Tseng, Yu-Hsuan Lee, Wan-Lun Wang, Ling-Ming Tseng

PO037 **Single-cell Analysis of Triple-negative Breast Cancer Reveals Subtype-specific Therapeutic Vulnerabilities for ADC and Immune Checkpoint Inhibitors** *305*
Jiun-I Lai, Chun-Yu Liu, Chi-Cheng Huang, Ta-Chung Chao, Ling-Ming Tseng

PO038 **Elevated Circulating Humanin Correlates with Poor Prognostic Features in Invasive Breast Carcinoma** *307*
Li-Kun Ko, Li-Ju Huang, Chia-Ning Yang

Poster Presentation

PO039 **Fewer Breast Cancers During Post-treatment Surveillance Among Patients Initially Staged Using Contrast-imaging** *308*
Wilson Yang, Allison Rose, Julia Matheson, Kenneth Elder, Caroline Maccallum, Carolyn Nickson, Gregory Bruce Mann

PO040 **Artificial Intelligence in Mammography for Breast Cancer Detection and Diagnosis: A Systematic Review** *309*
Michael Co, Ava Kwong, Billy Cheung

PO041 **Reducing Ambiguity in BI-RADS 3 and 4 Microcalcifications Using Bayesian Deep Learning and Uncertainty-Guided Classification** *310*
Hye Mi Ko, Sang-Ha Oh, Hyeon Dong Choi, Dongheon Lee

PO042 **Real-world Diagnostic Characteristics of Breast Cancer in a Regional Women's Hospital in Korea: A Comparison Between Screening-detected and Symptomatic Presentations** *311*
Jiwon Park

PO043 **Intraductal Papilloma Diagnosed by Core Needle Biopsy with Consideration of Non-Mass Lesions: A Single-Institutional Quantitative Analysis Following Vaccum Assisted Breast Excision** *312*
Junho Cho, Junghoon Cho, Seongmun Park, Minseo Kang, Hyun-Soo Shin, Eun-A Min, Soo-In Lee, Minhyuk Lee

PO0440 **Development and Training Status of Breast Imaging in Mongolia** *313*
Tugsjargal Purevsukh, Asai Ramish, Ankhzaya Batmunkh, Tuvshinjargal Dashjamts

PO045 **Applying Artificial Intelligence For The Combined Diagnosis And Treatment Of High-Risk B3 Breast Lesions** *314*
Ern Yu Tan, Niketa Chotai, Bee Kiang Chong

PO046 **CT-US Fusion for Pre-operative Perforator Mapping Before DIEP Flap Breast Reconstruction** *315*
Tze Gek Ho, Eelin Tan, Nadia Hui-Shan Sim, Alison Mei-Fern Quah, Geraldine Hwee-Ping Lee, Allen Wei-Jiat Wong, Yijia Wong, Gervais Wansaicheong

PO047 **BreastLAP: An Automated 3D Deep Learning Framework for Predicting Axillary Lymph Node Metastasis on Routine Chest CT in Breast Cancer Patients** *316*
Chia Hua Liu, Chih Yean Lum, Chieh Ting Lin, Nai Wen Shih, Jen Jee Chen

PO048 **Re-excision Rates for Invasive Lobular Carcinoma: Impact of Pre-operative Breast MRI on Surgical Outcomes** *317*
Theadora Forster-Anderson, Shanta Velaiutham, Rita Poon

PO049 **CTC Dynamics Pre and Post Chemotherapy in Advanced Breast Cancer** *318*
Annisa Syafitri, Gunawan Wibisana, Ninik Sukartini, Bob Andinata, Herqutanto Herqutanto

PO050 **Demographic Determinants of Timeliness in the Breast Cancer Diagnostic Interval in Indonesia** *319*
Widya Surya Avanti, Sumadi Lukman Anwar, Lina Choridah

PO051 **Deep Learning-based Analysis of Breast Ultrasound Images to Complement US-TILs Scoring and Stratification of Neoadjuvant Chemotherapy Response** *320*
Akari Murakami, Rin Yamaguchi, Yuri Kimura, Kayo Fukui, Akiko Kanou, Midori Noma, Sadako Akashi-Tanaka, Koji Arihiro, Naoko Iwamoto, Yusuke Ohta, Toshitaka Okuno, Shinichiro Kashiwagi, Yoshiaki Kamei, Yasuko Tanada, Shogo Nakano, Aya Nagata, Yukari Mochitomi, Arisa Yamakawa, Mina Yamaguchi, Tsukada Hiroko, Koji Takada, Yasuaki Sagara, Takashi Nakamura, Norio Masumoto, Hiroaki Shima, Akiko Emi

Poster Presentation

PO052 **Evaluation of a Serum Small RNABased Diagnostic Model for Breast Cancer** *322*
Kana Kawanishi, Ayane Yamaguchi, Masahiro Kawashima, Kei Ishii, Yukiko Fukui, Hanako Shimizu, Marina Kiso, Wakako Tsuji, Sachiko Takahara, Hiroyasu Yamashiro, Masahiro Takada, Yoshio Moriguchi, Shigeru Tsuyuki, Mariko Nishie, Hirofumi Suwa, Kazuhiko Yamagami, Norikazu Masuda

PO053 **Introduction to a Deep Learning System for Breast Ultrasound Diagnosis for Clinical Application** *323*
Rika Masuda, Aiko Nagayama, Takamichi Yokoe, Tomoko Seki, Maiko Takahashi, Tetsu Hayashida

PO054 **Photon Counting Breast CT Versus Breast MRI in Preoperative Evaluation of Breast Cancer: A Multi-center Prospective Pilot Study** *324*
Eun Young Ko, Myong Kyoung Kim, Hyejung Kim, Jeongmin Lee, Ji Soo Choi, Eun Sook Ko, Boo Kyung Han, Bong Joo Kang, Inyoung Youn

PO055 **Association of Breast Density with Breast Cancer Risk and Stage at Diagnosis: A Korean Nationwide Cohort Study** *325*
Hongki Gwak

PO056 **Clinical Significance of Mastocheck Biomarker in Breast Cancer Patients: A Retrospective Cohort Study** *326*
Hyukjai Shin

PO057 **Effect of a Real-time Artificial Intelligence-assisted Ultrasound System on BI-RADS C4 Breast Lesions Based on Breast Density** *327*
Joonsuk Moon, Won Hwa Kim, Jaeil Kim, Byeongju Kang, Ho Yong Park, Hye Jung Kim, Soo Jung Lee, In Hee Lee, Jeeyeon Lee

PO058 **Multiplex Droplet Digital PCR-Based Detection of ESR1 and PIK3CA Mutations in HR+/HER2- Breast Cancer** *328*
Seungjoo Lee, Hyunjin Yun, Junho Ko, Sungryong Hong, Miran Kang

PO059 **Blindsided: A Rare Case of Symptomatic Choroidal Metastasis In Breast Cancer** *329*
Dineshwary Periasammy, Vivian C, Juliana Al, Hai Di

PO060 **Correlation of Cytopathology with Histopathology in Breast Neoplasms: A Current Study from Hospital Al-Sultan Abdullah UiTM** *330*
Muhammad Nor Hidayat Mohd Norawi, Muhamad Halil Fikri Laililnizan, Muhamad Idham Mohamed, Nurfareha Mohd Hatta, Norizal Mohd Noor

PO061 **Diagnostic Accuracy and Histopathological Concordance of BIRADS Categories 4 and 5 in Patients Evaluated at Capitol Medical Center - A Retrospective Study** *331*
Colleen Hofer, Dale Avellanosa, Luinio Tongson, Maria Ellaine Briones

PO062 **Idiopathic Granulomatous Mastitis in a Tuberculosis-Endemic Country – A Case Series** *332*
Raissa Maxine Que, Ray Malilay, Joyce Hazel Chua, Mariniell Co, Kathleen Adryon Tan

PO063 **Is Ultrasound Strain Elastographic Assessment Reliable in Mucinous Breast Carcinoma? A Retrospective Single-Institution Experience** *333*
Si Ying Tan, Benjamin Livingston Farah, Engracia Loh, Lester Chee Hao Leong

PO064 **Early Outcomes of a Breast Cancer Screening Programme at a Regional Tertiary Hospital in Singapore** *334*
Victoria Elena Chan, Cathy Po Ching Ng, Mary Moon-Sun Liang, Shane Sim Wen Hui, Serene Ee Ling Tang

PO065 **Evaluating the Correlation Between Bone Scintigraphy and PET/CT in the Diagnosis of Bone Metastasis in Breast Cancer** *335*
An Huynh Khanh Nguyen, Nam Khac Vo, Cuong Quang Nguyen, Trang Thi Thuy Le, Phuoc Ba Le

Poster Presentation

PO066 **Application of the Cribriform Fascia in Axillary Sentinel Lymph Node Biopsy** 336
Yuqi Liu, Juan Zhang, Yongping Liang, Haifeng Cai

PO0675 **Single-Port Endoscopic Nipple-Sparing Mastectomy Using the HandX™ Articulating System: Feasibility and Early Outcomes** 337
Vasileios Kalles, Apostolos Mitrousias, Apostolos Vlachogiorgos, Sandra Maria Tsoti, Nikolaos Tasis, Olga Moutzouri, Antonio Toesca, Ioannis Papapanagiotou

PO068 **Is Chest Wall Resection in Locally Advanced or Recurrent Breast Cancer Worthwhile? A Contemporary Case Series in Hong Kong** 338
Alyson Cheung, Yee-Kei Violet Tsoi

PO069 **From Phantom to Practice: Multimarker Breast and Axillary Localisation for Breast Conserving Surgery and Targeted Axillary Dissection** 339
Chun Ting Wang, Elaine Wing Shan Fok, Novena Lin Sing Cheng, Carol Sheung Yan Lo, Joyce Yee Hing Hui

PO070 **Age Is Not the Risk, Obesity Is: Reframing Surgical Safety in Breast Cancer** 340
Dacita Suen, Ava Kwong

PO071 **Diagnostic Accuracy of Tumor Bed Biopsy for Predicting Pathological Complete Response in Breast Cancer Patients Achieving Clinical Complete Response After Neoadjuvant Chemotherapy: A Meta-Analysis** 341
Sanjay Kumar Yadav, Garvit Garg, Dhananjaya Sharma

PO072 **Does Tumor Marking before Neoadjuvant Chemotherapy Help Achieve Better Outcomes in Patients Undergoing Breast Conservation Surgery? A Randomized Controlled Trial** 342
Sanjay Kumar Yadav, Dhananjaya Sharma, Shyam Rawat, Rajesh Jain, Saket Shekhar

PO073 **Autologous Flaps Covering Large Defects of Mastectomy On Breast Cancer: A Case Series** 343
Salman Ardi Syamsu, Rachmad Meyliandry Putra, Muhammad Faruk

PO074 **Thoracoabdominal Flap for Malignant Phyllodes Chest Wall Defect** 344
Shabrina Rizky Putri

PO075 **Reducing Seroma Formation after Mastectomy Using Modified Flap Fixation with Suture by Closure of the Dead Space: A Single-Center Study** 345
Shogo Nakano, Kimihito Fujii, Junko Kousaka, Takahito Ando, Manami Goto, Mirai Ido, Hirona Banno, Masayuki Saito, Yukako Mouri, Kanna Ozaki

PO076 **Intercostobrachial Nerve (ICBN) Preservation Versus Sacrifice in Axillary Dissection Randomized Controlled Trial** 346
Ghada Odeh

PO077 **Feasibility of Papilla Resection in Patients with Suspected Nipple Invasion: A Strategy to Preserve the Nipple-Areolar Complex** 347
Byeongju Kang, Joon Suk Moon, Ho Yong Park, Jeeyeon Lee

PO078 **A Comparative Analysis of Oncologic Safety Between Conventional Total Mastectomy (CTM) and Skin/Nipple-Sparing Mastectomy (SSM/NSM) Techniques** 348
Da Young Yu, Hye Yoon Lee, Dohoe Ku, Youngwoo Chang, Gilsoo Son

PO079 **Comparison of Early Clinical Outcomes between Robotic and Endoscopic Breast-Conserving Surgery** 349
Dohoe Ku, Hye Yoon Lee, Da Young Yu, Young Woo Chang, Gil Soo Son

Poster Presentation

PO080 **Radiation-Modulated Tissue Remodeling According to Acellular Dermal Matrix Form: Comparative Evaluation of Sponge and Powder Configurations in a Rat Defect Model** *350*
Hunhwi Cho, Da Eun Seo, Nomin Erdene Tumursukh, Joo Heung Kim

PO081 **Revisiting the Safety of Close Surgical Margins in Ductal Carcinoma in Situ of the Breast: A Real-world Analysis of Recurrence in the Modern Era** *352*
Jai Hyun Chung, Ye Ryung Kim, Mi Young Jang, Ji Hye Kim, Yong Yeup Kim, Sang Uk Woo

PO082 **Comparison of Oncologic and Surgical Outcomes Between Robotic Mastectomy and Conventional Mastectomy Followed by Reconstruction After Neoadjuvant Chemotherapy in Breast Cancer Patients** *354*
Joongkwon Lee, Young-Jin Lee, Tae-Kyung Yoo, Jisun Kim, Il-Yong Chung, Hee Jeong Kim, Beom Seok Ko, Jong Won Lee, Byung Ho Son, Sae Byul Lee

PO083 **Long-Term Oncologic Outcomes After Breast-Conserving Surgery with Radiotherapy Compared with Total Mastectomy in Early Breast Cancer** *355*
Kibeom Kim, Ki Jo Kim, Seung Ah Lee, Do Youn Woen, Su Min Lee, Kawon Oh, Cho Eun Lee, Jihoon Lee, Dahn Byun, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jong Han Yu, Byung Joo Chae, Se Kyung Lee, Woong Ki Park, Jai Min Ryu

PO084 **Comparison of Nipple-sparing Mastectomy with Skin-sparing Mastectomy in Breast Cancer Patients Underwent Immediate Breast Reconstruction: A Single Center Registry** *356*
Seho Park, Si Yeon Lee, Jee Hyun Ahn, Eun-Jung Yang

PO085 **Role of an Indocyanine Green-hyaluronic Acid Mixture (LuminoMark™) in Localization of Robot-assisted Breast-conserving Surgery: Initial Experiences** *357*
Sehyun Paek, Hee Jun Choi, Jun-Hee Lee, Jai Min Ryu, Ku Sang Kim

PO086 **Outcomes of Breast Cancer Patients with Residual Sentinel Lymph Node Metastasis after Neoadjuvant Chemotherapy: Sentinel Lymph Node Biopsy Alone versus Axillary Lymph Node Dissection** *358*
Seung Hwan Lim, Woo Chul Noh, Young Bum Yoo, Kyoung Sik Park, Sang Eun Nam, Jong Hyun Kim

PO087 **Breast-Conserving Surgery with Radiotherapy for Patients with Prior Augmentation: A Multidisciplinary Study on Capsular Contracture** *359*
Woosung Jang, Myeong Jae Kang, Mi Young Kim, Jongmoo Park, Byeongju Kang, Jeeyeon Lee, Ho Yong Park, Jeong Yeop Ryu, Joon Seok Lee, Mansoo Suh, Kang Young Choi, Ho Yun Chung, Jung Dug Yang

PO088 **Comparison of the Rates of Fat Necrosis and Surgical Outcome after Oncoplastic Breast-Conserving Surgery with Acellular Dermal Matrix: Single-center Study** *361*
Young Jin Choi

PO089 **Transaxillary Retromammary Robotic Breast Conserving Surgery for Operable Breast Cancer - Three Pilot Cases -** *362*
Young-Jin Suh, Jean Schneider, Hyunjung Kang, Yeong Yi An, Hyun Joo Choi

PO090 **Learning Curve Comparison Between Frontier and Follower Surgeons in Robot-Assisted Nipple-Sparing Mastectomy: A Multicenter Study** *363*
Young-Joon Kang, Joo Heung Kim, Ku Sang Kim, Nak-Hoon Son, Sae Byul Lee, Jung Eun Choi, Moo Hyun Lee, Jeeyeon Lee, Young Woo Chang, Se Hyun Paek, Sun Young Min, Ji Young You, Chihwan Cha, Yong Yeup Kim, Hee Jun Choi, Eun-Shin Lee, Jai Min Ryu, Hyung Seok Park

PO091 **Current Status and Practice Patterns of Robot-Endoscopic Minimal Access Breast Surgery in South Korea: A National Survey (KoREa-BSG 19)** *365*
Young-Joon Kang, Hye Yoon Lee, Jeeyeon Lee

Poster Presentation

PO092 **Three-Dimensional (3D) Versus Two-Dimensional (2D) Endoscopic-Assisted Nipple Sparing Mastectomy: Comparison of Clinical, Oncologic and Patient-Reported Outcome Measurements** *367*
Cher Hui Koh, Jun Su, Dineshwary Periasammy, Nurul Hidayah Abdul Rauf, Yi-Yuan Lee, Hung-Wen Lai

PO093 **Single Axillary Incision for Minimal Access Nipple-sparing Mastectomy: Axillary Crease or Lateral Chest Incision?** *368*
Cher Hui Koh, Dinesh Periasammy, Yi-Yuan Lee, Hung-Wen Lai

PO094 **Single Port (SP) Three-Dimensional (3D) Endoscopic Assisted Partial Mastectomy (E-PM) for Breast Lesions With Single Aesthetic Scar: Technique, Clinical Results, Learning Curve and Patient Reported Outcomes** *369*
Dineshwary Periasammy, Hung-Wen Lai, Cher Hui Koh, Yi-Yuan Lee, Shih-Lung Lin

PO095 **Postoperative Analgesia Efficacy of Pectoral Nerve Block in Mastectomy in a Tertiary Hospital, Malaysia** *370*
Dineshwary Periasammy, Juliana Al, Hai Di

PO096 **Scarless Totally Implantable Venous Access Port (TIVAP) Implantation: Surgical Technique, Results, Learning Curve and Patient-reported Outcome Among 246 Breast Cancer Patients** *371*
Periasammy Dineshwary, Hung-Wen Lai, Cher Hui Koh, Yi-Yuan Lee, Shih-Lung Lin

PO097 **Overcoming Upper-Inner Quadrant Challenges: Matrix Rotational Flap Reconstruction in Breast Conservation Surgery** *372*
Yi Ping Lim, Ven Qing Shim, Kah Seng Khoo, Joanne Moisun, Yoke Kiet Doon, Mee Hoong See

PO098 **Early Outcomes of a Modified LICAP Flap – A Single-Centre Experience** *373*
Yi Ping Lim, Wing Yuen Chin, Kah Seng Khoo, Joanne Mosiun, Yoke Kiet Doon, Mee Hoong See

PO099 **Delayed Cutaneous Metastasis Occurrence After Skin-Sparing Radical Mastectomy: A Case Report** *374*
Erdenetogtokh Erdenetuya, Oyudari Sodnomgeleg, Khiabar Tulyeubai, Orgilbold Enkhbat, Munkhzul Munkhnyam, Davaadash Batsaikhan, Bilguunzaya Batmunkh, Gerelmaa Enkhbat, Shirnen Odnasan, Odbaatar Myagmar, Khurelbaatar Sainbaatar, Bold Altangerel

PO100 **A Rare Case of Gestational Gigantomastia and Outcomes Following Bilateral Mastectomy and Prosthetic Reconstruction** *375*
Maria Cecilia Pagdanganan, Jubi Lyn Tan, Mary Joy Bernardo, Karen Zaguirre

PO101 **Incidence and Surgical Outcomes of Contralateral Prophylactic Mastectomy in a Single Private Tertiary Hospital in the Philippines** *376*
Maria Kaiserin Santos-Lipana, Amanda May Ong Vano

PO102 **Factors Affecting Recurrence Among Diagnosed Cases of Phyllodes Tumor: A Single Center Retrospective Cohort Study** *377*
Rachelle Joanne Tugano, Angeli Andrea Cocos-Alcantara

PO103 **Locoregional Treatment Versus Systemic Therapy Alone in De Novo Metastatic Breast Cancer: An Updated Meta-analysis** *378*
Vannesza Hendricke Chua, Patricia Ong, Leona Marie Francesca Rebosa, Bryce Matthew Tan De Guzman, Jayson Co, Joyce Hazel Chua

PO104 **Comparison of Low Thermal Dissection Cautery and Conventional Electrocautery in Nipple-Areola Sparing Mastectomy with Immediate Silicone Implant-Based Reconstruction** *379*
Mustafa Tukenmez, Mustafa Caner Aydin, Baran Mollavelioglu, Erol Kozanoglu, Selman Emiroglu, Neslihan Cabioglu, Mahmut Muslumanoglu

Poster Presentation

PO105 **Management of a Massive Metastatic Malignant Phyllodes Tumour** *381*
Chee Meng Lee, Hong Yun Xu, Hui Wen Chua

PO106 **PRoMISing II: Prospective Real-World Evidence From the Largest Single-Institution Minimally Invasive Breast Surgery Experience in Southeast Asia** *382*
Pei Yin Dayna Sim, Chi Wei Mok, Zar Chi Lin, Yert Li Melissa Seet

PO107 **Endoscopic Nipple-sparing Mastectomy via Single Incision at the Upper Outer Quadrant of the Breast for a Recurrent Breast Cancer** *383*
Julie Liana Hamzah, Hui Chai Fong, Yirong Sim

PO108 **"Going Flat" in Nipple-sparing Mastectomy: An Analysis of Patient-reported Outcome Measurements of Preliminary 57 Procedures** *384*
Jun Su, Yi-Yuan Lee, Wen-Bin Kao, Nurul Hidayah Abdul Rauf, Bing-Fang Hwang, Chiu-Ying Chen, Mee-Hoong See, Hung-Wen Lai

PO109 **MCW- LiCAP Study: Outcomes of Modified Chest Wall Lateral Intercostal Artery Perforator Flap Reconstruction in Contemporary Oncoplastic Breast Surgery** *385*
Lin Zar Chi, Chi Wei Mok, Su-Ming Tan

PO110 **Economic Benefits of Same-Day Discharge for Breast Cancer Surgery, Cutting Costs, Not Corners** *386*
Lin Zar Chi, Koh Tiang Guan Bernard, Su-Ming Tan, Chi Wei Mok, Yun Le Linn

PO111 **Breast Conserving Surgery Margin Re-excision Rates and Operative Techniques: New Centre Experience** *387*
Rui Ying Goh, Serene Ee Ling Tang

PO112 **From Wire to Wireless: Initial Experience with Magseed® versus Hookwire Localisation for Breast Excision in a Newly Established Peripheral Breast Unit** *388*
Tzer Sien Tan, Wen Hui Shane Sim, Po Ching Cathy Ng, Ee Ling Serene Tang

PO113 **Safety and Feasibility of Concurrent Surgical Resection for Synchronous Primary Breast and Lung Cancer: A Single-Center Experience of 13 Cases** *389*
Chieh-Ni Kao

PO114 **Robotic-Assisted Nipple-sparing Mastectomy and Immediate DIEP Flap Reconstruction: A Case Series Report** *390*
Shou-Fan Lee, Dun-Hao Chang, Chih-Ho Hsu

PO115 **Botulinum Toxin for Improving Pain and Asymmetry in Breast Cancer Reconstruction and Augmentation: 3 Cases Report** *391*
Tsung Yu Liu

PO116 **Feasibility and Oncological Outcomes of Sentinel Lymph Node Biopsy in Early-stage Breast Cancer Using Blue Dye Alone in Limited-resource Country Compared to Dual Tracers and the Landmark Studies** *392*
Chayanee Sae-Lim

PO117 **A Case of Metastatic Breast Cancer with Abdominal Wall Metastasis** *393*
Panteera Loftus, Sasithorn Sujarittanakarn

PO118 **Patient-Reported Outcomes of Minimally Invasive vs. Conventional Nipple-Sparing Mastectomy with Direct-to-Implant Reconstruction: A Comparative Pilot Study** *394*
Voratape Kijtavee, Rapeephan Nanan, Korawan Chandrachamnong

Poster Presentation

PO119 **Shifting the Surgical Paradigm: A Retrospective Cohort Study of Clinicopathological and Radiological Correlates of Residual Microcalcifications Post Neo-Adjuvant Chemotherapy** *395*
Ravi Naik, Denise Vorburger, Tanja Gagliardi, Rachel O'connell, Marios Konstantinos Tasoulis

PO120 **Exploratory Study on Upper Limb Lymphatic Drainage and Axillary Anatomical Substructures in Breast Cancer Patients** *396*
Bei Zhang, Qingwei Wu, Guoshuai Ma, Xiaorong Sun, Yongsheng Wang, Binbin Cong

PO121 **Minimally Invasive and Precise: Robotic-Assisted Axillary Lymph Node Dissection in Breast Cancer Management** *397*
Haiyan Li, Qiwen Liu, Zongyan Li, Yongxin Wu

PO122 **Applicability of SENOMAC Trial in Hong Kong Breast Cancer Patients** *398*
Serena Yu Yan Wong

PO123 **Lymph Node Positivity Ratio as a Prognostic Indicator in Post-Neoadjuvant Chemotherapy for Locally Advanced Breast Carcinoma: A Single institution study** *399*
Anuradha S, Srinivas C, Prakash B V, Arun Kumar, Pavan Sugoor T

PO124 **Utility of Frozen Section in Axillary Conservation of Breast Cancer Patients Post-Neoadjuvant Chemotherapy** *400*
Ayushi Sahay, Sabaris Pushpanathan, Mansi Atal, Pallavi Daphale, Vaibhav Vanmali, Trupti Pai, Poonam Panjwani, Asawari Patil, Tanuja Shet, Shalaka Joshi

PO125 **Ligaclip-assisted Targeted Axillary TAD in Node-positive Breast Cancer Patients: An Innovative, Cost-effective, and Promising Approach** *401*
Lohita Krishna Kanyadhara, Sasimouli V V H P K, Bharat K S, Sunil Kalmath, Jismy Mathew, Sulakshana M S, Srinath B S

PO126 **ICG Fluorescence-Guided Sentinel Lymph Node Biopsy for cT1N0 Breast Cancer: A Retrospective Cohort Study of Sentinel Node Negativity, Postoperative Treatment, and Axillary Recurrence** *402*
Tomoe Taji, Fumika Kanamori, Chiaki Matsui, Aiko Oobayashi, Satsuki Sakaguchi, Kayoko Endo, Hirotsugu Yanai, Yuichiro Kikawa, Masahiro Takada

PO127 **Lymph Node Metastasis in ER+/HER2- Breast Cancer Who Are cN0 on Both Axillary Ultrasound and MRI** *404*
Janghee Lee, Yeonjoo Kwon, Youri Park, Young Ah Lim, Joo Hyun Woo, Woosung Lim, Byung-In Moon

PO128 **Low Axillary Nodal Metastasis Rates in Selected HER2-Positive and Triple-Negative Breast Cancer Patients: Toward De-escalation of Sentinel Lymph Node Biopsy** *405*
Soong June Bae, Jong-Ho Cheun, Eun Young Kim, Dooreh Kim, Sung Gwe Ahn, Wonshik Han, Chang Ik Yoon, Joon Jeong

PO129 **Pathologic Predictors of Axillary Metastasis in cT1N0 Breast Cancer: Identifying Candidates for Partial Breast Irradiation without Sentinel Lymph Node Biopsy** *406*
Won Kyung Cho, Hae Sol Lim, Haeyoung Kim, Tae Hoon Lee, Won Park, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jonghan Yu, Byung Joo Chae, Se Kyung Lee, Jai Min Ryu, Woong Ki Park

PO130 **De-escalation of Axilla Surgery in Early Invasive Lobular Carcinoma: Diagnostic Performance and Oncologic Outcomes** *407*
Charmagne Loren Ramos, Eunhye Kang, Changhoon Lee, Dong-Seung Shin, Hong-Kyu Kim, Hyeong-Gon Moon, Wonshik Han, Han-Byeol Lee

Poster Presentation

PO131 **Comparative Effectiveness of Sentinel Lymph Node Tracers in Breast Cancer: A Network Meta-analysis of 53 Randomised Trials** *408*
Beth Shi Yu Lim, Esther Yen-Qin Yong, Serene Si Ning Goh

PO132 **Choosing Wisely: Omission of Intraoperative Frozen Section for Sentinel Lymph Node Assessment in Early Breast Cancer** *409*
Jun Xian Jeffrey Hing, Chin Mui Jaime Seah, Xiao Shuang Ling, Yert Li Melissa Seet, Chi Wei Mok, Su-Ming Tan

PO133 **An Evaluation of the Use of Superparamagnetic Iron Oxide (SPIO) with Blue Dye as a Dual-tracer Method for Sentinel Lymph Node Biopsy (SLNB)** *410*
Kei Teng Nai, Cathy Po Ching Ng, Shane Wen Hui Sim, Serene Ee Ling Tang

PO134 **Novel Technique of Intra-operative Sonography Targeting Localization of Sentinel Lymph Node: A Comparative Study to Demonstrate Decreasing Operation Time and Blood Loss** *411*
Hsinhui Wang, Jun Su, Hung-Wen Lai, Nurul Hidayah Abdul Rauf, Yi-Yuan Lee

PO135 **The Pattern of Axillary Surgical Management and Axillary Relapse in Triple-negative Breast Cancer after Neoadjuvant Chemotherapy and Immunotherapy: A Single Medical Center Experience** *412*
Ruoh Yun Gau, Shin-Cheh Chen, Yung-Feng Lo, Shih-Che Shen, Wen-Ling Kuo, Chi-Chang Yu, Hsu-Huan Chou, Chia-Hui Chu, Wai-Shan Chung

PO136 **The Rate of Axillary Lymph Node Metastasis of Ductal Carcinoma in Situ with Microinvasion in University Hospital** *414*
Thanisorn Tungprayoonlert, Sopark Manasnayakorn, Mawin Vongsaisuwon, Phuphat Vongwattanakit

PO137 **Repeat Sentinel Lymph Node Biopsy in Early-Stage pN0 Breast Cancer with Ipsilateral Local Recurrence after Mastectomy: A Single-Center Experience from Vietnam** *415*
Kha Tran Nguyen, Luan Anh Nguyen, Phuong Tran Viet The, Tuan Pham Huynh Anh, Nam Ho Hoai, Huong Pham Thien, An Tran Cao Hong

PO138 **Acellular Dermal Matrix for Volume Replacement in Oncoplastic Breast-Conserving Surgery: Feasibility and Mid-Term Outcomes** *416*
Vasileios Kalles, Apostolos Mitrousias, Ioannis Papapanagiotou, Nikolaos Tasis, Olga Moutzouri, Sandra Maria Tsoti, Nikolaos Ivros, Apostolos Vlachogiorgos

PO139 **Evaluation of Chest Wall Perforator Flaps for Partial Breast Reconstruction: A Single Surgeon's Experience with Patient Demographics, Cosmetic Stability, and the Procedural Learning Curve** *417*
Neha Choudhary, Arunima Datta, Nilanjan Das

PO140 **Minimally Invasive Endoscopic Nipple-Sparing Mastectomy with Latissimus Dorsi Flap Reconstruction: Early Low-Cost Experience from a LMIC** *419*
Sanjay Kumar Yadav

PO141 **Versatility of Chest Wall Perforator Flaps for Oncoplastic Breast Surgery** *420*
Shabrina Rizky Putri, Gunawan Wibisana, Ahmad Kurnia

PO142 **Prospective Study on the MRI-based Integration Rate of Acellular Dermal Matrix and Complications after Breast-conserving Surgery** *421*
Eunju Shin, Soo Jung Hong, Hye Joung Eom, Tae-Kyung Yoo, Jisun Kim, Il Yong Jhung, Beom Seok Ko, Hee Jeong Kim, Jong Won Lee, Byung Ho Son, Sae Byul Lee

Poster Presentation

PO143 **Usefulness of Acellular Dermal Matrix (ADM) Assisted Oncoplastic Breast Reconstruction Following Breast Conserving Surgery** 422
Seok Gi Kim, Yong June Chang, Hyun Geun Cho, Jeong Yeop Ryu, Joon Seok Lee, Mansoo Suh, Kang Young Choi, Ho Yun Chung, Jung Dug Yang

PO144 **Radiologic Safety and Volume Preservation of a 3D-Printed Bioresorbable Spacer in Breast-Conserving Surgery: A Retrospective Analysis of 53 Patients** 424
Wooyeol Baek, Seho Park, Jee Hyun Ahn, Min Jung Kim, Kyung Jun Heo, Eun Jin Park

PO145 **Oncoplastic Outcomes and Patient-Reported Satisfaction Following Breast Conserving and Reconstructive Surgery: A 3-Year Experience at Intermed Hospital** 426
Khurelbaatar Sainbaatar

PO146 **Safety and Outcomes of Staged Implant Reconstruction after MRM and Radiotherapy** 427
Mergen Dugarsuren

PO147 **Comparison of Immediate and Delayed Autologous Breast Reconstruction Methods: A Retrospective Cohort Study** 428
Ilona Duadze, Azizzhon Zikiryakhodzhaev

PO148 **Intra-operative Doppler Mapping to Guide Secondary Pedicle Design in Therapeutic Mammoplasty** 429
Serene Si Ning Goh, Lucy Aitchison, Dalal Alaradi, Georgios Exarchos, Leah Marley, Samantha Chen, Leyla Swafe, Frederick Hartley, Peter Barry

PO149 **Comparing Surgical Outcomes of Robotic versus Conventional Mastectomy** 430
Tze Yi Low, Wei Qi Leong

PO150 **Adoption of Endoscopic Nipple-Sparing Mastectomy with immediate reconstruction: Feasibility, Technique, and Early Outcomes** 431
Wei Wen Ang, Aloysius Ming Ngan Tan, Rachel Yanlin Chen, Jun Su, Sheena Say Hoon Phua, Victoria Sze Hui Goh, Geraldine Hwee Ping Lee, Allison Mei Fern Quah, Ern Yu Tan

PO151 **A Single-centre Experience with Local Perforator Flap Reconstruction after Breast Conserving Surgery: A Review of Indication and Outcomes** 432
Xue En Chuang, Clement Chia

PO152 **Outcomes of Chest Wall Perforator Flaps: A 10-year District General Hospital Experience** 433
Qin Yi Lee, Laura Smith, Alexander Leeper, Jerome Pereira, Sarah Downey, Sue Down

PO153 **Investigation on the Imaging of the Upper Limb Lymphatic Drainage Systems at Different Injection Sites** 434
Bei Zhang, Qingwei Wu, Guoshuai Ma, Xiaorong Sun, Yongsheng Wang, Binbin Cong

PO154 **Palliative Radiotherapy for Inoperable or Metastatic Breast Cancer with Locoregional Oligoprogression on Stable Systemic Therapy** 435
Hiu Ching Wong, Brian Chan, Jean Ngan Sum Cheng, Winnie Wing Yan Tin, Ting Ying Ng, Frank Chi Sing Wong

PO155 **Impact of Postoperative Radiation Therapy on Local Control in Older Patients After Breast-Conserving Surgery: A Propensity Score-Matched Analysis of a Large Clinical Dataset** 436
Akimitsu Yamada, Masanori Oshi, Kumiko Kida, Kazutaka Narui, Yoshiya Horimoto, Kimiko Hirata, Shoko Takano, Tomohiro Itonaga, Yuka Ono, Mariko Kawamura, Masashi Mizumoto, Michio Yoshimura, Shinji Sugahara, Chikako Yamauchi, Koshi Kataoka, Kazuharu Harada, Masataka Taguri, Goro Kutomi, Itaru Endo, Takashi Ishikawa

Poster Presentation

PO156 **Axillary Nodal Dose Exposure During Whole-Breast Radiotherapy in Patients Undergoing Sentinel Lymph Node Biopsy Omission: Long-Term Axillary Control and Oncologic Outcomes** *437*
Haeyoung Kim, Won Park, Won Kyung Cho, Tae Hoon Lee

PO157 **Development of an Interpretable Machine Learning Model for Predicting Breast Cancer-Related Lymphedema** *438*
Hwa Kyung Byun, Jee Suk Chang, Yong Bae Kim

PO158 **Long-Term Clinical Outcomes of Proton Beam Re-irradiation for Locoregionally Recurrent Breast Cancer: A Single-Center Experience** *439*
Hyunju Shin, Jong Yun Baek, Haeyoung Kim, Won Park, Won Kyung Cho, Tae Hoon Lee

PO159 **Risk of Radiation Pneumonitis Following Concurrent Administration of Radiotherapy and Capecitabine in HER2-negative Breast Cancer** *440*
Jeongshim Lee, Moon Hee Lee, Yunseon Choi, Hun Jung Kim

PO160 **Quantitative Assessment of CBCT Image Quality Metrics and Their Translation to Clinical ART Workflow Performance in Breast Cancer Patients** *441*
Sunhwa Kim, Young Kyu Lee, Wonjoong Cheon, Yunji Seol, Byung-Ock Choi, Young Nam Kang

PO161 **Low Regional Recurrence Regardless of Nodal Irradiation in cN1-2a ypN0 Patients After Dual HER2 Blockade for HER2-Positive Breast Cancer: A Multicenter Study (KROG 24-02)** *442*
Tae Hoon Lee, Kyubo Kim, Yong Bae Kim, Tae Hyun Kim, Jin Hee Kim, Tae Gyu Kim, Jin Hwa Choi, Taeryool Koo, Hyebin Lee, Hyeli Park, Haeyoung Kim

PO162 **Delivering Cardiac-Sparing Breast Cancer Radiotherapy Using Deep Inspiration Breath Hold in a Low- and Middle-Income Country: A Dosimetric Analysis** *443*
Subhash Thakur, Saloni Chawla, Subhashree Mohanty, Iva Hamal

PO163 **Real-world Outcomes of Hypofractionated Adjuvant Radiotherapy Postmastectomy and Axillary Dissection in Early-stage Breast Cancer** *444*
Xuan Thi Tran, Ha My Cong Nguyen, Anh Tuyet Thi Cung

PO164 **Biodegradable and Redox-responsive Nanoparticle Platform with TROP2 Antibody Linkage for Lactate Dehydrogenase Inhibitor to Reduce Chemo-resistance in Triple Negative Breast Cancer** *445*
Hongwei Chen, Jiajia Hu, Jingyi Guo, Qingjian Li

PO165 **Bromelain Attenuates Doxorubicin-Induced Cardiac Injury in a Wistar Rat Model** *446*
Asdi Wihandono, Ngurah Arie Kapindra Dharma, Kiki Mario, Yohanes Arvi Primardian

PO166 **Successful Response to Tegafur in a Case of Aggressive Choriocarcinomatous Breast Carcinoma Progressing on CDK4/6 Inhibition: A Case Report** *447*
Bilguunzaya Batmunkh

PO167 **A Multicenter, Retrospective Study on the Real-World Efficacy and Safety of Oral Combination Metronomic Chemotherapy in Patients with Metastatic Breast Cancer** *448*
Jing-Jou Lo, Joseph Lin, Chin-Yao Lin, Ching-Ting Wei, Li-Kun Ko

PO168 **Association of Pegylated Liposomal Doxorubicin with Improved Overall Survival in Early-Stage Breast Cancer: A Population-Based Study** *449*
Min-Chi Cheng, Yang-Chuan Chen, Po-Huang Chen, Jia-Hong Chen, Ming-Shen Dai, Tzu-Chuan Huang

Poster Presentation

PO169 **Clinical Impact of Germline BRCA1/2 Mutations on Outcomes of First-line Endocrine Therapy in HR-positive/HER2-negative Metastatic Breast Cancer** *450*
Kyoko Goda

PO170 **Clinical Impact of Extended Endocrine Therapy in Premenopausal Women Aged 40 Years or Younger with T1N0 Breast Cancer: A Multicenter Retrospective Study** *451*
Young-Jin Lee, Seho Park, Hyun Jo Youn, Hee Jeong Kim

PO171 **Evaluating Hormonal Therapy in Breast Cancer Patients Who Choose To Forgo Curative Surgery** *452*
Audrey Poh Poh Tan, Veronique Kiak Mien Tan, Yirong Sim, Christina Shi-Hui Yang, Chow Yin Wong, Wei Sean Yong, Preetha Madhukumar, Si Ying Tan, Julie Liana Bte Hamzah, Ying Ching Tan

PO173 **Effectiveness of Primary Endocrine Therapy in Elderly Women with ER-Positive Breast Cancer** *453*
Serene Si Ning Goh, Hani Maalouf, Rebekah Law, Nikki Snuggs, Kate Downey, Amy Godden, Mohamed Attia, Peter Barry, Katherine Krupa, Rachel O'connell

PO174 **Prognosis and Hepatic Function Outcomes in Breast Cancer Patients with Hepatitis B Virus Infection Under Cyclin-Dependent Kinase 4/6 Inhibitor Therapy** *454*
Chih-Hao Huang, Ying-Rong Chen, Hsiang-Wen Lin

PO175 **Real World Data of Abemaciclib for ER+HER2- eBC: A Single Center Study** *456*
Yu-Wen Weng, Ming-Chia Hung, Chih-Chiang Hung

PO176 **Low Dose of CDK4/6 Inhibitors and Endocrine Therapy in Metastatic Breast Cancer Impact on the Efficacy and Safety: Insights from a Low-Middle-Income Country** *457*
Asmaa Kortoma

PO177 **Real-World Safety of Trastuzumab Deruxtecan With a Case of Hepatitis B Virus Reactivation and Contextual Benchmarking Using Ado-Trastuzumab Emtansine** *458*
Hyelim Kang, Eui Tae Kim, Myung Chul Chang, Junwon Min

PO178 **MonarchE: Evaluation of Prognostic and Predictive Value of Ki-67 Index Pre and Post Neoadjuvant Chemotherapy (NAC) and Changes Following NAC** *459*
Youngin Eom, Yoohee Jeong, Jose Angel Garcia Saenz, Stephen Rd Johnston, Nadia Harbeck, Peter A. Fasching, Liu Qiang, Sema Sezgin Goksu, Ivan Toledano, Daphne Tf Tsoi, Dorte Nielsen, Patricia Xavier Santi, Norikazu Masuda, Yoon-Sim Yap, Margaret Block, Maria Munoz Fernandez, Brenda R Grimes, Jennifer Wei, Deli Liu, Miguel Martin

PO179 **Effectiveness of Palbociclib in HR+ HER2- Metastatic Breast Cancer: A Real-world Data Study in Peruvian PatientsS** *461*
Joseph Pinto, Zaida Morante, Yomali Ferreyra, Mariano Lopez, Bruno Munante, Silvia Neciosup, Alejandra Zevallos, Henry Gomez

PO180 **Real-World Experience of Ribociclib-Associated Liver Injury in Hormone Receptor-positive/ HER2-negative Metastatic Breast Cancer** *462*
Ming-Han Yang, I-Chun Chen, Shih-Hung Yang, Yen-Shen Lu

PO181 **Real-World Outcomes of Ribociclib in HR+/HER2 Metastatic Breast Cancer: A Single-Center Retrospective Study from Southern Taiwan** *463*
Shih-Yu Huang, Shih-Chung Wu, Chien-Ting Liu, Chang Ting Lin

Poster Presentation

PO182 **Analysis of Asian Patients (PTS) with HR+/HER2- Early Breast Cancer (EBC) Treated with Ribociclib (RIB) + Nonsteroidal Aromatase Inhibitor (NSAI): 5-year Outcomes from NATALEE** *464*
Yen-Shen Lu, Daniil Stroyakovskii, Joohyuk Sohn, Yeon Hee Park, Chiun-Sheng Huang, Seock-Ah Im, Kyung Hae Jung, Arlene Chan, Jin Zhang, Jieun Lee, Jee Hyun Kim, Chi-Feng Chung, Dennis Slamon, Viktoriya Sakalosh, Melissa Gao, Khalid Amin, Nusrat Harun, Binghe Xu

PO183 **Impact of Neoadjuvant Chemotherapy (NACT) Response on Clinical Outcomes with Ribociclib (RIB) in HR+/HER2- EBC: A Subgroup Analysis from the Phase 3 NATALEE Trial** *466*
Nicholas Mcandrew, Fan-Chen Ku, Stephen Chia, Fabio Puglisi, Yann Izarzugaza, Christian Schem, Binghe Xu, Fanny Le Du, Priyanka Sharma, Peter A. Fasching, Alejandro Rodriguez, Murat Akdere, Yogesh Chattar, Juan Pablo Zarate, Aditya Bardia

PO184 **Imlunestrant + abemaciclib vs fulvestrant + abemaciclib in ER+, HER2- advanced breast cancer (ABC): An indirect treatment comparison (ITC) of three phase 3 trials** *468*
Youngin Eom, Yoohee Jeong, Komal Jhaveri, Francois-Clement Bidard, Kevin Kalinsky, Patrick Neven, Hope S Rugo, Sara M Tolaney, Lacey Litchfield, Christoph Cramer Von Laue, Sory Traore, Francisco Sapunar, Yujia Li, Joyce O'shaughnessy

PO185 **Real-world Outcomes of Ribociclib Plus Endocrine Therapy with Clinically Aggressive HR+/HER2- Metastatic Breast Cancer: Insights from Vietnam** *469*
Thao Vu, Ha Nguyen Khanh, Thang Do Duc, Cuong Nguyen Viet, Nam Vo Hoai, Son Nguyen Thai

PO186 **Real World Evidence for Early Stage TNBC on Neoadjuvant Chemotherapy and Pembrolizumab: Single Centre Experience in Hong Kong** *470*
Grace Yuk Fong Lo, Kuen Chan, Sung Inda Soong

PO187 **Rare Cascade of Severe Immune-Related Adverse Events Necessitating Treatment Discontinuation in Triple-Negative Breast Cancer** *471*
Hitomi Mori, Masami Hattori, Mari Mine, Kenichi Nishiyama, Kentaro Motoyama, Eishi Nagai, Yuji Nakafusa

PO188 **Targeting Aryl Hydrocarbon Receptor to Enhance Anti-PD-L1 Therapy in Triple-Negative Breast Cancer** *472*
Minkyoung Choi, Ju Hee Kim, Han Byoel Lee, Wonshik Han

PO189 **99TcRadiolabeled HA/TPGS Based Umbelliferone Loaded Nanoperticles for breast cancer Synergistic Theragnostic** *473*
Vikas Kumar

PO190 **Use of Statin and Breast Cancer Patient Prognosis: A Meta-Analysis of 26 Studies** *474*
Inge Kurniawati, Putu Andatusta Adiputra, I Gede Budhi Setiawan, Heru Sutanto Koerniawan, Amos Immanuel Chandra

PO191 **Discovery of a Novel Nucleolar stress-inducing p53 Activator with Antitumor Activity in Breast Cancer** *475*
Kohichi Kawahara, Momo Shiozaki, Yukichika Yasuki, Kazunari Arima

PO192 **Comparison of ER, PR, HER2, and Ki67 Expression in Diagnostic Core Biopsies and Corresponding Residual Tumors after Neoadjuvant Chemotherapy in Breast Cancer Patients of the ABCSG Trial 34** *476*
Martin Filipits, Dominik Hlauschek, Anita Brandstetter, Viktoria Gruber, Zsuzsanna Bago-Horvath, Christian F. Singer, Rupert Bartsch, Gabriel Rinnerthaler, Simon P. Gampenrieder, Daniel Egle, Michael Gnant

PO193 **Immune and Stress-Response Markers as Predictors of Anthracycline Neoadjuvant Chemotherapy Outcomes in Locally Advanced Breast Cancer** *477*
Desak Gede Agung Pramesti Devi, Desak Gede Agung Suprabawati

Poster Presentation

PO194 **Cluster-based Predictors for Malnutrition and Cachexia Across Cancer Patients Receiving Chemotherapy** *478*
Riani Witaningrum, Perdana Satria

PO195 **Advanced Stage: The Dominant Independent Predictor of Mortality in Breast Cancer in FAST-Scoring to Predict Mortality A Ten-Year Observational Study** *479*
Tania Nugrah Utami, Farah Mardhiyah, Arya Marganda Simanjuntak, Sinta Chaira Maulanisa, Effif Syofra Tripriadi, Fathar Usman Bunawar, Muhammad Muhammad, Salamullah Salamullah, Muhammad Zaki Abdul Hafiz

PO196 **High Ductal Carcinoma In Situ Component and HER3 Overexpression Predict Poor Recurrence-Free Survival in HER2-Positive Breast Cancer** *480*
Ahwon Lee, Jihyun Chun, Serin Moon, Dooreh Kim, Chang Ik Yoon, Chan Kwon Jung, Jieun Lee

PO197 **Upper Outer Quadrant Tumor Location as an Independent Favorable Prognostic Factor in N1 Breast Cancer** *481*
Changhoon Lee, Eunhye Kang, Han-Byoel Lee, Hyeong-Gon Moon, Wonshik Han, Hong-Kyu Kim

PO198 **Preoperative Risk Stratification in Biopsy-Proven Node-Positive Breast Cancer: Implications for Axillary De-escalation** *482*
Chi Hoon Lee, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jong Han Yu, Byung Joo Chae, Se Kyung Lee, Jai Min Ryu, Woong Ki Park, Ki Jo Kim, Cho Eun Lee, Su Min Lee, Doyoun Woen, Seung Ah Lee, Kawon Oh, Ki Beom Kim, Dahn Byun

PO199 **Choice-Based Comparison of Multigene Assays in Hormone ReceptorPositive, HER2-Negative Breast Cancer: A Single-Center Real-World Study** *484*
Donghyeon Oh, Su Hwan Kang, Soo Jung Lee, Jung Eun Choi

PO200 **P-p70S6K Expression as a Prognostic Factor in Early Recurrence in Contrast to Late Recurrence in Breast Cancer.: Analysis of 4,602 Patients** *485*
Donghyun Lim, Hyun-Ah Kim, Min-Ki Seong, Chan Sub Park, Yireh Han, Hanseul Lim

PO201 **Association between BRCA Mutation and p-p70S6K Expression in Breast Cancer: A Retrospective Single-center Cohort Study** *486*
Hanseul Lim, Hyun-Ah Kim, Min-Ki Seong, Chan Sub Park, Yireh Han

PO202 **Impact of Clinicopathologic Factors and Inflammatory Hematologic Markers on Pathologic Complete Response After Neoadjuvant Chemotherapy in Breast Cancer** *487*
Hyang Suk Choi, Seung-Taek Lim, Jong-In Lee, Jaeyeon Jang, Airi Han

PO203 **High Ductal Carcinoma In Situ Component and HER3 Overexpression Predict Poor Response to Trastuzumab in HER2-Positive Breast Cancer** *488*
Jihyun Chun, Serin Moon, Dooreh Kim, Chang Ik Yoon, Chan Kwon Jung, Jieun Lee, Ahwon Lee

PO204 **Integrative Clustering of Breast Cancer Has Different Prognostification Value at Diagnosis and after Neoadjuvant Chemotherapy** *489*
Ji-Yeon Kim, Kyunghee Park, Woong-Yang Park, Hee Kyung Ahn, Junghoon Shin, Seok Won Kim, Seok Jin Nam, Jeong Eon Lee, Yeon Hee Park

PO205 **Optimized Simple Clinical Rules for Identifying Low-Risk Oncotype DX Recurrence Scores in HR+/HER2- Early Breast Cancer: Prioritizing Safety through Automated Ki-67 Quantification** *490*
Kwan Ho Lee

PO206 **Predicting Pathologic Complete Response in Breast Cancer Using Shear Wave Elastography** *491*
Meehyun Lee, Younjoo Jung

Poster Presentation

PO207 **Triple Negative Breast Cancer is Independently Associated with Lower Femoral Neck T Score at the Time of Bone Metastasis** 492
Seuran Kim, Youngjin Seo

PO208 **The Significant Determinants of Clinicopathologic Factors Related to the Multigene Predictors in Hormone Receptor-positive, HER2-negative Breast Cancer** 493
Siyeon Lee, Jongwon Song, Jee Hyun Ahn, Seho Park

PO209 **Prognostic Impact of Disease-free Interval on Overall Survival in Metastatic Breast Cancer: A Retrospective Cohort Study** 494
Soo Jj Hong, Joohyun Woo

PO210 **Prognostic Impact of HER2-Zero versus HER2-Low Status in Young Women with Breast Cancer** 495
Yong Hwa Eom, Seung Hye Choi

PO211 **Spatial Transcriptomic Signatures of Chemo-resistant Residual Tumor Bed in Triple-negative Breast Cancer and Their Association with Recurrence** 496
Yoon Jin Cha, Inho Part, Jee Hung Kim, Su-Jin Shin, Soong June Bae, Sung Gwe Ahn, Joon Jeong, Soi Kim, Daeun Lee

PO212 **Neoadjuvant Chemotherapy Response Metrics Are Subtype-Dependent Surrogates for Prognosis in Breast Cancer** 497
Stephanie Choi, Eun-Shin Lee

PO213 **Exploratory Meta-regression of Tumor Biology and Metastatic Pattern in Locoregional Treatment Outcomes for De Novo Metastatic Breast Cancer** 498
Vannesza Hendricke Chua, Patricia Ong, Leona Marie Francesca Rebosa, Bryce Matthew Tan De Guzman, Jayson Co, Joyce Hazel Chua

PO214 **Prognostic Value of Ki-67 and Progesterone Receptor for Adjuvant Chemotherapy De-escalation in Early Luminal-type Breast Cancer** 499
Hung Hsun Chen, Ping Fu Yang, Fang Ming Chen

PO215 **Engineered α9 nAChR Targeting Antibodies Block Nicotine-Driven Triple-Negative Breast Cancer Progression and Exhibit Favorable Safety in Cynomolgus Monkeys** 501
Yuan Soon Ho, Li-Ching Chen

PO216 **Tumor Characteristics and Survival Rate of HER2-low Breast Cancer Patients: A Retrospective Cohort Study Conducted at Maha Chakri Sirindhorn Medical Center (MSMC)** 502
Patcharaphol Jongthira-Amnuay, Chanchai Charonpongsunton, Nayada Suongsarath, Jasleen Kaur Chhabra, Supicha Chaiprasithkul, Supanuch Siriviboonchaiyakul

PO217 **Prognostic Value of the CPS+EG Score in HR+/HER2- Breast Cancer Treated With Neoadjuvant Chemotherapy** 503
Phong Thanh Lenh, Thi Hong Duc Phan, Duc Hieu Vo, Hong Minh Phuoc Vo, Anh Luan Nguyen, Dang Ngoc Linh Tran, Thi Tuyet Anh Cung, Hoang Quy Nguyen

PO287 **Impact of Frailty, Endocrine Therapy Adherence, and Radiotherapy in Elderly Patients With Low-Risk HR+ Breast Cancer: A KBCSG 35 Multicenter Cohort Study** 504
Haeyoung Kim, Tae Hoon Lee, Hong-Kyu Kim, Soong June Bae, Jeong Eon Lee, Jonghan Yu, Chihwan David Cha, Ye Jeong Kim, Kwang Hyun Yoon, Ha Rim Ahn, Sumin Chae, Sun Young Min, Jung Ho Park, Young-Joon Kang, Jeeyeon Lee, Joon Suk Moon, Sun Hee Kang, Moo Hyun Lee, Young Ju Jeong, Eun-Gyeong Lee, Hee Jun Choi, Jae Il Kim

Poster Presentation

PO218 **The Experiences, Perceptions, and Care Needs of Patients with Cancer Therapy Induced Menopause: A Phenomenological Qualitative Study** *505*
Gabrielle H. Van Ramshorst, Sofie Lingier, Eva Pape

PO219 **Partners' Experiences and Needs in Supporting Women with Cancer Therapy Induced Menopause** *506*
Gabrielle H. Van Ramshorst, Hanna Piceu, Eva Pape

PO220 **Cancer Therapy Induced Menopause: Healthcare Providers' Perceptions and Care Needs** *507*
Gabrielle H. Van Ramshorst, Alanis Reynaert, Eva Pape

PO221 **A Cross Sectional Study on Shoulder Mobility after Breast Surgery** *508*
Ho Hung Billy Cheung, Blythe Siu, Andria Sze, Michael Co, Ava Kwong

PO222 **Single Center Retrospective Study on Risk Factors for Lymphoedema after Breast Cancer Treatment** *509*
Kylie Joan Yi Szeto, Man Yi Chan, Ho Yan Yuen, Wai Fong Tsang, Pui Sze Wong

PO223 **Impact of an AI-Driven Chatbot on Breast Cancer Awareness, Anxiety Reduction, and Timely Specialist Consultation in a Resource Constrained Setting: A Prospective Evaluation of "ASHA"** *510*
Sanjay Kumar Yadav

PO224 **Real-World Survival of HER2-Positive and Triple-Negative Breast Cancer at a Tertiary Referral Center in Indonesia** *511*
Farah Mardhiyah Hidayat, Sinta Chaira Maulanisa, Tania Nugrah Utami, Effif Syofra Tripriadi, Fathar Usman, Muhammad Muhammad, Salamullah Salamullah, Muhammad Zaki Abdul Hafiz

PO225 **Survival Patterns of Hormone ReceptorPositive Breast Cancer According to Luminal Subtypes: A Decade of Real-World Evidence from Indonesia** *512*
Sinta Chaira Maulanisa, Tania Nugrah Utami, Farah Mardhiyah, Effif Syofra Tripriadi, Fathar Usman Bunawar, Muhammad Muhammad, Salamullah Salamullah, Muhammad Zaki Abdul Hafiz

PO226 **Effectiveness of Scalp-Cooling System for the Prevention of Chemotherapy-induced Hair Loss among 42 Metastatic Breast Cancer Patients Treated with Eribulin** **513**
Makoto Kato

PO227 **Digital Decision Aid for Genetic Counseling in Breast Cancer: A Prospective Pilot Study** *514*
Ji Sun Kim, Min Jung Lee, Mijin An, Sun-Young Park, Eun-Gyeong Lee, Jaihong Han, Seeyoun Lee, Yeon-Joo Kim, Heejung Chae, Yoon-Jung Choi, Kum Hei Ryu, Sun-Young Kong, So-Youn Jung

PO228 **Beyond Overall Survival: Cancer-Specific Survival Reveals Equivalent Prognosis in Elderly Breast Cancer Patients (≥ 70 Years)** *515*
Jihye Choi

PO229 **Unmet Needs of Breast Cancer Patients Living Alone: A Qualitative Study** *516*
Jung Hee Yoon, Nayeon Kim, Soo Yeon Kim, Jinsung Choi, Eunjoo Choi, A-Young Lee, Juhee Cho, Jai-Min Ryu

PO230 **Factors Associated with Quality of Life Among Patients with Breast Cancer** *517*
Miri Ryu, Hyun Yul Kim

PO231 **Serial Quality of Life Assessment in Breast Cancer Patients Undergoing Radiotherapy** *518*
Won Kyung Cho, Tae Hoon Lee, Haeyoung Kim, Won Park, Se Kyung Lee, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jonghan Yu, Byung Joo Chae, Jai Min Ryu, Woong Ki Park

Poster Presentation

PO232 **Factors Associated with Fatigue in Breast Cancer Survivors: Secondary Analysis of a Prospective Cohort Study (BIG-S)** 519
Won Kyung Cho, Tae Hoon Lee, Haeyoung Kim, Won Park, Woong Ki Park, Jai Min Ryu, Se Kyung Lee, Byung Joo Chae, Jonghan Yu, Jeong Eon Lee, Seok Won Kim, Seok Jin Nam

PO233 **Complementary and Alternative Medicine in Breast Cancer: A Cross-Sectional Survey of Korean Physicians' Perspectives and Clinical Experience** 520
Young-Joon Kang, Hyobin Kim, Jeong Young Park, Seonhui Kim, Hoon Choi, Se Jeong Oh

PO234 **Exploring Women's Perspective on Sexual Health of Post Mastectomy vs. Post Lumpectomy of Breast Cancer Patients in a Tertiary Hospital in the Philippines** 522
Viela Mae Remo, Emmeline Cua-De Los Santos, Margaret Joyce Cristi-Limson

PO235 **Management of Hot Flushes in Women Receiving Endocrine Therapy for Breast Cancer: An Updated Systematic Review and Meta-Analysis** 523
Julian Rocero, Olivette Chen, Qin Xiang Ng, Serene Goh

PO236 **Complementary and Alternative Medicine for Supportive Care in Breast Cancer Survivors: An Umbrella Review** 524
Su Min Charmaine Tan, Joan Xin Ern Tan, Mattias Wei Ren Kon, Qin Xiang Ng, Serene Si Ning Goh

PO237 **Benefit of Primary Tumour Resection in De Novo Metastatic Breast Cancer: A Multicentre Retrospective Cohort Study** 525
Xin Yan Lim, Yirong Sim, Ying Ching Tan

PO238 **Beyond Survival: Adapting Metacognitive Therapy to Reduce Fear of Cancer Recurrence in Taiwanese Breast Cancer Survivors** 526
Chihtao Cheng

PO239 **NADA Ear Acupuncture Improves Postoperative Pain, Anxiety, and Upper Limb Stiffness in Breast Cancer Patients: A Retrospective Case Series** 528
Chin-Hu Tsai, Kuen-Jang Tsai, Chao-Ming Hung, Hui-Ming Lee, Kuan-Tso Chen, Yuan-Her Lin, Chin-Chuan Tsai

PO240 **The Immune Modulation Effects and Survival Benefit in Astragalus polysaccharides (PG2)-treated Breast Cancer Patients with Fatigue** 530
Ming-Shen Dai, Yu-Guang Chen, Jyh-Cherng Yu, Chia-Yu Bai, Li-Chia Chen

PO241 **Breast Radiotherapy and Risk of Hematologic Malignancies: a Target Trial Emulation Using Real-world Data** 531
Ming-Shen Dai, Cho-How Lee, Po-Huang Chen, Li-Ting Gao

PO242 **Personal and Familial Factors Associated with Genetic Testing Decisions in HBOC and Lynch Syndrome Families** 532
Sivia Barnoy, Ronit Tsemach

PO243 **Positive Motivation for Family Disclosure and Associated Factors among Women with Hereditary Breast Cancer: The K-CASCADE study** 533
Bora Moon, Jiun Yang, Yonju Yoo, Yunhee Ko, Choon Hee Bae, Hye Jin Lee, Sikyeong Park, Maria Katapodi, Sue Kim

PO244 **Identification of Latent Classes Based on Pre-Specified Symptom Cluster in Posttreatment Cancer Survivors** 535
Soo Hyun Kim

Poster Presentation

PO245 **Early Detection of Drug-Induced Interstitial Lung Disease Through a Nurse-Integrated Multidisciplinary Monitoring Program in Breast Cancer Patients** 536
Hsiu-Hsuan Chan, Chih-Chiang Hung

PO246 **Effectiveness of a Blended Learning Program for Antineoplastic Drug Safety Management among Newly Graduated Nurses: A Quasi-Experimental Study** 537
Booyoung Ha, Insook Lee

PO247 **Safety and Treatment Patterns of Ribociclib Plus Endocrine Therapy in Chinese Patients with HR+/HER2− Early Breast Cancer: A Multicenter Prospective Real-World Study** 538
Chao Ni, Zixuan Wang, Pengfei Qiu, Jun Zhou, Bojian Xie, Yangjun Cai, Xidong Gu, Wenwu Wang, Jinhua Ding, Jun Zhou, Zhijun Dai, Chaoyang Xu, Jun Shen, Minjun Dong, Xiaoyan Jin, Zhangsheng Xiao

PO248 **Upfront Surgery versus Neoadjuvant Systemic Therapy in T4b Fungating/Ulcerated Breast Cancer: Real-World Comparative Effectiveness on Quality of Life and Survival in a High-Burden LMIC Population** 539
Sanjay Kumar Yadav, Shyam Rawat, Rajesh Jain, Dhananjaya Sharma

PO249 **MASCC International Healthcare Professional Survey of Current Practices of Managing Breast Cancer-Related Lymphoedema and Lymphoedema-Related Cellulitis** 540
Kaori Tane, Cindy Wong, Henry Wong, Muna Al-Khaifi, Jennifer Yin Yee Kwan, Jennifer Jones, Corina Van Den Hurk, Bolette Skjodt Rafn, Amanda Porcheron, Matthew Wallen, Debanjan Kundu, Beth Hoag, Kerry Sherman, Deborah Kirk, Angela Rio-Gonzalez, Julie Ryan Wolf, Monique Bareham, Stephanie Phan, Gustavo Nader Marta, Shing Fung Lee, Adrian Chan, Yuichiro Kikawa, Maryam Beheshti Lustberg, Raymond Chan, Luis Lopez Montoya, Michael Jefford, Greg Kotronoulas, Edward Chow

PO250 **Randomized Study Comparing Artificial Intelligence-Supported ePRO Monitoring vs Routine Follow-up During Sacituzumab Govitecan Treatment in Patients with Advanced Breast Cancer (PRO-VIDE)** 542
Yuichiro Kikawa, Shogo Nakamoto, Atsushi Ishiguro, Haruru Kotani, Yumiko Koi, Kana Miyahara, Yuko Tanabe, Sena Yamamoto, Rie Ozeki, Atsushi Fushimi, Nobuhiro Shibata, Tetsuhiko Taira, Takayuki Iwamoto, Cosmina Hogea, Takayuki Kimura, Tadahiko Shien, Eriko Tokunaga, Junichiro Watanabe, Takafumi Sangai, Ryo Sadachi, Joe Hasei, Hirofumi Mukai

PO251 **Radiotherapy Dose Adaptation Based on Tumor Biology in cN3 Breast Cancer: Interim Results of the RADAPT-N3 Study Incorporating ctDNA Analysis** 544
Haeyoung Kim, Dongsoo Kyung, Hwang-Phill Kim, Won Park, Won Kyung Cho, Tae Hoon Lee

PO252 **GERD Symptoms Do Not Worsen During Neoadjuvant Chemotherapy but Increase After Radiotherapy in Breast Cancer Patients** 545
Sung Ui Jung, Kusang Kim, Jinhyuk Choi

PO253 **A Randomized Controlled Trial of LLM-Assisted Chemotherapy Side Effect Management in Breast and Colon Cancer Patients: ALLIANCE Trial** 547
Young-Joon Kang, Jung Young Park, Ju Myung Song, Yun-Jung Yang, Jae Ho Byun, Ji Hoon Kim, Moon Jin Kim, Young Chul Yoon, Hyobin Kim, Seonhui Kim, Hoon Choi, Se Jeong Oh

PO254 **Bilateral Risk-Reducing Nipple-Sparing Mastectomy with Reconstruction Surgery in BRCA 1/2 Gene Mutation Carriers, First-Degree Relatives: A Case Report** 549
Oyudari Sodnomgeleg, Jungeun Kwak, Erdenetogtokh Erdenetuya, Khaibar Tulyeubai, Orgilbold Enkhbat, Munkhzul Munkhnyam, Davaadash Batsaikhan, Bilguunzaya Batmunkh, Gerelmaa Enkhbat, Shirnen Odnasan, Odbaatar Myagmar, Khurelbaatar Sainbaatar, Bold Altangerel

PO255 **Metastasis of Endometrioid Carcinoma to Breast: A Case Report and Literature Review** 550
Patra Thasee, Thitiporn Wannasri, Narongchai Teerayathanakul, Tanitti Limpratya

Poster Presentation

PO256 **Telemedicine-Based Dietary and Behavioral Support Versus Conventional Follow-up in Pediatric Breast Cancer: A Digital Supportive Oncology Study** *551*
Vikas Sharma, P Kumar, P Sharma

PO257 **Eliminating Uncertainties in Post-Breast-Conserving Surgery Cosmesis Evaluation Using Vision-Language Artificial Intelligence** *552*
Sangjoon Park, Hwa Kyung Byun, Yeona Cho, Ji Ye Kim, Dong Won Lee, Seung Yong Song, Jee Suk Chang

PO258 **A Study Protocol for Evaluating an AI-based Chatbot to Support Decision-making in Breast Cancer Surgery and Adjuvant Therapy: A Patient-centered Outcomes Study** *554*
Young-Jin Lee, Jung Won Park, Hyun Seung Moon, Jae Young Choi, Tak Yeon Lee, Beom Seok Ko

PO259 **Benign Tumors Arising from Axillary Accessory Breast at a Single Center** *556*
Seongbae Hwang, Byungseo Choi

PO260 **Streamlining Management of Nipple Discharge: Lessons from ductal excisions over the last 10 years in a District General Hospital** *557*
Qin Yi Lee, Laura Smith, Alexander Leeper, Jerome Pereira, Sarah Downey, Sue Down

PO261 **Temporal Trends in BRCA1/2 Genetic Testing and Clinical Management Following Insurance Expansion in Japan** *558*
Hanano Sugimoto, Naoki Hino, Aya Nishisho, Koh Uyama, Toru Sawada, Hiroyuki Sumitomo, Soichiro Sasa, Atsushi Mima

PO262 **One Case of Invasive Micropapillary Carcinoma, which Indicates Osteoclast-like Giant Cell Tumor in Pathology** *559*
Chigusa Suma, Hirofumi Terakawa, Yuki Kurokawa, Ryosuke Mohri, Miki Hirata, Hiroko Kawashima, Noriyuki Inaki

PO263 **A Case Report of Inflammatory Breast Cancer in a 75-Year-Old Filipino Female** *560*
Aileen Calicaran, Eloisa Rachel Lobo, Eileen Regalado-Morales, Benedicto Carpio, Armelia Lapitan-Torres, Matthew David Parco, Amelita Tanglao-De Guzman, Faye Elinore Kison

PO264 **Extraintestinal Salmonella Enteritidis Infection of the Breast Simulating Malignancy** *561*
Maria Ellaine Briones, Sim Yirong, Tan Ying Ching

PO265 **A Rare Case of Borderline Phyllodes Tumor in a Male Patient: A Case Report and Review of Literature** *562*
Nicola Raphaela Tison, Celestine Marie Trinidad

PO266 **Secretory Breast Carcinoma Detected on Routine Screening: A Rare Case Managed with Breast Conserving Surgery** *563*
Sarfia Pandangan, Nicola Raphaela Tison, Celestine Marie Trinidad

PO267 **Malignant Adenomyoepithelioma of the Breast-Case Report** *564*
Sawsan Khan

PO268 **Malignant Phyllodes Tumor with Pancreatic Metastasis Mimicking Pancreatic Neuroendocrine Tumor on Imaging: A Rare Case Report** *565*
Thitiporn Wannasri, Natnicha Wittayagomol, Somboon Kittikongwat, Tanitti Limpratya

PO269 **A Cost Analysis of the Robot-assisted Nipple-Sparing Mastectomy in the Republic of Korea** *566*
Siyeon Lee, Gayoun Kim, Nam Hui Kim, Jee Hyun Ahn, Jee Ye Kim, Jeeyeon Lee, Woo Young Kim, Ji Young You, Hyuk Jai Shin, Jai Min Ryu, Hee Jun Choi, Young-Joon Kang, Hyung Seok Park

Poster Presentation

PO270 **Evaluating the Feasibility of an Electronic Patient-Reported Outcomes Platform Integrating Electronic Health Records and a Mobile Messaging App in Breast Cancer Radiotherapy** 567
Jongyun Baek, Haeyoung Kim, Won Kyung Cho, Nalee Kim, Tae Hoon Lee, Won Chul Cha

PO271 **Extra-mammary Metastasis to the Breast: A Great Mimicker** 568
Qin Yi Lee, Laura Smith, Alexander Leeper, Sarah Downey, Sue Down, Nikolaos Vachtsevanos, David Newman, Donna Shrubsall, Elizabeth Musgrave

PO272 **Ovarian Tissue Cryopreservation and Successful Reimplantation in a Breast Cancer Patient, a Modern Miracle** 569
Jiayi Lee, Charissa Goh, Siak Ming Goh

PO273 **Regional Mismatch Between Breast Cancer Burden and Treatment Capacity in Korea: Evidence of Uniform Demand but Concentrated Supply** 570
Yongseok Kim, Hyung Suk Kim

PO274 **BELLA (Breast Cancer Evidence-based Learning in AI): My SASSY (Standard Aligned AI for Synthesis and Support of Your MDT decisions) MDT Assistant** 571
Jaime Seah, Tiang Guan Bernard Koh, Su-Ming Tan, Chi Wei Mok

PO275 **Benchmarking Cloud and On-premises LLMs for Structuring Narrative Medical Reports across Higher-order Clinical Reasoning Tasks** 572
Hwa Kyung Byun, Sangjoon Park

PO276 **Male Breast Cancer - Lessons Over 15 Years from a District General Hospital** 573
Qin Yi Lee, Laura Smith, Jerome Pereira, Sue Down, Sarah Downey, Aslan Maha, David Maskell, Alexander Leeper

PO277 **Attitudes of Patients Towards Medical Students in Outpatient Breast Specialist Clinics** 574
Yirong Sim, Zhao Feng Chen, Ying Ching Tan, Wei Sean Yong

PO278 **Image-Guided Pre-Operative Magnetic Seed Localisation of Breast Lesions: Experience of a Singapore Hospital With the Magnetic Occult Lesion Localization Instrument (MOLLI)** 575
Samantha Lee, Yien Sien Lee, Zahra Al Yusuf

PO279 **Paraneoplastic Neurological Syndrome and Breast Cancer: A diagnostic Challenge** 576
Qin Yi Lee, Jerome Pereira, Sarah Downey, Tibor Hajdu, Aslan Maha

PO280 **HER2 Gene Amplification was Assessed by Fluorescent in Situ Hybridization (FISH) for the First Time in Mongolia in Breast Cancer Cases with Equivocal HER2 Status** 577
Bayart-Uils Bayar, Munguntsetseg Sodnom, Gantsetseg Purevsuren, Ganzorig Batbaatar

PO281 **Post-radiation Angiosarcoma of the Breast: A Multi-faceted Disease** 578
Qin Yi Lee, Laura Smith, Alexander Leeper, Jerome Pereira, Sarah Downey, Sue Down

PO282 **Effect of Bariatric Surgery on the Incidence of Breast Cancer in Females with Morbid Obesity** 579
Aly Elbahrawy

PO283 **When Child-Rearing Becomes a Barrier to Breast Cancer Treatment: A Case Series Involving Collaboration with Child Welfare Services** 580
Mayuko Suematsu, Hitoe Miyazaki, Toshiko Hatachi, Teiri Sagawa, Kinya Matsuoka

Poster Presentation

PO284 **Marked Response to Palliative Chemoradiotherapy for Esophageal Metastasis From Breast Cancer: A Case Report** *581*
Masahiro Yoshida, Takahiro Fujii, Aya Kawata, Saori Morishita, Akiko Kajiyama, Souichirou Tamada, Yuki Oka, Takuya Ngatata, Yuki Yokouchi, Naoya Gomi, Makoto Hasegawa, Tatsuya Gomi

PO285 **Long Term Oncological Outcomes of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) Following Multidisciplinary Management at a Tertiary Referral Centre** *582*
Ronak Patel, Andrew McKean, Dima El-Sharkawi, Ayoma Attygale, Andrew Wotherspoon, Rachel O'connell, Joseph Ward, Aadil Khan, Marios Tasoulis

PO286 **Against The Odds: A Case of Metachronous Quadruple Primary Cancers in a Single Patient** *583*
Raissa Maxine Que, Joyce Hazel Chua

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Plenary Lecture

Go Beyond Cure of Breast Cancer

Modern Axillary Surgery in Node-positive Breast Cancer - Where Are We Going?

Jana de Boniface

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This plenary lecture will discuss the role of modern axillary surgery in node-positive breast cancer, both in the setting of upfront surgery and when performed after preoperative systemic treatment. We will differentiate between situations where axillary surgery may play a therapeutic role and situations where axillary surgery mainly serves staging purposes. Naturally, staging requirements are changing with the systemic treatment landscape, and a delicate balance must be struck between providing necessary diagnostic information and minimizing long-term arm morbidity.

Precision Oncology in Motion: Evolutionary Insights, Clinical Impact and Future Directions in Breast Cancer

Masakazu Toi

Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital, Department of Hospital Management, Japan

In a clinical trial evaluating FEC-Docetaxel therapy, I encountered a case where the tumour achieved a complete response (CR) with FEC but rapidly progressed upon transition to Docetaxel. The progression was exceptionally remarkable, prompting considerations of underlying mechanisms such as treatment-resistant clonal expansion and potential protumour effects induced by chemotherapy. Based on these observations, I hypothesized that tumour microenvironment dynamics, particularly chronic inflammation maintained by positive feedback loops, could be contributing factors. This concept was rooted in our research on tumour microenvironment interactions conducted in the 1990s, where we proposed that in breast cancer, the microenvironment sustains a chronic inflammatory state via such positive feedback mechanisms.

In treatment-resistant tumours, we postulated that therapeutic stress might further accelerate this inflammatory feedback loop, exacerbating resistance and tumour progression. To disrupt this circuit, targeting thymidine phosphorylase (TP) emerged as a promising approach, given its role in tumour angiogenesis and prodrug activation. This led to a focus on capecitabine, a TP-dependent prodrug, and the design of the CREATE-x trial. The trial targeted patients with residual invasive disease post-neoadjuvant multi-drug chemotherapy who were at high risk for poor prognosis, particularly those with non-pCR status.

During protocol development, we primarily relied on evidence from oral fluoropyrimidines established in Asian populations. Multiple discussions and revisions among Korean and Japanese investigators refined the trial design, resulting in a pragmatic and sophisticated clinical protocol. The CREATE-x trial\'s design and outcomes have since significantly influenced subsequent neoadjuvant and adjuvant clinical trial strategies. Identifying high-recurrence-risk patients and guiding therapy escalation has become widespread. This approach has facilitated the development of novel therapies, including anti-HER2 antibody-drug conjugates (ADCs), S-1, CDK4/6 inhibitors, and PARP inhibitors, many of which have demonstrated significant efficacy and are now incorporated into clinical practice.

Understanding the natural evolutional history and pathogenesis of primary breast cancer is essential for devising preventive and therapeutic strategies. Collaborative research with Prof. Seishi Ogawa and colleagues indicated that initial genomic abnormalities may occur during puberty, suggesting that the evolution of Luminal A and invasive lobular carcinomas should be viewed within a woman's entire lifespan. Although recent studies have begun elucidating the mechanisms underlying TNBC, HER2-positive, and Luminal B subtypes, integrating biological evolution into future prevention paradigms remains crucial. Interventions targeting lifestyle, hormonal factors, and other modifiable variables could significantly influence tumour evolution, requiring

further basic and clinical research.

The integration of evolutionary dynamics with precision medicine represents a promising frontier in future oncological medicine. Advances in liquid biopsy technologies will facilitate monitoring of tumour evolution and therapeutic response. The incorporation of AI-driven drug discovery is expected to drastically shorten the timeline for developing targeted therapies. To realize these innovations, healthcare infrastructure must evolve into a next-generation system capable of semi-automated extraction of clinical data, integrative analysis of imaging, pathological, and molecular datasets, and precise patient stratification in clinical trials. Such digital transformation and AI integration will accelerate the translation of molecular biological insights into innovative treatments, opening new horizons in breast cancer research and precision oncology.

Next Generation ADCs

Giuseppe Curigliano

Univ. of Milano, Department of Oncology and Hemato-Oncology, Italy

Antibody–drug conjugates (ADCs) represent a promising approach in cancer therapy, enabling the targeted delivery of highly cytotoxic payloads to tumour cells. However, unlocking the full potential of this platform requires innovative molecular designs that address key clinical challenges, including drug resistance, tumour heterogeneity and treatment-related toxicity.

A range of next-generation ADC formats has emerged, such as bispecific constructs, conditionally active agents (also referred to as probody–drug conjugates), immune-stimulating ADCs, protein-degrader ADCs and dual-payload systems. Each of these formats provides distinct advantages in overcoming specific limitations. For instance, probody–drug conjugates can improve tumour selectivity, whereas bispecific and dual-payload ADCs may help counter resistance and heterogeneity through enhanced functional activity. Meanwhile, immune-stimulating and protein-degrader ADCs introduce alternative mechanisms of action, offering opportunities for combination or multimodal therapeutic strategies.

Despite this progress, careful patient stratification and robust biomarker identification remain essential to maximize clinical benefit, as these approaches help identify individuals most likely to respond. Continued advances in tumour biology, together with improvements in ADC design, are expected to drive the development of more effective and safer therapies for patients with refractory disease.

We outline recent progress across the key components of ADCs — including the monoclonal antibody, payload, linker and conjugation chemistry — and discuss representative examples of emerging formats enabled by engineering innovations in one or more of these elements.

What Does it Take to Make Precision Oncology Precise?

Laura Esserman

Univ. of California, San Francisco, Department of Surgery, U.S.A.

The goal of the I-SPY 2 Breast Cancer platform trial is to refocus drug development on the high-risk early stage setting where an excellent response translates to a cure- the prevention of metastatic disease. Treatments in the metastatic disease delay the onset of progression and death, but cure is unlikely. For the last 2 decades, the I-SPY TRIAL program has been re-engineering the clinical trial process. We have made trials more efficient, patient-centered, and biologically driven. By innovating how patient responses are measured, employing novel biomarkers, and rapidly measuring efficacy signals, the I-SPY trials have identified how best to use and sequence new agents. Several agents that have graduted from I-SPY are now standard of care. One of the early endpoints, complete pathologic response, has increased from 19% to nearly 60% over the course of 15 years. The I-SPY network of over 200 US oncologists and surgeons in more than 45 sites, have built an infrastructure to begin testing new agents within a month of submission to IRBs and FDA, rapidly accruing across the country, adopting new biologic assays, and evaluating patient responses with novel endpoints. The I SPY Trial design for breast cancer has evolved from adapting within the trial to make sure the next patient gets the therapy that works best for their subtype to a trial that enables adapting to the response for each individual to improve efficacy and or reduce toxicity. The backbone is now a Sequential Multiple Assignment Randomized Trial. or SMART design. This allows both individualization of treatment, which is patient-centered, and population specific., which allows evaluation of trial level effects for specific tumor subtypes. The pivotal feature that enables this innovation is the incorporation of robust early endpoints of response at multiple timepoints. Intermediate predictors that predict the prevention of metastatic disease, or distant recurrence free survival, measured at the end of neoadjuvant therapy, include continuous measures of response by imaging (MRI functional tumor volume), pathology (residual cancer burden), circulating tumor burden (ctDNA). Early endpoints, that enable response adaptive treatment over the course of care include combining these same features to determine when therapy can be stopped or when response is not sufficient with the current treatment and patients need to move to the next block of therapy. This design is an efficient way to test new agents, optimize care of patients, and rapidly find strategies that optimize outcomes and prevent metastases. Integrating response predictive subtypes enhances the performance of early endpoints. The I SPY 2 platform enables us to better understand the biology of the different tumor types, and to better understand why a treatment succeeds or does not succeed in improving outcomes. The platform allows us to better understand drivers of resistance and develop strategies to overcome it, interrogating tissues and organoids from poor responders, and using organdies from residual disease to screen new agents, to set priorities for I-SPY clinical leadership, to identify partners and agents that can be rapidly tested and screened for more successful rescue. options

The key is to identify the right drug for the right patient, rather than to treat all patients the same. The model pioneered with I-SPY is scalable. These principles and our efficient trial process was employed during the COVID pandemic to rapidly evaluate multiple agents in critically ill patients for BARDA and has led to integrating subtypes of ARDS into next generation trials in this condition.

Moderately Hypofractionated Locoregional Radiation Therapy of High-risk Breast Cancer, Results from the Phase III Randomized DBCG Skagen Trial 1 and HYPO G-01 Trial

Birgitte Offersen

Aarhus Univ. Hospital, Department of Experimental Clinical Oncology, Aarhus Univ. Hospital, Dept. Oncology, Aarhus Univ. Hospital, Dept. Clinical Medicine, Aarhus Univ., Danish Centre for Particle Therapy, Aarhus Uni, Denmark

Moderately hypofractionated radiation therapy (RT) for early breast cancer patients operated with breast conservation for node-negative disease has become standard therapy during the recent decade in most countries. The evidence base is relatively good for whole breast irradiation, and 40Gy/15fractions is the preferred fractionation scheme with a solid evidence base. However, the evidence base using 40Gy/15fr for patients with indication for loco-regional RT was very limited until recently. Every one in three to four breast cancer patients in a mammography screened cohort requires loco-regional RT, thus this patient group is large in all departments providing RT.

Two large randomized, clinical trials have now reported results using essentially the same primary and secondary endpoints, RT techniques and follow up schemes. The groups behind the two trials worked closely together when conducting, evaluating and reporting results, thus providing optimal conditions for comparison for results. The trials are the Danish Breast Cancer Group (DBCG) Skagen trial 1 and the French HypoG-01 trial.

Both trials included early breast cancer patients with an indication for loco-regional RT, and the randomization was 50Gy/25fr (standard) versus 40Gy/15fr (experimental). The primary endpoint was 3-yr ipsilateral arm lymphedema defined as ≥10% arm increase measured 15cm proximal and/or 10cm distal to the olecranon compared to the contralateral arm (DBCG Skagen trial 1) or baseline (HypoG-01 trial). Secondary endpoints included other loco-regional morbidities (e.g., impaired shoulder movement, induration, telangiectasia, dyspigmentation, pain, patient reported outcomes, and pattern of cancer recurrence). Both trials were non-inferiority trials, and estimated a 10% 3-yr risk of lymphedema with 50Gy/25fr accepting an increase to 15% with 40Gy/15fr. To exclude a higher risk than 15% with 40Gy/15fr, 1012 patients with 3-yr follow up were needed. The DBCG Skagen trial 1 continued accrual of patients until 1012 patients had 3-yr follow up, whilst the HypoG-01 stopped accrual when 1200 patients had been enrolled (accounting for loss of follow up). In this presentation results from first analysis of the primary and secondary endpoints are presented.

The DBCG Skagen trial 1 accrued 2908 patients during 2015-2021, and the HypoG-01 trial accrued 1221 patients during 2016-2020. Median follow up was 5 years in both trials. Results on primary and secondary endpoints are compared from the trials. In addition, results from acute morbidity evaluations in the HypoG-01 trial, validation of the ESTRO consensus for target volume delineation, and RT quality assurance from both trials are presented.

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Advancing Endocrine Based Therapy to Treat Breast Cancer

Nicholas Turner

Royal Marsden Hospital, Department of Oncology, U.K.

GBCC 2026
Global Breast Cancer Conference 2026

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Symposium

Go Beyond Cure of Breast Cancer

Challenging Decisions: Interpreting Genomic Assays in Premenopausal and Node-Positive Patients

Eleftherios (Terry) Mamounas

AdventHealth Cancer Center, Department of Surgery, U.S.A.

Rates of loco-regional recurrence, distant recurrence, and breast cancer mortality have steadily declined since the mid-1980s at the expense of significant overtreatment, underscoring the need for individualizing adjuvant systemic therapies.

Since the introduction of molecular subtyping by Sorlie and Peru in 2000, several commercially genomic classifiers have been shown to predict risk of distant recurrence in patients with HR+/HER2- breast cancer. Some of these genomic classifiers have also shown to predict risk of loco-regional recurrence and late recurrence as well as benefit from adjuvant endocrine therapy, adjuvant chemotherapy, or extended endocrine therapy.

The 21-gene recurrence score was validated in the B-14 trial for prediction risk of distant recurrence but, in addition, it was found to predict benefit from adjuvant tamoxifen in that trial and benefit from adjuvant chemotherapy in the B-20 trial (for node-negative patients) and in SWOG 8814 trial (for postmenopausal node-positive patients).

These observations were subsequently validated prospectively in two randomized clinical trials (TAILORx and RxPONDER). Both trial showed no significant benefit from the addition of adjuvant chemotherapy to adjuvant endocrine therapy in postmenopausal patients with low/intermediate RS. However, premenopausal patients with similar RS obtained a significant benefit from the addition of adjuvant chemotherapy to adjuvant endocrine therapy whether they were pN0 or pN1.

In addition, neoadjuvant chemotherapy trials in ER+/HER2- patients with low/intermediate RS have shown low pathologic response (pCR) rates, irrespective of menopausal status.

Furthermore, in the SOFT/TEXT trials, premenopausal patients at high-risk for recurrence benefited from ovarian function suppression plus an aromatase inhibitor even if they had received adjuvant chemotherapy.

Based on the above information, it is reasonable to hypothesize that the observed benefit from adjuvant chemotherapy in premenopausal patients with low/intermediate RS may be the result of the endocrine effect of chemotherapy through induction of ovarian function suppression.

To address the above hypothesis, a prospective, phase III randomized clinical trial has been initiated (NRG BR009 or OFSET Chemo). The trial randomizes premenopausal, node-negative and node-positive patients (1-3 + nodes) with low/intermediate recurrence score to OFS + AI vs. adjuvant chemotherapy + OFS + AI. The primary objective of the trial is to determine whether adjuvant chemotherapy added to ovarian function suppression plus an aromatase inhibitor is superior to ovarian function suppression plus an aromatase inhibitor in improving invasive breast cancer-free survival. Target accrual is 3,960 patients. As of 3/25/26, 546 patients have been randomized.

Genomic Assays in ER-Positive Breast Cancer: From Prognosis to Endocrine Activity Assessment and Therapeutic Decision-Making

Otto Metzger

Dana-Farber Cancer Institute, Department of Medical Oncology, U.S.A.

Emerging Roles of Genomic Assays in Non-Luminal Breast Cancer: Beyond Hormone Receptor Positivity

Airi Han

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The clinical management of breast cancer has traditionally relied on estrogen receptor (ER) and HER2 status as key determinants of tumor biology and treatment strategy. However, transcriptomic profiling has demonstrated that approximately 510% of clinically ER-positive/HER2-negative (ER+/HER2) tumors exhibit non-luminal intrinsic subtypes, most commonly HER2-enriched (HER2-E) or Basal-like. These tumors represent biologically distinct entities characterized by higher proliferative activity, genomic instability, and reduced dependence on estrogen signaling, challenging the conventional assumption that ER positivity uniformly reflects luminal biology. This presentation examines the clinical and biological significance of these non-luminal intrinsic subtypes and discusses the role of genomic assays in identifying high-risk ER+ tumors that may require alternative therapeutic strategies.

Molecular analyses have revealed that ER+ HER2-E and Basal-like tumors share several genomic and transcriptional features associated with aggressive disease. HER2-E tumors frequently demonstrate activation of growth factor signaling pathways and increased cell-cycle activity, while ER+ Basal-like tumors exhibit molecular characteristics overlapping with triple-negative breast cancer, including TP53 alterations and dysregulation of cell-cycle control. These biological features are associated with reduced endocrine sensitivity and a more inflamed tumor microenvironment compared with Luminal A or Luminal B subtypes, supporting the concept that intrinsic subtype classification provides clinically meaningful information beyond immunohistochemistry.

Clinical evidence further supports the prognostic and predictive relevance of intrinsic subtypes. Pooled analyses of the MONALEESA trials have shown that patients with HER2-E tumors in the metastatic ER+/HER2 setting have poorer survival outcomes compared with luminal subtypes, while also deriving substantial benefit from CDK4/6 inhibition combined with endocrine therapy. In the neoadjuvant and perioperative setting, studies such as the POETIC trial have demonstrated that early Ki67 response to short-term aromatase inhibitor exposure varies significantly by intrinsic subtype, with HER2-E and Basal-like tumors more frequently showing endocrine non-responsiveness. These findings suggest that intrinsic subtype classification may help identify patients who are less likely to benefit from endocrine therapy alone and who may require more aggressive or alternative systemic approaches.

Large-scale genomic and clinical datasets have also suggested that non-luminal ER+ tumors exhibit higher responsiveness to chemotherapy compared with Luminal A disease, despite reduced endocrine sensitivity. This apparent divergence highlights the importance of biological stratification within ER+ breast cancer and supports a more individualized therapeutic approach based on intrinsic subtype rather than receptor status alone.

In clinical practice, validated transcriptomic assays such as PAM50-based Prosigna and BluePrint enable identification of intrinsic subtypes that are not captured by standard immunohistochemistry. By integrating molecular subtyping into treatment decision-making, clinicians may better recognize biologically aggressive ER+ tumors and tailor systemic therapy accordingly. Continued prospective studies are needed to clarify optimal treatment strategies and to define how intrinsic subtype classification should be incorporated into routine clinical algorithms for ER+/HER2 breast cancer.

Biomarker-driven Radiotherapy in Early Breast Cancer

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Introduction

Adjuvant radiotherapy (RT) following breast-conserving surgery (BCS) has established itself as a definitive standard of care for early-stage breast cancer, significantly reducing locoregional recurrence. However, the clinical challenge remains that the therapeutic benefit of radiation is not uniformly distributed across all patient populations. While some individuals harbor biologically aggressive disease necessitating intensive treatment, others with very low-risk tumors may be safely spared the potential side effects of radiation without compromising oncological outcomes. The transition from a "one-size-fits-all" approach to personalized medicine requires the integration of molecular tumor characteristics with traditional clinicopathologic factors. This presentation aims to evaluate the current landscape of genomic biomarkers and clinical trials that are redefining the role of radiotherapy in early breast cancer.

Genomic Signatures: The Predictive Power of ARTIC and POLAR

The first major advancement in identifying patients who truly benefit from RT lies in genomic signatures, specifically the ARTIC and POLAR classifiers. The Adjuvant Radiotherapy Intensification Classifier (ARTIC) is a clinicogenomic tool comprising a 27-gene expression profile combined with patient age. Validated in the SweBCG91-RT trial, ARTIC has demonstrated its ability to identify low-risk patients who experience a significant reduction in locoregional recurrence through RT, while high-risk patients may require treatment intensification, such as a tumor-bed boost or regional nodal irradiation, due to persistent recurrence risks even after standard RT.

Similarly, the Profile for the Omission of Local Adjuvant Radiation (POLAR) uses a 16-gene signature to predict RT benefit. Analysis of randomized trials indicates that patients with a "POLAR-low" profile derive no significant survival or recurrence benefit from RT, whereas "POLAR-high" patients show clear therapeutic gains. Notably, these signatures capture distinct radiobiological aspects compared to common assays like Oncotype Dx, highlighting the necessity of radiation-specific genomic tools to refine patient selection in the era of modern adjuvant systemic therapy.

Evidence for Radiotherapy Omission: LUMINA and IDEA Studies

To address the safety of omitting RT altogether, two landmark prospective cohort studies, LUMINA and IDEA, provide critical insights. The LUMINA study focused on women aged 55 or older with Luminal A biology (defined by Ki67 ≤ 13.25%). In this highly selected population treated with endocrine therapy alone, the 5-year cumulative incidence of local recurrence was a mere 2.3%, comfortably below the prespecified safety threshold.

The IDEA trial utilized the Oncotype Dx recurrence score (≤ 18) to define ultra-low genomic risk in postmenopausal women aged 5069. With a 5-year freedom from any recurrence reaching 99%, IDEA reinforces the prospect that genomic profiling can successfully identify a subset of patients where RT omission is

oncologically safe. Despite these promising results, limitations such as the reproducibility of Ki67 assays and the need for longer follow-up for late recurrences in hormone receptor-positive disease necessitate further prospective validation.

Current Frontiers: Ongoing Prospective Clinical Trials

Building upon these foundations, five major ongoing clinical trials are currently seeking to provide higher-level evidence for biomarker-driven RT decisions:

PRECISION: Testing the safety of RT omission in patients identified as low-risk by the Prosigna (PAM50) assay.

EXPERT: A randomized trial evaluating the 10-year local recurrence rate in patients with a Prosigna Risk of Recurrence score ≤ 60.

PRIMETIME: Utilizing the IHC4+C biomarker, a cost-effective combination of immunohistochemistry and clinical factors, to define patients eligible for RT omission.

DEBRA: A randomized trial specifically assessing RT omission in patients with an Oncotype Dx score ≤ 18, aiming to provide more robust evidence than previous single-arm studies (IDEA).

TAILOR RT: Uniquely addressing the role of regional nodal irradiation in node-positive patients (13 positive nodes) with an Oncotype Dx score ≤ 25, targeting a significant unmet clinical need.

Conclusion

The integration of genomic biomarkers into clinical practice marks a paradigm shift toward truly personalized care in breast radiation oncology. While the LUMINA and IDEA studies have demonstrated that RT omission is a valid option for selected low-risk Luminal A patients, the results of ongoing randomized trials (PRECISION, EXPERT, PRIMETIME, DEBRA, and TAILOR RT) will be essential to establish definitive clinical guidelines. Until higher-level evidence is fully matured, shared decision-making that considers patients' preferences remains crucial.

Biology-guided Radiotherapy in Oligometatatic Breast Cancer

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Cardiac Risk Mitigation in Breast Cancer Radiotherapy

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Adjuvant radiation therapy (RT) of high-risk breast cancer patients leads to an improved breast cancer survival and overall survival. However, there are also risks from RT, and at longer follow up radiation induced heart disease (RIHD) may become a challenge. Since 2013, a dose response relationship between mean heart dose and risk of major cardiac events has been known.

Several issues are to be considered when approving treatment plans for individual breast cancer patients: what is the target for RT, are there cardiac risk factors, how to improve the treatment plan, thus how to balance gains and risks.

In this presentation, tips & tricks from daily clinical work are presented to improve the balance between gains from RT versus risks of RIHD. These include selecting the right target for RT, how to optimize the technique for respiratory gating and patient positioning, and using advanced treatment techniques including VMAT and proton therapy.

AI-Augmented Mammography in Population Screening: Real-World Results from Korea

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Screening mammography has significantly reduced breast cancer mortality through early detection, yet important limitations remain in real-world practice. Diagnostic performance varies according to reader experience, lesions are frequently obscured in women with dense breasts, and screening programs need to improve cancer detection with acceptable recall and false-positive rates. In Korea, where nearly 70% of women have dense breasts and screening is performed using a single-reading system, improving both diagnostic accuracy and reading efficiency remains a critical clinical need.

Artificial intelligence computer-aided detection (AI-CAD) has emerged as a promising tool to address these challenges. Reader studies and meta-analyses consistently demonstrate that radiologists assisted by AI achieve higher diagnostic accuracy than radiologists reading alone. Stand-alone AI performance is comparable to that of radiologists, indicating strong baseline capability [1,2]. However, large-scale prospective studies are required to validate these retrospective results before clinical implementation.

Recent prospective trials provide important real-world evidence supporting AI integration into screening workflows. In European double-reading systems, studies such as the ScreenTrust CAD and MASAI trials demonstrate that AI can safely replace one human reader or be used for AI scorebased triage, resulting in substantial workload reduction while maintaining or improving cancer detection. Importantly, many additional cancers detected with AI were early invasive cancers or clinically relevant ductal carcinoma in situ, supporting true clinical benefit rather than overdiagnosis [3-8].

The Korean AI-STREAM study represents a prospective implementation of AI within a single-reading workflow. AI-assisted reading improved cancer detection across all reader groups, with a 13.8% increase observed among experienced breast radiologists without increasing recall rates. Less-experienced readers benefited more in detection but showed higher recall rates, while AI stand-alone performance exceeded that of less-experienced readers but remained inferior to expert radiologists in recall rate [9].

Secondary analyses showed that AI abnormality scores provide meaningful risk stratification, with higher scores associated with higher positive predictive values. However, both AI-only detected and AI-missed cancers were observed, particularly in women with dense breasts. In dense breasts with low AI scores, cancer risk remains non-negligible, emphasizing the need for cautious interpretation and careful human review [10].

Overall, prospective evidence supports the safe integration of AI into population-based mammography screening. However, AI is not yet suitable as a stand-alone reader, as some cancers are still missed and long-term outcomes, including interval cancer reduction, are not yet fully established. The greatest value of AI lies not in

replacing radiologists, but in complementing their expertise through workflow-adapted integration. For safe and effective implementation, national guidelines, quality assurance systems, and clear medicolegal frameworks are essential, with final clinical decision-making remaining the responsibility of radiologists.

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J-START Follow-up: Long-Term Outcomes of Combined Mammography Plus Ultrasound Screening

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Background: Mammography is the only breast cancer screening modality for which a reduction in breast cancer mortality has been established. However, its sensitivity is limited in younger women and in those with dense breasts. This issue is particularly relevant in Asian populations, including Japan, where breast cancer incidence rises substantially after age 40 and dense breast tissue is common among women aged 40-49 years. The Japan Strategic Anti-cancer Randomized Trial (J-START) was designed to evaluate effectiveness of adjunctive ultrasonography in this population. The initial report showed improved sensitivity, increased cancer detection, and fewer interval cancers with adjunctive ultrasonography. In the present long-term follow-up analysis, we examined the cumulative incidence of advanced breast cancer as a prespecified secondary outcome.

Methods: J-START was a multicentre randomized controlled trial conducted at 42 study sites in 23 prefectures in Japan. Asymptomatic women aged 40-49 years were randomly assigned in a 1:1 ratio, by individual or cluster randomization, to undergo either mammography plus ultrasonography or mammography alone. Participants underwent two screening rounds over a 2-year period. In this prespecified secondary analysis, the outcome was the cumulative incidence of advanced breast cancer, defined as stage II or higher according to the TNM classification. Outcome ascertainment was based on trial screening data, reports from screening facilities, participant self-report, regional cancer registries, and national vital statistics, with confirmation by medical record review.

Results: A total of 72,661 women were included in the long-term analysis, with 36,723 in the intervention group and 35,938 in the control group. Median follow-up was 11.4 years in the intervention group and 11.3 years in the control group. Overall, 894 breast cancers were detected in the intervention group and 843 in the control group. Among these, 234 (26.1%) in the intervention group and 277 (32.8%) in the control group were classified as advanced cancers. Adjunctive ultrasonography was associated with a significant reduction in the cumulative incidence of advanced breast cancer (hazard ratio 0.83, 95.6% CI 0.70-0.98; $p = 0.026$). The between-group difference emerged approximately 4 years after randomization, widened until around 8 years, and then remained stable thereafter. The intervention group also showed a higher proportion of early-stage cancers than the control group (72.3% vs 65.4%). By contrast, no significant difference was observed in the cumulative incidence of overall breast cancer.

Conclusions: Adjunctive ultrasonography reduced the cumulative incidence of advanced breast cancer in women aged 40-49 years. These findings support the potential role of adjunctive ultrasonography in improving long-term screening outcomes, particularly for younger women with dense breasts in Asian populations. Although the reduction in advanced breast cancer is clinically meaningful, breast cancer mortality remains the

ultimate endpoint, and further follow-up is required to determine whether this stage shift translates into a mortality benefit.

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Risk-Based Screening and Emerging Biomarkers: The Glandular Tissue Component (GTC)

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In the 5th Edition of BI-RADS (2013), tissue composition on US is defined as a homogeneous or heterogeneous background echotexture in terms of the balance between FGT and fat similar to mammographic density. The sonographic appearance of FGT, however, varies between individuals and changes over time in the same individual. With aging, breast lobules involute physiologically, and the extent of the glandular component decreases. Studies evaluating the degree of lobular involution in the background tissue using benign breast biopsy specimens have found an association between the degree of lobular involution and a reduced risk of breast cancer. We proposed a method to classify the glandular tissue component (GTC) of FGT at breast US in 2017 and many institutions in East Asia include the GTC category in breast US report. In line with the shift towards personalized medicine, it is becoming increasingly important to discover image characteristics related to individual predisposition to specific diseases. If sonographic GTC can provide additional risk information beyond mammography, then it has the potential to serve as an imaging biomarker for risk stratification and may be used to develop a personalized breast cancer screening algorithm.

In this talk, I briefly describe the classification, influencing factors, and histology of sonographic GTC, and discuss an association of sonographic GTC and future breast cancer risk in women with dense breasts. I also discuss clinical applicability of sonographic GTC as an imaging biomarker for risk stratification and directions for future work.

* BI-RADS v2025 introduces the GTC as a new element of breast tissue composition assessment on ultrasound.

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Prophylactic Lymhovenous Anastomosis (Immediate Lymphatic Reconstruction)

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Lymphedema is a chronic condition characterized by damage to the lymphatic vessels, fat hypertrophy, tissue fibrosis, and, ultimately, progression to skin ulcers and cellulitis. Although many physiological surgical techniques, such as lymphaticovenular anastomosis (LVA) and vascularized lymph node transfer (VLNT), have been introduced recently due to advances in microsurgical techniques, their effectiveness remains limited, and lymphedema is still considered a difficult-to-treat condition.

More than 95% of lymphedema cases occur following lymph node dissection during cancer surgery; in the case of relatively common upper extermity lymphedema, it is known to occur in 20–25% of patients who undergo axillary lymph node dissection. Consequently, the idea that anastomosing the cut ends of lymphatic vessels directly to adjacent blood vessels at the site of lymph node dissection would help prevent lymphedema naturally gained attention. In 2009, the Boccardo group in Italy first introduced this concept under the term "Lymphatic Microsurgical Preventive Healing Approach (LYMPHA)." In 2014, they garnered significant attention by reporting that, following a four-year follow-up of 71 patients who underwent the LYMPHA procedure, only 4.05% of those who received the preventive procedure developed lymphedema under identical conditions, confirming its effectiveness in prevention. [1] Since then, leading centers worldwide, including the University of Genoa in Italy, Harvard University and the Cleveland Clinic in U.S, have performed the preventive procedure, and sporadic reports confirming its effectiveness have been published.

The surgical procedure is relatively simple: first, approximately 2.5 mL of blue dye is injected into the medial intramuscular groove of the ipsilateral upper limb, followed by a 5-minute massage to allow the dye to travel up to the amputation site. This process is called Axillary Reverse Mapping (ARM). Thompson et al. reported that the ARM method allows for the identification of arm lymphatics in approximately 61% of patients. [2] The severed lymphatic vessels identified through this process are then anastomosed to nearby blood vessels. Initially, unlike standard lymphatic-venous anastomosis, it was reported that sufficient results could be achieved by anastomosing the vein in a sleeve-in fashion—including the tissue surrounding the anastomosis site—without dissecting the lymphatic vessel. However, due to risks such as fat embolism and other complications, recent guidelines emphasize the need for precise anastomosis of the endothelium between the blood vessel and the lymphatic vessel.

In Korea, this procedure began to be performed in 2019 and is now widely practiced at many centers. Although some studies published in the Plastic and Reconstructive Surgery (official journal of the American Society of Plastic Surgeons) have reported minimal efficacy, numerous papers, systematic reviews, and meta-analyses have established a consensus in the academic community that ILR reduces the risk of BCRL. Furthermore, as long-

term follow-up results—which surpass the previously limited short-term data—are being published one after another, this procedure has now become established as a routine preventive technique.

The most critical issue in immediate lymphatic reconstruction (ILR) surgery moving forward is the question of "who should receive it," that is, the issue of indications. In the past, it was performed on all patients undergoing ALND, but it is now recommended to be performed selectively in patients receiving radiation therapy, those undergoing extensive ALND, and those with a high BMI. Second, because the surgery itself is technically challenging, it is expected that standardized techniques will be established to do preoperative mapping more accurately in less time and achieve better outcomes. In this regard, the results of large-scale, multicenter prospective studies currently underway in the United States are expected to provide a new evidence base. Reports suggesting that breast reconstruction using flaps based on the lymph axiality theory itself has a preventive effect against lymphedema are expected to lead to the exploration of more advanced lymphatic reconstruction techniques.

In this presentation, we will briefly review the history and methods of ILR and focus on introducing recent clinically significant changes and updated information to the audience.

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Lymphovenous Anastomosis for Treatment of Breast Cancer Related Lymphedema (BCRL)

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Lymphedema of extremities is a chronic, debilitating disease. The more severe it becomes, the harder it becomes to treat. Lymphaticovenous anastomosis (LVA) is effective and minimally invasive surgery for compression-refractory breast cancer-related lymphedema (BCRL). Although the concept of this surgical procedure is simple, without advanced imaging techniques for selection of lymphatic vessels, the efficacy of LVA will be limited in moderate to severe lymphedema cases.

We present our strategy of effective LVA for BCRL, which may overcome the weakness of the past strategy. Our current updated strategy using advanced technologies for lymphedema supermicrosurgery may open new frontiers and have infinite possibilities.

Vascularized Lymph Node Transfer for the Treatment of Breast Cancer Related Lymphedema (BCRL)

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VLNT involves harvesting healthy lymph nodes from a donor sites, commonly the inguinal or supraclavicular regions and transferring them to the recipient site. For BCRL, the recipient site is typically the axilla or distal areas like the wrist and forearm.

The transferred lymph nodes function through several key mechanisms. Lymphangiogenesis: The nodes release growth factors like VEGF-C to stimulate the growth of new lymphatic vessels. Lymphovenous Communication: Often called the "Pump" mechanism, the nodes possess inherent connections that shunt excess lymph fluid directly into the venous system. "Wick" Effect: The transferred tissue acts as a bridge, wicking up interstitial fluid toward functional channels.

Clinical evidence supports these mechanisms. Studies have shown a dramatic reduction in cellulitis episodes. Furthermore, about 88% of patients remained entirely infection-free post-surgery. We also see significant improvements in volume reduction and overall patient satisfaction.

It is important to distinguish VLNT from Lymphaticovenous Anastomosis (LVA). While LVA is excellent for early-stage patients with functional vessels, VLNT is the preferred choice for advanced stages (Stage II-III) where severe fibrosis is present and functional vessels are scarce. VLNT is more invasive but provides a sustainable solution that is independent of the existing lymphatic vessel quality.

My preferred method is the Inguinal Lymphatic Complex Transfer. To ensure safety and efficacy, we use Pelvis CT for evaluation and Technetium 99m lymphoscintigraphy for "Reverse Lymphatic Mapping". This mapping is crucial to distinguish which nodes to harvest and which to preserve to prevent donor site lymphedema.

VLNT is highly versatile. It can be performed simultaneously with breast reconstruction, such as using a TRAM flap while placing the groin lymph flap in the axilla. Additionally, for patients with significant adipose tissue, we can combine VLNT with adjunctive liposuction, typically performed 6 to 12 months after the initial transfer once the fluid accumulation has subsided.

In conclusion, Vascularized Lymphatic Complex Transfer is a highly effective treatment for advanced BCRL. By using meticulous techniques like reverse lymphatic mapping, we can avoid donor site complications. When combined with procedures like liposuction, we can achieve optimal functional and aesthetic outcomes for our patients. Thank you for your attention.

Surgical Decision-Making of Axilla Response After Neoadjuvant Therapy: The Role of Biomarkers

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The management of the axilla after neoadjuvant therapy is complex and evolving. There are several factors that should inform our approach to surgical management as well as shared decision making with patients.

The key points will include:

1.Does burden of disease at presentation dictate outcomes?

For this I will review the predictors of event free survival after neoadjuvant therapy as well as whether involvement of intramammary node involvement is an independent risk factor

2. How should we incorporate assessment of response after neoadjuvant therapy?

Review the various biomarkers that can be used measure response to neoadjuvant therapy and their impact on both local and distant recurrence. I will discuss the complex biomarker strategy currently in use in the I SPY 2.2 Trial to predict near complete response will be shown along with planned improvements based on integration of improved tumor subtyping. We also use prediction of poor response to enable patients to move to the next block of therapy.

3. What dictates complications of surgery?

We will review the impact of full node dissections and radiation on reconstruction outcomes and lymphedema risk

4. How can apply lessons from trials in the upfront surgical setting to the neoadjuvant setting?

We will review the data from AMAROS and how this has impacted axillary dissection in the non-neoadjuvant setting. The AMAROS trial (EORTC 10981-22023) found that axillary radiotherapy (ART) provides comparable 5-year and 10-year locoregional control and survival to axillary lymph node dissection (ALND) in early-stage breast cancer patients with a positive sentinel node. Importantly, ART causes significantly less lymphedema, making it a preferred, less morbid alternative to surgery. These results are applicable in the neoadjuvant setting as well.

5. Are there emerging new biomarkers to assist with decision making?

We will review a recent publication on how ctDNA could inform decisions on axillary dissection

6. Decision making in context:

By putting the focus on improving distant recurrence outcomes we will necessarily improve local outcomes and reduce morbidity

Decisions about axillary management should focus on the overall goals of therapy, the likelihood of recurrence both local and distant, and strategies to reduce the chance of surgical complications. It is important to consider whether more aggressive intervention will truly improve outcome and for whom and whether additional surgery is of value in the setting of radiation and additional adjuvant therapy. Finally, there is the consideration of the timing of surgery. Does every patient with risk need therapy up front or can interventions be sequenced at the time of a local recurrence. In the setting of neoadjuvant therapy, preoperative evaluation provides information on likely next steps of therapy. Then the question can be asked- what interventions are likely going to be needed? If radiation is highly likely, regardless of surgical approach, that can further inform decisions about the choice of breast conservation vs. mastectomy with or without reconstruction. Making choices to reduce the chance of complications and to enable focus on the therapy that is most likely to impact distant recurrence can provide better overall outcomes. Conversely, for the patient with a predicted excellent outcome, the goal should be to reduce surgical complications from extended surgery that will not improve survival or local recurrence risk.

Surgical Decision-Making of Breast Response After Neoadjuvant Therapy: The Role of Biomarkers

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Neoadjuvant systemic therapy (NST) is the standard of care for locally advanced and high-risk early breast cancer. The degree of tumor response from pathologic complete response (pCR) to significant residual disease directly determines the extent of breast surgery. Accurate response assessment is therefore critical to enable safe breast-conserving surgery (BCS) while avoiding unnecessary mastectomy. MRI has emerged as the most reliable modality for measuring residual tumor extent, and its integration with tumor biomarker profiles now forms the basis of biomarker-guided, MRI-directed breast surgical de-escalation.

This presentation reviews how biomarker profiles predict NST response and guide breast surgical planning, examines the role of biomarkers in BCS versus mastectomy decisions and oncoplastic approaches, discusses the emerging role of ctDNA as a liquid biopsy tool, and addresses surgical strategies for complete responders.

1. Subtypes and Prediction of Breast Response to NST

TNBC and HER2-positive subtypes demonstrate pCR rates of 4070%, frequently permitting BCS in tumors that were initially mastectomy-bound. Luminal A tumors, in contrast, exhibit limited chemosensitivity, and surgical planning must anticipate residual disease. Serial Ki-67 measurement between baseline biopsy and early NST cycles provides an early functional indicator of response, allowing adaptive surgical planning before NST completion.

2. MRI-Based Assessment and Breast Surgical De-escalation

Post-NST MRI is the gold standard for evaluating residual breast disease, with superior sensitivity over ultrasound or mammography, particularly in TNBC and HER2-positive subtypes. The pattern of MRI response concentric shrinkage versus fragmented residual enhancement critically influences surgical planning: concentric responders are well-suited for BCS with standard margins, whereas fragmented patterns may require wider excision or oncoplastic techniques despite apparent radiological response.

Biomarker subtype modulates the reliability of MRI assessment. MRI tends to overestimate residual disease in HER2-positive tumors and underestimate in lobular and luminal subtypes, necessitating subtype-specific interpretation. When MRI indicates complete or near-complete response in high-pCR subtypes (TNBC, HER2+), surgical de-escalation including clip-guided BCS with reduced margins is oncologically justified. The ACOSOG Z1071, SENTINA, and MD Anderson series have validated MRI-biomarker integrated algorithms for guiding BCS eligibility after NST.

3. Emerging Role of ctDNA: Future Directions

Circulating tumor DNA (ctDNA) represents a promising liquid biopsy tool for dynamic, non-invasive

monitoring of NST response. Early ctDNA clearance correlates with pCR and may complement MRI in future de-escalation algorithms, while persistent post-operative ctDNA signals minimal residual disease. However, ctDNA-guided breast surgical decision-making remains investigational and awaits prospective validation.

In conclusion, MRI-guided, biomarker-informed breast surgical de-escalation after NST enables individualized operative planning that maximizes breast conservation without compromising oncologic safety. Integration of tumor subtype, MRI response pattern, and RCB class provides a robust framework for tailoring surgical extent. ctDNA holds future promise as an additional layer of biological confirmation, but MRI combined with biomarker profiling remains the current cornerstone of precision breast surgery after NST.

Surgical Planning for Special Subtypes of Breast Cancer After Neoadjuvant Therapy: Beyond Ductal Carcinoma

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Background: Special histologic subtypes of breast cancer, accounting for up to 25% of all cases, pose distinct biological and surgical challenges that are inadequately addressed by guidelines developed primarily for invasive carcinoma of no special type (NST). The increasing use of neoadjuvant systemic therapy (NST) necessitates a subtype-informed approach to surgical planning.

Methods and Content: This presentation reviews the clinical, pathologic, and molecular characteristics of the most relevant non-ductal breast cancer subtypes including invasive lobular carcinoma (ILC) and rare triple-negative (TNBC) variants with a focus on their implications for surgical decision-making following primary systemic therapy.

Key Findings: ILC, representing approximately 15% of early breast cancers, exhibits a diffuse, discohesive growth pattern associated with a 3.4-fold higher risk of positive margins after breast-conserving surgery compared to NST. Pathologic complete response rates in ILC are low (47% in HR+/G1-2 disease), and pCR does not reliably predict survival outcomes. Among TNBC special subtypes, low-grade salivary gland-like tumors including secretory and adenoid cystic carcinomas harbor recurrent fusion genes and demonstrate indolent behavior, arguing against cytotoxic neoadjuvant treatment. Conversely, carcinoma with medullary features achieves pCR rates exceeding 80% and follows conventional surgical pathways.

Conclusions: Histologic subtype can be a central determinant of neoadjuvant treatment selection and surgical planning. A multidisciplinary approach, high-quality radiology, and precise pathologic characterization including CDH1 immunohistochemistry and genomic profiling are essential tools for optimal surgical planning.

Mammography AI 2025: What We Know—and What's Next

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Artificial Intelligence (AI) for mammography has been developed and now commonly used in clinical practice. Along with the validation studies showing the performance levels of AI, recent clinical trials prove that AI is ready for realworld implementation in terms of improved diagnostic performances of readers and reduced workload or interpretation time. In addition to AI for mammography interpretation, AI systems for risk prediction is now being validated to be used for personalized screening. Although AI development and its implementation is occurring rapidly, there are several practical issues to consider for safe and effective AI integration in our practice. During this session, we will discuss the current application of AI for mammography, summarize the results of recent studies, and review what more we need to investigate for clinical implementation.

Ultrasound CAD/CADx in Practice: HHUS Now, ABUS on the Horizon

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Breast ultrasound is widely used in diagnostic settings for the differential diagnosis of breast lesions based on morphological features such as shape, margin, orientation, echo pattern, and posterior acoustic features on B-mode images. It supports clinical decision-making, including biopsy recommendations, radiology-pathology correlation, and real-time guidance for interventional procedures. Its role in screening is also expanding, particularly for detecting breast cancer in women with dense breast tissue where mammographic sensitivity is reduced.

Despite these advantages, handheld ultrasound (HHUS) has intrinsic limitations, most notably high operator variability that depends heavily on experience and expertise. To overcome these limitations, artificial intelligence (AI)-based computer-aided detection and diagnosis (CAD/CADx) systems have been proposed to support diagnostic accuracy and democratize performance across different levels of ultrasound users. Currently, commercial AI-CAD systems are mainly designed to support lesion characterization as CADx tools—estimating malignancy probability or assigning BI-RADS categories after the user identifies regions of interest. In addition, AI-CAD for computer-aided detection (CADe) is increasingly being applied to enhance breast cancer detection in ultrasound, helping ensure that small invasive cancers are not overlooked.

Supporting real-time diagnostic workflow through ultrasound—a dynamic, video-based imaging method—presents unique technical challenges due to the demands of real-time AI inference. The author's group has developed an AI-CAD system specifically designed to seamlessly support both CADe and CADx functions in real time during HHUS. A key feature of this system is its integration of on-device inference technology, enabling AI processing directly on mobile PCs without requiring external servers or cloud infrastructure. Clinical evaluation has demonstrated the feasibility and initial clinical impact of this mobile AI solution in real-world practice, showing improvements in diagnostic accuracy and workflow efficiency.

Looking beyond HHUS, automated breast ultrasound (ABUS) offers standardized volumetric acquisition that eliminates operator dependency, making it a promising platform for population-level screening. However, interpreting the large number of images generated per examination creates a significant reading burden. AI-powered detection algorithms applied to ABUS datasets can automatically flag suspicious volumes for targeted review, substantially reducing reading time while maintaining high sensitivity. Deep learning models trained on ABUS data have shown particular promise in coronal-plane reconstruction analysis, uniquely highlighting architectural distortion and retraction patterns characteristic of malignancy. The current state of AI-ABUS development, including key validation data and workflow integration challenges, will be reviewed.

In summary, AI-integrated breast ultrasound represents a rapidly maturing field with immediate clinical relevance. Real-time AI-CAD for HHUS is already demonstrating measurable benefits in daily practice, while

AI-assisted ABUS interpretation holds promise for scalable, operator-independent screening. This presentation will discuss both the current evidence and the practical considerations necessary for meaningful clinical adoption, drawing on the author's experience in developing and prospectively validating AI-CAD solutions for breast ultrasound.

MRI with AI in Practice: From Faster Scans to Smarter Reads

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Artificial intelligence (AI) is rapidly transforming breast MRI from a technically demanding, time-intensive examination into a more efficient and clinically integrated imaging tool. This presentation provides a practical overview of AI applications across the breast MRI workflow, from accelerated acquisition and advanced reconstruction to image interpretation and clinical decision-making.

AI-enabled techniques can substantially reduce scan time while maintaining diagnostic image quality, improving patient comfort, workflow efficiency, and access to MRI for multiple clinical indications. Beyond acquisition, AI supports lesion detection and characterization, quantitative assessment, treatment decision support, and risk stratification, facilitating more consistent and efficient interpretation. By highlighting real-world use cases, this presentation illustrates how AI-enhanced breast MRI can transition from innovation to routine practice, advancing precision medicine and smarter imaging-based care.

Precision Pathway Inhibition: Targeting PI3K, mTOR and AKT to Optimize Endocrine Therapy

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Next-Generation Endocrine Agents: SERDs, PROTACs and Innovative Strategies in HR+/HER2- mBC

Yen-Shen Lu

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Evolving Translational Landscape of Resistance to CDK4/6i

Pedram Razavi

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From ALND to SLNB Omission: Historical View of Barriers for Clinical Application

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The presentation will focus on the history of de-escalation in axillary surgery for clinically node-negative breast cancer patients. The NSABP-04 and ACOSOG Z0011 trials were the landmark trials for current concepts investigating the complete omission of axillary sentinel lymph node biopsy (SLNB) in low-risk patients. Available data were presented, and updated guidelines (ASCO, German AGO Mamma) will be discussed.

Neoadjuvant-driven De-escalation of Surgery: Are We Ready to Skip Breast Surgery?

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Radiotherapy alone without breast surgery produced excellent oncologic and patient-reported outcomes in 50 highly selected patients with an image-guided vacuum-assisted core biopsy (VACB)–determined pCR after NST in an inaugural landmark phase 2 trial in the field. These anticipated results, with a doubling of the median follow-up from the first reported 2-year interim analysis suggest that this new technique utilized to select patients for omission of breast surgery provides additional evidence of durability in outcomes as there have yet to be any recurrences. These findings at the 5-year mark showing no recurrences are promising as potential missed disease without surgery in such patients would be expected to generally recur early.

Early clinical trials that challenge traditional dogma regarding established standard treatments are difficult to perform and controversial to undertake as clinicians and patients may be apprehensive. While lumpectomy and axillary surgery are usually straight forward, the overall documented complication rates for this surgical procedure are not insignificant. Complications in the form of infection, bleeding, chronic pain, paresthesia, seroma, lymphedema, unsatisfactory cosmetic and psychological outcomes, can impact quality of life and may occur (often with several occurring in the same patient) about 30% of the time. Over the last several decades breast cancer (BC) surgery has progressively been safely de-escalated moving from radical mastectomy through breast conserving therapy and axillary node dissection to sentinel node biopsy, eliminating sentinel node biopsy in select patients, and even allowing for less surgery for node-positive breast cancer after neoadjuvant systemic therapy (NST).

The limitations of this phase 2 trial design include the small number of patients and limited follow-up time of 6-years. HER2-postive hormone receptor-positive cancers may recur later although this is also the case with standard surgery.

In the first completed trial of its kind with stringent eligibility and meticulous protocol directed procedural requirements, radiotherapy alone without breast surgery produced excellent oncologic and patient-reported outcomes in highly selected patients with TNBC and HER2+BC with an image-guided VAB–determined pCR to NST. Additional clinical trials are necessary. The trial reported here has been expanded with an additional cohort and there is active accrual in the landmark South Korean OPTIMIST trial (NCT05505357-KBCSG-24) study recruiting patients. The novel methods utilized in the current study, together with additional results from future studies could represent the commencement of a paradigm shift in the surgical management of breast cancer after NST. There is great resistance to changing the standard approach of breast surgery and considerable misinformation about the selection and technical requirements. Carefully designed larger trials are necessary with identical excellent oncologic outcomes before the world will be rightfully ready to skip standard breast

surgery after NST.

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SLNB Omission for cN0 Patients in the Post-neoadjuvant Setting: Is it Feasible?

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Advances in our understanding of tumor biology and systemic therapy have been reshaping breast cancer management, leading to the concept of risk-adapted axillary surgery. Alongside improvements in neoadjuvant chemotherapy, the development of novel agents such as targeted therapies and immune checkpoint inhibitors has further increased the pathological complete response (pCR) rates, particularly in subtypes already known to have a high probability of pCR. In HER2-positive patients, neoadjuvant TCHP (docetaxel, carboplatin, trastuzumab, and pertuzumab) administered for six cycles achieved an overall pCR rate of almost 65%, with significantly higher rates in HR-negative tumors compared to HR-positive tumors (approximately 77% vs. 50%). In TNBC, neoadjuvant chemotherapy consisting of weekly paclitaxel plus carboplatin followed by doxorubicin and cyclophosphamide, administered with or without pembrolizumab, achieved higher pCR rates with immune checkpoint inhibition compared to chemotherapy alone (57.7% vs. 49.1%) in recent analyses at Samsung Medical Center.

Since the introduction of the sentinel lymph node biopsy (SLNB) in the late 20th century, numerous reports have documented how it has significantly reduced lymphedema, discomfort, and paresthesia compared to axillary lymph node dissection (ALND). However, SLNB alone does not eliminate upper extremity morbidity, with approximately a 5% risk of lymphedema, while the traditional restrictions on ipsilateral arm use may reinforce patient anxiety and misconceptions, leading to unnecessary distress despite the low actual risk. For this reason, clinical trials such as SOUND, INSEMA, and NAUTILUS were initiated to evaluate the feasibility of omitting SLNB in early-stage low-risk patients. According to the INSEMA study, the no-SLNB group showed noninferior oncologic outcomes with reduced morbidity, such as lymphedema incidence (1.8% vs. 5.7%), restriction of arm or shoulder mobility (2.0% vs. 3.5%), and pain with arm or shoulder movement (2.0% vs. 4.2%), compared to the SLNB group.

In these contexts, the logical next step in breast cancer management is the omission of axillary surgery in initially cN0 patients who achieve an excellent radiologic response after neoadjuvant chemotherapy (NAC), particularly in HER2-positive and triple-negative subtypes with high pCR rates. Key initiatives such as ASLAN and EUBREAST-01 are based on the premise that nodal surgery may offer limited oncologic benefit in these selected patients while still causing morbidity, with a focus on maintaining regional control under standardized radiotherapy.

The ASLAN trial (KBCSG-28; NCT04993625) represents the Asian population, designed as a prospective, multicenter, single-arm study targeting cT1-3 cN0-1 M0 HER2-positive and triple-negative breast cancer (TNBC) patients who have received preoperative systemic therapy and demonstrate excellent radiologic

response in both breast and axilla using MRI and ultrasonography. In patients achieving bpCR after lumpectomy, sentinel lymph node biopsy is omitted, and all proceed to standardized whole-breast and regional radiotherapy. The study incorporates centralized radiotherapy review and patient-reported outcomes to evaluate both oncologic safety and quality of life. Enrollment in the ASLAN trial began in December 2021 and was completed in December 2023, and patients are currently under follow-up. During the two-year enrollment period, 252 patients were screened, and the clinical outcomes of 180 patients who achieved pCR following breast lumpectomy are being monitored, with interim results expected in GBCC 2026 and the final analysis planned for 2029. Similarly, the EUBREAST-01 (NCT04101851) trial is investigating axillary recurrence over three years in HER2-positive and TNBC patients. Whereas EUBREAST-01 included only cN0 patients, approximately 22% of patients enrolled in ASLAN were cN1. Approximately two-thirds of these cN1 patients at initial diagnosis were confirmed by fine-needle aspiration, while the remaining cases were defined based on imaging findings.

We need to explore whether we can fundamentally prevent lifelong side effects without compromising oncological outcomes by introducing the concepts of the risk-adapted optimization of axillary surgery. We anticipate that more definitive insights will soon emerge regarding the feasibility of omitting sentinel lymph node biopsy for cN0 HER2-positive and TNBC excellent responders in the post-neoadjuvant setting.

ADC: The Emerging Role and Future Perspectives in Early Breast Cancer

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Antibody-drug conjugates (ADCs) are drugs consisting of an antibody, a linker, and a payload. Antibodies can be designed to target various membrane proteins highly expressed on cancer cells, and the combination of superior linker technology and various payloads has led to the development of diverse drugs, creating epoch-making drug development in cancer treatment across various cancer types. ADCs are not merely a drug delivery strategy where the antibody carries the payload (anti-cancer drug) to cancer cells; they are also effective formulations that exert their effects through the immune response of the antibody and the bystander effect, where the payload released from apoptotic cells affects surrounding cancer cells. Currently, the types of targets are incredibly diverse, including the HER family, TROP2, B7 family, and Claudin family, and it is possible to create formulations with antibodies targeting multiple membrane proteins, demonstrating remarkable progress in antibody creation technology. Furthermore, not only the types of drugs included, but also the adjustment of drug ratios is being strategically considered.

In the field of breast cancer, the market launch of antibody-drug conjugates had been stagnant for a long time since the introduction of trastuzumab emtansine in 2013. However, with the emergence of trastuzumab dextertzcan and succizumab govitecan, the situation has become extremely busy, including the development of ADCs. Furthermore, trastuzumab dextertzcan marked a turning point in the development of breast cancer treatment strategies, which had previously been based on the subtype-based classification system, by expanding into the HER2-Low category. Currently, development is underway that anticipates synergistic effects between ADCs and immune checkpoint inhibitors, and not only is ADC development itself progressing, but also the development of best combinations and plans aimed at directly entering breast cancer treatment strategies. It is predicted that strategy of early breast cancer treatment will change rapidly from achievement in the field of metastatic or recurrent breast cancer. In this presentation, I would like to discuss the current state of ADC treatment development for early breast cancer.

Optimizing ADCs in Metastatic Triple Negative Breast Cancer

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Triple negative breast cancer is a heterogeneous disease, serving as one of the challenges for optimization of therapeutic strategies, especially in the metastatic setting.

While there has been continuous advancement in the management of metastatic triple breast cancer, especially those with expression of Programmed Death-Ligand 1 (PD-L1) on immune cells or tumour cells, which allows the use of immune checkpoint inhibitors (ICIs) to improve clinical outcomes; or those with germline BRCA mutation who could benefit from the added value of PARP inhibitors, the emergence of antibody-drug conjugates (ADCs) has become a new approach with new hope for patients living with metastatic triple negative breast cancer (mTNBC).

This lecture will give an overview of the development and update of ADCs in metastatic triple breast cancer with particular reference to recent emerging data for both with PD-L1 expression and those without any PD-L1 expression or any actionable oncogenes, potential new targets and future development of ADCs, and the proposed optimization of ADCs in mTNBC with reference to positioning, potential biomarkers and new targets, the challenges and opportunities, especially those relevant to the Asia-Pacific region

Understanding ADC Mechanism of Action and Implications on Better Efficacy and Safety

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Antibody drug conjugates (ADCs) have rapidly emerged as a major therapeutic class in oncology, combining the selectivity of monoclonal antibodies with the cytotoxic potency of chemotherapy payloads. Recent clinical successes across multiple tumor types, particularly in breast cancer, have demonstrated the potential of these agents to substantially improve patient outcomes. However, ADC activity is determined by a complex interplay between drug design and tumor biology. Key features including the choice of target antigen, linker stability, drug to antibody ratio, and payload class influence both antitumor efficacy and toxicity. A detailed understanding of ADC pharmacology and mechanisms of action is therefore essential to optimize the therapeutic index of these agents and guide their integration into clinical practice.

This lecture will review the biological principles underlying ADC activity, including antigen binding, internalization, intracellular and extracellular payload release, and the contribution of bystander killing to antitumor effects. The role of ADC structural components in shaping pharmacologic behavior and clinical outcomes will be discussed, with examples from currently approved ADCs. In addition, emerging insights into tumor determinants of ADC sensitivity and resistance, including antigen expression levels, tumor heterogeneity, and adaptive molecular changes during treatment, will be highlighted. The session will conclude by discussing the clinical implications of these mechanistic insights for improving ADC efficacy and safety through optimized drug design, rational patient selection, and more effective toxicity monitoring and management in routine oncology practice.

Evolving Treatment Landscape in the First-line Treatment of HER2+mBC

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Future Treatment Strategy After Progression on T-DXd in HER2+mBC

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1. Background & Objectives

Trastuzumab deruxtecan (T-DXd) is the standard second-line treatment for HER2-positive metastatic breast cancer (mBC). As its use moves to earlier lines, managing post-T-DXd progression is a critical clinical challenge. This presentation reviews T-DXd resistance mechanismsincluding altered HER2 expression and payload-specific resistanceand explores therapeutic strategies following T-DXd failure.

2. Mechanisms of Resistance

Molecular resistance to T-DXd is multifaceted. Paired biopsies show that ~32% of patients experience complete HER2 loss, while 29% show decreased expression post-treatment. Beyond downregulation, multi-omic profiling identifies the ABCC1 transporter as a predictor of reduced efficacy. Acquired mutations in ERBB2, TOP1, and the NFE2L2/KEAP1 pathway (upregulating drug efflux) also contribute to resistance. Additionally, the DAISY trial suggested that SLX4 loss-of-function mutations may circumvent topoisomerase I inhibition.

3. Clinical Outcomes & Strategies

Real-world data (RWD) show limited efficacy of current options post-T-DXd, with a median progression-free survival (mPFS) of ~4.6 months. Outcomes are influenced by the reason for discontinuation; patients stopping due to toxicity achieve longer subsequent mPFS (9.1 months) than those with true progression (3.3 months).

Regarding sequencing, using ADCs with similar topoisomerase I inhibitor payloads, like sacituzumab govitecan, yielded poor results (rwPFS ~3 months) due to potential cross-resistance. Thus, switching to different payloads like T-DM1 or non-ADC therapies is more rational. Among TKI-based regimens, the tucatinib-trastuzumab-capecitabine (TTC) triplet remains viable, with an mPFS of 4.7 months post-T-DXd. Targeting the PI3K/AKT/mTOR pathway is also active, with early data for combinations like gedatolisib plus trastuzumab or PI3K inhibitors (inavolisib, alpelisib) showing benefit, especially in PIK3CA-mutated populations.

4. Conclusion

Optimal sequencing after T-DXd failure remains challenging due to limited high-level evidence. Re-assessing HER2 status and genomic profiling can guide the selection of subsequent therapies, such as different ADC payloads, TKIs, or novel combinations. Further trials and RWD are essential to establish evidence-based algorithms for the post-T-DXd setting.

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Management of CNS Metastasis in HER2+mBC

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Brain metastasis (BM) is a major issue for the patients with HER2 positive breast cancer (BC), and leading cause of functional impairment, worsening quality of life (QOL) and early death among the patients. Approximately 30-50% of pts develop BM throughout the course of disease, and the primary goal of the care for the patients is prolongation of survival and maintaining their QOL. Albeit BM could be a challenging situation to achieve these goals due to its aggressive nature.

International guidelines for treatment of BM recommend multi-disciplinary treatment incorporating local and systemic therapy, but controversy exists over the care of the patient with BC and BM.

Recently, advances in drug development have been remarkable, resulting in a substantial expansion and diversification of available treatment options. Based on the results from the BM subset analysis of the DESTINY-Breast12, HER2CLIMB and PATINA trials, the efficacy and safety of the systemic therapies for BM will be reviewed along with the recent report on SRS/SRT for BM.

Providing an optimal treatment strategy for each individual patient requires a thorough understanding of disease condition and the pros and cons of each treatment, along with patient preferences and values.

In this lecture, I will discuss treatment strategies for HER2-positive BC with BM and future perspectives in this field.

Biologic Implications and Therapeutic Targeting of Homologous Recombination Deficiency in Breast Cancer

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Integrating Multi-omics and Clinical Data into Practice

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Breast cancer exhibits profound molecular heterogeneity that influences treatment response and clinical outcomes. Over the past two decades, landmark studies—from Perou's intrinsic subtype classification (2000) through TCGA's multi-platform integration (2012) to large-scale whole-genome sequencing (WGS) initiatives—have progressively deepened our understanding of breast cancer biology. However, these efforts predominantly relied on Western cohorts and lacked systematic integration with clinical outcome data.

The CUBRICS study addresses these gaps by performing WGS on 1,364 Korean breast cancer patients paired with comprehensive clinical records. This presentation synthesizes key findings including mutational signatures, structural variant landscapes, HRD assessment, ecDNA-mediated amplification, and chromothripsis. Critically, it demonstrates how WGS-derived biomarkers—MATH score, HRD status, and tumor mutational burden—serve as independent predictors of treatment response in anti-HER2 and CDK4/6 inhibitor therapies.

Notably, HRD confers a dual-context effect: favorable in TNBC chemotherapy yet unfavorable in HR-positive CDK4/6 inhibitor settings. Population-specific features, including elevated APOBEC3A/3B deletion frequency and higher BRCA1/2 germline mutation rates, underscore the necessity of ethnicity-aware genomic profiling. These findings position WGS as a clinically actionable tool for precision oncology in breast cancer management.

Keywords: Breast cancer, Whole-genome sequencing, Multi-omics, CUBRICS, Precision oncology, HRD, Mutational signatures, Clinical biomarkers

Multiomic Biomarkers of Breast Cancer

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The clinical management of breast cancer has been significantly reshaped by our deepening understanding of its intrinsic molecular heterogeneity. While traditional clinical staging remains foundational, the integration of multiomic profiling has emerged as a transformative approach to characterize the complex biological landscape of the disease. However, translating multiomic data into actionable clinical insights remains a critical challenge.

This talk will explore the advancements in multiomic frameworks to enhance precision oncology, focusing on three pivotal dimensions: the construction of breast cancer subtyping, the development of multi-modal prognosis prediction models, and the implementation of efficacy prediction. The discussion will first focus on the optimization of molecular subtyping, particularly within the luminal population, by leveraging the Chinese Breast Cancer Genome Atlas (CBCGA). Using Similarity Network Fusion (SNF) to integrate genomic, transcriptomic, and metabolomic data, we identify distinct metabolic vulnerabilities and actionable targets that extend beyond traditional histopathological classifications, thereby providing a more refined and comprehensive understanding of tumor biology.

Building upon these molecular insights, the presentation will then address how multi-modal data integration can be leveraged to refine prognosis prediction. By synthesizing multiomic data with clinical and pathological features, we have developed comprehensive models that significantly enhance our ability to predict long-term outcomes.

The final part of this talk will discuss the role of Artificial Intelligence and multimodal integration in predicting therapeutic efficacy. We will illustrate how these advanced tools assess sensitivity to specific treatments, such as Antibody-Drug Conjugates (ADCs) or standard PCbHP regimens in HER2-postive breast cancer. Advancing from single-agent response prediction to a comparative treatment selection strategy, our causal machine learning can evaluate multiple therapeutic options in parallel to drive patient-tailored selection and elevate pathologic complete response (pCR) rates.

As we advance towards a future of truly personalized breast cancer treatment, it is imperative to transition from single-platform biomarkers to comprehensive multiomic integration. By harmonizing molecular profiling with advanced computational modeling across subtyping, prognosis, and efficacy prediction, we can accelerate the implementation of "bench-to-bedside" discovery into routine clinical practice.

Introduction of Digital Pathology

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Application of Digital Pathology in Precision Oncology

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Computational pathology has advanced rapidly since 2020 and is now entering a new phase, driven by the emergence of foundation models and recent progress in multimodal artificial intelligence. Traditionally, pathology has played a central role in precision oncology by providing not only essential diagnostic information, such as tumor classification, subtype, and grade, but also prognostic and therapeutic guidance through a wide range of histopathologic features, including lymphovascular invasion, tumor budding, and lymphoid stroma. With the integration of artificial intelligence, the role of pathology is being redefined and expanded. Computational pathology now offers possibilities beyond simple cancer detection and classification, enabling more quantitative, reproducible, and biologically meaningful interpretation of pathologic features. There is also cautious optimism that these approaches may eventually complement, or in some settings partially replace, ancillary studies such as immunohistochemistry and next-generation sequencing. As spatial transcriptomics and other multilayered molecular datasets continue to accumulate, the potential for linking morphologic patterns with underlying molecular characteristics is becoming increasingly evident. In this context, computational pathology is emerging as a key tool for the next generation of precision medicine, integrating morphologic, molecular, and clinical information into a unified framework.

In this presentation, I will discuss both the advances that computational pathology has already enabled and the future possibilities it may open for precision oncology.

Foundation Models in Digital Pathology: Now and Future

David Joon Ho

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Foundation models are large machine learning models trained on extensive unlabeled datasets. Unlike traditional task-specific models, foundation models are designed as general-purpose models that can support multiple downstream tasks and can be adapted to specific applications with minimal labeled data. In digital pathology, several foundation models have recently been developed and released. These models allow computational analysis of whole slide images for tasks such as tumor detection, grading, segmentation, and image retrieval. In addition, multimodal integration with genomic data and clinical text has facilitated applications such as molecular subtype prediction and report generation. This talk will review current foundation models in digital pathology, including UNI, Virchow, CONCH, and others. While these models can demonstrate promising performance across multiple downstream tasks, they still exhibit limitations, including site-bias batch effects. I will introduce fmMAP, an approach designed to reduce confounding factors while strengthening biological signals. In conclusion, continued efforts are needed to fully realize the potential of foundation models to advance biomedical research and transform clinical and diagnostic workflows in pathology.

Panel Discussion

Go Beyond Cure of Breast Cancer

Biomarker Guided Immunotherapy in Breast Cancer

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Novel Combinations and Optimal Immunotherapy Strategies in Metastatic Breast Cancer

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Immunotherapy has transformed outcomes in several solid tumors, but its role in metastatic breast cancer (MBC) remains limited. Currently, immune checkpoint inhibitors (ICIs) are largely confined to PD-L1positive triple-negative breast cancer (TNBC) in the first-line setting in combination with chemotherapy, with modest benefit observed beyond this context.

TNBC is the most immunogenic breast cancer subtype, and clinical data consistently show that ICIs are most effective when used early, in less heavily pretreated disease, and in combination regimens. However, outcomes remain suboptimal, and the field has shifted toward identifying more effective partners beyond chemotherapy.

Antibodydrug conjugates (ADCs) have emerged as a key strategy. The phase III ASCENT-04 trial demonstrates that pembrolizumab combined with sacituzumab govitecan significantly improves progression-free survival compared with chemotherapy-based regimens in PD-L1positive metastatic TNBC, and this combination may become a new first-line standard of care. In parallel, the BEGONIA trial evaluating datopotamab deruxtecan (dato-DXd) plus durvalumab has shown high response rates and durable disease control, notably with activity observed irrespective of PD-L1 status. These findings suggest the potential to extend immunotherapy-based combinations to an all-comers TNBC population in the first-line setting.

Beyond TNBC, ADCICI combinations are also being explored in hormone receptorpositive/HER2-negative MBC, including as first-line nonendocrine-based therapy, representing a potential paradigm shift for selected patients. In addition, novel immunotherapy strategies are emerging, including bispecific antibodies targeting PD-1 and VEGF, which aim to simultaneously enhance immune activation and modulate the tumor microenvironment. Early data are promising, and randomized trials in the first-line setting for unselected populations are ongoing.

Overall, combination strategies are central to advancing immunotherapy in breast cancer. However, optimal development will likely require integration with biomarker-driven patient selection to identify subsets most likely to benefit. This may result in smaller, molecularly defined populations that are less attractive for large industry-sponsored trials. Consequently, academic-led studies will play a critical role in advancing the field and refining precision immunotherapy approaches in MBC.

Tailoring Immunotherapy in Early Breast Cancer: Right Balance with Escalation and De-escalation

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Background

The integration of immune checkpoint inhibitors (ICIs) into neo/adjuvant chemotherapy has fundamentally transformed the management of high-risk early breast cancer (EBC). The KEYNOTE-522 trial established pembrolizumab-based neoadjuvant/adjuvant therapy as standard of care in triple-negative breast cancer (TNBC), with confirmed overall survival benefit (HR 0.66). However, the central challenge has now shifted not whether to use ICI in EBC, but how to calibrate its delivery. This talk focuses on clinical decision-making identifying the right moment and the right axis – ICI or chemotherapy- for escalation or de-escalation based on clinical context and pathological response.

Clinical decision triggers: when and what to assess

Escalation and de-escalation decisions occur at three distinct clinical timepoints. At baseline, high tumor burden (cT3-4, cN+), ER-low disease, and low stromal tumor-infiltrating lymphocytes (TILs) signal an immune-cold microenvironment warranting more intensive therapy. During neoadjuvant treatment, ctDNA clearance and on-treatment TIL dynamics offer real-time signals of immune response. In the I-SPY 2 trial, early ctDNA clearance as early as week 3 of neoadjuvant therapy was significantly associated with achieving pCR, while post-treatment ctDNA positivity in residual disease patients identified a high-recurrence risk subgroup beyond RCB class alone- suggesting a future role for ctDNA in guiding both de-escalation and escalation decisions. The most actionable trigger remains the post-surgical pathological response: pathological complete response (pCR, RCB-0) creates the opportunity to de-escalate, while residual disease (RCB II-III) demands escalation. Importantly, escalation and de-escalation are independently applicable to the ICI and chemotherapy components, enabling a nuanced matrix of therapeutic choices.

Escalation strategies: ICI vs. chemotherapy

Chemotherapy escalation in residual disease builds on established platforms. In gBRCA-mutated residual TNBC after neoadjuvant chemotherapy, adjuvant olaparib might provide evidence-based escalation with pembrolizumab (OlympiA trial). For non-BRCA residual TNBC, capecitabine remains the current backbone, but emerging ADC-based strategies represent the next frontier: OptimICE-RD (sacituzumab govitecan + pembrolizumab) and TRIPION-Breast03 (datopotamab deruxtecan +/- durvalumab) are evaluating post-neoadjuvant escalation in these high-risk population. Meanwhile, ICI escalation- adding or extending ICI beyond standard perioperative duration- is less well defined and show slow progress due to higher toxicities.

De-escalation strategies: ICI vs. chemotherapy

ICI de-escalation centers on whether patients achieving pCR after neoadjuvant chemo-immunotherapy require continued adjuvant pembrolizumab. The GeparNuevo trial demonstrated that neoadjuvant durvalumab alone improved event-free and overall survival without adjuvant continuation. The ongoing OptimICE-pCR and OPT-PEMBRO trials are directly testing whether adjuvant pembrolizumab omission is non-inferior to continuation in patients with pCR. Chemotherapy de-escalation, by contrast, seeks to reduce the toxicity burden of the neoadjuvant backbone while preserving immunological benefit. The NeoPACT trial showed anthracycline free chemotherapy backbone (carboplatin/paclitaxel + pembrolizumab) was comparable to those results of KEYNOTE-522 in pCR. The BELLINI trial demonstrated a 33% pCR rate with nivolumab ± ipilimumab without any chemotherapy, suggesting that immune-hot tumors may not require cytotoxic priming.

Conclusion

Personalized ICI based therapy in EBC requireds a response-adaptive approach that distinguished ICI and chemotherapy as independently modulatable axes. Currently actionable clinical triggers include pathological response (pCR vs. RD), RCB class, and germline BRCA status; emerging tools such as ctDNA MRD and on-treatment TIL dynamics will further refine individualization. The evolving trial landscape will progressively define when and how to escalate or de-escalate each component, enabling truly calibrated perioperative immunotherapy.

Clinical Evidence Supporting the Use and Omission of Intraoperative Margin and Sentinel Lymph Node Frozen Section

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Intraoperative frozen section analysis has two distinct purposes in breast cancer surgery: reducing positive resection margins and identifying sentinel lymph node (SLN) metastases. While intraoperative frozen-section biopsy demonstrates high diagnostic accuracy, its slow turnaround time, disruption of surgical workflow, interdepartmental logistical demands, and resource requirements have led to significant variation in uptake across institutions and countries.

A positive resection margin following breast-conserving surgery correlates with a 2-fold increase in local recurrence, and reoperation is accompanied by physical, psychological, and economic consequences – including delays to adjuvant therapy. In institutions where frozen-section biopsy for margin evaluation is routinely used, omitting this process can be burdensome, raising concerns about positive margin rates. This talk examines factors related to positive margins and reviews tools applied to reduce frozen section use without compromising the positive margin rate.

The management of the axilla has been transformed by the practice-changing ACOSOG Z0011 and subsequent trials. These studies established the oncologic safety of omitting axillary lymph node dissection in patients with 1-2 positive SLNs, fundamentally redefining the surgical rationale for intraoperative nodal diagnosis. The question today is which patients still require intraoperative SLN results to guide surgical decision making. This talk reviews the current evidence to identify those populations.

Optimal Margin Width of BCS

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Breast-conserving surgery (BCS) followed by whole-breast irradiation (WBRT) is the standard of care for early-stage breast cancer. Prior to 2014, the absence of a consensus margin definition led to re-excision rates of 0–70% by surgeon, with approximately 30% of BCS patients undergoing unnecessary reoperation.[1] The landmark SSO-ASTRO 2014 consensus — based on a meta-analysis of 33 studies (28,162 patients) — established that "no ink on tumor" constitutes an adequate negative margin for invasive breast cancer with WBRT, as wider margins confer no additional reduction in ipsilateral breast tumor recurrence (IBTR).[2,3] For pure DCIS, the SSO-ASTRO-ASCO 2016 consensus recommends ≥2 mm, a threshold broadly endorsed by major international guidelines including ESMO, NCCN, NICE, and ASBrS.[4-7]

However, applying these guidelines uniformly across all clinical situations has its limitations. Real-world practice frequently encounters scenarios in which the standard margin definition provides insufficient guidance — including invasive lobular carcinoma, where diffuse growth patterns result in re-excision rates twice those of invasive ductal carcinoma; patients undergoing BCS after neoadjuvant chemotherapy, where scattered residual disease challenges conventional margin interpretation; those with multiple ipsilateral tumors, where per-focus margin assessment and field coverage remain debated; non-mass enhancement on MRI, where imaging-pathology discordance makes surgical boundary determination inherently uncertain. In each of these scenarios, no current guideline provides a clear, evidence-based answer.

This lecture aims to move beyond standard thresholds and critically examine what the evidence — and its absence — tells us about optimal margin width in these complex situations.

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Intraoperative Frozen Section: A New Era of Pathological Precision

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Surgical management of breast cancer invariably entails intraoperative frozen section evaluation of sentinel lymph nodes and excision margins. Determining the status of sentinel lymph nodes during surgery allows the option of immediate axillary lymph node dissection in patients with sentinel nodal metastases. Positive margins in breast-conserving surgery double the recurrence risk, necessitating reoperation, which can be obviated by ensuring negative margins through frozen section assessment.

Meta-analyses report a sensitivity of 74.7% and specicity of 99.4% for frozen section analysis of sentinel lymph nodes, while for margin evaluation, a sensitivity of 81% and a specicity of 97% are documented. Discrepancies between frozen and permanent sections are observed in 3.8%33% for sentinel lymph nodes, and 1.6%16.2% for surgical margins, inuenced by frozen artefacts, methodological differences in frozen section sampling and reporting, as well as technical and pathologist experience.

Pursuit of complete pathological precision in intraoperative frozen section diagnosis is challenged by inherent limitations of frozen tissue handling and interpretation. While the shave margin approach may be advantaged by facilitating assessment of the entire margin surface during frozen section, a higher rate of false negative results on subsequent paraffin section may be encountered. The actual margin distance from tumour is also not readily measured in the shave technique.

Apart from conventional frozen section analysis, the alternative molecular tool of the one-step nucleic acid amplification (OSNA) detection of sentinel node metastasis is adopted in some centres. Novel approaches such as artificial intelligence enabled imaging and other innovative methodologies are being trialed though these have not been implemented in routine practice.

In conclusion, intraoperative frozen section assessment remains a routine pathology procedure during breast cancer surgery. Accurate diagnosis can be achieved through preoperative planning, careful tissue handling in conjunction with technical expertise and pathologist awareness of pitfalls.

Tailoring Endocrine Treatment and Duration for Early Luminal Breast Cancer

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Expanding Adjuvant Options: Integrating CDK4/6 Inhibitors and PARP Inhibitors in Luminal Breast Cancer

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Adjuvant endocrine therapy is the cornerstone of treatment for patients with ER-positive, HER2-negative early breast cancer. The administration of tamoxifen (TAM) or aromatase inhibitors (AIs) is recommended for at least 5 years, and in patients with a high risk of recurrence, continuation of endocrine therapy for up to 10 years is advised.

Since 2020, the results of trials evaluating the addition of CDK4/6 inhibitors to endocrine therapy have been reported, including the monarchE trial (abemaciclib) and the NATALEE trial (ribociclib). Based on these findings, the addition of a CDK4/6 inhibitor to endocrine therapy is recommended for patients at high risk of recurrence.

Furthermore, in patients harboring germline pathogenic variants in BRCA1 or BRCA2, the addition of a PARP inhibitor (olaparib) in the adjuvant setting has demonstrated a statistically significant improvement in overall survival (OlympiA study). Therefore, in high-risk patients with BRCA1/2 pathogenic variants, an important clinical question is how to optimally use CDK4/6 inhibitors and PARP inhibitorswhether to use them sequentially or in combination.

Based on currently available evidence, olaparib, which has demonstrated a clear overall survival benefit, may be prioritized. Following discussion with the patient, sequential administration of a CDK4/6 inhibitor may be considered as a potential treatment option.

Recently, it was reported that the oral SERD (giredestrant) demonstrated superior recurrence prevention compared with the current standard endocrine therapies, tamoxifen and aromatase inhibitors (lidERA study). These findings raise the possibility that oral SERDs such as giredestrant could replace the current positioning of TAM and AIs. However, the lack of evidence regarding their combination with CDK4/6 inhibitors or PARP inhibitors represents a practical challenge in clinical practice.

Looking ahead, the widespread adoption of MRD-guided treatment strategies is anticipated, and numerous clinical trials are currently underway. In Japan, a clinical trial evaluating the additional benefit of abemaciclib in patients with postoperative MRD-positive disease has recently been initiated.

Thus, the management of luminal-type breast cancer in the adjuvant setting is entering a new era, characterized not only by treatment escalation for patients at high risk of recurrence but also by the introduction of MRD-guided therapeutic strategies.

Overcoming Endocrine Resistance: Adjuvant Strategies for High-Risk Luminal Breast Cancer

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Biomarkers in ADC, Unmet Needs and Future Directions: Oncologist's View

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Antibody-drug conjugates (ADCs) have reshaped the cancer treatment landscape across a variety of different tumor types. ADCs' peculiar pharmacologic design combines the cytotoxic properties of chemotherapeutic agents with the selectivity of targeted therapies. At present, the approval of many ADCs used in clinical practice has not always been biomarker-driven. Indeed, predicting ADCs' activity and toxicity through the demonstration of specific biomarkers is still a great unmet need, and the identification of patients who can derive significant benefit from treatment with ADCs may often be uncertain. With the lack of robust predictive biomarkers to anticipate primary, intrinsic resistance to ADCs and no consolidated biomarkers to aid in the early identification of treatment resistance (ie, acquired resistance), the determination of precise biologic mechanisms of ADC activity and safety becomes priority in the quest for better patient-centric outcomes. Of great relevance, whether the target antigen expression is a determinant of ADCs' primary activity is still to be clarified, and available data remain quite controversial. Antigen expression assessment is typically performed on tissue biopsy, hence only providing information on a specific tumor site, therefore unable to capture heterogeneous patterns of tumor antigen expression. Quantifying the expression of the target antigen across all tumor sites would help better understand tumor heterogeneity, whereas molecularly characterizing tumor-intrinsic features over time might provide information on resistance mechanisms. In addition, toxicity can represent a critical concern, since most ADCs have a safety profile that resembles that of chemotherapies, with often unique adverse events requiring special management, possibly because of the differential in pharmacokinetics between the small-molecule agent versus payload of a similar class (eg, deruxtecan conjugate-related interstitial lung disease). As such, the identification of robust predictive biomarkers of safety and activity of ADCs has the potential to improve patient selection and enrich the population of patients most likely to derive a substantial clinical benefit, especially in those disease settings where different ADCs happen to be approved in competing clinical indications, with undefined biomarkers to make precise decision making and unclear data on how to sequence ADCs. At this point, the identification of clinically actionable biomarkers in the space of ADCs remains a top research priority.

ADC Biomarkers and Diagnosis of HER2-low/ultralow Breast Cancer: Pathologist's View

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The advent of antibody–drug conjugates (ADCs), particularly trastuzumab deruxtecan (T-DXd), has fundamentally reshaped the clinical relevance of HER2 assessment in breast cancer. The emergence of "HER2-low" and more recently "HER2-ultralow" categories reflects this therapeutic shift. However, from a pathologist's perspective, these categories raise important conceptual and practical concerns regarding their biological validity, reproducibility, and clinical interpretability.

HER2-low and ultralow breast cancers are currently defined by immunohistochemical thresholds that were not originally intended to delineate biologically distinct entities. Unlike HER2-positive disease, which is driven by ERBB2 amplification and exhibits relatively stable expression, HER2-low/ultralow tumors demonstrate substantial variability across timepoints, metastatic sites, and even within the same tumor. Multiple studies have shown discordance in HER2 expression between primary and metastatic lesions, as well as dynamic shifts during treatment. This instability suggests that HER2-low/ultralow status does not represent a fixed tumor subtype, but rather a continuum of expression influenced by technical, spatial, and temporal factors.

Moreover, the reproducibility of distinguishing IHC 0 from 1+—the boundary defining HER2-ultralow versus negative disease—remains limited, even among expert breast pathologists. Pre-analytic variables, staining platforms, and interpretive subjectivity further compound this issue. As a result, categorizing tumors into HER2-low or ultralow groups risks overinterpretation of what may be, in many cases, marginal or artifactual differences. These limitations highlight the need to reconsider whether current diagnostic frameworks are sufficiently robust to support biologically meaningful classification.

Paradoxically, the clinical efficacy of T-DXd in HER2-low and even HER2-negative tumors challenges the centrality of HER2 expression itself as a predictive biomarker. Emerging mechanistic studies suggest that T-DXd activity in low-expressing tumors may be less dependent on HER2-mediated internalization than previously assumed. Instead, extracellular proteases such as cathepsin L within the tumor microenvironment can cleave the linker and release the cytotoxic payload independently of target engagement. In addition, the payload (a topoisomerase I inhibitor) exerts a bystander effect, enabling tumor cell killing beyond HER2-expressing cells. These findings imply that HER2 expression may function more as an enrichment marker rather than a strict requirement for drug activity.

At the same time, resistance to ADCs is emerging as a major clinical challenge, with multiple mechanisms converging on impaired drug delivery or payload activity. One of the most consistent findings is the reduction or complete loss of HER2 expression at progression, which directly limits ADC binding and internalization. In parallel, mutations affecting the trastuzumab-binding interface of HER2 can further impair target engagement.

Beyond target loss, upregulation of drug efflux transporters such as ABCC1, often driven by alterations in the KEAP1–NFE2L2 axis, reduces intracellular payload accumulation and correlates with inferior outcomes independently of HER2 levels.

Importantly, resistance mechanisms extend beyond the target itself. Alterations in the payload target, such as acquired mutations in TOP1, have been identified under selective pressure from ADC therapy and may mediate cross-resistance to sequential ADCs sharing similar payloads. Similarly, activation of DNA repair pathways has been implicated in attenuating the cytotoxic effects of topoisomerase I inhibitors, providing a rationale for combination strategies with DNA damage response inhibitors.

The tumor microenvironment also plays a critical role. While ADCs can induce immunogenic cell death and activate antitumor immunity, adaptive resistance mechanisms may emerge, including upregulation of immune checkpoint molecules such as CD47. In HER2-positive disease, truncated HER2 variants such as p95HER2 further contribute to immune evasion and therapeutic resistance by promoting PD-L1 expression and immunosuppressive signaling. These findings underscore the complexity of ADC response, which integrates tumor-intrinsic, microenvironmental, and pharmacologic factors.

From a biomarker perspective, these insights suggest that reliance on static HER2 IHC categories is insufficient. Emerging data highlight the importance of integrating quantitative HER2 assessment, spatial heterogeneity, immune contexture, and genomic alterations to better predict ADC response. Notably, patterns of HER2 distribution, immune cell infiltration, and tumor–immune spatial relationships may provide additional predictive value beyond conventional scoring.

In conclusion, while HER2-low and ultralow classifications have enabled broader application of ADCs, they do not represent biologically stable or discrete tumor subtypes. For pathologists, this necessitates a shift from rigid categorical interpretation toward a more nuanced, integrative framework that reflects the dynamic and multifactorial determinants of ADC efficacy. Future diagnostic strategies will likely require incorporation of molecular and spatial biomarkers to fully realize the potential of ADC-based therapies in breast cancer.

Optimizing ADC Treatment for HER2-low/ultralow Metastatic Breast Cancer in the Real World Clinic

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The recognition of HER2-low and HER2-ultralow expression has redefined the therapeutic landscape of metastatic breast cancer (MBC), driven by the activity of antibodydrug conjugates (ADCs), particularly trastuzumab deruxtecan (T-DXd). These agents have demonstrated substantial improvements in clinical outcomes compared with conventional chemotherapy in patients with HER2-low disease. However, translating clinical trial evidence into routine practice raises several challenges, including optimal patient selection, treatment sequencing, toxicity management, and interpretation of HER2 expression levels across pathology platforms.

This lecture will review the biological and clinical rationale for targeting HER2-low and HER2-ultralow disease with ADCs and summarize the key clinical trials that established the role of T-DXd in this setting. Practical aspects of ADC use in routine clinical practice will be discussed, including pathology considerations for HER2-low and ultralow classification, optimal treatment sequencing with endocrine therapy, chemotherapy, and other ADCs, and strategies for managing ADC-related toxicities such as interstitial lung disease and hematologic adverse events. Real-world data and emerging translational insights, including biomarkers, mechanisms of resistance, and the potential role of circulating tumor DNA, will be integrated to highlight how precision approaches may further refine ADC treatment strategies.

Upfront Surgery in cN1 Patients: Current Evidence and Future Perspectives

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The presentation will focus on the small subset of patients diagnosed with clinically node-positive breast cancer and no indication for neoadjuvant treatment. Upfront axillary lymph node dissection (ALND) is indicated in patients with hormone receptor-positive/HER2-negative disease and low-grade tumors with a low Ki-67 index. Current guidelines (NCCN, German AGO Mamma) will be discussed. Histological confirmation of node-positive disease by FNA or CNB is mandatory before ALND. Future perspectives include the tailored axillary surgery for cN1 patients. First, descriptive data from the TAXIS trial will be presented.

Residual Nodal Disease After Neoadjuvant Therapy: Optimal Surgical Strategy

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Three or More Positive Nodes: ALND Alone or ALND Plus Regional Nodal Irradiation?

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The optimal management of the axilla in patients with three or more positive lymph nodes remains a critical and evolving question in breast cancer care. While axillary lymph node dissection (ALND) has historically been the cornerstone of regional disease control in node-positive patients, the role of additional regional nodal irradiation (RNI) in this setting continues to be debated, particularly in light of advances in systemic therapy and a broader shift toward treatment de-escalation.

Evidence supporting the use of RNI in node-positive breast cancer is largely derived from randomized trials and meta-analyses demonstrating reductions in locoregional recurrence and improvements in breast cancerspecific survival. These include landmark studies evaluating postmastectomy radiotherapy and regional nodal irradiation following breast-conserving surgery, which consistently show benefit across node-positive subgroups. However, these trials were not designed to directly compare ALND alone versus ALND plus comprehensive RNI, particularly in patients with higher nodal burden (≥ 3 positive nodes). As a result, current practice is often based on extrapolation rather than direct evidence, contributing to substantial variation in clinical decision-making across regions.

Notably, differences in treatment philosophy are observed between continents. In parts of Europe, omission of additional axillary-directed radiation following an adequate ALND is more commonly accepted, whereas in the United States and Korea, comprehensive RNI is more routinely incorporated into treatment for node-positive disease. The Lucerne Toolbox 2 provides important insight into this variability, emphasizing that axillary surgery and radiotherapy should be considered interdependent components of locoregional management. The consensus highlights that even after ALND, RNI is frequently recommended in the presence of macrometastatic disease, reflecting ongoing uncertainty regarding the completeness of surgical control and the potential for residual disease in non-dissected nodal basins such as the supraclavicular and internal mammary regions.

The clinical question becomes even more nuanced in the context of neoadjuvant systemic therapy, where treatment response plays a pivotal role in guiding locoregional management. Patients who achieve pathologic complete response in the axilla (ypN0) after initially node-positive disease represent a biologically favorable subgroup in whom the necessity of RNI has been increasingly questioned. The recently reported NSABP B-51/RTOG 1304 trial provides level I evidence addressing this issue, demonstrating that omission of RNI in patients who convert from clinically node-positive to pathologically node-negative status does not compromise invasive disease-free survival or overall survival. These findings support a paradigm shift toward response-adapted de-escalation of radiotherapy in selected patients.

In contrast, patients with residual nodal disease following neoadjuvant therapy continue to represent a high-risk population in whom comprehensive locoregional treatment remains standard. The optimal balance between surgical extent and radiotherapy in this setting is currently being investigated in ongoing trials, reflecting a broader effort to individualize treatment based on both tumor biology and treatment response.

This presentation will critically examine the evidence supporting ALND alone versus ALND plus RNI in patients with three or more positive nodes, with a clear distinction between upfront surgical management and post-neoadjuvant scenarios. It will also explore how multidisciplinary frameworks, such as the Lucerne Toolbox 2, and emerging randomized data are reshaping contemporary practice. By integrating historical evidence, modern trials, and real-world variability, this session aims to provide a nuanced perspective on optimizing locoregional control while minimizing treatment-related morbidity in patients with node-positive breast cancer.

Tailoring Surgery in Extensive Nodal Disease

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Patients who present with advanced breast cancer nodal disease require multidisciplinary care. Staging definitions are important to consider: N1 indicates 1-3 nodes, N2 indicates 4- 9 axillary or internally mammary nodes (IMN) alone, N3a: 10 or more nodes or infraclavicular nodes, N3b Indicates IMNs and axillary lymph nodes, and N3c indicates supraclavicular lymphadenopathy or stage 3C breast cancer. A recent MD Anderson contemporary treatment and long-term outcomes analysis for breast cancer patients presenting with advanced nodal disease was recently published (1). All 529 patients presented with non-distant metastatic disease and were treated with neoadjuvant systemic therapy (NST) from 2012 to 2018 with the median follow-up time of five years. Patients in this study had cN2 disease in 27% and 73% had N3 disease. One essential finding was that 34% achieved an axillary nodal pathologic complete response, that is going from biopsy proved nodal metastases before NST and obtaining a nodal pCR at surgery; this was subtype dependent. Not surprisingly invasive disease event free survival was significantly higher in patients without residual nodal metastases compared to those with residual disease. This information indicates that a large proportion of patients could have tailored axillary surgery. It's important to note in the initial description and outcome of the procedure targeted axillary dissection (TAD) designed, tested and implemented at MD Anderson Cancer Center to eliminate the need for axillary lymph node dissection in patients with yPN0 disease in the clipped/SLN there, were 28% of cases with N2 disease (2). The false-negative rate of the procedure was 2.4% and was adopted by the NCCN and world-wide as a safe procedure to identify which patients do not need a complete ALND. Since that time there have been several papers demonstrating that TAD is likely a safe and effective way to identify patients where ALND will unlikely benefit the patient (4,5). N2/N3 nodal disease requires comprehensive nodal radiation which is a standard for the undissected nodal basins. For image detected residual disease after NST in these nodal regions additional boost dosage is also utilized routinely United States. For N1 conversion to ypN0 in the nodes the benefit of comprehensive nodal radiotherapy for patients without residual disease has been called into question with the NRG B-51 trial results and additional research is needed for more advanced nodal disease (6). Tailoring nodal surgery for inflammatory breast cancer is currently unacceptable. For patients needing ALND axillary reverse mapping with lymph-venous bypass is emerging routine technique used to decrease the rate of lymphedema in many centers(7). The potential role of TAD in patients presenting with occult breast cancer is discussed.

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Optimization of RT in N+ or High-Risk Breast Ca.

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Radiotherapy (RT) optimization in node-positive or high-risk breast cancer hinges on precise patient selection, tailored target volumes, and modern delivery techniques to maximize disease control while minimizing toxicity. Current guideline trends support postmastectomy RT (PMRT) and comprehensive regional nodal irradiation (RNI) for patients with ≥N1 disease or high-risk features (e.g., large tumors, lymphovascular invasion, close/positive margins), with evolving recommendations on hypofractionation, boost use, and internal mammary node (IMN) coverage based on risk and anatomy. Technical advancesincluding intensity-modulated RT, deep inspiration breath hold, and adaptive planningenable better sparing of heart and lungs, facilitating broader adoption of RNI and IMN irradiation where indicated. Evidence supports escalation strategies such as targeted IMN boosts for clinically positive IMNs as a non-surgical alternative, improving local control in carefully selected patients while maintaining acceptable toxicity profiles. Conversely, de-escalation is appropriate for biologically favorable or low-burden disease when systemic therapy achieves excellent response, with hypofractionated schedules and omission of boosts in select scenarios reducing treatment burden without compromising outcomes. Optimal sequencing with systemic therapy, integration of pathologic and imaging response, and consideration of genomic risk can refine RT intensity and fields. The future of RT in this population lies in risk-adaptive personalizationescalating for residual nodal disease or IMN involvement, and de-escalating for low-risk biologygrounded in guideline evolution and supported by modern techniques that improve therapeutic ratio.

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Optimizing Systemic Therapy in N3 Breast Cancer

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Background

N3 nodal disease (ipsilateral infraclavicular, internal mammary with axillary, or supraclavicular node involvement) represents the highest-risk category within non-metastatic breast cancer. Despite this, patients with N3 disease have been systematically excluded from virtually all pivotal neoadjuvant trials across every major molecular subtype. As treatment strategies become increasingly response-adaptive and biomarker-driven, the absence of prospective N3-specific evidence constitutes a widening clinical gap.

TNBC

KEYNOTE-522 (establishing neoadjuvant pembrolizumab + platinum chemotherapy as standard of care) enrolled T1cN12 or T24N02 disease only, explicitly excluding N3. GeparSixto, BrighTNess, and GeparNuevo applied identical N0N2 caps. The CREATE-X trial likewise did not address N3 at baseline. Yet real-world cohort data confirm that N3 patients are routinely receiving these regimens in practice one RCB analysis reported N3 comprising 19.3% of its cohort without dedicated evidence to guide their management.

HR+/HER2

KEYNOTE-756 (first phase III trial showing significant pCR improvement with pembrolizumab in ER+/HER2 disease) enrolled T1c2 ($\geq$2 cm) cN12 or T34 cN02. GeparTrio, GeparSepto, ADAPT, and CDK4/6 inhibitor-based neoadjuvant trials similarly limited eligibility to N0N2. Notably, KEYNOTE-756 subgroup analyses showed pCR benefit was numerically greater in node-positive patients (9.3%) vs. node-negative (3.8%), raising the untested hypothesis that higher nodal burden may predict greater immunotherapy responsiveness.

HER2 positive

NeoSphere and TRYPHAENA the pivotal trials establishing dual anti-HER2 blockade as neoadjuvant standard enrolled operable/locally advanced T24 disease but without systematic N3 stratification. KATHERINE (T-DM1 for residual disease) did not stratify outcomes by baseline N3 status. Emerging ADC-based neoadjuvant trials partially include N3 (T23N2N3 or T4 any N), but remain insufficient to define N3-specific standards.

Evidence Gap and Unmet Need

The consistent N3 exclusion across subtypes reflects legitimate trial design constraints (multimodal staging complexity, borderline resectability, lower prevalence). However, the cumulative effect is a near-total absence of evidence precisely where it is most needed: residual lymph node disease is the single strongest adverse prognostic factor after neoadjuvant therapy across all subtypes, yet the patients with the greatest nodal burden remain least represented in defining trials. Key unanswered questions include: optimal neoadjuvant regimen

selection by subtype in high nodal burden; validity of pCR as a long-term surrogate in N3 disease; integration with regional nodal irradiation; post-neoadjuvant escalation decisions; and the potential immunological distinctiveness of N3 disease as a therapeutic target. Dedicated prospective data through mandated N3 enrollment strata, enriched real-world registries, or biomarker-driven platform trials are urgently required. Optimizing treatment for N3 nodal breast cancer in the modern era demands evidence generated from, not merely extrapolated to, this high-risk population.

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Go Beyond Cure of Breast Cancer

Cryoablation without Excision for Early-Stage Breast Cancer

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Breast cancer has the highest incidence of female cancer, and the leading case of cancer death in women. Clinical and basic knowledge is essential for the prevention and treatment of breast cancer. Surgical treatment for breast cancer has evolved from radical mastectomy to modified radical mastectomy to breast-conserving surgery. As the de-escalation of surgical treatment for breast cancer continues, nonsurgical treatment for early-stage breast cancer with favorable ancillary features (low grade, positivity for hormone receptors) is being explored.

Of the nonsurgical treatment options, cryoablation has demonstrated the greatest appeal, proven to be effective, safe, well tolerated, and feasible in an outpatient setting with local anesthetic alone. For tumor cryoablation, there are two potential objectives: (1) palliation through tumor debulking (for control of tumor volume and disease progression) or relief of symptoms (e.g., hemorrhage, pain) in patients with metastatic disease or an inoperable primary tumor (2) cure through complete ablation of the primary tumor.

The current speech would share the experience of using cryoablation in early breast cancer and show the current evidence of cryoablation in the treatment of early breast cancer.

Radiofrequency Ablation without Excision for Early Stage Breast Cancer

Tomomi Fujisawa

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Is Surgery Always Needed in Small Breast Tumors?

Tristen Park

Mount Sinai Hospital, Department of Surgery, U.S.A.

For generations, surgery has been the accepted cornerstone of breast cancer treatment. Yet as the field enters a more biologically informed era, that certainty is beginning to shift. In this lecture, we will discuss how the modern question is no longer simply how small a breast cancer is, but what kind of cancer it is, how it behaves, how it responds to therapy, and whether an operation truly changes outcome for the individual patient before us.

This lecture will explore several evolving strategies of surgical de-escalation. The strongest prospective evidence for omission of surgery comes from low-risk ductal carcinoma in situ, where active monitoring has shown noninferior short-term invasive cancer outcomes compared with guideline-concordant surgery-based care in carefully selected patients. These findings, although still maturing, have opened the door to a serious reconsideration of whether all biologically favorable lesions require immediate operation.

For invasive breast cancer, surgery remains the standard of care, but even here the landscape is evolving. One of the most provocative concepts is omitting surgery in highly selected patients who achieve an exceptional response to neoadjuvant systemic therapy. This strategy is especially relevant in biologically aggressive but treatment-sensitive subtypes such as HER2-positive and triple-negative disease. Early prospective data suggest that in carefully chosen patients with image-guided confirmation of complete response, omission of breast surgery may be feasible without compromising short-term oncologic outcomes. Although this remains investigational, it signals a possible future in which surgery becomes optional for a subset of patients who achieve a pathologic complete response.

Thermal ablation has further expanded this conversation, particularly through the ICE3 and FROST cryoablation trials in older women with small, hormone receptor-positive, HER2-negative invasive cancers. These studies reported low five-year ipsilateral breast tumor recurrence rates, excellent tolerability, strong cosmetic satisfaction, and encouraging quality-of-life outcomes, suggesting that for carefully selected patients, cryoablation may offer a meaningful alternative to surgical excision. Complementary data on radiofrequency and microwave ablation likewise support the broader promise of image-guided local therapy, though important questions remain regarding patient selection, surveillance, and the need for phase 3 comparisons against standard surgery. Particularly intriguing is the possibility that ablation may not only control local disease, but also modulate anti-tumor immunity. Taken together, these approaches underscore a broader principle: less invasive local therapy may become increasingly relevant as biologic selection improves.

This insight also reframes how we think about screening and overdiagnosis. We will review studies that helped establish the conceptual foundation for this shift, showing that favorable tumor biology may override size as a determinant of prognosis and suggesting that many small, screen-detected cancers represent indolent disease

with very long lead times. In that context, the smallest cancers may sometimes raise the largest questions about whether intervention is always necessary.

Lastly, an important and already established example of surgery omission is primary endocrine therapy in frail elderly women with strongly hormone receptor-positive invasive cancer. In this setting, the decision is guided not only by tumor biology but also by life expectancy, comorbidity, functional status, and patient preference. For selected older patients, endocrine therapy alone may offer a more appropriate balance of disease control and quality of life than surgery. This longstanding practice reminds us that de-escalation is not solely about innovation; in some contexts, it has long been part of thoughtful individualized care.

These developments do not mark the end of surgery in breast cancer. Rather, they reflect a more mature understanding of the role of surgery in the context of tumor biology and personalized medicine. In that future, the smallest cancers may pose the greatest conceptual challenge, forcing us to reconsider not only what we can remove, but what truly needs to be removed at all. This session will examine the evidence, the controversies, and the evolving clinical frameworks behind one of the most the emerging question in modern breast oncology: Is Surgery Always Needed in Small Breast Tumors?

De-escalating Axillary Intervention in Breast Cancer: Concepts, Trials and Future Directions

Jai Min Ryu

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Management of the axilla in early-stage breast cancer has evolved from routine complete axillary lymph node dissection (ALND) toward less invasive approaches that minimize morbidity without compromising oncologic outcomes. The driving rationale for de-escalation is to reduce long-term complicationslymphedema, shoulder dysfunction, neuropathic painwhile preserving accurate staging and effective regional control. Advances in systemic therapy, more effective radiation techniques, and refined pathologic and imaging staging have enabled this paradigm shift.

Concepts and principles

Risk stratification: Treatment is individualized based on tumor biology, burden of nodal disease, and response to systemic therapy. Patients with low-volume nodal disease (micrometastases or 1,2 positive sentinel nodes) derive limited incremental benefit from ALND.

Diagnostic precision: Sentinel lymph node biopsy (SLNB), targeted axillary dissection (TAD), and improved imaging (axillary ultrasound with fine-needle/core biopsy) allow accurate assessment of nodal status while avoiding routine full dissection.

Integration with systemic therapy and radiotherapy: Effective systemic agents reduce nodal disease burden, while regional nodal irradiation (RNI) can provide locoregional control when surgery is limited. The interplay between systemic therapy response and the need for ALND is central in contemporary decision-making.

Morbidity minimization: Preservation of quality of life is a primary endpoint; reduced surgical extent lowers lymphedema risk and improves functional outcomes.

Key trials shaping practice

ACOSOG Z0011 (2011, long-term follow-up): In clinically node-negative women undergoing breast-conserving surgery with whole-breast irradiation and 12 positive sentinel nodes, omission of ALND did not worsen overall survival or locoregional recurrence compared with ALND. This landmark trial justified avoiding ALND in many patients with limited sentinel-node metastasis.

IBCSG 23-01: Patients with micrometastases in sentinel nodes randomized to ALND versus no further axillary treatment showed no survival or recurrence disadvantage for omission of ALND.

AMAROS: For patients with a positive sentinel node, axillary radiotherapy provided equivalent regional control to ALND with significantly lower lymphedema rates. This established axillary RT as an alternative to ALND.

ACOSOG Z1071, SENTINA, and SN-FNAC studies: These evaluated SLNB accuracy after neoadjuvant chemotherapy (NAC) in initially node-positive patients. False-negative rates were high with standard SLNB but

improved with dual tracer techniques, retrieval of ≥ 3 sentinel nodes, and marking the biopsy-proven positive node (TAD).

Alliance A011202 and ongoing trials: A011202 (comparing ALND versus axillary radiation for patients with residual nodal disease after NAC) and other randomized studies are clarifying management for patients with persistent nodal disease after systemic therapy.

Ongoing trials (e.g., TAXIS, SENOMAC): TAXIS examines tailored axillary surgery plus radiotherapy versus ALND, and SENOMAC assesses safety of omitting ALND in sentinel-node positive mastectomy patients. These will refine boundaries for de-escalation.

Current practice implications

Clinically node-negative, breast-conserving patients with 1,2 positive sentinel nodes can often avoid ALND if receiving whole-breast irradiation and systemic therapy, per Z0011 criteria.

Patients with sentinel-node micrometastases typically do not require ALND.

In clinically node-positive patients downstaged to nodal negativity after NAC, TAD or optimized SLNB (dual tracer, ≥ 3 nodes, clip removal) can accurately stage the axilla and may allow ALND omission in selected responders.

Axillary radiotherapy is a valid alternative to ALND for regional control when surgery is limited, with lower lymphedema risk.

Future directions

Biomarkers and tumor biology: Integration of molecular subtype, circulating tumor DNA, and genomic risk scores may refine which patients truly require axillary treatment.

Personalization using response-adaptive strategies: Trials may stratify surgical/radiation intensity based on NAC response assessed by imaging, pathology, and molecular markers.

Minimally invasive and image-guided techniques: Wider adoption of TAD, improved clip localization, and advanced imaging could further reduce false-negative rates and permit broader ALND omission.

Long-term functional and patient-reported outcomes: Future studies should prioritize quality-of-life endpoints alongside survival and recurrence metrics.

De-escalation in mastectomy patients: Evidence gaps remain for safely omitting ALND in sentinel-node positive mastectomy patientsongoing trials will guide changes.

Global implementation and equity: Ensuring access to accurate SLNB, clips, dual tracers, radiation planning, and multidisciplinary care is essential for safely adopting de-escalation worldwide.

Conclusion

De-escalation of axillary intervention represents a major shift toward balancing oncologic safety with preservation of function and quality of life. Landmark trials support omitting ALND in many patients with limited nodal disease, and ongoing studies will expand and refine indication sparticularly after neoadjuvant therapy and in mastectomy patients. The future lies in individualized, response-adapted approaches integrating biology, imaging, and minimally invasive techniques to ensure optimal outcomes with minimal morbidity.

Imaging of Axillary Lymph Nodes: Accuracy, Challenges and Evolving Tools

Jessica Leung

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Lymph node involvement by tumor is undoubtedly one of the most important factors in the prognosis and treatment of the breast cancer patient. In TNM staging, the regional nodal basins that comprise the "N" component include the axilla (levels I, II, III), internal mammary chain, and supraclavicular region. The level I axillary node is typically the first node to be involved by tumor, and this is the underlying basis of sentinel lymph node biopsy. Information about tumor involvement of the axillary node(s) is invaluable in the care of the breast cancer patient. Surgical staging of the axilla has long been the standard for such evaluation.

In recent years, imaging is playing an increasingly important role in assessing axillary lymph node. Axillary adenopathy may be visualized on all three conventional imaging modalities mammography/tomosynthesis, ultrasound, and MRI but mammography/tomosynthesis is least able to provide an accurate and comprehensive depiction.

Ultrasound is the primary modality for imaging the axilla. There is no absolute upper limit regarding the size of the normal lymph node. Instead, the cortical-hilar relationship is more important as an indicator of tumor involvement. The cortex should be seen as a circumscribed hypoechoic rim around the echogenic hilum, and the shape of the normal lymph node is either oval or reniform. When tumor cells invade the lymph node, they are trapped in the cortex, and cortical thickening (uniform or focal) may result. The measurement of 3 mm has been accepted as the upper limit of normal cortical thickness. The resultant cortical thickening may compress, displace, or even efface the hilum. While these sonographic changes are consistent with tumor involvement, they are not 100% sensitive or specific. Thus, biopsy is necessary to diagnose or exclude breast cancer in the setting of an abnormal axillary node at ultrasound. Besides diagnostic imaging, ultrasound also offers real-time guidance for percutaneous tissue sampling.

When compared with ultrasound, MRI may provide information about both the left and the right sides in a comparative manner. Additionally, MRI may provide precise anatomic details, such as the location of the lymph node(s) with respect to the pectoralis minor muscle. MRI is also more standardized (less affected by variability in technique and operator). However, breast MRI requires the intravenous administration of gadolinium, and it is more expensive and less accessible than ultrasound.

There is increasing interest and research in novel modalities for imaging axillary lymph nodes. Photoacoustic (also known as optoacoustic) imaging relies on the differential absorption of light in oxygenated vs. deoxygenated hemoglobin, thereby assessing the neovascularity associated with tumorigenesis. An intravenous contrast agent may aid in improving accuracy. Examples include contrast-enhanced ultrasound (use of microbubble agents) and 18F-Fluoroestradiol (FES) versus 18F-Fluorodeoxyglucose (FDG) in PET/CT imaging

(especially in setting of invasive lobular carcinoma).

While imaging plays an invaluable role in assessing the axilla in the breast cancer patient, there are associated challenges. Financial costs pose an issue, as well as false positives (interpretation and biopsy). Training for personnel is required for accurate results. There also needs to be proper implementation in the clinical workflow to avoid delays in care and achieve optimal patient satisfaction.

The SOUND (Sentinel Node vs. Observation After Axillary Ultrasound) trial showed that patients with small (2 cm or smaller) invasive breast cancer who have had a negative axillary ultrasound do not necessarily need to undergo sentinel lymph node biopsy, as the 5-year distant disease-free survival did not differ in a statistically significant manner (from those patients who did undergo sentinel lymph node biopsy). Should this become universal practice and standard-of-care, the role of imaging in assessing the axilla will be foundational in the care of the breast cancer patient.

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Pathologic Evaluation of Axillary Nodes: Performance, Pitfalls and Clinical Implications

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The recent publication of clinical trial results for axillary management marks a historic turning point in breast cancer axillary management guidelines. Several pivotal clinical trials such as NAUTILUS, ASLAN, and and NEO-NAUTILUS are underway in Korea, and I'll give you comprehensive review of them. Modern factors that make it possible to omit aillary surgery include the development of imaging technology that can predict the condition of lymph nodes before surgery more precisely, such as ultrasound and MRI, the understanding of the genetic characteristics of tumors that can predict the risk of patients and design customized treatments, and the development of anticancer drugs and targeted therapeutics, which enable powerful systemic treatment, and the multidisciplinary approach to determine the optimal minimum surgical scope in cooperation with surgery, oncology, radiation oncology, and pathology has become more active. I also want to take the time to think about Pathologist's role in the de-escalation era by answering the following questions: What is the accuracy of preoperative ultrasound? How accurately can we predict the treatment response with imaging tests after chemotherapy before surgery? Will axillary lymph node tests be needed during surgery? what are the differences according to each genetic subtype?

Lymphoscintigraphy and Beyond: Nuclear Medicine Approaches to Lymphedema Diagnosis

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Nuclear medicine plays a pivotal role in the management of lymphedema, ranging from the visualization of fundamental physiological mechanisms to the application of advanced hybrid imaging technologies.

First, the principles of lymphoscintigraphy and the characteristics of radiopharmaceuticals form the foundation of lymphatic diagnostics. Radiopharmaceuticals, such as 99mTc-phytate, act as molecular probes that travel through the physiological flow of the lymphatic system after interstitial injection. Understanding the interaction between particle size and lymphatic transport mechanisms is essential for the accurate interpretation of a patient's functional lymphatic status.

Second, various staging and classification systems are utilized to standardize the diagnosis of lymphedema. Key frameworks include the Lee & Bergan system, which focuses on vessel morphology and collateral pathways; the Mikami et al. system, which evaluates nodal transit time and lymphatic contractility; and the Cheng et al. system, which provides standardized grading based on the anatomical extent of dermal backflowa model particularly optimized for clinical environments utilizing 99mTc-phytate. These systems provide the necessary evidence for categorizing disease severity and establishing personalized treatment strategies.

Third, the clinical application of SPECT/CT represents a diagnostic evolution beyond conventional planar imaging. By integrating functional data with precise anatomical localization, SPECT/CT enables sophisticated preoperative mapping for lymphaticovenular anastomosis and rigorous functional evaluation following vascularized lymph node transfer. Quantitative indices, such as maximum lymphatic activity and total lymphatic accumulation, serve as objective tools for assessing the success of surgical interventions.

In conclusion, the integration of standardized classification systems and advanced SPECT/CT technology bridges the gap between functional diagnosis and successful surgical outcomes, facilitating more objective and evidence-based clinical decision-making in lymphedema care.

Radiation-Induced Lymphatic Injury in Breast Cancer: Dose-Volume Correlates and Predictive Modeling

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Introduction: Breast cancer-related lymphedema (BCRL) remains a significant challenge for survivors, profoundly impacting their quality of life. While axillary surgery is recognized as the primary driver of BCRL, regional nodal irradiation (RNI) contributes a modest but modifiable 3-5% to the overall incidence. As the treatment paradigm for breast cancer continues to evolve, balancing oncologic control with lymphatic toxicity has become a central focus. This presentation explores the pathophysiology of radiation-induced lymphatic injury and introduces strategies for "precision prevention" through radiation dose-volume analysis and predictive modeling.

Pathophysiology and Field Optimization: Unlike surgical injury, radiation-induced damage to the lymphatic system is often delayed, characterized by TGF-β1-mediated tissue fibrosis and lymphocyte depletion in the lymph nodes. Recent clinical evidence has highlighted that the risk of BCRL is significantly influenced by radiation field design, particularly the inclusion of the upper AXL1 and AXL2. Importantly, our institutional data demonstrates that excluding the upper AXL1 from the RNI field is oncologically safe, showing no significant increase in axillary recurrence rates while potentially reducing the risk of lymphedema.

Emergence of Lymphatic Organs-at-Risk (OARs): A key strategy for minimizing lymphatic toxicity is shifting from indirect field modifications to the direct sparing of specific lymphatic structures defined as Organs-at-Risk (OARs). The Axillary-Lateral Thoracic Vessel Juncture (ALTJ) has recently emerged as a critical lymphatic OAR. Based on the axillary reverse mapping (ARM) theory, the ALTJ serves as a vital compensatory pathway for upper extremity drainage after surgical dissection. Multiple studies, including large-scale multicenter analyses, have identified ALTJ dose metrics, specifically V35Gy, as independent predictors of BCRL risk. For instance, maintaining an ALTJ V35Gy < 66% has been shown to result in significantly lower lymphedema rates.

The Paradigm Shift to Hypofractionation: The global transition from conventional fractionation to moderate hypofractionation (40 Gy in 15 fx) has raised questions regarding its impact on BCRL. Long-term results from the UK-START trials and the preliminary report of HypoG-01 Phase III trial confirm that hypofractionated RNI is non-inferior to conventional fractionation regarding arm lymphedema risk, while maintaining comparable oncologic safety and overall clinical profiles.

Conclusion: Radiation oncologists serve as the final "risk checkpoint" in the breast cancer treatment journey. By evaluating patients after surgery and chemotherapy, we have the unique opportunity to integrate cumulative risk profiles into precision treatment planning. Aligning "risk-sensitive" planning, such as the implementation of ALTJ sparing and optimized field design, with early rehabilitative interventions will be essential to go "beyond the cure" and ensure the long-term well-being of our patients.

Integrative Rehabilitation Approaches to Breast Cancer-Related Lymphedema: The Role of ICG Lymphography

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Indocyanine green (ICG) lymphography is a minimally invasive imaging technique that enables real-time visualization of superficial lymphatic flow. In patients with cancer-related lymphedema, this modality provides valuable information regarding functional lymphatic pathways, dermal backflow patterns, and areas of lymphatic obstruction. Beyond its diagnostic value, ICG lymphography has increasingly been utilized to guide individualized rehabilitation strategies.

By identifying preserved lymphatic channels and alternative drainage pathways, clinicians can tailor manual lymph drainage (MLD) techniques and compression strategies to optimize lymphatic transport. Image-guided rehabilitation allows therapists to adjust the direction, pressure, and sequence of drainage techniques according to the patient's unique lymphatic architecture. In addition, dynamic assessment during imaging can help distinguish between functional lymphatic flow and stagnant interstitial fluid, which has important implications for therapeutic decision-making.

This lecture will review the principles of ICG lymphography interpretation and demonstrate how imaging findings can be integrated into rehabilitation planning. Clinical cases will be presented to illustrate practical applications, including the selection of alternative drainage routes, adjustment of manual therapy techniques, and monitoring of treatment response.

Ultimately, the integration of ICG lymphography into rehabilitation practice may contribute to more precise, personalized, and effective management of lymphedema.

Axillary Lymph Node Dissection and Targeted Axillary Dissection in Node-Positive Breast Cancer Patients Undergoing Upfront Surgery: Current Evidence and Clinical Perspectives

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In clinically node-positive patients undergoing upfront surgery, axillary lymph node dissection is often standard of care. NCCN guidelines open for marking the metastatic lymph node and performing targeted removal together with a sentinel lymph node biopsy, i.e., a targeted axillary dissection, if only limited nodal disease is suspected (1-2 axillary metastases). This strategy is, however, not widespread in countries where preoperative axillary ultrasound is part of the routine clinical workup. Importantly, clinical node positivity ranges from non-palpable, ultrasound-detected limited nodal involvement to palpable significant nodal disease, and management must therefore be adapted to the initial nodal burden. When an upfront surgical approach is used, nodal staging is important for adjuvant treatment decisions; on the other hand, axillary lymph node dissection has a significant negative impact on long-term arm morbidity and should not be used without good reason. In this talk, we will discuss when axillary lymph node dissection can be questioned and which diagnostic and therapeutic role it may play.

Various Axillary Lymph Node Localization Techniques and Oncologic Outcomes After Neoadjuvant Chemotherapy in Node-Positive Patients with Excellent Response

Marios Konstantinos Tasoulis

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Neoadjuvant systemic therapy (NST) is increasingly used in early-stage breast cancer and is now considered standard of care especially for greater than stage II triple negative or HER2 positive disease. Existing literature suggests that NST can downstage the axilla in approximately 40–70% of node-positive (cN+) patients and this has driven a paradigm shift towards de-escalation of axillary surgery.

Results from seminal trials including ACOSOG Z1071, SENTINA, SN FNAC and GANEA showed that sentinel lymph node biopsy (SLNB) is feasible in patients presenting with cN+ disease that convert to ycN0 post-NST. This technique was associated with a false negative rate (FNR) of < 10% if dual mapping was used to excise at least 3 nodes and immunohistochemistry was used for the analysis. This was further improved if the index axillary lymph node was clipped and included in the axillary surgery. This led to the concept of targeted axillary dissection (TAD) which involved removal of the marked (clipped node) and the sentinel lymph nodes. Several studies have shown that TAD is associated with a FNR of ~2–4%, compared to ~10–19% for SLNB alone and ~4–7% for clipped node excision.

Several methods have been described for the marking and facilitation of the identification and removal of the index (biopsy proven) metastatic axillary lymph node including use of seeds employing different technologies (magnetic, electromagnetic, radiofrequency, radioactive), guide-wires, carbon suspension injections and use of intra-operative ultrasound. Across studies, localization techniques demonstrated high success, with pooled localization rates around 97% and retrieval rates near 99%. Wireless, probe-guided methods showed the highest identification rates, though each modality has specific advantages and limitations related to cost, logistics, and imaging compatibility.

The available literature also suggests that the oncologic outcomes are favourable with de-escalated approaches. Studies reported very low axillary recurrence rates following SLNB or TAD without completion ALND, while survival outcomes are excellent. There does bit appear to be any difference in terms of oncological outcomes between SLNB and TAD.

In summary, de-escalation of axillary surgery in cN+ patients who convert to ycN0 after NST is feasible and oncologically safe. TAD offers the lowest FNR and improved staging accuracy compared to SLNB alone, though both approaches demonstrate comparable long-term outcomes. Multiple effective localization techniques are available, allowing flexibility based on institutional resources. These findings support a shift toward individualized, less invasive axillary management strategies.

De-escalation of Axillary Surgery and Escalation of Radiotherapy

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The management of axillary lymph nodes in breast cancer has shifted dramatically, with surgical de-escalation driving a parallel expansion in the role of regional nodal irradiation (RNI). Landmark trials ACOSOG Z0011, AMAROS, IBCSG 23-01, and SENOMAC established that ALND can be safely omitted or replaced by axillary RT without compromising locoregional control or survival. However, these trials used heterogeneous RT fields, and their oncologic safety was often underpinned by substantial incidental axillary irradiation from conventional 3D-CRT tangential fields. In the IMRT era, uncontoured volumes receive virtually no dose, making explicit contouring decisions mandatory.

A risk-stratified approach to RT target volumes is proposed. For pN1 after SLNB, axillary levels III should be covered, with higher nodal levels and IMN considered based on tumor biology, lymphovascular invasion, grade, and tumor location. For pN1 after ALND, level II coverage is optional in minimal disease; pN2 warrants comprehensive irradiation of levels IIIV and IMN.

In the NAC setting, the RAPCHEM trial supports RT de-escalation to levels III in cN1/ypN0 patients, with 5-year locoregional recurrence rates of only 13%. The NSABP B-51/RTOG 1304 results will further refine RNI omission criteria in ypN0 disease. For ypN1 after SLNB alone, full axillary RT (levels IIV with IMN) is recommended pending results of Alliance A011202. Targeted Axillary Dissection (TAD) requires close multidisciplinary coordination to guide appropriate RT volumes.

RT escalation is a necessary consequence of surgical restraint but it must be deliberate, evidence-based, and technique-aware. Future de-escalation of both surgery and RT, guided by tumor biology and genomic profiling, remains the ultimate goal to reduce morbidity and improve quality of life.

Long Term Care After Primary Breast Cancer Treatment

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Management of Toxicities Associated with Endocrine Therapy for HR-positive Breast Cancer

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Endocrine therapy remains the cornerstone of treatment for hormone receptor-positive (HR+) breast cancer across both early and advanced disease settings. Tamoxifen and aromatase inhibitors have long been established as standard therapies, while fulvestrant has played an important role in the management of advanced disease, collectively delivering meaningful and durable clinical benefit. Meanwhile, the endocrine treatment landscape continues to evolve with next-generation estrogen receptor-targeting agents, including oral selective estrogen receptor degraders (SERDs), complete estrogen receptor antagonists (CERANs), selective estrogen receptor covalent antagonists (SERCAs), and PROTAC estrogen receptor degraders.

Despite these advances, the long-term benefit of endocrine therapy is frequently compromised by treatment-related toxicity, which remains a major cause of poor adherence and premature discontinuation. Tamoxifen is characteristically associated with hot flashes, vaginal bleeding or discharge, venous thromboembolism, and endometrial cancer; aromatase inhibitors with arthralgia/myalgia, bone loss and fractures, and genitourinary or sexual symptoms; and approved oral SERDs primarily with nausea, fatigue, and gastrointestinal symptoms, all of which may substantially impair quality of life and compromise treatment persistence.

Accordingly, the optimal use of endocrine therapy should extend beyond antitumor efficacy alone and adopt a personalized approach that integrates menopausal status, comorbidities, patient preferences, and proactive toxicity management. Such management should include baseline risk assessment, patient education, symptom-specific supportive care, bone health surveillance, and timely treatment modification or switching when needed to maintain treatment persistence. This approach is essential to preserve quality of life, maximize adherence, and optimize the long-term outcomes of patients with HR+ breast cancer.

Fertility Preservation and Pregnancy After Breast Cancer

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This presentation addresses the complex interplay between anticancer treatments and reproductive health in premenopausal women with early breast cancer. Fertility concerns are highly prevalent in this population and may significantly influence treatment decision-making. Anticancer treatments are associated with varying degrees of gonadotoxicity, potentially leading to premature ovarian insufficiency and long-term sequelae such as infertility and early menopause. Current international guidelines emphasize that oncofertility counseling should be systematically offered to all patients of reproductive age at diagnosis, irrespective of disease stage. Risk assessment is multifactorial, with patient age and treatment type representing the principal determinants. Biomarkers such as anti-Mllerian hormone (AMH) have emerged as useful tools for predicting ovarian reserve decline. Established fertility preservation strategies include embryo and oocyte cryopreservation. Ovarian tissue cryopreservation represents an alternative option, especially when treatment initiation cannot be delayed. Additionally, the administration of gonadotropin-releasing hormone agonists during chemotherapy has been shown to reduce the incidence of treatment-induced ovarian failure and increase post-treatment pregnancy rates. Breast cancer survivors exhibit a reduced likelihood of achieving pregnancy compared to the general population. Nevertheless, accumulating evidence indicates that pregnancy after breast cancer does not adversely affect oncologic outcomes, including in patients with hormone receptorpositive disease. Obstetric and neonatal outcomes are generally reassuring. In conclusion, early integration of oncofertility counseling within multidisciplinary cancer care is essential to optimize both oncologic and reproductive outcomes in young women with breast cancer.

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Endoscopic and Robotic Breast Surgery Session

Go Beyond Cure of Breast Cancer

Endoscopic Breast Mastectomy: Technique, Benefits, and Future Directions

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Endoscopic assisted breast surgery (EABS) or robotic assisted breast surgery (RABS) performed through minimal axillary and/or peri-areolar incisions has become the representative of minimal access breast surgery (MABS). We report the trend and clinical outcome of MABS for treatment of breast cancer. MABS performed annually has shown an increasing trend. Compared with CBS, MABS such as breast conserving surgery and nipple sparing mastectomy (NSM) have effectively reduced wound scar length. Since the sequential uprise from conventional NSM (C-NSM), dual-axillary-areolar-incision two dimensional (2D) endoscopic assisted NSM (E-NSM), single-axillary-incision E-NSM, robotic assisted NSM (R-NSM), and single-port 3D E-NSM, the development of minimal access mastectomies increasingly paralleled with NSM. The operation time of various MABS decreased significantly and showed no statistical difference compared with CBS. R-NSM was associated with highest cost, followed by 3D E-NSM, E-NSM, and C-NSM. The positive surgical margin rate and local recurrence rate of MABS and CBS were not statistically different. MABS showed comparable clinical outcome and preliminary oncologic safety as CBS and has been increasingly performed as the surgical treatment of breast cancer, especially minimal access NSM.

The current speech would focus on the endoscopic breast mastectomy: technique, benefits, and future directions.

Robotic Breast Surgery in Middle East Asia – From Observation to Cadaveric Workshops and Proctorship

Ahmad Matalkah

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This Presentation chronicles the journey of establishing the first minimal invasive breast surgery program in the Middle East, with a particular focus on robotic mastectomy in Cleveland Clinic Abu Dhabi. Drawing from a background as a robotic and oncological surgeon, the speaker outlines the structured, stepwise approach taken to build a program of international calibres, one that not only delivers excellent surgical outcomes but also contributes to the academic and training landscape of the region.

The foundation of this initiative was rooted in a commitment to advancing breast surgical oncology through minimally invasive techniques. Recognizing the transformative potential of robotic surgery in breast cancer care, the speaker embarked on a rigorous training pathway to acquire the specialized skills necessary to lead such a program.

A pivotal component of this journey was an observership in South Korea, a global leader in robotic breast surgery, where exposure to high-volume, cutting-edge practice provided invaluable insight into both the technical and organizational demands of running a successful robotic breast surgery unit.

Complementing the clinical observership, the speaker participated in cadaveric workshops specifically designed for robotic mastectomy. These hands-on training sessions were instrumental in translating theoretical knowledge into practical surgical competence, allowing for the safe and effective transfer of skills to a new institutional environment. The importance of cadaveric training in procedural surgery, particularly for novel or complex techniques cannot be overstated, as it bridges the gap between observation and independent practice in a controlled, low-risk setting.

A further critical step in the program's development was proctorship, whereby the speaker performed robotic mastectomy procedures under the direct supervision of internationally recognized experts. This phase ensured that the highest standards of surgical technique and patient safety were maintained during the early implementation period. Proctorship also served to validate the program's readiness to function autonomously and to meet global benchmarks for quality and outcomes.

Each of these steps observership, cadaveric training, and proctorship was not undertaken in isolation but was part of a deliberate, evidence-informed strategy to establish a robust and sustainable program. The speaker emphasizes that no single element alone is sufficient; rather, it is the integration of all these components that enables a surgeon and an institution to deliver consistently excellent results.

The program has since demonstrated strong clinical outcomes, reflecting the effectiveness of this comprehensive training model. Alongside favourable patient results, the program has contributed to the academic community

through publications, further cementing the institution's role as a centre of excellence in robotic breast surgery in the region.

Perhaps most significantly, the program now extends its impact beyond individual patient care by offering observership opportunities to other breast surgeons. This commitment to education and knowledge, sharing reflects a broader mission: to elevate the standard of breast surgical care across the Middle East by empowering surgeons with the skills, exposure, and mentorship needed to bring minimally invasive techniques to their own institutions and patient populations.

In conclusion, this talks highlights that establishing a first-of-its-kind surgical program requires far more than technical skill alone. It demands vision, structured preparation, international collaboration, and an unwavering dedication to both patient outcomes and surgical education.

The Middle East's first minimal invasive breast surgery program stands as a testament to what is achievable when each step of the development process is approached with rigor and purpose, and serves as a replicable model for surgeons across the region who aspire to bring the same standard of care to their patients.

Minimal Access Approaches in Breast-Conserving Surgery: Techniques and Outcomes

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Robot-assisted breast-conserving surgery has a potentially better cosmetic benefit than conventional breast-conserving surgery without any scarring on the breast. However, data on the feasibility and safety are limited.

A multi-center retrospective review was conducted to identify women who underwent robot-assisted breast-conserving surgery as part of the Korea Robot-Endoscopy and Minimal-Access Breast Surgery Study Group between August 2019 and October 2023. Information on the clinicopathological characteristics, perioperative complications, operation time, recurrence, and reoperation was collected.

A total of 150 patients underwent the surgery performed by 10 breast surgeons at seven institutions. Invasive breast cancer was observed in 121 cases and ductal carcinoma in situ was detected in 29 cases. Of all the patients, 75.3% and 65.3% had an estrogen and progesterone receptor positive status, respectively. A total of 35.3% of the patients had a HER2-positive status. In terms of the surgical technique, the Da Vinci SP system was more frequently used (60%). Gas insufflation was applied in 97.33% of the cases, and sentinel lymph node biopsy was the most common axillary surgery (89.3%). The median postoperative days was 5.4 days (range, 1.0-15.0 days). The incision location was the mid-axillary line, and the median incision length was 37.1 mm (range, 27.0-60.0 mm). The median total operation time was 133.8 min (range, 62.0-295.0 min). Eleven cases (7.3%) had positive frozen margins, and only one case (0.7%) required reoperation because of permanent positive margin. Six patients (4%) developed surgical complications. Postoperative bleeding was found in one case and skin burns were found in five cases (3.3%); two cases (1.3%) required skin excision and three cases (2.0%) showed spontaneous resolution. There were no cases of conversion to open surgery or of mortality. Only one patient (0.7%) had recurrence.

This is the first multicenter report on robot-assisted breast- conserving surgery worldwide; this could be technically feasible and safe.

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Multidisciplinary Session

Go Beyond Cure of Breast Cancer

Molecular Tumor Board: How Does ctDNA Add to the Real-World Practice?

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Advances in cancer genomics have facilitated the integration of precision medicine into the management of metastatic breast cancer, where treatment decisions are increasingly guided by tumor biology and mechanisms of resistance. Molecular tumor boards (MTBs) provide a multidisciplinary platform to interpret genomic data in conjunction with clinical, radiologic, and pathologic findings to optimize personalized therapy.

Circulating tumor DNA (ctDNA) has emerged as a minimally invasive tool for real-time genomic profiling, enabling detection of actionable alterations such as ESR1 and PIK3CA mutations, as well as quantitative parameters including variant allele frequency and tumor fraction. However, its impact on real-world clinical decision-making within the MTB setting remains to be fully defined.

In this session, we present representative cases of breast cancer discussed in a multidisciplinary MTB format. Treatment strategies are evaluated before and after disclosure of ctDNA results, with audience participation through live polling to assess changes in clinical decision-making.

These cases highlight how ctDNA can directly influence therapeutic choices, particularly in selecting targeted treatments, and emphasize the importance of integrating ctDNA with imaging and pathologic data. This session underscores the growing role of ctDNA in MTBs and its potential to advance precision oncology in breast cancer.

Medical Professionalism and Virtual Reality for Patients with Breast Cancer

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Virtual reality (VR) is emerging as a powerful, non pharmacological intervention in breast cancer care, with growing evidence supporting its role in symptom management, patient education, rehabilitation, and psychosocial support. As oncology care increasingly emphasizes patient centeredness, shared decision making, and holistic outcomes, VR technologies offer unique opportunities to enhance medical professionalism while improving patient experience and quality of life. This presentation explores the clinical applications of VR across the breast cancer continuum, examines its alignment with core principles of medical professionalism, and discusses current challenges, ethical considerations, and future directions for integration into routine care.

Breast cancer patients frequently experience anxiety, pain, fatigue, distress, and functional limitations during and after treatment, particularly during chemotherapy, radiation therapy, surgery, and survivorship. VR has demonstrated effectiveness as an immersive distraction tool that can reduce procedural pain, treatment related anxiety, and emotional distress. By engaging patients in calming, interactive virtual environments during chemotherapy or radiation sessions, VR helps shift attention away from discomfort and fear, thereby reducing perceived pain and anxiety without reliance on pharmacologic interventions. In addition, studies suggest that VR can improve mood, decrease depressive symptoms, and enhance overall psychological well being during treatment.

Beyond symptom management, VR can play an important role in rehabilitation and functional recovery for breast cancer patients and survivors. Interactive VR platforms such as motion tracking systems and immersive rehabilitation programs have been used to improve shoulder range of motion, strength, and daily functioning following surgery or radiation therapy. Importantly, VR based rehabilitation can be adapted for home use, increasing accessibility and supporting continuity of care beyond the clinical setting.

VR also represents a transformative tool for patient education and empowerment. Three dimensional visualization systems and 360 degree VR experiences allow patients to better understand their diagnosis, tumor location, and treatment plan, including chemotherapy and radiation therapy workflows. By visualizing complex medical information in an intuitive and immersive manner, VR can reduce uncertainty and fear, enhance comprehension, and support informed consent. This improved understanding fosters autonomy, strengthens communication between patients and clinicians, and promotes shared decision making, all of which are central components of medical professionalism.

From a clinician perspective, VR supports professionalism through enhanced surgical planning and precision. Advanced VR visualization enables surgeons to better understand tumor anatomy and surrounding tissues prior to intervention, which is especially beneficial in complex cases. This technology contributes to thoughtful,

evidence informed decision making and reinforces a commitment to excellence, competence, and patient safety. Furthermore, VR aligns with professionalism by offering non pharmacological approaches to pain and distress management, minimizing unnecessary medication use and supporting compassionate, holistic care.

The presentation will also address the expanding role of VR in home based care and with cancer survivors. Pilot studies indicate that at home VR interventions are feasible and potentially effective for rehabilitation, standardized assessments, symptom management, and psychosocial support. Home based VR has the potential to reduce disparities in access to supportive care, enhance patient engagement, and improve long term outcomes when integrated thoughtfully into clinical workflows.

Despite its promise, several challenges limit widespread clinical adoption of VR in breast cancer care. These include the cost of equipment, variability in insurance reimbursement, concerns about cybersickness, and practical issues related to headset weight, comfort, and fit which is a concern for patients experiencing fatigue or treatment related side effects. Ethical considerations such as equitable access, data privacy, and long term impact on patient clinician relationships must also be carefully addressed as VR technologies continue to evolve.

In conclusion, virtual reality is a versatile and effective tool that supports multiple dimensions of breast cancer care, including symptom management, rehabilitation, education, and psychosocial well being. When implemented thoughtfully, VR aligns closely with the principles of medical professionalism by fostering patient centered care, enhancing informed consent, improving communication, and promoting compassionate, non pharmacological interventions. As technology advances and evidence continues to grow, VR holds significant promise for improving quality of life for breast cancer patients and survivors by addressing both physical and psychosocial needs across the cancer continuum.

Real World Challenges of AI in Breast Cancer Care

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Artificial intelligence (AI) is increasingly used in breast cancer care, particularly in screening, imaging interpretation, and clinical decision support. While many studies demonstrate that AI can perform well in cancer detection, translating these results into routine clinical practice raises important questions for surgeons, trainees, and healthcare teams. This talk discusses the practical challenges of implementing AI in real-world breast cancer care and outlines a structured approach to safe adoption based on institutional experience.

A key challenge is generalizability. Many AI systems are developed using datasets that may not reflect local patient populations, imaging platforms, or clinical workflows. As a result, performance can vary across institutions, potentially influencing referral patterns, surgical workload, and case complexity. Another major barrier is workflow integration. AI tools that do not align with established radiology reporting processes, multidisciplinary tumor boards, or surgical decision-making pathways may increase cognitive burden rather than improve efficiency.

From a systems perspective, cost-effectiveness and sustainability are critical considerations. AI may shift workload rather than reduce it, and its value depends on local staffing models, case mix, and downstream resource utilization. Equally important are the voices of clinicians. Acceptance of AI is shaped by trust, interpretability of outputs, and clarity regarding clinical responsibility when AI recommendations differ from human judgment.

Drawing on implementation experience at National University Hospital, I will share a practical framework for utilizing AI in Cancer Care. By focusing on real-world implementation rather than algorithm performance alone, this framework aims to help surgeons, trainees, and healthcare leaders understand how AI can support, rather than replace, clinical judgment in breast cancer care.

Deep Learning Frameworks for Patient-Level Drug Response Prediction, Patient Survival, and Biomarker Discovery by Modeling Transcriptome

Sun Kim

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AI in Surgery: From Planning to Precision

Jinsoo Rhu

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AI in Medical Oncology: Artificial Intelligence in Patient Care

Nadia Harbeck

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AI in Radiotherapy: AI-Driven Personalization and Accuracy in Breast Radiation Therapy

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Radiotherapy technology has evolved rapidly, yet breast radiation therapy has remained largely field-based in routine practice. The transition to volume-based IMRT/VMAT planning offers clear clinical benefits more uniform dose distribution, better organ-at-risk sparing, and reduced toxicity but demands precise delineation of multiple targets and structures, creating a substantial workload that has long been a barrier to broader adoption.

AI is increasingly addressing this bottleneck. Deep learning-based auto-contouring systems have reached clinical deployment, reducing contouring time while improving consistency across physicians and institutions. What began as a tool for organ-at-risk segmentation has expanded into clinical target volume delineation, where multimodal AI systems integrating imaging with structured clinical data from electronic medical records are beginning to replicate the reasoning process of experienced clinicians. Alongside contouring, AI-driven dose prediction and knowledge-based planning are enabling automated, expert-quality treatment plans and machine learning models are showing promise in predicting individual patient risk for toxicity and survival outcomes, adding a layer of personalized decision support that extends beyond the planning process itself.

In the management of metastatic disease, AI-assisted lesion detection is already reshaping clinical judgment revealing disease burden that conventional review might miss, and directly influencing whether ablative therapy is appropriate or should be withheld.

Radiation-induced lymphopenia is consistently associated with poor outcomes across cancer types, yet circulating lymphocytes have historically been an invisible organ at risk. Personalized blood dosimetry enabled by whole-body segmentation and compartment modeling now makes it possible to quantify and potentially minimize lymphocyte exposure during treatment planning, opening a new dimension of biologically-informed RT optimization.

Taken together, these advances reflect a broader transformation: AI is no longer a research curiosity in radiation oncology but an active participant in clinical workflows. Its continued impact will depend not on the technology alone, but on the rigor with which it is validated and the depth of collaboration between those who build it and those who use it.

Does Surgery Have to be Different?

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Breast cancer in very young patients, typically defined as those diagnosed at ≤ 40 years of age, represents a distinct clinical entity characterized by unique biological, genetic, and psychosocial features. Although breast cancer diagnoses in younger women have increased moderately, particularly in recent decades, younger women still represent a minority of total breast cancer cases. Even though its clinical significance is substantial due to delay in breast cancer diagnosis, more aggressive tumor biology, higher rates of hereditary predisposition, and longer life expectancy, which amplifies the long term consequences of treatment decisions. This has led to ongoing debate regarding whether surgical management should differ from that of older patients.

In most European countries, organized breast cancer screening programmes target women aged 50–69, with the new European Council recommendations to extend it to 45–74 years, although not implemented in all member States, implying a delay in diagnosis and consequently, diagnosis in a later stage.

Evidence from several meta-analyses has shown that breast-conserving surgery (BCS) followed by radiotherapy provides survival outcomes equivalent to mastectomy, even in very young patients, and young age alone is not an indication for more radical surgery, reinforcing the oncologic adequacy of breast conservation.

However, evidence has shown that younger patients have higher locoregional recurrence (LRR) rates, which do not translate into worse survival. Even though there is still evidence in retrospective and prospective studies that rates of axillary downstaging and avoidance of axillary node dissection (ALND) are highest among young women compared with older age groups. And despite equivalent rates of downstaging to breast conservation, young women were less likely to elect BCS when eligible.

Although higher LRR risk in younger patients does not automatically mandate full axillary dissection, in the ACOSOG Z0011 trial, younger patients and those with HER2+ and TNBC were less likely to undergo SLNB alone despite meeting the eligibility criteria.

Generally, there is less evidence for breast cancer management among younger patients than among middle-aged patients because they are often underrepresented in clinical trials, despite some progress towards removing upper age limits. In trials for omission of SLN in upfront surgery, such as the SOUND trial, only 1.4% in each arm were patients < 40 years, and 16% were in the range of 40-49 y/o. In the INSEMA trial, 10 % or less were aged < 50 years, indicating that patients < 40 y/o were a very small minority

Performing extensive breast and axillary surgery solely due to chronological age, physician bias, or patient anxiety is not supported by evidence and may turn into unnecessary morbidity without survival benefit. Other considerations in this population are fertility preservation, body image concerns, reconstruction preferences, and psychosocial issues that frequently influence surgical choices. These factors call for a surgical plan and

careful integration of all factors into decision-making in a multidisciplinary framework.

Notably, the most recent manifesto from the European Breast Cancer Conference 2026 highlights persistent global barriers related to age disparities in breast cancer care and calls for coordinated international action to ensure equitable, evidence-based management across all age groups.

In summary, breast cancer surgery for very young breast cancer patients should not be inherently different based on age alone; rather, it should be individualized according to tumor biology, genetic risk, and patient priorities. A personalized, evidence-based approach remains the cornerstone of high-quality breast surgical care in this unique population.

Does Adjuvant Endocrine Therapy have to be Different?

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Women aged 35-40 years or younger with hormone receptor positive (HR+) early breast cancer represent a distinct subgroup with higher-risk disease and unique survivorship considerations, including fertility, premature menopause, and treatment adherence.

The baseline risk of recurrence is higher, and they may derive greater absolute benefit from treatment escalation including chemotherapy, though the benefit may also be related to chemotherapy-induced amenorrhoea. The addition of ovarian function suppression (OFS) to tamoxifen improves outcomes, with the largest benefit seen in higher-risk patients. OFS combined with aromatase inhibitors (AIs) provides further disease-free survival advantage over tamoxifen-based regimens, particularly after chemotherapy. Currently there is limited literature on the optimal duration of treatment as extended therapy trials have been conducted mainly in postmenopausal patients. The benefit of additional treatments such as bone modifying agents, CDK4/6 inhibitors and PARP inhibitors will be discussed. However, intensified therapy is associated with increased toxicity, including menopausal symptoms, bone loss, and sexual dysfunction, which can negatively affect adherence and quality of life.

A risk-adapted personalised approach is warranted. Tamoxifen alone may be sufficient for selected low-risk patients, while most very young womenespecially those with high-risk features benefit from OFS-based strategies. The choice between tamoxifen plus OFS and AI plus OFS should balance efficacy with tolerability, fertility considerations, and patient preferences. Proactive management of side effects and support for adherence are essential.

Does Imaging Surveillance have to be Different? More MRI? Less Mammography?

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Patients diagnosed with breast cancer at a young age (3540 years) are at increased risk for recurrence and contralateral breast cancer. As survival rates continue to improve with advances in systemic therapy, the cumulative burden of lifelong imaging surveillance has become an increasingly important clinical issue. This lecture examines current surveillance recommendations for young breast cancer patients, reviews imaging modality performance, and explores practical options in a real-world multimodality setting.

The case for more intensive surveillance begins with risk. Women diagnosed before age 50 treated with breast-conserving surgery carry a lifetime breast cancer risk exceeding 20%, qualifying them for annual MRI per ACR and NCCN recommendationsthough recommendations vary by society. Importantly, approximately 80% of young breast cancer patients do not carry BRCA1/2 or other high-penetrance mutations, leaving their long-term surveillance needs insufficiently defined.

Local recurrence rates have declined substantially over two decades, from nearly 10% at 5 years in the pre-2000 era to 3.3% in the 20062010 cohort, largely due to advances in adjuvant systemic therapy. Contralateral breast cancer (CBC) risk, though also historically declining, remains elevated in young patients. Critically, CBC timing varies by tumor subtype: HR+/HER2 tumors show a continuously rising hazard over time, whereas HR/HER2+ and triple-negative subtypes peak around 2 and 10 years after surgery, respectively. These subtype-specific patterns should inform the timing and intensity of surveillance.

Regarding imaging modality selection, MRI consistently demonstrates superior sensitivity compared with mammography or ultrasound. In a multicenter Korean prospective study of 745 women aged ≤50 years after breast-conserving surgery, MRI achieved sensitivity of 88.2% versus 52.9% for mammography, with no interval cancers detected. However, MRI carried a higher recall rate (10.7% vs. 4.4%) and lower specificity (89.9% vs. 96.0%), raising concerns about false-positive burden over decades of annual screening. However, real-world data from a Korean institution showed that surveillance MRI had the highest specificity (94.9%) and lowest abnormal interpretation rate (5.2%) compared with mammography (10.0%) and ultrasound (30.2%). Notably, 90% of second in-breast cancers following a negative MRI were detected more than 2 years later, raising the question of whether annual MRI frequency is necessary for all patients.

The role of mammography alongside MRI is nuanced. For high-risk women under 40including BRCA mutation carriersevidence from the High-Risk Ontario Breast Screening Program and multicenter Dutch studies suggests mammography adds minimal incremental detection benefit while substantially reducing specificity (78.0% with MRI+MG vs. 86.2% with MRI alone). ACR and NCCN guidelines permit deferral of mammography until age 40 in mutation carriers undergoing annual MRI.

For the broader population of young, non-BRCA survivors, guidelines are less uniform. ACR and NCCN recommend annual MRI with mammography for patients diagnosed under 50 or with dense breasts, whereas EUSOBI 2025 takes a more risk-stratified approach, recommending annual MRI for high-risk and biennial MRI for intermediate-risk patients. Whether annual MRI is necessary versus a biennial or alternating schedule remains an open question.

Contrast-enhanced mammography (CEM) has emerged as a viable, more accessible alternative to MRI. A systematic review and meta-analysis (Ptsch et al., Radiology 2022) reported that while CE-MRI retains higher sensitivity (97% vs. 91%), CEM offers higher specificity (74% vs. 69%) and a lower recall ratea clinically meaningful trade-off for population-scale surveillance. In the BRAID randomized controlled trial (Gilbert et al., Lancet 2025)the first large-scale RCT comparing supplemental imaging techniques in women with dense breastsCEM achieved a cancer detection rate of 19.2 per 1,000 examinations, statistically equivalent to abbreviated MRI (17.4 per 1,000; $p = 0.62$), with both modalities detecting invasive tumors half the size of those found by automated whole-breast ultrasound (11 mm and 10 mm vs. 22 mm). The ongoing CMIST trial (NCT05625659) is investigating CEM versus digital breast tomosynthesis in intermediate-risk women across 15 sites, with results expected to further define CEM's role.

In conclusion, a one-size-fits-all approach to surveillance imaging is difficult to justify. For young, high-risk patients with genetic mutations, annual MRI with mammographyor alternating every 6 monthsremains standard. For the larger group of young survivors without mutations, risk-stratified, subtype-informed strategies incorporating CEM, extended MRI intervals, and multimodality combinations may better balance detection benefit against the long-term burden of false positives, radiation, contrast exposure, and resource utilization. Practical surveillance frameworks must account for guideline recommendations alongside individual risk trajectories defined by age at diagnosis, tumor subtype, breast density, and treatment history.

Understanding ctDNA: It's Biology and Methodology

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ctDNA-guided Precision Medicine for Early and Metastatic Breast Cancer

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Liquid Biopsy for Early Detection and Screening (Multi Cancer Early Detection)

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Mammography screening for breast cancer has contributed to reduced breast cancer deaths. However, mammography screening is associated with high false positive rates resulting in psy-chological harm, overdiagnosis, and possibly over-treatment. The optimal screening strategy is constantly under debate. There are inconsistencies in national screening guidelines regarding the age at which mammography screening should start, the frequency of screening, screening recommendations for strategies for screening women with dense breasts, and at what age mammography screening should be terminated. The rise in young onset breast cancer represents an additional challenge. Although models for breast cancer risk assessment are available that indicate lifetime risk, there is a need for blood based biomarker to assess real time risk which can change over time. Progress made in the identification of circulating biomarker panels for real time risk assessment to personalize breast cancer screening will be presented.

Incorporating ctDNA in Clinical Trials and Biomarker Discovery

Nicholas Turner

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Surgical Personalization: Surgical Decision-Making in Hereditary Breast Cancer: Balancing Risk, Benefit, and Patient Preference

Tibor Gyorgy Kovacs

American Hospital Dubai, Department of Surgery, U.A.E.

Medical Treatment Consideration: PARP Inhibitors in Early Hereditary Breast Cancer: Optimizing Adjuvant Therapy According to Subtype

Matteo Lambertini

Univ. of Genova - IRCCS Policlinico San Martino Hospital, Department of Medical Oncology, Italy

This presentation provides a comprehensive overview of the role of poly(ADP-ribose) polymerase inhibitors (PARPi), particularly olaparib, in the adjuvant management of early-stage HER2-negative breast cancer associated with germline BRCA1/2 pathogenic or likely pathogenic variants (PVs).

In terms of clinicopathological features of BRCA-mutated breast cancer, it should be emphasized the predominance of triple-negative phenotypes in BRCA1 carriers and hormone receptorpositive disease in BRCA2 carriers. Despite a higher mutation prevalence in triple-negative breast cancer (TNBC), the absolute number of BRCA-mutated cases remains greater in hormone receptorpositive tumors due to their higher incidence.

Mechanistically, PARP inhibitors exploit homologous recombination deficiency via synthetic lethality, selectively inducing tumor cell death in BRCA-mutated cancers. The phase III OlympiA trial constitutes the cornerstone of evidence supporting adjuvant PARPi therapy in BRCA carriers with high-risk HER2-negative early breast cancer. In this trial, one year of adjuvant olaparib significantly improved invasive disease-free survival, distant disease-free survival, and overall survival compared with placebo, and consistent efficacy across major clinical subgroups (including according to tumor subtype in both TNBC and luminal-like disease). The safety profile of olaparib is favorable, with a low incidence of serious adverse events, including myelodysplastic syndrome and acute myeloid leukemia. This trial underscores the critical importance of germline BRCA testing, advocating for broader implementation, preferably at the time of diagnosis, to optimize therapeutic decision-making.

Regarding additional adjuvant strategies in a subtype-specific context, in hormone receptorpositive disease, CDK4/6 inhibitors confer a survival benefit, with a potential for sequential use (despite lack of efficacy or safety data) in patients with high-risk disease (on the contrary, the concomitant use with PARPi should not be considered due to overlapping toxicities). In TNBC, immune checkpoint inhibitors and platinum-based chemotherapy remain integral components of therapy, with emerging evidence supporting combinatorial approaches involving PARPi.

Unresolved issues include the extension of PARPi beyond BRCA PVs, integration with radiotherapy, and fertility preservation considerations. Overall, adjuvant olaparib represents a standard of care in high-risk HER2-negative early breast cancer in patients with germline BRCA PVs, while ongoing research seeks to refine patient selection and therapeutic sequencing.

Regional Implementation: Genetic Testing Guidelines and Clinical Application in Asia: Bridging the Gap

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Go Beyond Cure of Breast Cancer

Tailored Axillary Surgery (TAS) in Patients with Clinically Node-Positive Breast Cancer

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Axillary surgery in breast cancer has progressively evolved toward de-escalation, aiming to reduce treatment-related morbidity while maintaining oncological safety. In clinically node-negative (cN0) disease, sentinel lymph node biopsy (SLNB) has replaced axillary lymph node dissection (ALND), and even in patients with limited sentinel node metastases, ALND can be safely omitted with the addition of systemic therapy and regional nodal irradiation (RNI).

However, this paradigm has not yet been extended to patients with clinically node-positive (cN+) disease undergoing upfront surgery, for whom ALND remains the standard of care. This represents a major unmet clinical need, particularly in hormone receptorpositive/HER2-negative breast cancer, where upfront surgery is frequently selected.

Tailored axillary surgery (TAS) has been proposed as a novel strategy to selectively remove clinically suspicious lymph nodes while avoiding complete ALND. To evaluate its feasibility, we conducted a prospective, multicenter phase II study in patients with cN+ breast cancer undergoing upfront surgery.

In this study, TAS demonstrated excellent technical feasibility, with both the identification rate and the marked lymph node retrieval rate reaching 100%. The primary endpoint, the non-TAS lymph node positivity rate, was 38.7%, indicating that residual disease remained in a subset of the axilla not targeted by TAS. Multivariable analysis identified the number of metastatic TAS nodes as an independent predictor of additional nodal involvement; however, definitive criteria for patient selection could not be established.

Importantly, this study targeted a relatively low-volume disease population, defined as 13 metastatic lymph nodes confined to level I and cT3 or smaller tumors. This selection strategy may have contributed to limiting the residual axillary tumor burden.

Furthermore, the fundamental concept of TAS lies in identifying a subgroup of patients with limited axillary tumor burden in whom local intervention can be most effective, thereby enabling safe de-escalation of axillary surgery.

Based on these findings, the clinical question has shifted from feasibility to appropriate patient selection and oncological validation. A randomized phase III trial comparing TAS-based management with standard ALND is warranted. Future studies should incorporate refined eligibility criteria and standardized RNI to ensure adequate control of residual axillary disease.

In conclusion, TAS represents a promising de-escalation strategy for cN+ breast cancer in the upfront surgery setting. Establishing its oncological safety through a well-designed randomized trial will be essential to enable safe omission of ALND and to improve long-term quality of life.

PROSPECTIVE – Finding the Missing Piece in Tailored Local Therapy

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Optimization of local therapy for early-stage breast cancer has been a goal for breast cancer research for many decades. After the seminal NSABP B06 and Milan trials demonstrated the safety of breast conserving surgery and adjuvant radiotherapy compared with total mastectomy, breast conservation has become standard and optimising radiotherapy became a major objective [1].

The CALGB 9343 and PRIME 2 trials both showed that breast conserving surgery alone in Stage 1 ER+ve patients aged over 65 or 70 was associated with a local recurrence rate of ~10% at 10 years, compared with ~2% with radiotherapy but with no difference in overall survival [2,3]. More recent trials have and are using immunohistochemical or assay-based assessment of the primary cancer to identify a subset of stage 1 cancers where the risk of local recurrence after excision is sufficiently low for omission of radiotherapy to be accepted as a standard treatment. In all these studies, standard mammography is the only required preoperative imaging.

MRI is the most sensitive imaging modality to assess the extent of a breast cancer, identifying additional disease in around 10-15% of cases of apparently unifocal cancer. Its routine use in early-stage disease is discouraged by guidelines however, as trials have not demonstrated consistent benefit from it where standard adjuvant therapy is delivered.

PROSPECT - Post-operative Radiotherapy Omission in Selected Patients with Early breast Cancer Trial (ANZ:1002) tested the hypothesis that additional areas of cancer and DCIS, not identified with standard imaging, are responsible for many early events in apparently unifocal early-stage breast cancer, and that those with unequivocally unifocal cancer on MRI with surgical pathology that meets defined low risk criteria may be at minimal risk of local recurrence without radiation. This group may be able to safely omit radiotherapy.

Inclusion criteria included age over 50, clinical T1N0 cancer that was not TNBC, did not have LVI or extensive associated DCIS. Preoperative MRI had to have nil/minimal or mild BPE, and any additional BIRADS3+ lesions required biopsy proof that they were benign.

443 patients were recruited. 201 met all inclusion criteria and were treated with standard adjuvant systemic therapy but no adjuvant radiotherapy. These were "Group 1". 242 were in "Group 2". Reasons for exclusion from Group 1 included high BPE in 99, pathology that did not meet criteria in 110 and biopsy-proven malignant occult lesions in 48.

Primary analysis occurred when the 100th patient in Group 1 reached 5 years of follow-up. There was only one local recurrence in the first 5 years of follow-up and a second at 7.5 years, making a local recurrence rate without RT of 1%. In the entire cohort there were very few events, and only a single distant metastasis. Sequencing showed this was unrelated to the index cancer. Health economic and quality of life analyses

were very favourable [4,5].

The final analysis will be done once the 100th patient in Group 1 reaches 10 years of follow-up in May 2026. This will demonstrate whether the very promising early results persist beyond completion of adjuvant endocrine therapy for most patients.

PROSPECTIVE (PROSPECT International VErsion) is an international multicentre trial designed to confirm and extend the findings of PROSPECT. The inclusion criteria are very similar to those of PROSPECT, but adjuvant endocrine therapy is not mandated for those with lower risk disease. It aims to recruit 600 patients with lower risk disease over 3-4 years, and incorporates longitudinal assessment of quality of life and health economic impacts of this model of care. It includes routine collection of samples and data for translational research.

PROSPECTIVE is open at multiple sites in Australia, is about to open in Houston, USA, and is planned to open at the Samsung Medical Centre, Korea in 2026 and at several UK sites in 2027.

Safe omission of adjuvant radiotherapy in early-stage breast cancer has been an elusive goal. Highly sensitive imaging may be the missing piece of the puzzle.

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EUBREAST - Introduction of EUBREAST and MELODY (KBCSG-31)

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EUBREAST Network's objective is to research less invasive approaches to breast cancer surgery to improve the quality of life of affected patients. The intent of this non-profit network of renowned oncological breast surgeons is to join forces to accelerate scientific progress to the direct benefit of breast cancer patients.

In Europe, more than five hundred thousand patients are diagnosed with breast cancer every year. EUBREAST Network physicians are convinced that less invasive surgery is possible for many of these patients without increasing the risk. Minimalizing surgery can help to reduce the physical and psychological burden after the operation as well as to facilitate their return to an active lifestyle. However, research aimed at reducing the amount of required therapy doesn't readily attract financial support because its results do not involve any direct economic profit for the sponsors. Details of the ongoing MELODY registry trial (recruitment numbers and top recruiter) will be presented.

SENOMAC Ultra - Collaboration with KBCSG, JCOG, Taiwan Breast Cancer Society

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Axillary lymph node dissection is often standard of care in clinically node-positive breast cancer planned for upfront surgery, even though NCCN guidelines suggest performing a sentinel lymph node biopsy with or without marking of the metastatic lymph node. This practice is, however, limited to patients with limited nodal disease, i.e. 1-2 suspicious axillary metastases on preoperative ultrasound. Since axillary lymph node dissection exposes the patient to a high risk of long-term arm morbidity such as arm lymphedema, pain and reduced arm and shoulder mobility, it is crucial to find ways to reduce the use of this most extensive axillary surgery. SENOMAC-ULTRA is a randomized international non-inferiority trial evaluating a more limited approach to axillary surgery: targeted axillary dissection (TAD). TAD, more commonly used in the neoadjuvant setting, implies the marking of nodal metastases and the removal of the marked node/s together with a sentinel lymph node biopsy. Thereby removing only the most relevant lymph nodes, it may offer a less extensive yet more precise strategy for modern axillary surgery. SENOMAC-ULTRA features broad international collaboration including European countries (Sweden, Finland, Denmark, Norway, Spain, Ireland) and our fantastic Asian collaborators, the Korean Breast Cancer Study Group, The Japan Clinical Oncology Group and the Taiwan Breast Cancer Society. The first endpoint of the SENOMAC-ULTRA trial is recurrence-free survival and the first sites will open in April 2026, aiming to enroll 1380 patients within five years.

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Policy on Breast Cancer

Go Beyond Cure of Breast Cancer

Global Breast Cancer Burden and Health System–Based Breast Cancer Care

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Breast cancer remains the most common cancer affecting women globally, with an estimated 2.3 million new cases and 670,000 deaths in 2022. Although incidence is highest in many high-income settings partly reflecting reproductive and lifestyle transitions, organised screening, and stronger cancer surveillance mortality is disproportionately concentrated in low- and middle-income countries (LMICs), where late-stage presentation and constrained access to diagnostics and multimodality treatment drive poorer outcomes.

This presentation examines how health systems shape these inequities across the breast cancer care continuum, highlighting the "incidence–mortality paradox" and the interpretation challenges introduced by improving diagnostic classification (stage migration/Will Rogers phenomenon). Future projections indicate a substantial escalation in burden, with annual cases expected to rise to approximately 3.2–3.6 million and deaths to ~1.1 million or more by 2050 without system-level action. Drawing on the World Health Organization Global Breast Cancer Initiative, we outline pragmatic, stepwise priorities: population-facing health promotion to shift diagnosis towards stages I–II (> 60% of cases), timely diagnostic pathways (imaging/biopsy/pathology within ~60 days), and uninterrupted comprehensive management (> 80% completing multimodality treatment).

We further emphasise financial protection, geographic accessibility, workforce capacity, and data systems (registries and quality metrics) as enabling conditions for equitable implementation. Overall, reducing avoidable breast cancer deaths requires sustained health-system strengthening so that where a woman lives does not determine whether she survives breast cancer.

Overcoming Breast Cancer Treatment Inequity

Paul Cornes

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The World Health Organization (WHO) Global Breast Cancer Initiative (GBCI) has identified significant inequity in breast cancer outcomes. While 5-year survival is more than 90% in wealthy nations, that figure falls to 60% in middle-income nations and 40% in low-income countries.

The GBCI solution is based on 3-pillars of improvement - in prevention, early diagnosis and timely access to effective treatment that can be afforded by at least 80% of global patients. For the world, that sets the challenge of delivering treatments for households earning as low as $1500 USD a year.

At current costs, this seems to exclude targeted biologic therapies - yet it is these precision medicines that hold the key to controlling much of the world's cancer and which are the focus of much of the innovation reported at this meeting. All Health Systems share an interest in this problem, for biologic drugs are proving unaffordable even in wealthy nations. They are expected to have cost 51% of the US medicines budget in 2024, and 8-12% of total US healthcare spending.

Solutions to the inequity of high-cost medicines can be found by looking at key WHO initiatives on Medicines Procurement and Health System Financing - and crucially in the pivot to "Value Based Medicine" led by the WHO program "More Health for the Money". Such programs suggest that the WHO goal of saving 2.5 million breast cancer lives in 20-years is achievable and affordable; offerring lessons for all health systems to learn for all cancers.

WHO - GBCI. URL:https://www.who.int/initiatives/global-breast-cancer-initiative

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WHO - World Health Report 2010 Chapter 4, More health for the money. URL: https://www.who.int/publications/i/item/9789241564021.

Achieving Equity in Hereditary Breast Cancer Care: From Genetic Testing to Prevention for All

Chihwan David Cha

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Hereditary breast cancer, driven primarily by pathogenic variants in BRCA1, BRCA2, and a growing panel of moderate-to-high penetrance genes, represents a clinically important and preventable subset of breast cancer. Despite decades of scientific progress, the promise of hereditary breast cancer care remains unevenly realized across populations, health systems, and nations. This presentation examines the global landscape of germline genetic testing, risk counseling, and preventive intervention, with a focus on equity gaps that persist both within and between countries.

The mutation spectrum of hereditary breast cancer varies substantially across populations. Western risk-prediction models significantly underestimate mutation probability in East Asian patients, underscoring the need for locally validated risk-assessment tools. Non-European populations remain severely underrepresented in global genomic databases, further limiting the accuracy of variant interpretation in these groups.

Access to genetic testing and counseling is profoundly unequal. Insurance status, income, education, and geographic location are dominant drivers of testing uptake across all health systems. The vast majority of high-risk patients in public health systems particularly in middle- and low-income countries go untested despite meeting established clinical criteria. Barriers operate at the individual level (limited awareness, cultural stigma, fear of discrimination), the healthcare system level (counselor shortages, long wait times, under-referral), and the structural level (absence of reimbursement and overly restrictive eligibility criteria).

Preventive interventions for identified carriers are highly effective but inequitably accessed. Risk-reducing surgery offers dramatic reductions in cancer incidence and mortality, yet uptake varies widely by socioeconomic status, cultural context, and availability of surgical expertise. Chemoprevention is more accessible but remains underutilized even in well-resourced settings. Shared decision-making must incorporate not only oncologic risk, but also the financial, cultural, and structural realities shaping each patient's choices.

Policy frameworks vary dramatically across health systems, from integrated national programs in some European countries to largely unfunded, fragmented approaches in most low- and middle-income settings. Asia-wide collaborative networks offer a critical opportunity to generate region-specific evidence and develop locally appropriate care pathways. Scalable innovations including telehealth, AI-assisted triage, and task-shifting models offer pragmatic solutions where specialist infrastructure is limited.

Equity in hereditary breast cancer care is achievable. The science and tools exist. What is required is political will, policy alignment, and sustained investment to ensure that every woman at inherited risk has access to testing, counseling, and the full spectrum of preventive options.

Current Status, Key Gaps and Policy Priorities in Philippines

Felicidad Claudia Ordonez

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Current Status, Key Gaps and Policy Priorities in Indonesia

Abdul Rachman

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Breast cancer is a cancer with the highest incidence and is the leading cause of cancer related deaths among women in Indonesia. Data from the Global Cancer Observatory shows that each year more than 66,000 new breast cancer cases are detected, resulting in approximately 22,600 deaths. This finding aligns with data from BPJS Kesehatan that shows among National Health Insurance participants, breast cancer is cancer with the highest prevalence, 163 cases per 100,000 population. This high incidence and mortality rate indicate that the infrastructure and human resources for health (HRH) capacity are not yet able to provide comprehensive breast cancer services that are tailored to the patient's clinical needs. Furthermore, breast cancer management is not limited to treatment, but also includes palliative care to reduce the burden of disease and improve patient's quality of life. The clinical stage when patient first accesses service significantly influences the type of interventions, treatment, and cost applied. In Indonesia, around 68–73% of breast cancer cases are diagnosed at advanced stages (III and IV). As a result, survival rates are low, and patients bear a high financial burden. Challenges such as patients who delay to seek treatment (patient delay) and barriers in diagnosis and therapy at health facilities (healthcare delay) need to be promptly mitigated through structured interventions.

The development of the Breast Cancer National Action Plan (BCNAP) is therefore a strategic step toward a comprehensive, targeted, and sustainable policy, is strategically derived from the National Cancer Control Plan 2024 2034. Breast cancer control program follows the Global Breast Cancer Initiative (GBCI) targets, which include up to 60% increase in the proportion of patients who are diagnosed at early stages, accelerating diagnosis to a maximum of 60 days since the onset of symptoms, and ensuring that more than 80% of patients receive and complete multimodality treatment without abandonment. Achieving this target is expected to reduce mortality by 2.5% per year and increase the survival rate of breast cancer patients.

The GBCI's vision aligns with the six pillars of Indonesia's national health system transformation. As part of the Breast Cancer National Action Plan, a situation analysis was carried out within the framework of these six pillars to understand the current situation, the efforts that have been implemented, and the gaps or challenges faced in breast cancer management in Indonesia. Based on this situation analysis, six main strategies have been established for the implementation of breast cancer program in Indonesia. The strategies include: 1. Health promotion strategy 2. Early detection through screening and early diagnosis 3. Increased access to breast cancer services and improved case management from diagnosis to palliative care 4. Strengthening breast cancer recording, registry and research 5. Stakeholder partnership 6. Governance and accountability of breast cancer prevention and control programs.

Current Status, Key Gaps and Policy Priorities in Vietnam

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Breast Cancer in Vietnam: Current Status, Key Gaps and Policy Priorities

Breast cancer has emerged as a critical public health crisis in Vietnam, currently standing as the most prevalent malignancy among women. Over the last three decades, the age-standardized rate has surged from 15.2 to 40.6 per 100,000, with an annual percent change of 3.05% among women younger than 40. This rise is attributed to population growth, changing lifestyle habits, and reproductive factors.

Despite its prevalence, significant gaps hinder effective management. Approximately 49% of patients experience diagnostic delays, often resulting in late-stage presentations where treatment costs can be up to 109% higher than for early-stage disease. Systemic barriers include a high centralization of care, with urban oncology hubs like K Hospital operating at 200% to 250% capacity while provincial levels face equipment gaps in radiotherapy and pathology. Furthermore, Vietnam faces the highest rate of financial catastrophe in the ASEAN region (68%), as patients grapple with high out-of-pocket (OOP) costs for innovative targeted therapies and non-medical expenses like transportation. Cultural stigmas and a reliance on traditional medicine further delay clinical intervention.

In response, the Vietnamese government has prioritized breast cancer within its 2021-2030 National Strategy for Non-Communicable Diseases. Key initiatives include a National Action Plan to pilot systematic screening and improve early detection in underserved regions. To standardize care, Vietnam has adopted NCCN Harmonized Clinical Practice Guidelines, which provide evidence-based recommendations tailored to the local resource landscape.

Future policy priorities focus on achieving health equity and reducing financial toxicity. Starting in 2026, the government plans to offer free annual health checks to all citizens. Additionally, new regulations aim to expand insurance coverage for 30 high-cost oncology drugs and incentivize the adoption of biosimilars to lower the cost of targeted therapies. By regionalizing care and strengthening provincial capacity, Vietnam seeks to bridge the urban-rural survival gap and align its oncology services with global standards.

Special Session: General Session

Go Beyond Cure of Breast Cancer

Long-term Outcome Analysis of Extended Endocrine Therapy (EET) and Ovarian Function Suppression (OFS) in Multigene Assay (MGA)-Tested HRpos/HER2neg Early Breast Cancer(EBC): A Multicenter Real-world Retrospective Study

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Background: Majority of patients with HR+/HER2- early breast cancer (EBC) undergo multigene assays (MGA) for chemotherapy decisions, yet optimal endocrine therapy (ET) duration and role of ovarian function suppression (OFS) remain unclear. We investigated real-world extended ET (EET) and OFS application based on genomic and clinical risk profiles, and identified subgroups deriving greatest benefit from EET and OFS.

Methods: This multicenter retrospective study included 7,349 HR+/HER2- EBC patients who underwent surgery and MGA testing at four Korean institutions (2011-2023). Patients were stratified by G-risk (ODX RS ≥ 26 or high by MMP/others) and C-risk (per MINDACT criteria). 5-year landmark analysis evaluated EET benefit. OFS was assessed among 4,382 premenopausal patients.

Result: Excluding 235 patients with recurrence within 5 years, 42.1% of 2,626 disease-free patients received EET. Compared to 5yr-ET group, EET group had higher proportion of G-risk high, age ≤ 40yr, tumor size > 2cm, nodal metastasis, and Ki-67 ≥ 20% (all $p < 0.05$). At median follow-up of 82.8 ± 19.8month in landmark analysis, revealing 2.2% absolute 10yr-DFS benefit with EET, particularly in clinical high-risk group (10yr-DFS 89.1% vs 97.4%, $p < 0.001$). Among the discordant subgroups, C-high/G-low patients derived the most pronounced EET benefit, whereas C-low/G-high showed none. Regarding premenopausal patients, 57.0% received OFS (42.2% for 2yr, 57.6% for 5yr). TAM plus OFS group had higher proportion of age ≤ 40yr, size > 2cm, LN metastasis and Ki-67 ≥ 20%. No significant survival difference was observed between TAM plus OFS and TAM-alone groups, even within clinical high-risk group. However, in C-high/G-high patients without chemotherapy, recurrence rate was significantly lower with Tam plus OFS vs. Tam-alone.

Conclusions: In real-world practice, in HR+/HER2- EBC who underwent MGA is primarily determined by clinical factors. The benefit of EET was profound among the C-risk high group. The lack of significant OFS advantage warrants further investigation, particularly given the early-stage population. These findings underscore the need for predictive biomarkers to optimize precision ET in HR+/HER2- EBC.

Germline Background Redefines the Clinical Meaning of Somatic BRCA Alterations in Breast Cancer

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Background: Although BRCA alterations are increasingly identified by comprehensive genomic profiling, it remains unclear whether germline- and somatic-BRCA alterations represent the same or distinct disease contexts in breast cancer. We hypothesized that germline background modifies the biological and therapeutic implications of acquired BRCA alterations.

Methods: Among 5,411 breast cancer cases registered in the Center for Cancer Genomics and Advanced Therapeutics (C-CAT), 2,978 patients with available germline- and somatic-BRCA status and subtype data were included. Patients were classified into four groups (g+/s+, g+/s, g-/s+, g-/s-). Mutational profiles, non-BRCA homologous recombination deficiency (HRD)-related alterations, specimen origin, and time to treatment discontinuation (TTD) were evaluated, with subgroup analyses in ER+/HER2- and TNBC.

Result: Somatic BRCA-positive tumors without germline alterations (g-/s+) were more prevalent than g+/s+ tumors, with limited germline-somatic concordance. Somatic BRCA alterations were more frequently detected in metastatic than primary lesions, suggesting an association with tumor evolution. In ER+/HER2- breast cancer, TTD for CDK4/6 inhibitors was significantly shorter in germline BRCA-positive patients, and g+/s+ status remained an independent adverse factor after adjustment for treatment line and specimen origin (HR 1.3, $p < 0.001$). In contrast, g-/s+ tumors showed TTD comparable to g-/s- tumors, suggesting that somatic BRCA alterations alone were insufficient for resistance. Genomic profiling demonstrated distinct molecular contexts between groups: g-/s+ tumors were enriched for oncogenic signaling-related mutations including PIK3CA, TP53, and AKT1, whereas g+/s+ tumors showed a homologous recombination-deficient profile dominated by BRCA1/2 alterations. Non-BRCA HRD-related alterations were increased in g-/s+ group (52%, $p = 0.004$). TP53 mutation and g+/s+ status were independent adverse factors. In TNBC, immune checkpoint inhibitor outcomes were not associated with BRCA status.

Conclusions: Germline and somatic BRCA alterations represent biologically and therapeutically distinct entities in breast cancer. Somatic BRCA-positive tumors are heterogeneous, and germline background fundamentally redefines the clinical significance of acquired BRCA alterations, underscoring the need for context-dependent interpretation in precision oncology.

Omission of Sentinel Lymph Node Biopsy in HER2+/TNBC Patients with Pathologic Complete Response after Neoadjuvant Systemic Therapy: 3-Year Interim Analysis of the Prospective ASLAN Trial (KBCSG-28)

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Background: Pathologic complete response (pCR) after neoadjuvant systemic therapy (NST) strongly correlates with eradication of axillary disease in HER2+ and triple-negative breast cancer (TNBC). Despite this, sentinel lymph node biopsy (SLNB) remains the standard method for axillary staging after NST. The ASLAN trial prospectively evaluates the oncologic safety of omitting SLNB in patients who achieve breast pCR following NST. Here, we report the preplanned 3-year interim analysis.

Methods: ASLAN is a prospective, multicenter, single-arm trial enrolling patients with cT1-3N0-1M0 TNBC, HER2+, or low-estrogen receptor (ER) breast cancer who demonstrate excellent radiologic response after NST. All patients underwent breast-conserving surgery. Patients with breast pCR (ypT0/is) omitted SLNB and received mandatory adjuvant radiotherapy. Patients with residual invasive disease (non-pCR) underwent standard axillary surgery and were followed in a registry cohort. The primary endpoint is 5-year recurrence-free survival (RFS).

Result: Between September 2021 and December 2023, 252 patients were screened and 245 underwent surgery. Breast pCR was confirmed in 182 patients (74.3%), in whom SLNB was omitted; 180 remain under follow-up. In the pCR cohort, molecular subtypes included 97 (53.5%) TNBC, 33 (18.1%) HR+/HER2+, 48 (26.4%) HR-/HER2+, and 4 (2.2%) low-ER/HER2- cases. At a median follow-up of 32.7 months, 5 RFS events occurred, yielding a 3-year RFS of 98.3%, compared with 91.9% in the non-pCR cohort. Events included one ipsilateral breast tumor recurrence and one brain metastasis, both in HER2+ tumors. Three additional events were second primary malignancies involving the thyroid or lung. Importantly, no axillary or regional lymph node recurrences and no deaths were observed.

Conclusions: Omission of SLNB in patients achieving breast pCR after NST resulted in extremely low regional recurrence and excellent early survival outcomes. These findings support the feasibility of axillary surgical de-escalation in highly responsive breast cancer subtypes. Continued follow-up will determine long-term oncologic safety and confirm the primary 5-year RFS endpoint.

A Randomized Controlled Trial for Doing vs. Omitting Intraoperative Frozen Section Biopsy for Resection Margin Status in Selected Patients Undergoing Breast Conserving Surgery (OFF-MAP trial, KBCSG-17)

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Background: Retrospective studies suggest that frozen section (FS) biopsy reduces margin positive rate. In the Republic of Korea, it is routinely used by > 80% of surgeons. The OFF-MAP trial (NCT03975179, KBCSG-17) evaluated whether omitting FS biopsy in selected patients is safe.

Methods: This is a multicenter, noninferiority, randomized trial including patients with core biopsy-confirmed invasive breast cancer (cT1-3) eligible for upfront breast-conserving surgery. Eligibility criteria were based on factors for positive margins. The primary endpoint was margin positive rate on final pathology, defined as "ink on tumor" for invasive cancer or ductal carcinoma in situ (DCIS). Non-inferiority was defined as the upper bound of the two-sided 95% confidence interval (CI) for the difference in positive margin rates being < 5%. A total of 581 patients per group were required.

Result: From September 2020 to December 2025, 371 patients were enrolled before early termination for slow accrual. A total of 348 patients were analyzed (FS group, n = 172; FS omission group, n = 176). Median age was 52 years (interquartile range [IQR], 45-60.25). Median preoperative tumor size was 1.7 cm (IQR, 1.3-2.2), and median invasive tumor size was 1.5 cm (IQR, 1.1,-2). Baseline characteristics were similar between groups. FS biopsy was performed in 169 (98.3%) patients in the FS group and 6 (3.4%) patients in the FS omission group. FS biopsy showed invasive cancer or DCIS in 11 (6.3%) patients (all FS group), while 10 (5.7%) patients (FS, n = 8; FS omission, n = 2) had atypical cells or were deferred to permanent pathology. On final pathology, margins were positive in 10 (5.8%) patients in the FS group and 12 (6.8%) patients in the FS omission group. The estimated risk difference was 1.0% (95% CI: -4.1%, 6.1%).

Conclusions: Frozen section omission did not meet the prespecified criterion for non-inferiority; however, the absolute difference in positive margin rates between was minimal.

Clinical Effect of Bisphosphonate in Patients with Hormone Receptor-positive Early Breast Cancer: A Nationwide Real-world Data Analysis

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Background: Adjuvant bisphosphonates (BPs) improve survival in early breast cancer (EBC), particularly among postmenopausal women. However, in Korea, BPs are primarily reimbursed for osteoporosis, limiting their application as adjuvant cancer therapy. This nationwide real-world study aimed to evaluate the impact of BP use on survival and fracture outcomes in Korean women with hormone receptor-positive (HR+) EBC.

Methods: We identified 52,599 women diagnosed with HR+ EBC between 2012 and 2019 from the Korea Central Cancer Registry, who underwent surgery and initiated endocrine therapy. BP users (n = 4,800) were defined as those prescribed BPs for ≥ 1-year post-diagnosis. Outcomes included overall survival (OS), disease-free survival (DFS), fracture incidence, and fracture-free survival (FFS). Multivariate Cox models incorporating age stratifications and landmark analyses were further applied.

Result: BP use was significantly associated with improved OS. Although the overall DFS was not significant, patients aged ≥ 60 years showed significant improvements in both OS and DFS. Longer BP exposure (≥ 3 years) demonstrated consistent OS benefits across the 1-, 2-, and 3-year landmark analyses. Although fractures were higher in BP users, reflecting confounding by indication, age-stratified FFS suggested a potential protective effect against fractures in older patients (≥ 73 years).

Conclusions: BP therapy was associated with improved OS and age-dependent (≥ 60 years) benefits in HR+ EBC. Despite higher fracture rates in BP users, age-stratified analyses suggest a fracture-preventive signal in older patients. These findings support adjuvant BP use in selected postmenopausal/high-risk subgroups. Prospective studies are needed to optimize BP timing and duration in this population.

A Multidisciplinary Digital Platform to Support Breast Cancer Patients During Adjuvant Treatment: A Pilot Randomized Controlled Trial

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Background: Despite advances in breast cancer treatment, patients experience significant treatment-related side effects that impair function and delay return to normal life. Unmet needs for information, communication with clinicians, and self-management guidance remain high, particularly during the critical adjuvant treatment phase when proactive supportive care could relieve complications and facilitate recovery. We evaluated the feasibility and preliminary effects of a newly developed digital platform for breast cancer patients from immediately post-surgery through adjuvant treatment.

Methods: We conducted a 24-week pilot RCT enrolling 72 post-mastectomy patients receiving adjuvant therapy at two territory centers. The intervention integrated multidisciplinary expertise (surgical oncology, medical oncology, radiation oncology, rehabilitation medicine, and breast cancer patient advocates) into a comprehensive digital platform. Patients reported symptoms via electronic patient-reported outcomes and received risk-stratified feedback through clinical algorithms to guide tailored self-management and informed decision-making. This also provided post-operative shoulder rehabilitation guidance, personalized exercise prescription, wearable-based activity tracking, nutrition management, and education, with monitoring by healthcare professionals. Controls received standard care with educational materials. Follow-up occurred at 2, 12, and 24 weeks post-surgery. Outcomes included quality of life, symptom severity, physical activity, occupational balance, self-efficacy, and ICF functioning. Analyses used generalized estimating equations with baseline adjustment.

Result: At 12 weeks, intervention patients reported significantly less pain ($p = .021$) and better performance of routine tasks ($p = .026$) among ICF items, higher behavior stage ($p = .046$) and lower moderate-to-severe chemotherapy toxicities (11% vs 17%, $p = .033$). Non-chemotherapy patients in intervention group showed earlier pain interference reduction ($p = .041$) among PROMIS-29 subscales. Acceptance was high and compliance reached approximately 60%, with patients reporting increased awareness of active living, improved symptom knowledge and health behaviors.

Conclusions: This platform demonstrates clinical promises for proactive survivorship care during adjuvant treatment, by reducing treatment burden and accelerating daily life activity and participation. These findings suggest integration of digital platforms into routine breast cancer care pathways.

Figure 1. Overview of Digital Health Intervention: (A) Algorithm Architecture, (B) User Interface Screenshots (ex, symptom management)

Figure 2. Between-Group Difference in Pain Sensation of ICF items over 24 weeks. Error bars represent standard error. Significant group × time interaction (p=.021) with lower pain scores in the intervention group at 12 weeks (EMM 0.856 vs 1.182, difference -0.326, 95% CI: -0.904 to -0.145). ICF qualifier: 0=no problem, 1=mild, 2=moderate, 3=severe. EMM=estimated marginal mean adjusted for baseline.

Efficacy and Patient-reported Outcomes (PROs) of Ribociclib (RIB) + Nonsteroidal Aromatase Inhibitor (NSAI) in Younger Patients (pts) with HR+/HER2-early Breast Cancer (EBC) in NATALEE: a 5-y Update

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Background: NATALEE showed a statistically significant invasive disease-free survival (iDFS) improvement with RIB + NSAI vs NSAI alone in pts with HR+/HER2-EBC. A prior 3-y analysis also showed RIB benefit among pts < 40y. We report an updated 5-y analysis of RIB efficacy and PROs in pts < 40y vs ≥ 40y in NATALEE.

Methods: NATALEE randomized pts with stage II/III HR+/HER2-EBC (with additional high-risk criteria for stage IIA N0 G2) to treatment with RIB (3y) + NSAI (≥ 5y) or NSAI (≥ 5y) alone. Premenopausal pts received goserelin. Efficacy and PROs were assessed using Kaplan-Meier methods (data cutoff: May 28, 2025; median follow-up, 58.4 mo).

Result: Compared with pts ≥ 40y (n = 4558), pts < 40y (n = 543) had higher median Ki-67 score (30.0% vs 20.0%) and more frequent prior neoadjuvant chemotherapy (61.1% vs 40.5%). Within each group, baseline characteristics were balanced across treatment arms. iDFS benefit with RIB + NSAI was sustained at 5y, with comparable iDFS rates between the RIB-treated arms in both age groups. Similar benefits were observed for distant disease-free survival (DDFS), recurrence-free survival (RFS), and distant recurrence-free survival (DRFS) (Table). RIB adverse event (AE) rates, dose reductions due to AEs, and discontinuations were consistent with the prior analysis (Loi, ESMO 2024, 235MO). In pts < 40y or ≥ 40y, the risk of first deterioration (10-point change) for physical functioning (HR, 0.96 vs 1.00), global health status (HR, 1.06 vs 1.04), and diarrhea (HR, 0.94 vs 1.05) scores did not differ between treatment arms.

Conclusions: In this 5-y analysis, with all patients off RIB for a median of 2y, RIB + NSAI treatment continued to show durable efficacy benefit and maintenance of quality of life vs NSAI alone in pts with HR+/HER2-EBC, regardless of age, including in pts < 40y who typically have more aggressive disease.

HR (95% CI)	<40y (n=543)	≥40y (n=4558)
iDFS	0.669 (0.429-1.043)	0.722 (0.618-0.843)
DDFS	0.650 (0.409-1.032)	0.717 (0.610-0.844)
RFS	0.709 (0.446-1.127)	0.700 (0.591-0.828)
DRFS	0.660 (0.411-1.057)	0.705 (0.592-0.840)

Chemotherapy-Induced Amenorrhea Duration Modifies the Benefit of Ovarian Function Suppression: A Substudy of the ASTRRA Trial

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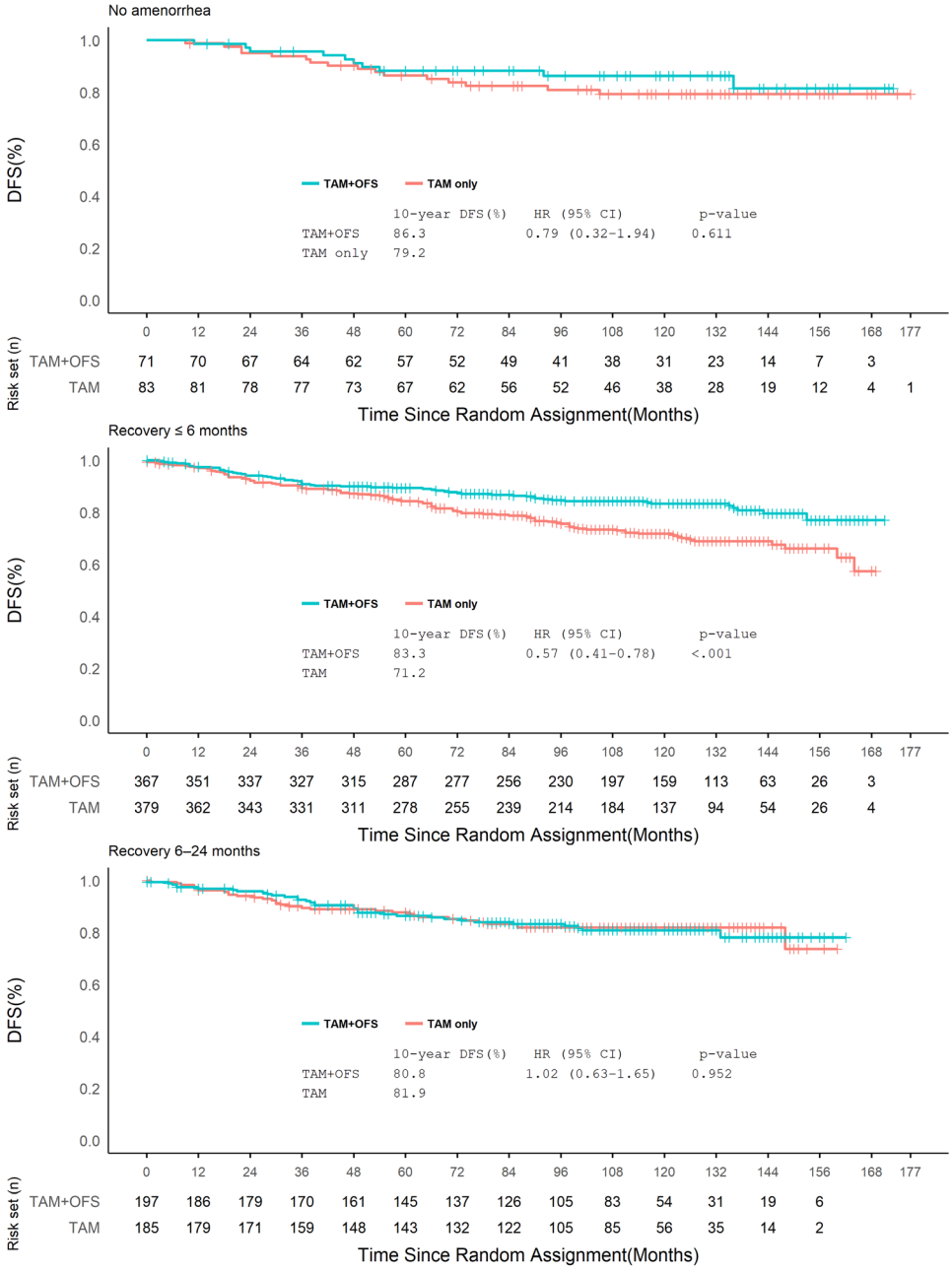
Background: Randomized trials have demonstrated that ovarian function suppression (OFS) improves disease-free survival (DFS) and reduces recurrence risk in premenopausal patients with hormone receptor-positive breast cancer. However, the optimal duration and patient selection for OFS remains unclear. The ASTRRA trial adopted a 2-year OFS strategy with randomization based on recovery of ovarian function after chemotherapy (CTx), enabling evaluation of whether OFS benefit varies by amenorrhea duration.

Methods: This substudy analyzed 1,282 randomized patients from the ASTRRA trial. Patients were categorized into three groups according to ovarian function recovery after CTx: no amenorrhea, recovery ≤ 6months, and recovery between 6-24 months. DFS and overall survival (OS) were compared between tamoxifen (TAM) alone and TAM+OFS. A 24-month landmark and interaction analyses were performed.

Result: With a median follow-up of 123 months, the no-amenorrhea group had a higher proportion of early-stage disease than the other subgroups, whereas baseline characteristics were otherwise well balanced between treatment arms. In the ≤6month recovery group (n = 746), OFS significantly improved DFS compared with TAM alone (HR 0.57; $p < 0.001$), with sustained benefit in landmark analysis (HR 0.49; $p < 0.001$). At 10 years,

DFS was 83.3% with TAM+OFS versus 71.2% with TAM alone. In contrast, DFS outcomes were virtually identical in the 6-24month recovery group (80.8% vs 81.9%), whereas the no-amenorrhea group showed a modest numerical difference at 10 years (86.3% vs 79.2%) favoring TAM+OFS without statistical significance. A significant interaction was observed between treatment effect and ovarian function recovery timing (p for interaction = 0.015). OS differences were not significant.

Conclusions: The benefit of 2-year OFS appears greatest in patients with early recovery of ovarian function after CTx. Patients with delayed recovery showed favorable outcomes regardless of OFS use, while those without amenorrhea may require further investigation to determine the optimal OFS strategy. Amenorrhea duration may serve as a clinically useful marker for individualized OFS treatment.



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Go Beyond Cure of Breast Cancer

Cutting-Edge Insights: The Latest Evidence on Ovarian Function Suppression

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Ovarian function suppression (OFS) has become a key component of adjuvant endocrine therapy for premenopausal women with hormone receptorpositive breast cancer. Randomized trials, including SOFT, TEXT, and ASTRRA, have demonstrated that the addition of OFS improves recurrence-related outcomes; however, the magnitude of benefit is highly dependent on individual patient risk.

Long-term follow-up data confirm that the absolute benefit of OFS is greatest in younger patients, particularly those under 35 years of age, and in those with higher-risk disease features such as nodal involvement, high tumor grade, or prior exposure to chemotherapy. In contrast, patients with low-risk clinical characteristicsincluding node-negative, low-grade tumors without chemotherapyderive minimal benefit and may be appropriately treated with tamoxifen alone. These findings support a risk-adapted approach rather than uniform application of OFS.

Among patients selected for OFS, the choice of endocrine partner further refines outcomes. Aromatase inhibitors combined with OFS provide greater reductions in recurrence compared with tamoxifen plus OFS, particularly in higher-risk populations, but are associated with increased toxicity, including bone loss and menopausal symptoms, which may compromise adherence. Therefore, treatment decisions must balance incremental efficacy against tolerability and patient-reported outcomes.

The optimal duration of OFS remains an area of active investigation. While 5 years has been considered standard, emerging evidence suggests that shorter durations, such as 2 years, may be sufficient in selected patients, particularly those with intermediate risk or recovery of ovarian function after chemotherapy. These data highlight the need to individualize treatment duration based on risk and treatment context.

Current decision-making relies largely on clinical factors, including age, nodal status, tumor grade, and prior chemotherapy exposure. However, genomic risk stratification using multigene assayssuch as Oncotype DX, PAM50-based assays, and other emerging toolsis increasingly being explored to refine patient selection and guide treatment intensity. In addition, tools developed for late recurrence risk, including Breast Cancer Index and CTS5, may contribute to decisions regarding treatment duration.

Collectively, these data support a transition toward precision endocrine therapy, in which the use, intensity, and duration of OFS are tailored according to both clinical and genomic risk, as well as patient tolerance. Such an approach aims to maximize absolute benefit while minimizing unnecessary toxicity, ultimately improving long-term outcomes and quality of life in premenopausal women with hormone receptorpositive breast cancer.

Real-World Practice of Ovarian Function Suppression: Taiwanese Perspective

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Real-World Efficacy of Ovarian Function Suppression as a Replacement for Adjuvant Chemotherapy in Young Patients with HR+/HER2- Early Breast Cancer: A Taiwan NHIRD Study

Background: In Taiwan, National Health Insurance (NHI) regulations allow ovarian function suppression (OFS) as a reimbursed alternative to chemotherapy for specific HR+/HER2- early breast cancer (EBC) patients. This study evaluates the real-world outcomes of this "chemo-replacement" strategy.

Methods: Using the Taiwan National Health Insurance Research Database (2010-2020), we identified patients aged <50 years with HR+/HER2- EBC. Using 1:2 propensity score matching (PSM), we compared 1,784 patients in the OFS + endocrine therapy (ET) group with 2,805 patients in the chemotherapy (CT) + ET group.

Results: The cohort was predominantly in their 40s (3,305), followed by 30s (1,151) and 20s (133). Pathological stages were I (2,912), II (1,644), and III (33). The application of OFS as a chemo-replacement significantly decreased as risk increased: from pStage I (59.57%) to pStage II/III (11.05%), and from grade I/II (43.86%) to grade III (12.77%). The overall survival (OS) was comparable between the OFS and CT groups (97.65% vs. 97.15%). However, CT showed significantly better OS in subgroups: pStage IB (98.14% vs. 92.31%, $P=0.03$) and grade III (95.02% vs. 88.3%, $P=0.007$). Relapse-free survival (RFS) was 96.02% (OFS) vs. 96.43% (CT). CT provided significantly better RFS in pStage IA (96.88% versus 97.18%, $P=0.0175$), Stage IB (89.74% versus 97.52%, $P=0.0045$), grade II (95.61% versus 96.6%, $P=0.0005$), and grade III (87.23% versus 96.55%, $P=0.0055$). The mean duration of OFS was 25.9 (median: 31) months, while the mean ET duration was significantly longer in the OFS group than the CT group (51.4 vs. 44.1 months, $P<0.001$).

Conclusions: For young patients with HR+/HER2- EBC, OFS is a viable alternative to chemotherapy for low-risk disease (Grade I/II, Stage IA). However, for patients with grade III or stage IB disease, adjuvant chemotherapy remains the superior strategy for improving both RFS and OS. Key limitations include the inability to track self-paid OFS in the CT group (likely underestimating the CT group's total intensive therapy) and the 3-year NHI reimbursement cap, which results in a shorter OFS duration (mean 25.9 months) compared to the 5-year international standard.

Real-World Practice of Ovarian Function Suppression: Japanese Perspective

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Background

Ovarian function suppression (OFS) has been established as a critical component of adjuvant therapy for premenopausal women with hormone receptor-positive breast cancer, particularly those at high risk of recurrence. The clinical benefits of OFS have been clearly demonstrated in pivotal trials, including the Suppression of Ovarian Function Trial (SOFT), the Tamoxifen and Exemestane Trial (TEXT), and the Adjuvant Tamoxifen and Ovarian Function Suppression Trial (ASTRRA). While these trials provide robust evidence, the practical implementation of OFS in daily clinical settings is often complicated by national healthcare policies, reimbursement constraints, and evolving patient priorities, such as fertility preservation.

The Japanese Regulatory and Reimbursement Landscape

In Japan, the implementation of intensified endocrine therapy has historically been influenced by a unique regulatory environment. For many years, a "label mismatch" existed within the National Health Insurance (NHI) system, in which the concurrent use of LHRH agonists and aromatase inhibitors (AIs) faced significant reimbursement challenges, despite global clinical guidelines. A transformative shift occurred in June 2025 following a notification from the Health Insurance Claims Review & Reimbursement Services. This policy change has significantly improved clinical access to LHRH+AI therapy, allowing Japanese clinicians to align their practice more closely with international standards. This presentation will detail how these regulatory adjustments have reshaped the "Real-World Practice" in Japan.

Clinical Challenges: Timing, Monitoring, and Long-term Management

In modern breast cancer care in Japan, a personalized approach to treatment timing and supportive care is also emphasized.

Impact on fertility preservation: The increasing prevalence of oocyte and embryo cryopreservation has altered the traditional timing of LHRH agonist initiation. Rather than universal pre-chemotherapy administration for ovarian protection, clinicians now carefully coordinate the start of OFS with assisted reproductive technology schedules.

Hormone Monitoring and "Ovarian Escape": Routine assessment of baseline E2 and FSH levels, as well as ongoing monitoring during treatment, remains a vital yet debated topic. Identifying "ovarian escape"where estrogen levels rise despite LHRH agonist therapyis crucial, especially when using AIs; however, interpreting these results in a clinical setting presents ongoing challenges.

Adherence and Bone Health: Ensuring the recommended five-year duration of OFS requires proactive management of adverse effects, including bone mineral density loss and menopausal symptoms, to maintain patient quality of life and treatment adherence.

Conclusions

Sharing Japan's experience, from navigating insurance complexities to integrating fertility preservation, is essential for the development of a Pan-Asian consensus on OFS. By addressing the gaps between clinical evidence and real-world constraints through pre-session surveys and interactive discussions, we aim to optimize therapeutic outcomes for premenopausal patients across Asia.

Real-World Practice of Ovarian Function Suppression: South Korean Perspective

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Background

Despite established guideline recommendations, real-world practice patterns for adjuvant ovarian function suppression (OFS) in premenopausal, early-stage ER-positive breast cancer vary substantially across regions. This presentation reports findings from an international practice survey conducted across the GBCCJBCSTBCS network, with comparative data from an ASCO respondent survey.

Methods

An online survey was distributed between February and March 2026 to breast cancer specialists across 14 countries (N = 163; Korea n = 56, Japan n = 42, Trkiye n = 27, Taiwan n = 18, others n = 20). Domains included OFS agent selection, dosing schedule, timing of initiation, endocrine therapy switching, bone-modifying agent (BMA) use, and hormone profile monitoring.

Results

Goserelin was the most commonly used GnRH analogue across all three major countries, except Japan where leuprolide predominated (73%). Monthly dosing was preferred by 35% of Korean and 38% of Japanese respondents, while Japan had the highest rate of 6-monthly use (51%). Korea showed the strongest preference for immediate initiation of OFS with endocrine therapy after chemotherapy (83%), consistent with the ASCO cohort (56%). Without chemotherapy, Korean respondents most commonly started OFS and TAM/AI simultaneously (68%), whereas Japanese practice was more heterogeneous, with 31% preferring tamoxifen-first followed by OFS. BMA use was nearly universal (Korea 91%; Japan 87%), predominantly zoledronic acid, planned for 5 years in most Korean centers. Hormone profile monitoring was performed regularly by 43% of ASCO respondents but practice was highly variable; 55% found interpretation challenging, and 92% expressed a need for dedicated ASCO guidance on estradiol monitoring during OFS+AI therapy.

Conclusions

Significant inter-country variation exists in OFS practice, particularly in timing strategies, dosing schedules, and hormone monitoring approaches. Korean practice is characterized by higher-volume centers, immediate OFS initiation, and universal BMA use. These findings highlight unmet needs in standardizing real-world OFS management and inform the design of prospective studies and future guideline refinement.

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Go Beyond Cure of Breast Cancer

Contralateral Prophylactic Mastectomy: The U.S. Experience

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Rates of contralateral prophylactic mastectomy (CPM) among patients with unilateral breast cancer have been increasing in the United States. While CPM reduces the risk of contralateral breast cancer by approximately 90–95%, this reduction does not translate into a survival benefit for most average-risk women. As a result, decisions regarding CPM require careful balancing of risk reduction, potential morbidity, and patient values.

Over the past two decades, CPM use has risen substantially. Population-level analyses show that although overall surgical management has shifted back toward breast-conserving surgery since approximately 2013, CPM use has remained elevated among patients undergoing mastectomy. These trends highlight a divergence between broader de-escalation in breast surgery and the persistent use of more extensive surgery in selected populations.

Patient decision-making regarding CPM is influenced by factors that extend beyond objective oncologic risk. Perceived risk of contralateral breast cancer often exceeds actual risk, with patients frequently overestimating both their likelihood of developing a second cancer and the survival benefit of CPM. Emotional drivers play a central role, along with practical considerations such as imaging burden, symmetry, and reconstruction. As a result, CPM is often chosen not solely for risk reduction, but to reduce uncertainty and improve perceived quality of life. The increasing use of genetic testing has further shaped CPM decision-making. While identification of pathogenic germline variants appropriately supports CPM in high-risk patients, elevated rates of CPM are also observed among patients with negative or indeterminate results. Clinician recommendation is also a major determinant of CPM use. Variation in surgeon preferences is also strongly associated with differences in CPM rates. Patients treated by surgeons who are more reluctant to perform CPM have substantially lower rates of CPM compared to those treated by more permissive surgeons, highlighting the influence of surgeon communication and framing.

Structured approaches to shared decision-making are therefore essential. Interventions that standardize counseling, such as multidisciplinary approaches, consistent messaging, and structured discussion tools have been shown to reduce CPM use, particularly among average-risk and gene-negative patients. Decision aids improve knowledge and reduce decisional conflict, although they do not consistently change the final decision.

CPM is associated with increased healthcare utilization and cost, largely driven by reconstruction and subsequent procedures. Cost-effectiveness varies by patient characteristics, and variability in insurance coverage contributes to inconsistent access and potential misalignment with evidence-based recommendations.

Ultimately, CPM use is driven by a complex interplay of patient perception, clinician influence, and healthcare system factors. Aligning patient preferences with accurate risk information through shared decision-making is essential to ensure that surgical choices are both informed and value-concordant.

Contralateral Prophylactic Mastectomy: The Korean Perspective

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Contralateral prophylactic mastectomy (CPM) has gained increasing attention as a risk-reduction strategy for breast cancer patients, particularly those harboring BRCA1/2 pathogenic variants. However, CPM uptake in Korea remains substantially lower than in Western countries, with only 9.9% of affected BRCA carriers undergoing contralateral risk-reducing mastectomy compared to approximately 50% in the United States. This presentation examines the Korean perspective on CPM, addressing the unique epidemiological, cultural, and systemic factors that shape surgical decision-making. Korea's younger median age at breast cancer diagnosis (48 years), the 10-fold expansion of BRCA genetic testing following National Health Insurance coverage in 2012, and the persistent lack of insurance reimbursement for prophylactic mastectomy represent critical contextual elements. We review the KOHBRA multicenter data demonstrating a 5.8-fold increase in contralateral risk-reducing mastectomy since 2013, alongside substantial inter-institutional variation ranging from 2.9% to 44.4%. Current evidence supports CPM for BRCA1/2 carriers, with 90-97% contralateral breast cancer risk reduction and 20-year cumulative contralateral breast cancer risks of 40% (BRCA1) and 26% (BRCA2) without intervention. For average-risk patients, the 20-year survival benefit remains less than 1%, and CPM is discouraged by international guidelines. East Asian cultural factors, including collectivist decision-making paradigms, body image concerns, and financial barriers, uniquely influence CPM decisions. We propose future strategies including insurance reform, culturally sensitive decision aids, and expanded genetic counseling infrastructure to optimize CPM decision-making in the Korean healthcare context.

Keywords: Contralateral prophylactic mastectomy; BRCA mutation; Risk-reducing surgery; Shared decision-making; Korean breast cancer

Who Truly Benefits From CPM?

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Contralateral prophylactic mastectomy (CPM) reduces the risk of contralateral breast cancer (CBC) by more than 90%, yet its survival benefit remains limited for most patients. Despite guidelines consistently discouraging CPM for average-risk women, surgical rates have continued to rise over the past two decades, underscoring a persistent gap between evidence and clinical practice.

This lecture provides a gene-by-gene evidence review of CPM benefit. Among all gene carriers, BRCA1 mutation carriers have the strongest evidence for CPM, with recent meta-analyses and large international cohorts demonstrating significant improvements in overall and breast cancerspecific survival. TP53 (Li-Fraumeni syndrome) carriers represent another group for whom CPM discussion is appropriate at primary surgery, given their exceptionally high CBC risk and the added concern of radiation-induced secondary malignancies that favor mastectomy over breast-conserving surgery. In contrast, the overall survival benefit of CPM in BRCA2 carriers remains statistically uncertain, and the emerging recognition of hypomorphic (reduced-penetrance) BRCA2 variants further challenges the assumption that all pathogenic variants confer uniformly high risk.

For moderate-penetrance genes such as PALB2, CHEK2, and ATM, CPM decisions require individualized risk assessment rather than gene-level management. Variant-specific penetrance data now formally recognized in the 2026 ACMG clinical statement demonstrate that the same gene can harbor variants spanning low to high risk tiers, making the specific variant, not the gene name, the relevant unit of clinical decision-making.

Polygenic risk scores (PRS) offer further risk refinement, particularly for moderate-penetrance genes, but remain limited by population-specific validation gaps; European-derived PRS models do not perform adequately in Asian BRCA carriers. Absolute risk modeling through tools such as CanRisk/BOADICEA, integrating gene, variant, family history, breast density, and hormonal factors, provides the most comprehensive framework currently available, though population-specific PRS integration awaits further validation.

These findings collectively support a paradigm shift from a binary (gene-positive/negative) approach to a continuous, individualized risk framework. Every CPM decision should be guided by variant-level interpretation, absolute risk modeling, and structured shared decision-making because the gene name starts the conversation, but should never end it.

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Go Beyond Cure of Breast Cancer

Guidelines of Regional Lymph Node Metastasis Beyond Axillary Lymph Node

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Regional lymph node metastasis beyond the axilla, particularly involving the internal mammary (IMLN) and supraclavicular lymph nodes (SCLN), represents an important yet less clearly defined area in breast cancer management.

Despite established staging classifications, detailed surgical strategies for IMLN and SCLN metastasis are not explicitly addressed in major guidelines. As a result, surgical management in these nodal basins often depends on clinical judgment rather than standardized algorithms.

In contrast, regional nodal irradiation is incorporated into guideline recommendations. Both ESMO and NCCN guidelines support nodal radiotherapy in patients with involved lymph nodes, with treatment fields determined by disease burden and response to systemic therapy. However, these recommendations provide a general framework rather than highly specific procedural direction.

Real-world practice patterns reflect this variability. A Korean Clinical Practice Guideline consensus conference demonstrated greater agreement regarding radiotherapy than surgical intervention for non-axillary regional lymph node metastasis, highlighting the ongoing need for multidisciplinary evaluation.

Overall, while current guidelines clearly recognize the clinical significance of IMLN and SCLN involvement, regional nodal management beyond the axilla requires careful consideration of clinical context and multidisciplinary collaboration.

Surgical and Staging Considerations for Regional Nodes Beyond the Axilla

Yongsheng Wang

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Systemic Therapy in the Era of Escalation and De-escalation

Hanxiang An

Shanxi Bethune Hospital, Department of Medical Oncology, China

Risk-Adapted Radiotherapeutic Strategies for Non-Axillary Regional Nodes: Current Evidence and Practice Patterns in Korea

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Background:

The management of regional lymph nodes (LN) beyond the axillaspecifically the internal mammary (IMN) and supraclavicular nodes (SCN)is a critical component of high-risk breast cancer treatment. In South Korea, research has focused on establishing risk-adapted radiotherapeutic strategies by integrating multi-institutional clinical evidence. This presentation summarizes the Korean experience in tailoring treatment based on nodal tumor burden and diagnostic findings within the context of modern multidisciplinary care.

Methods:

Regarding the management of clinical N3 (cN3) breast cancer, several key investigations have been conducted in Korea, including four multicenter studies and four major institutional cohorts. These investigations evaluated the role of advanced imaging, pathologic confirmation, and dose-response relationships in non-axillary nodal disease to define optimal treatment volumes and schedules.

Results:

Evidence indicates that comprehensive regional nodal irradiation (RNI) achieves excellent locoregional control (LRC) rates, typically 8090% at five years. Current risk-adapted strategies in Korea are characterized by several key clinical considerations: (1) Diagnostic Precision: Pathologic confirmation of suspicious IMNs via fine-needle aspiration biopsy (FNAB) provides superior prognostic value over imaging alone, guiding intensified management. (2) Selective Dose Escalation: For bulky nodes ($\geq$ 1.0 cm) or imaging-defined residual disease, radiation dose escalation (targeting an EQD2 $>$ 63.5 Gy) is utilized to improve disease-free survival. (3) Non-Invasive Management: Definitive radiotherapy has become the established standard for SCN metastasis, providing robust regional control without the morbidity of surgical excision.

Considerations for Stage IV Cervical Lymph Nodes: Distinct from regional LNs, metastasis to the lower cervical chain is classified as Stage IV (M1). While Korean data identify cervical involvement as a potent marker for systemic failure, local-regional control can be successfully maintained with comprehensive radiation field design. These cases require a multidisciplinary approach that integrates optimized radiotherapy with aggressive systemic therapy.

Ongoing Research (Prospective Phase II Single-Center Study): To further refine risk-adapted strategies, a prospective phase II study is currently being conducted at a single center in Korea. This study investigates a precision model where radiotherapy doses are adapted based on the image-defined residual nodal burden in non-axillary regions following neoadjuvant chemotherapy. A key component of this risk-adaptation method is

the incorporation of circulating tumor DNA (ctDNA) analysis to identify biological risk, evaluating the feasibility of response-adapted simultaneous integrated boost (SIB) based on real-time imaging and biomarkers.

Conclusions:

The Korean approach to non-axillary regional metastasis has transitioned into a precision model that balances clinical nodal burden with biological insights. By tailoring radiotherapy doses and target volumes based on diagnostic certainty and response to neoadjuvant treatment, optimized clinical outcomes are expected to be achieved for these complex nodal presentations.

Current Status on Regional Lymph Node Management Beyond the Axilla in Breast Cancer in Korea

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Regional lymph node (RLN) involvement beyond the axilla, most commonly the internal mammary (IM) and supraclavicular (SCV) basins, remains a pivotal determinant of prognosis and locoregional control in breast cancer. While axillary management has rapidly evolved toward de-escalation, decision-making regarding non-axillary RLNs remains heterogeneous in clinical practice. This presentation reviews the current status of RLN management beyond the axilla in Korea, highlighting contemporary diagnostic pathways, patterns of care, and key areas of uncertainty that influence multidisciplinary treatment decisions.

Suspicious non-axillary nodes are usually assessed with contrast-enhanced CT, PET/CT, and breast MRI. However, imaging-based criteria for defining clinically meaningful IM or SCV involvement are not standardized across institutions, and false-negative imaging remains a concern, particularly in small-volume disease. Consequently, the integration of imaging findings into definitive treatment planning requires careful correlation with tumor biology, axillary status, and the expected systemic therapy benefit.

Surgical management beyond the axilla is generally limited in Korea. IM node biopsy or dissection is not routinely performed due to technical complexity and limited evidence that surgical clearance improves survival in the modern systemic therapy era. Instead, regional nodal irradiation (RNI) has become the principal modality for managing suspected or confirmed IM/SCV disease. Contemporary Korean practice increasingly favors individualized RNI fields, balancing oncologic benefit with toxicity risks. Advances in radiation techniques have improved the feasibility of IM coverage, yet access and institutional experience vary.

A uniquely important contemporary issue is the expanding role of neoadjuvant systemic therapy (NST) in biologically aggressive subtypes (HER2-positive and triple-negative breast cancer) and its implications for RLN management. In Korea, NST is commonly used for downstaging and response-guided escalation/de-escalation strategies. However, the optimal approach for initially suspicious IM/SCV nodes that normalize radiologically after NST remains unclear. Whether to maintain full RNI fields irrespective of response, tailor fields based on residual disease, or incorporate selective nodal boosts remains an area of active discussion. Similarly, for HR+HER2- disease, where radiologic response to NST may be less dramatic, accurate baseline assessment and risk stratification are central to decisions on RNI, particularly when axillary surgery is minimized.

This presentation reviews the current status of RLN management beyond the axilla in Korea, highlighting contemporary diagnostic pathways, patterns of care, and key areas of uncertainty that influence multidisciplinary treatment decisions.

Current Status on Regional Lymph Node Management Beyond the Axilla in Breast Cancer in China

Chunhua Xiao

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Current Status on Regional Lymph Node Management Beyond the Axilla in Breast Cancer in China (Clinical Insights from TMUCIH)

This presentation outlines the current clinical landscape, diagnostic strategies, and evolving management paradigms for non-axillary (i.e., internal mammary - IMN, and supraclavicular - SCN) regional lymph node metastases in breast cancer within the Chinese context, drawing on data and experience from Tianjin Medical University Cancer Institute and Hospital (TMUCIH).

Clinical Significance and Epidemiology in China: Non-axillary nodal metastasis is a common and clinically significant scenario in China, not a rarity. The unique profile of breast cancer in Chinacharacterized by a younger median age at diagnosis (48-52 years) and a higher proportion of aggressive subtypes like Triple-Negative Breast Cancer (TNBC) and HER2+ diseasecontributes to this burden. TMUCIH data indicates that 25-30% of patients present with involvement beyond the axilla. Tumor location is a prime determinant for IMN metastasis, with medial/central quadrant tumors showing positivity rates as high as 45%. The status of axillary nodes further modifies risk; when positive, the concurrent IMN metastasis risk rises significantly to 20-40%. SCN metastasis, though present in 1-4.3% at diagnosis, is a marker of advanced disease, automatically upstaging to N3 (Stage IIIC).

Diagnostic Pathway: A proactive, systematic, and multi-modality diagnostic approach is mandatory due to the limitations of preoperative imaging. While targeted ultrasound of the axilla, IM, and supraclavicular regions is recommended for universal screening, its sensitivity for IMN metastasis is only around 55%. Therefore, for patients with suspicious ultrasound findings, ultrasound-guided core needle biopsy is crucial for pathological confirmation. For high-risk patients (e.g., young age, medial tumor, aggressive subtype, clinical N2-3 disease) with negative ultrasound, baseline 18F-FDG PET-CT should be considered for comprehensive staging, as it can alter management in about 15% of locally advanced cases.

Therapeutic Paradigm Shift: The management philosophy has fundamentally evolved. Radiotherapy has established itself as the primary and cornerstone modality for regional control of IMN and SCN basins, supported by level-1 evidence. Modern techniques like Deep Inspiration Breath Hold (DIBH)which can reduce mean heart dose by over 50% for left-sided cancersVolumetric Modulated Arc Therapy (VMAT), and Image-Guided Radiotherapy (IGRT) maximize efficacy while minimizing toxicity. Surgery now plays a highly selective, secondary role, reserved for specific scenarios such as when percutaneous biopsy is not feasible, for isolated palpable recurrence, or as part of en bloc resection for chest wall invasion.

Systemic Therapy and Multidisciplinary Care: The presence of non-axillary disease signifies high systemic risk, making potent, subtype-specific systemic therapy (chemotherapy, anti-HER2 agents, CDK4/6 inhibitors, immunotherapy for TNBC) non-negotiable. Management requires a dedicated Multidisciplinary Team (MDT). The presentation illustrates a TMUCIH MDT case, highlighting coordinated decision-making from diagnosis through systemic therapy, radiotherapy planning, and even timing of reconstruction (e.g., planning for delayed autologous flaps to avoid implant complications post-radiation).

Comprehensive Support and Future Directions: TMUCIH emphasizes holistic supportive care, including a dedicated lymphedema clinic (employing innovative techniques like immediate lymphatic reconstruction - LYMPHA), psycho-oncology, and cardiac surveillance for patients receiving regional nodal irradiation. Looking forward, the field is moving towards greater precision and personalization. Future concepts being explored include a "surgery exemption" paradigm using definitive chemoradiation for oligometastatic disease, and the integration of liquid biopsy (ctDNA for Molecular Residual Disease detection) and genomic assays (e.g., Oncotype DX) to biologically guide and personalize decisions, such as omitting regional nodal irradiation for lower genomic risk patients. The presentation concludes by underscoring the urgent need for high-quality, China-specific randomized controlled trials to tailor guidelines for the unique patient population.

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Junior Doctors Forum

Go Beyond Cure of Breast Cancer

Building bridges: How Junior Doctors Can Engage in Global Research Collaboration

Isabel T. Rubio

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Breast cancer remains the most commonly diagnosed cancer among women worldwide, demanding coordinated international research to advance prevention, diagnosis, treatment, and survivorship. International collaboration in breast cancer research is essential for generating robust evidence, improving external validity, and accelerating innovation for improving outcomes for breast cancer patients. For junior surgeons, early exposure to multinational clinical trials and prospective registries is a critical step toward building research competence and academic networks.

Participation pathways may begin locally, where junior surgeons can join ongoing studies as data contributors under experienced principal investigators. Another highly effective initial strategy is to complete part of surgical training or fellowship training in Breast cancer centers known to be actively conducting studies or are highly innovative groups. These placements can often be arranged via institutional partnerships, senior mentors' professional contacts, or international surgical societies such as ESSO through the BRESO School. Additional opportunities include applying to structured research or working group programs through organizations such as the European Organization for Research and Treatment of Cancer (EORTC) (Breast cancer group).

Immersion in active research environments allows trainees to observe trial logistics, learn standardized data collection, and participate directly in patient recruitment and multidisciplinary collaboration. Prospective registries are often the most accessible starting point because they require fewer regulatory resources than randomized trials while still providing exposure to standardized data collection, international methodology, and collaborative authorship structures

Geographic mobility, however, presents practical challenges. In Europe, English is generally required for research participation, yet linguistic diversity can limit full engagement during rotations if local clinical communication occurs in another language. Despite these obstacles, early international experience substantially strengthens professional credibility, fosters cross-border mentorship, and enhances understanding of variations in surgical practice.

Another step is to strategically network at scientific meetings and proactive outreach to study coordinators, which remain highly effective approaches. Ultimately, early involvement in collaborative research not only enhances individual career development but also strengthens international surgical evidence by integrating diverse patient populations, health systems, and operative practices. It also prepares future leaders for designing independent multinational trials and registries in breast oncology research globally.

Despite these opportunities, several barriers limit participation. Time constraints remain the most significant

challenge, as junior doctors must balance heavy clinical workloads with research responsibilities. Language differences and limited experience in academic writing can also hinder communication with international collaborators. Funding constraints may restrict travel or unfamiliarity with global regulatory requirements that can discourage involvement. Additionally, some institutional cultures may limit junior doctors' autonomy.

Addressing these obstacles requires a strategic, multi-level approach. At the individual level, junior doctors can begin by joining ongoing studies rather than attempting to lead projects immediately. Enrolling patients into active multinational trials at their home institutions provides practical exposure and establishes credibility. In some countries, hospitals and universities can support trainees by offering protected research time, seed grants, and formal mentorship programs linking junior clinicians with experienced global investigators.

Building these bridges early in their careers not only strengthens individual professional development but also advances the collective fight against breast cancer through shared scientific innovation and cross-border cooperation.

The Power of Partnerships in Cancer Research: Driving Growth and Innovation

Yeon Hee Park

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Effective partnerships between academia and industry are essential to advancing cancer research and delivering innovation to patients. This lecture explores the foundations, dynamics, and strategic principles of academic–industry collaboration in oncology, with practical guidance for junior doctors aspiring to become key opinion leaders (KOLs).

We examine how pharmaceutical companies and academic investigators share common goals—scientific innovation and patient impact—while navigating distinct institutional missions. Historical examples, from the discovery of trastuzumab to the development of trastuzumab deruxtecan (Enhertu), illustrate how university-originated science fuels industry breakthroughs. The session addresses key elements of productive collaboration, including clinical trial engagement, advisory board participation, and strategies for aligning scientific vision with drug development priorities.

Drawing from real-world clinical cases and the speaker's experience in breast cancer genomics, including the 1,364-patient whole-genome sequencing study, this talk emphasizes that the best partnerships arise when clinicians pursue rigorous science, embrace a team approach, and proactively seek the best available evidence for their patients.

Keywords: academic-industry partnership, cancer research, drug development, key opinion leader, clinical trials, breast cancer genomics

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Nursing Session

Go Beyond Cure of Breast Cancer

Patient Education on Capsular Contracture and Early Rehabilitation After Implant-Based Breast Reconstruction: A Case-Based Approach

Byonghee Jeon

Yonsei Univ. Severance Hospital, Department of Nursing, Korea

Patient Education on Capsular Contracture and Early Rehabilitation After Implant-Based Breast Reconstruction: A Case-Based Approach.

Recently, as the number of patients undergoing implant-based breast reconstruction after breast cancer surgery has increased, cases of capsular contracture are frequently encountered in clinical practice. In this presentation, the stages of capsular contracture in patients with implant-based breast reconstruction are organized using step-by-step photographs to help provide a clear and intuitive understanding of how capsular contracture actually appears.

Capsular contracture is generally classified according to the Baker grading system (Grades IIV). Using the prepared stage-specific photographs, the progression can be visually identified as follows:
Grade I: natural feel and appearance
Grade II: slight firmness
Grade III: visible deformity with discomfort
Grade IV: pain with severe deformity

These changes are not limited to alterations in breast appearance but are also directly associated with limitations in shoulder movement. As contracture progresses, restrictions in shoulder flexion and abduction become more evident, making it increasingly difficult for patients to raise their arms or perform daily activities. Patients often report discomfort such as “difficulty lifting the arm” or “a pulling sensation during movement,” which may lead to decreased functional ability in daily life. Furthermore, dissatisfaction with body image, feelings of withdrawal, and changes in interpersonal relationships may negatively affect overall quality of life (QoL).

Therefore, early rehabilitation and appropriate nursing education are important. Although excessive exercise should be avoided before the implant becomes fully stabilized, complete avoidance of movement may also increase the risk of contracture. By using the prepared photographs, patients can better understand their condition at each stage, and repeated education can be provided regarding the appropriate timing and methods of range-of-motion (ROM) exercises, pain management, behaviors to avoid, and the importance of regular follow-up.

This material was developed from a practical perspective to help nurses intuitively understand the progression of capsular contracture in patients with implant-based breast reconstruction and to facilitate its use in patient education and rehabilitation planning.

Clinical Management of Immediate Hypersensitivity Reactions in Breast Cancer Patients with Chemotherapy

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Chemotherapy in breast cancer is used not only as adjuvant therapy but also as neoadjuvant and adjuvant therapies before and after surgery. As various anticancer agents have been developed alongside conventional cytotoxic agents, the possibility of unpredictable adverse effects has also increased. Since all anticancer agents carry the risk of hypersensitivity reactions, patients must be carefully monitored. Among them, platinum compounds, taxanes, and monoclonal antibodies have high incidence rates of hypersensitivity reactions, and these agents are frequently used in breast cancer patients. Hypersensitivity reactions are classified as immune-mediated or non-immune-mediated depending on the mechanism, but the symptoms appear similarly. Patient risk factors should be identified, premedication should be administered according to the drug, and in cases with many risk factors, patients should be educated to report any abnormal reactions immediately.

Hypersensitivity reactions can range from mild symptoms to severe adverse effects leading to death. Skin reactions such as urticaria or rash are the most common, followed by respiratory symptoms like dyspnea, chest tightness, and hypoxemia; gastrointestinal symptoms such as nausea, vomiting, and diarrhea; cardiovascular and neurological symptoms like syncope, dizziness, hypotension, and tachycardia; and fever and chills. Depending on the severity of symptoms, the anticancer drug should be discontinued, and medications such as epinephrine and chlorpheniramine should be administered.

When a hypersensitivity reaction to an anticancer drug occurs, re-administration must be done with extreme caution. In cases of prior sensitization, the risk of subsequent anaphylaxis is very high, and premedication may not prevent it, necessitating desensitization therapy. Desensitization protocols (e.g., 3-bag-12-step) safely enable first-line therapy continuation, protecting against anaphylaxis and extending treatment with high success rates in breast cancer patients.

Bone Health and Weight Control in Young Breast Cancer Undergoing Endocrine Therapy

Hyejin Cho

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Endocrine therapy is a cornerstone of treatment for hormone receptor-positive breast cancer and plays a critical role in reducing recurrence and improving survival. In young breast cancer patients, commonly defined as women diagnosed before the age of 40 years, endocrine therapy often includes tamoxifen alone or in combination with ovarian function suppression (OFS), and in higher-risk patients, aromatase inhibitors (AIs) combined with OFS. While these approaches improve oncologic outcomes, they are also associated with important survivorship issues, particularly bone loss and weight gain or unfavorable body composition changes.

Bone mineral density (BMD), typically assessed by dual-energy X-ray absorptiometry, is an essential component of long-term care in this population. Estrogen deprivation caused by endocrine therapy accelerates bone resorption, with the greatest negative effects seen in patients receiving AI plus OFS. Tamoxifen has differential skeletal effects depending on menopausal status, showing relative bone protection in postmenopausal women but potential bone loss in premenopausal women. Decreased BMD increases the risk of osteopenia, osteoporosis, and fragility fractures, which may negatively affect physical function, quality of life, and adherence to cancer treatment. Although low BMD itself is not clearly established as a direct determinant of breast cancer recurrence, skeletal complications may indirectly influence prognosis through treatment interruption and long-term morbidity.

Weight control is another major concern in young breast cancer survivors receiving endocrine therapy. Although evidence on absolute weight gain by endocrine therapy subtype is mixed, many patients experience increased fat mass, visceral adiposity, and adverse metabolic changes, especially when OFS induces abrupt hypoestrogenism. Excess body weight and obesity are associated with poorer breast cancer outcomes, reduced quality of life, and increased risk of cardiovascular and metabolic comorbidities. Therefore, weight management should be considered an integral part of survivorship care.

Effective interventions for bone health include baseline and follow-up BMD monitoring, adequate calcium and vitamin D intake, resistance and weight-bearing exercise, smoking cessation, and pharmacologic treatment with bisphosphonates or denosumab in selected high-risk patients. Weight control strategies include exercise, nutritional counseling, behavioral interventions, and individualized consideration of anti-obesity medications when appropriate. A comprehensive, multidisciplinary approach addressing both bone health and weight control is essential to optimize long-term outcomes and quality of life in young breast cancer patients undergoing endocrine therapy.

Unmet Needs in Patients with Metastatic or Recurrent Breast Cancer

Seo Jung Park

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Metastatic and recurrent breast cancer patients experience prolonged disease trajectories, resulting in complex and persistent unmet needs across multiple domains. This study aimed to review the literature on unmet needs in this population and to explore the role of oncology advanced practice nurses in addressing these needs. A narrative review of key international studies was conducted, focusing on supportive care needs, psychological distress, symptom burden, and healthcare systemrelated challenges. Across studies, a high prevalence of unmet needs was consistently reported, with the most prominent domains including psychological support, information provision, and physical symptom management. In particular, fear of disease progression, uncertainty about prognosis, and inadequate access to tailored information were major concerns among metastatic breast cancer patients. These unmet needs were strongly associated with decreased quality of life, increased emotional distress, and reduced treatment adherence. International care models emphasize multidisciplinary approaches, early integration of palliative care, and routine screening for patient-reported outcomes. Oncology advanced practice nurses play a pivotal role in identifying unmet needs, coordinating care, providing patient-centered education, and delivering psychosocial support. Implementing structured needs assessment and nurse-led interventions may significantly improve patient outcomes and quality of life in this population.

Psychosocial Support for Patients Living with Metastatic or Recurrent Breast Cancer

Eunkyung Hwang

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Breast cancer patients often experience significant psychological distress, including anxiety and depression. While many survivors face long-term challenges, those with metastatic or recurrent breast cancer encounter unique stressors, such as the initial shock of diagnosis, "never-ending" treatments, and the constant need to redefine their quality of life.

A review of current literature and clinical programs was conducted, including meta-analyses of depression prevalence in breast cancer patients. Various psychological interventions were analyzed, such as cognitive-behavioral group interventions and supportive-expressive group therapy. Additionally, the psychosocial support model implemented at the Seoul National University Hospital was examined, focusing on its multi-faceted approach involving education, counseling, and self-help groups.

Meta-analytical data confirms high prevalence rates of psychological distress, with metastatic or recurrent breast cancer. Research on structured interventions like cognitive-behavioral group interventions (comprising 35 weekly sessions or intensive weekend courses) and supportive-expressive group therapy (weekly 90-minute sessions for over a year) demonstrated measurable improvements in coping skills, emotional expression, and the "detoxification" of death and dying. At Seoul National University Hospital, the implementation of participatory education and personalized counseling has been effective in addressing symptoms like fatigue and depression. Notably, patient-led initiatives, such as the "Cancer Patient Volunteer Program," where survivors share experiences to offer hope, and the "Support Program for Teens," have shown significant value in stabilizing the emotional ecosystem of the patient's family.

The findings emphasize that for patients with metastatic or recurrent breast cancer, it is crucial to provide structured psychosocial interventions that move beyond curative goals and focus on long-term disease coexistence. These programs should be tailored to their unique trajectory from the initial shock to the management of "never-ending" treatments addressing chronic fatigue and emotional exhaustion through personalized counseling. Furthermore, patient-led initiatives and family support programs are vital in helping these patients redefine their quality of life and maintain emotional stability despite the clinical uncertainties of their condition.

Integrating Early Palliative Care: The Expanding Role of Breast Cancer Nurse Specialist

Namgyo Lee

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Title: Integrating Su-Ji Kim's Interpersonal Caring Theory into Early Palliative Care: Empowering the Role of Breast Cancer Oncology Nurse Specialists

Background:

Early Palliative Care (EPC) is no longer confined to end-of-life care; it is recognized as an essential component of comprehensive breast cancer management from the moment of diagnosis. As patients navigate physical distress and psychological crises during surgery and chemotherapy, the role of Breast Cancer Oncology Nurse Specialists (BCONS) becomes pivotal. However, successful EPC implementation depends on the specialized competencies of these nurses. This presentation proposes integrating Dr. Su-Ji Kim's Interpersonal Caring Theory as a foundational framework to empower BCONS. By applying this holistic approach, we explore how to enhance the quality of early interventions and bridge the gap between clinical treatment and patient-centered healing.

Methods:

This presentation outlines a framework for bridging Su-Ji Kim's Interpersonal Caring Theory with the clinical practice of BCONS in early palliative care. The approach includes:

1. Conceptual Integration: Aligning the 10 core principles of the theory with the clinical trajectory of breast cancer to provide a structured care model.
2. Competency Framework: Identifying specific nursing interventions where BCONS can integrate holistic psychosocial support into routine symptom management.
3. Practical Application: Sharing actionable strategies and "Caring-based EPC" protocols designed to be implemented by nurse specialists from the initial point of patient contact.

Key Content (The Role of BCONS through a Caring Lens):

The integration of the theory manifests in four primary dimensions:

* Physical Vigilance (Noticing & Comforting): Proactive management of treatment side effects to alleviate physical suffering and associated patient anxiety.
* Psychosocial Presence (Being with & Listening): Building a strong therapeutic alliance to help patients navigate the emotional shock and uncertainty of a new diagnosis.
* Empowerment in Decision-Making (Assuring & Encouraging): Guiding patients through complex clinical pathways to make value-based choices regarding their treatment trajectory.
* Holistic Rehabilitation (Strengthening & Sharing): Facilitating the patient's transition back to daily life by honoring them as a "whole person" rather than merely a clinical case.

Conclusion:

By integrating Dr. Su-Ji Kim's Interpersonal Caring theory into the technical expertise of BCONS, this presentation proposes a new standard for early palliative care that transcends conventional nursing to provide transformative healing experiences. This synergy not only enhances the professional self-efficacy of nurse specialists but also ensures that patients receive compassionate, comprehensive support from the very beginning of their cancer journey. Ultimately, we advocate for the development of standardized EPC protocols based on this nursing-led caring model, as it is vital for improving both the quality of life and clinical outcomes for breast cancer patients.

Keywords: Early Palliative Care, Breast Cancer Oncology Nurse Specialist (BCONS), Su-Ji Kim's Interpersonal Caring Theory, Quality of Life

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References 1. 키트루다 허가사항. 식품의약품안전처.

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Pembrolizumab in TNBC - Realizing a New Era of Care

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Triple-negative breast cancer (TNBC) has historically been the most challenging breast cancer subtype due to its aggressive nature and limited targeted options. However, the integration of pembrolizumab has fundamentally shifted the treatment paradigm. This lecture reviews the practice-changing data of pembrolizumab combination in TNBC, focusing on survival outcomes, AE management, and remaining unmet needs.

The final overall survival (OS) analysis of KEYNOTE-522 was released in 2024. With a median follow-up of over 75 months, the addition of pembrolizumab to neoadjuvant chemotherapy followed by adjuvant monotherapy demonstrated a statistically significant and clinically meaningful improvement in OS (HR 0.66; 95% CI, 0.50-0.87). The 5-year OS rate reached 86.6% in the pembrolizumab group compared to 81.7% in the placebo group. Even in the high-risk non-pathologic complete response(pCR) subgroup, pembrolizumab continued to offer a survival benefit, reducing the risk of death by nearly 30% compared to chemotherapy alone. Despite these landmark results, defining the optimal adjuvant strategy remains a significant unmet need. Questions persist regarding the necessity of adjuvant pembrolizumab for patients who achieve pCR, and the best management for those with residual disease specifically whether to combine pembrolizumab with other agents like capecitabine or olaparib to further mitigate recurrence risks.

In the metastatic setting, patient access in South Korea has improved with the expansion of national health insurance coverage for 1L pembrolizumab and chemotherapy combination based on the KEYNOTE-355 data. Moreover, the role of pembrolizumab in metastatic setting has been further solidified by the ASCENT-04 results, showing the synergy between ADCs.

As we navigate 2026, pembrolizumab serves as the backbone of TNBC therapy in most cases. Future efforts must focus on personalized treatment escalation or de-escalation based on molecular signatures to maximize survival while minimizing toxicity.

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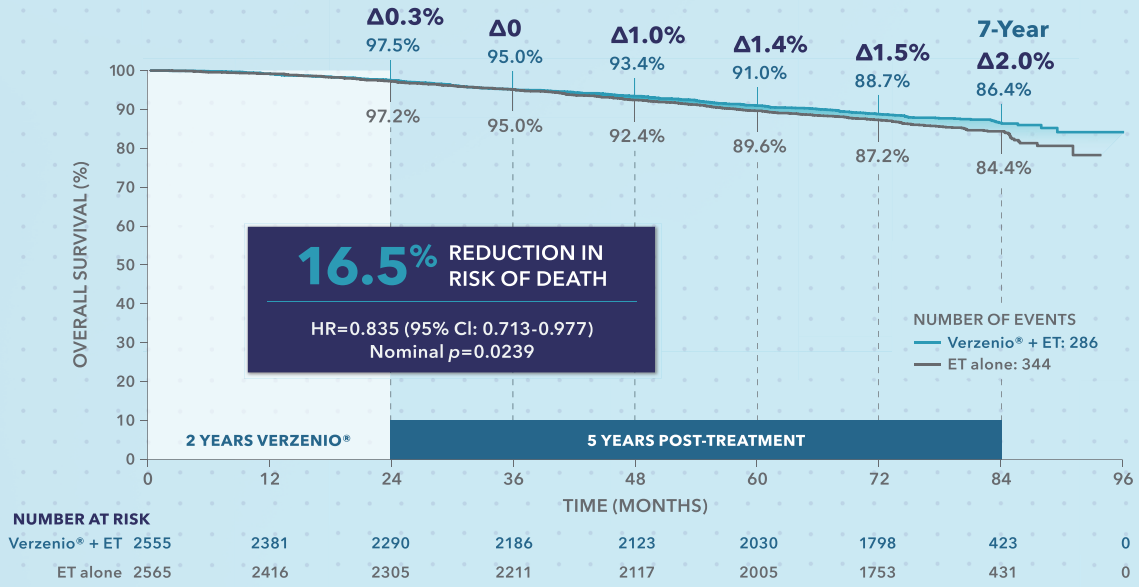
Verzenio® is the first[#] CDK4/6 inhibitor with a confirmed overall survival benefit in the curative setting and 2 years of treatment[*,†,1]

Increasing overall survival benefit seen at 7 years[1]



NUMBER AT RISK									
Verzenio® + ET	2555	2381	2290	2186	2123	2030	1798	423	0
ET alone	2565	2416	2305	2211	2117	2005	1753	431	0

Verzenio® delivers 7 years of sustained IDFS benefit with 2 years of treatment[*,2]

- At the 4-year IDFS analysis, 85.5% of patients remained recurrence free with Verzenio® + ET vs 78.6% with ET alone (HR=0.653 [95% CI: 0.567-0.753]; nominal $p<0.0001$).[5]
- At the 7-year IDFS analysis, 77.0% of patients remained recurrence-free with Verzenio® + ET vs 70.1% with ET alone (HR=0.726 [95% CI: 0.648-0.815]; nominal $p<0.0001$).[2]

INDICATION[1]

1. HR+, HER2- 진행성 또는 전이성 유방암이 있는 여성의 치료를 위한 일차 내분비 기반 요법으로서 아로마타제 억제제와 병용
2. 내분비 요법 후 질병이 진행된 HR+, HER2- 진행성 또는 전이성 유방암 여성의 치료에 풀베스트란트와 병용
   폐경 전 또는 폐경 이행기 여성에서, 내분비 요법은 LHRH 작용제와 병용
3. HR+, HER2-, 림프절 양성의 재발 위험이 높은 조기 유방암이 있는 성인 환자의 보조 치료로서 내분비 요법과 병용
   폐경 전 또는 폐경 이행기 여성에서, 아로마타제 억제제 내분비 요법은 LHRH 작용제와 병용

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제품상세정보 자세히보기	제품상세정보 자세히보기	제품상세정보 자세히보기

†Published online October 17, 2025 *Verzenio® in combination with ET (AI or tamoxifen) is indicated for the adjuvant treatment of adult patients with HR+, HER2-, node-positive EBC at a high risk of recurrence. High-risk EBC in Cohort 1 was defined as patients who had ≥4 positive nodes or 1-3 positive nodes and tumors that were ≥5 cm, histological Grade 3—or both.[1] #A statistically significant OS benefit was seen in the ITT population. Following regulatory consultation at the primary IDFS analysis, the OS analysis plan was amended to increase final events from 390 to 650 to ensure ≥5 years' follow-up. Verzenio® is approved for Cohort 1 (91% of ITT); OS analysis in this subpopulation was not powered or alpha-controlled.[1]

AI: aromatase inhibitor; **CDK4/6:** cyclin-dependent kinase 4 and 6; **CI:** confidence interval; **EBC:** early breast cancer; **ET:** endocrine therapy; **HER2-:** human epidermal growth factor receptor 2-negative; **HR:** hazard ratio; **HR+:** hormone receptor-positive; **IDFS:** invasive disease-free survival; **ITT:** intent-to-treat; **OS:** overall survival; **LHRH:** Luteinizing hormone releasing hormone.

References 1. Johnston S, Martin M, O'Shaughnessy J, *et al.* Overall survival with abemaciclib in early breast cancer. *Ann Oncol.* 2025. DOI: 10.1016/j.annonc.2025.10.005(including supplement) **2.** Johnston S, Martin M, O'Shaughnessy J, *et al.* Overall survival with abemaciclib in early breast cancer. *Ann Oncol.* 2025. DOI: 10.1016/j.annonc.2025.10.005 **3.** Rastogi P *et al. J Clin Oncol.* 2024;42(9):987-93. **4.** 버제니오 식약처 허가사항(식약처 의약품통합정보시스템 https://nedrug.mfds.go.kr/) [revised 29 Aug 2025] **5.** Johnston SRD *et al. Lancet Oncol.* 2023;24(1):77-90.

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PP-AL-KR-1033 [Expiration Date : 2027년 10월 31일]

Optimizing Care in High-Risk HR+/HER2-eBC: Preventing Recurrence and Improving Survival with Adjuvant Abemaciclib

Paolo Tarantino

Dana-Farber Cancer Institute, Department of Medical Oncology, U.S.A.

Patients with high risk hormone receptor positive HER2 negative (HR+/HER2-) early breast cancer remain at substantial risk of recurrence despite optimal locoregional treatment and standard endocrine therapy. Recent advances have expanded the role of adjuvant systemic therapy in this setting, with the CDK4/6 inhibitor abemaciclib demonstrating clinically meaningful improvements in invasive disease free survival and overall survival when added to endocrine therapy in patients with high risk disease. These findings have established adjuvant abemaciclib as an important treatment option for selected patients, although questions remain regarding optimal patient selection, treatment duration, and management of treatment related toxicities in routine clinical practice.

This lecture will review the clinical rationale for CDK4/6 inhibition in early HR+/HER2- breast cancer and summarize the key evidence supporting the use of adjuvant abemaciclib in patients with high risk disease. The discussion will focus on practical aspects of integrating abemaciclib into clinical care, including identification of eligible patients based on clinicopathologic features, coordination with endocrine therapy, and strategies to manage common adverse events such as diarrhea, neutropenia, and fatigue. Emerging data on long term outcomes, biomarkers of benefit, and evolving treatment algorithms will also be discussed, with the goal of outlining evidence based strategies to reduce recurrence risk and improve survival outcomes for patients with high risk HR+/HER2- early breast cancer.

[References] 1. KISQALI product information. 2. Fasching PA, *et al.* Oral LBA13. Presented at the European Society for Medical Oncology Congress 2024, 13-17 September.

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FA-L184KR01J2027Aug7

NATALEE 5 Year Outcomes: Guiding Patient Selection for Adjuvant Ribociclib in HR+/HER2- Early Breast Cancer

Giuseppe Curigliano

Univ. of Milano, Department of Oncology and Hemato-Oncology, Italy

Background: In the primary efficacy analysis of the phase III NATALEE trial, the combination of ribociclib with a nonsteroidal aromatase inhibitor (NSAI) showed a statistically significant improvement in invasive disease-free survival (iDFS) compared with NSAI alone in patients with hormone receptor (HR)-positive/human epidermal growth factor receptor 2 (HER2)-negative early breast cancer (EBC). Ongoing evaluation of outcomes is essential to determine whether this benefit is sustained over time. This report presents 5-year efficacy data, including an updated assessment of overall survival (OS).

Patients and methods: The study enrolled premenopausal and postmenopausal women, as well as men, diagnosed with HR-positive/HER2-negative EBC at anatomic stage IIA (either N1 or N0 with high-risk features), IIB, or III. Participants were randomly assigned in a 1:1 ratio to receive either ribociclib (400 mg daily, administered 3 weeks on/1 week off for 3 years) plus an NSAI (letrozole 2.5 mg daily or anastrozole 1 mg daily for 5 years), or NSAI alone. Premenopausal women and men were additionally treated with goserelin. The primary endpoint was iDFS, while secondary and exploratory endpoints included distant disease-free survival, recurrence-free survival, distant recurrence-free survival, and OS.

Results: After a median follow-up of 55.4 months for iDFS, the combination of ribociclib and NSAI continued to show a significant advantage over NSAI alone (hazard ratio 0.716, 95% confidence interval 0.618–0.829; one-sided log-rank $P < 0.0001$). The absolute difference in iDFS between the treatment groups increased over time, from 2.7% at 3 years to 4.5% at 5 years. Consistent benefits were observed across patient subgroups, including those with N0 disease (hazard ratio 0.606, 95% CI 0.372–0.986), as well as across secondary and exploratory endpoints. Although OS data are still maturing, a numerical trend favoring ribociclib was noted (hazard ratio 0.800, 95% CI 0.637–1.003; one-sided log-rank $P = 0.026$).

Conclusions: At the prespecified 5-year follow-up, findings from the NATALEE trial indicate that ribociclib combined with an NSAI provides a sustained reduction in recurrence risk that extends beyond the 3-year treatment period. These results support its role as an adjuvant treatment option for patients with HR-positive/HER2-negative EBC. A continuing positive trend toward improved overall survival with ribociclib plus NSAI was also observed.

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BICR, blinded independent central review; **CDK4/6,** cyclin-dependent kinases 4 and 6 inhibitor; **CI,** confidence interval; **ET,** endocrine therapy; **HER2,** human epidermal growth factor receptor 2; **HR+,** hormone receptor positive; **HR,** hazard raio; **IHC,** immunohistochemistry; **ISH,** in situ hybridization; **ITT,** intent to treat; **mBC,** metastatic breast cancer; **mPFS,** median progression-free survival; **OS,** overall survival

References 1. 엔허투®주 100mg (트라스투주맙데룩스테칸) 제품설명서. 개정연월일 2026.01.30. **2.** Bardia A, et al. Trastuzumab deruxtecan after endocrine therapy in metastatic breast cancer. N Engl J Med. 2024;391(22):2110-2122.

Study Design[2]: A multicenter, randomized, open-label trial phase 3 trial evaluating ENHERTU® versus physician's choice chemotherapy* in patients who HR+/HER2-low or ultralow mBC after 1-2 lines ET†, with the primary endpoint of PFS (by BICR) in the HER2-low group.‡
*In the control arm, 60% of patients received capecitabine, 24% nab-paclitaxel, and 16% paclitaxel; †Patients who had progression after receiving at least 2 lines of ET for mBC, or who received 1 line ET for mBC if they had had disease recurrence within 24 months after initiation of adjuvant ET or if they had had disease progression within 6 months after initiation of 1 line ET + CDK4/6i for mBC.; ‡Key secondary endpoints was OS in HER2-low, PFS (BICR) in ITT (HER2-low + ultralow), OS in ITT

DESTINY-Breast06 Results in ITT[2]

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(n=436; 95% CI: 12.0, 15.2)	(n=430; 95% CI: 7.0, 9.0)

(HR for disease progression or death:0.64, 95% CI, 0.54–0.76; p<0.001)

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P26-144-202803-V1
KR-222331 | Exp. 2028-03 (Prep. 2026-03)

Beyond Conventional Sequencing in HR+ MBC : Establishing a New Standard through Early and Deep Response with HER2-targeted ADC

Junghoon Shin

Samsung Medical Center, Department of Medical Oncology, Korea

The treatment landscape for hormone receptor–positive (HR+), HER2-negative metastatic breast cancer (mBC) is undergoing a significant transformation; however, therapeutic options remain limited following progression on first-line CDK4/6 inhibitors plus endocrine therapy (ET). Subsequent treatments are typically associated with modest efficacy, with median progression-free survival (mPFS) ranging from approximately 2 to 8 months. This highlights a critical need for therapies capable of providing both meaningful tumor control and durable clinical benefit in patients with endocrine-refractory disease.

Trastuzumab deruxtecan (T-DXd), the first and only HER2-directed antibody–drug conjugate (ADC) to demonstrate substantial clinical benefit in this setting, has emerged as an important therapeutic option. In the phase 3 DESTINY-Breast06 trial, T-DXd demonstrates superiority over TPC in chemo-naive patients with HR+, HER2-low mBC after ≥1 prior line of ET, with consistent results in HER2-ultralow mBC, establishing HER2-ultralow as a newly targetable patient population (mPFS in overall population:13.2 vs. 8.1mo; HR, 0.63, DCO: Mar 18, 2024). The confirmed objective response rate (ORR) was higher with T-DXd than with TPC in the HER2-low population (56.5% vs. 32.2%), with durable responses observed (median duration of response, 14.1 vs. 8.6 months).

A post-hoc subgroup analysis suggested consistent efficacy across patients with clinical characteristics known to influence prognosis, including subgroups defined by endocrine resistance patterns, time to progression on prior CDK4/6i plus ET, and baseline disease burden. Median PFS2 exceeded 17 months with T-DXd across these subgroups (vs. 12.7 months with TPC), suggesting that treatment with T-DXd does not compromise the effectiveness of subsequent therapies.

Patient-reported outcomes further demonstrated that quality of life was maintained with T-DXd despite longer treatment duration, with clinically meaningful delays in deterioration of physical functioning, role functioning, and pain compared with TPC.

Based on the results of DESTINY-Breast04 and DESTINY-Breast06, trastuzumab deruxtecan is currently recommended in international guidelines, including NCCN and ESMO, for mBC patients with HER2-low and HER2-ultralow disease. In parallel, updated 2025 CAP guideline recommend routine documentation of HER2-low and HER2-ultralow expression in pathology reports to ensure appropriate identification of patients who may benefit from HER2-targeted ADC.

Together, these advances support a paradigm shift in the management of HR+ mBC, expanding the therapeutic relevance of HER2 targeting beyond conventional HER2-positive disease.

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Reference 1.퍼제타 제품정보(Perjeta-2022-12-20-1.0) 2.허셉틴 IV 제품정보(Herceptin 150mg-2022-04-28-1.0) 3.페스코 제품정보(Phesgo-2021-09-30-1.0)

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[성상] 무색내지 옅은 황색의 액체가 충전된 무색투명한 바이알 주사제
[효능·효과] • 전이성 유방암: 전이성 질환에 대해 항-HER2 치료 또는 화학요법 치료를 받은 적이 없는, HER2 양성 환자로서 전이성 또는 절제 불가능한 국소 재발성 유방암 환자에게 도세탁셀과 병용투여 ○ 조기 유방암: 국소진행성, 염증성 또는 초기 단계(지름 2cm 초과)인 HER2 양성 유방암 환자의 수술 전 보조요법으로서 화학요법과 병용투여–재발 위험이 높은 HER2 양성 조기 유방암 환자의 수술 후 보조요법으로서 화학요법과 병용투여
[용법·용량] 이 약은 검증된 방법으로 측정된 IHC 3+ 및/또는 ISH≥2.0 비율로 정의된 HER2 양성 종양 환자에게 투여해야 한다. 이 약은 항암제 치료 경험이 있는 의료전문가의 감독 하에 투여되어야 한다. 투약 오류를 방지하기 위해, 조제하여 투여하는 약이 페스코피하주사(퍼투주맙/트라스투주맙)가 맞는지 바이알 라벨을 확인해야 한다. 이 약은 허박지에 피하주사로만 투여해야 하며, 정맥주사하면 안된다. 현재 퍼투주맙과 트라스투주맙 정맥주사를 투여받는 환자는 이 약으로 교체(또는 그 반대)할 수 있다. ○ 전이성 및 조기 유방암: 전이성 및 조기 유방암에서 이 약의 용량 권장사항은 아래 표 1 을 참고한다.

표1. 용법용량

	용량(체중에 관계 없음)	피하주사투여소요시간	관찰시간
초기용량	퍼투주맙 1200mg/트라스트주맙 600mg	8분	30분
유지용량(매 3주마다)	퍼투주맙 60mg/트라스트주맙 600mg	5분	15분

*환자의 주입관련반응과 과민반응을 관찰해야한다. *관찰은 이 약 투여 후 시작되어야 하며, 이후 화학요법의 투여 시작 전에 관찰이 완료되어야 한다. 퍼투주맙과 트라스투주맙 정맥주사 마지막 투여 후 6주 미만 경과한 환자에게는 이 약을 퍼투주맙 600mg/트라스투주맙 600mg의 유지 량으로 투여해야 하며, 그 후 매 3주마다 투여한다. 퍼투주맙과 트라스투주맙 정맥주사 마지막 투여 후 6주 이상 경과한 환자에게는 이 약을 퍼투주맙 1200mg/트라스투주맙 600mg의 초기 용량으로 투여해야 하며, 그 후 퍼투주맙 600mg/트라스투주맙 600mg의 유지 용량을 매 3주마다 투여한다. 좌우 허벅지에 번갈아 가며 주사해야 한다. 새로 주사하는 곳은 이전에 주사했던 곳과 2.5cm 이상 떨어져 있어야 하고, 붉거나 멍들었거나 아프거나 딱딱한 피부에는 절대 주사하지 않는다. 두 주사기 간 또는 두 주사 부위 간 용량을 나누어 투여하면 안된다. 이 약 치료 중 다른피하주사 약물을 투여할 경우, 이 약 주사 부위와 다른 곳에 주사하는 것이 바람직하다. 탁산계 약물을 투여 받는 환자의 경우에는 이 약 투여 후에 탁산계 약물을 투여한다. 이 약과 병용 투여 시, 도세탁셀은 초기용량으로 75mg/m² 를 투여한다. 안트라싸이클린계 약물을 포함하는 요법을 투여 받는 환자는 전체 안트라싸이클린계 약물 요법을 완료한 후 이 약을 투여해야 한다. ○ 조기 유방암: 수술 전 보조요법(Neoadjuvant): 조기유방암에 대한 다음의 요법 중 하나로서 이 약을 매 3주마다 한번씩, 3-6주기 동안 투여한다. • 수술 전 이 약과 도세탁셀을 4 주기 투여한 뒤, 수술 후 보조요법으로 FEC 요법 (플루오로우라실, 에피루비신과 싸이클로포스파마이드) 3주기 투여 • 수술 전 FEC 요법 3 또는 4주기 투여 후 이 약과 도세탁셀을 3 또는 4주기 투여 • 수술 전 이 약과 도세탁셀, 카보플라틴을 6주기 투여(75mg/m²을 넘는 도세탁셀 용량 투여는 권장하지 않음) • 수술 전 ddAC 요법 (용량집중 독소루비신과 싸이클로포스파미드) 4주기 투여 후 이 약과 파클리탁셀 또는 도세탁셀 4주기 투여 • 수술 전 AC 요법 (독소루비신과 싸이클로포스파미드) 4주기 투여 후 이 약과 도세탁셀 4주기 투여 수술 후, 환자는 이 약 투여를 지속하여 총 1년의 투여를 완료해야 한다(최대 18주기). 수술 후 보조요법(Adjuvant): 표준 안트라싸이클린계 및 / 또는 탁산계 약물을 포함하는 화학요법 등 조기유방암에 대한 전체 요법의 일부로서 이 약을 총 1년간 병용투여한다(최대 18주기) 또는 질병 재발이나 관리 불가능한 독성이 나타날 때까지. 이 약은 첫 탁산계 약물 포함 치료 주기의 제 1일에 시작해야 하며, 화학요법이 중단되더라도 투여를 지속해야 한다. ○ 전이성 유방암: 질병의 진행이나 조절할 수 없는 독성이 발생할 때까지 이 약을 도세탁셀과 병용투여한다. 도세탁셀 투여가 중단되더라도 이 약은 계속 투여할 수 있다. ○ 투약일이 지났거나 투약을 놓친 경우: 연속 투약일 간격이 6주 미만인 경우, 이 약 유지 용량인 퍼투주맙 600mg/트라스투주맙 600mg을 가능한 한 빨리 투약한다. 계획된 다음 투여일까지 기다리지 않는다. 연속 투약일 간격이 6주 이상인 경우, 다시 이 약 초기 용량인 퍼투주맙 1200mg/트라스투주맙 600mg을 투약하고, 이후 매 3주마다 유지 용량 퍼투주맙 600mg/트라스투주맙 600mg을 투여한다. ○ 용량조절: 이 약의 감량은 권장되지 않는다. 화학요법제의 용량조절은 해당 품목의 허가사항에 따른다.
[사용상의 주의사항] 1. 경고 1) 좌심실 기능부전 ① 이 약을 포함하여 HER2 활성을 차단하는 약물을 투여하는 경우 좌심실박출률(LVEF, left ventricular ejection fraction) 감소가 보고되었다. 트라스투주맙과 화학요법을 투여한 환자군과 비교해 이 약과 화학요법을 병용투여한 환자군에서 증후성 좌심실 기능부전(LVSD, left ventricular systolic dysfunction)의 발생률이 더 높았다. 수술 후 보조요법에서 보고된 증후성 심부전 사례의 대부분은 안트라싸이클린계 약물을 포함하는 화학요법을 받았던 환자들이었다. 퍼투주맙 정맥주사와 트라스투주맙 및 화학요법을 병용투여한 연구에 의하면, 이전에 안트라싸이클린계 약물을 투여받았거나 가슴 부위에 방사선요법을 받은 시험대상자는 좌심실박출률 감소 위험이 높을 수 있다. ② 다음의 환자들은 이 약 또는 퍼투주맙과 트라스투주맙 정맥투여에 대한 연구가 실시되지 않았다. 치료 전 좌심실박출률 수치가 55%(조기 유방암) 또는 50%(전이성 유방암) 미만인 환자, 울혈성 심부전(CHF) 병력이 있는 환자, 조절되지 않는 고혈압이 있는 환자, 최근 심근경색증이 발병한 환자, 치료가 필요한 중대한 심장부정맥이 있는 환자, 이전에 독소루비신 360mg/m² 초과 또는 이와 동등한 안트라싸이클린 노출이 누적된 환자와 같이 좌심실 기능에 장애가 있는 상태를 포함하는 경우이다. 이전에 수술 후 보조요법(adjuvant therapy)으로 트라스투주맙을 투여한 기간에 좌심실박출률이 50% 미만으로 감소한 환자에서 퍼투주맙 트라스투주맙 정맥주사 및 화학요법 병용투여에 대한 연구가 실시되지 않았다. ③ 이 약 투여 전에 좌심실박출률을 평가하고, 치료기간 동안 정상범위의 좌심실박출률을 유지하기 위하여 정기적 간격으로 좌심실박출률을 평가한다(아래 표 2 참조). 좌심실박출률이 표 2 와 같이 감소한 후 개선되지 않거나 이후 평가에서 더 감소한 경우에는, 환자에 대한 유익성이 위험성을 상회하지 않는 한 이 약의 투여 중단을 심각하게 고려해야 한다.

표 2. 좌심실 기능부전에 대한 권장용량

	투여 전 LVEF	LVEF 모니터간격	최소 3주간 이 약 휴약이 필요한 LVEF 감소	3주 후 이 약 투여재개가 가능한 LVEF 회복
전이성 유방암	50% 이상	약 매 12주	LVEF가 40% 미만으로 감소하거나 투여 전 수치보다 10% 이상 감소하여 LVEF가 40–45% 인 경우	LVEF가 45%를 초과하거나 투여전 수치보다 10% 미만 감소 하여 LVEF가 40–45% 인 경우
조기 유방암	55%** 이상	약 매 12주(수술 전 보조 요법 중 1회)	투여 전 수치보다 10% 이상 감소하여 LVEF가 50% 미만일 경우	LVEF가 50% 이상 이거나 투여 전 수치보다 10% 미만으로 감소했을 때

퍼투주맙 정맥주사 자료에 근거 (CLEOPATRA 연구)

** 안트라싸이클린계 약물을 포함하는 화학요법을 받은 환자의 경우, 안트라싸이클린 투여 완료 후 이 약 투여를 시작하기 전에 LVEF 가 50% 이상이어야 한다. 2) 주입관련반응: 이 약은 주입관련반응과 연관성이 있다. 주입관련반응은 이 약 투여 후 24시간 이내에 발생하는 사이토카인 방출로 인한 열, 오한, 두통 등의 증상을 동반하는 전신 반응으로 정의된다. 이 약의 초기 용량 투여 시는 주입시간 및 주입 후 30분간, 유지 용량 투여 시는 주입시간 및 주입 후 15분간 환자를 면밀하게 관찰한다. 유의한 주입관련반응이 발생한 경우에는 주사 속도를 줄이거나 멈추어야 하며 적절한 처치를 해야 한다. 증상 및 증후가 완전하게 개선될 때까지 환자를 면밀하게 모니터하고 평가해야 한다. 중증 주입관련반응이 발생한 경우에는 이 약의 투여를 영구 중단해야 한다. 반응의 중증도 및 이상사례에 따라 투여한 치료법을 기반으로 임상적 평가를 해야 한다. 이 약에 대해 주입관련반응으로 인한 치명적인 결과는 관찰되지 않았지만, 퍼투주맙 정맥주사와 트라스투주맙 정맥투여 및 화학요법 병용투여에서 치명적인 주입관련반응이 연관되어 있었으므로 주의를 기울여야 한다. 3) 발열성 호중구감소증: 이 약은 화학요법에 의한 호중구감소증을 악화시킬 수 있다. 무작위 배정된 통제된 임상시험에서 3-4 등급의 호중구 감소증 및 발열성 호중구 감소증이 화학요법군 대비 화학요법과 트라스투주맙을 투여받은 군에서 높게 발생하였다. 패혈증성 사망 발생비율은 두 군간 차이를 보이지 않았다. 4) 과민반응/아나필락시스: 과민반응에 대해 환자를 면밀히 관찰한다. 이 약에 대해 아나필락시스 및 치명적인 결과를 포함한 중증의 과민반응이 관찰되지 않았지만, 퍼투주맙과 트라스투주맙 정맥투여 및 화학요법 병용투여에서 이러한 중증 과민반응이 연관되어 있었으므로 주의를 기울여야 한다.(3.약물이상반응 항 참고) 응급장치뿐만 아니라 이러한 반응을 치료하기 위한 약물 처치가 즉시 가능해야 한다. 이 약 또는 이 약의 구성성분에 과민반응이 알려진 환자에게 이 약을 투여하지 않는다. 5) 폐이상사례: 드물게 중증 폐이상사례가 트라스투주맙의 시판후 조사에서 보고되었으므로 이 약 투여 시 주의한다. 이는 때때로 치명적일 수도 있다. 이러한 이상사례로 폐침윤을 포함한 간질성 폐질환, 급성 호흡곤란 증후군, 폐렴, 간질성 폐렴, 흉막 삼출, 호흡곤란, 급성 폐부종 및 호흡부전 등이 보고되었다. 간질성 폐질환과 연관된 위험 요소로는 탁산계 약물, 젬시타빈, 비노렐빈, 방사선 요법과 같이 이러한 질환과 연관이 있는 것으로 알려진 여타의 항종양약물 요법을 이전에 투여 받았거나 동시에 투여하는 경우가 있다. 이는 주입관련 이상사례의 일부분이거나 지연형 이상사례와 함께 나타날 수 있다. 전이성 악성종양과 그에 따른 합병증의 발병으로 인해 안정 시 호흡곤란을 나타내는 환자는 폐질환의 위험성이 증가할 수 있다. 따라서 이러한 환자에 이 약을 투여하지 않는다. 폐렴환자, 특히 탁산계 약물을 병용 투여하는 경우 주의해야 한다. **2. 다음 환자에는 투여하지 말 것** 1) 이 약의 구성성분에 과민반응이 알려진 환자

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[안전성 정보[1]] 임상시험에서 가장 빈번하게 보고된 이상반응은 호중구 감소증이었으며, 주기적인 혈액검사가 필요합니다. 호중구 감소 증과 관련된 자세한 용량 조절 정보는 제품설명서를 참고해주세요.

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A Decade of Palbociclib and the Next Chapter in HR+ mBC

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The introduction of cyclin-dependent kinase 4 and 6 (CDK4/6) inhibitors has fundamentally transformed the treatment landscape of hormone receptor–positive (HR+), human epidermal growth factor receptor 2–negative (HER2–) metastatic breast cancer (mBC). Among these agents, palbociclib was the first-in-class CDK4/6 inhibitor to demonstrate significant clinical benefit in combination with endocrine therapy. Over the past decade, multiple pivotal trials and real-world studies have established its efficacy and safety profile, while ongoing investigations continue to refine its optimal use and explore novel combination strategies.

We reviewed key clinical evidence from randomized phase 2 and 3 trials, including PALOMA-1, PALOMA-2, and PALOMA-3, as well as subsequent analyses and long-term follow-up data. Additional insights were obtained from the PARSIFAL trial and its extended follow-up (PARSIFAL-LONG), along with real-world data from the Korean nationwide KCSG BR21-15 study. Outcomes of interest included progression-free survival (PFS), overall survival (OS), time to chemotherapy, safety, and treatment durability.

Palbociclib in combination with endocrine therapy consistently demonstrated significant improvements in PFS across multiple lines of therapy. In the first-line setting, PALOMA-2 showed a marked prolongation of median PFS with palbociclib plus letrozole compared to letrozole alone (27.6 vs. 14.5 months; HR 0.56), with sustained benefit observed over extended follow-up. In endocrine-resistant disease, PALOMA-3 demonstrated a significant PFS improvement with palbociclib plus fulvestrant (11.2 vs. 4.6 months; HR 0.50), confirming its efficacy in later-line settings.

Although improvements in OS were observed numerically across studies, statistical significance was not consistently achieved, likely due to confounding effects from subsequent therapies and study design limitations. Nevertheless, long-term follow-up data suggest clinically meaningful survival benefits, with median OS exceeding 50 months in first-line settings and durable responses observed in a subset of patients.

The PARSIFAL trial demonstrated no superiority of fulvestrant over letrozole as an endocrine partner for palbociclib in the first-line setting, while extended follow-up from PARSIFAL-LONG reported a median OS of over 60 months and sustained PFS benefit, reinforcing the long-term efficacy of CDK4/6 inhibition. Real-world data from the KCSG BR21-15 study further supported these findings, demonstrating consistent effectiveness and treatment patterns in routine clinical practice across Korea.

Importantly, palbociclib exhibited a favorable safety profile, characterized primarily by manageable hematologic toxicities such as neutropenia, without evidence of cumulative toxicity over long-term use. Additionally, treatment with palbociclib delayed the need for chemotherapy, contributing to improved quality of life and prolonged endocrine-based disease control.

Over the past decade, palbociclib has established itself as a cornerstone therapy in HR+/HER2– metastatic breast cancer, demonstrating consistent PFS benefit, durable disease control, and a well-characterized safety profile. While OS benefit remains modest and context-dependent, long-term data and real-world evidence support its continued clinical value. Emerging combination strategies, including integration with PI3K inhibitors and HER2-targeted therapies, represent the next chapter in optimizing treatment outcomes. Continued research is warranted to identify predictive biomarkers and refine patient selection to maximize the therapeutic potential of CDK4/6 inhibition.

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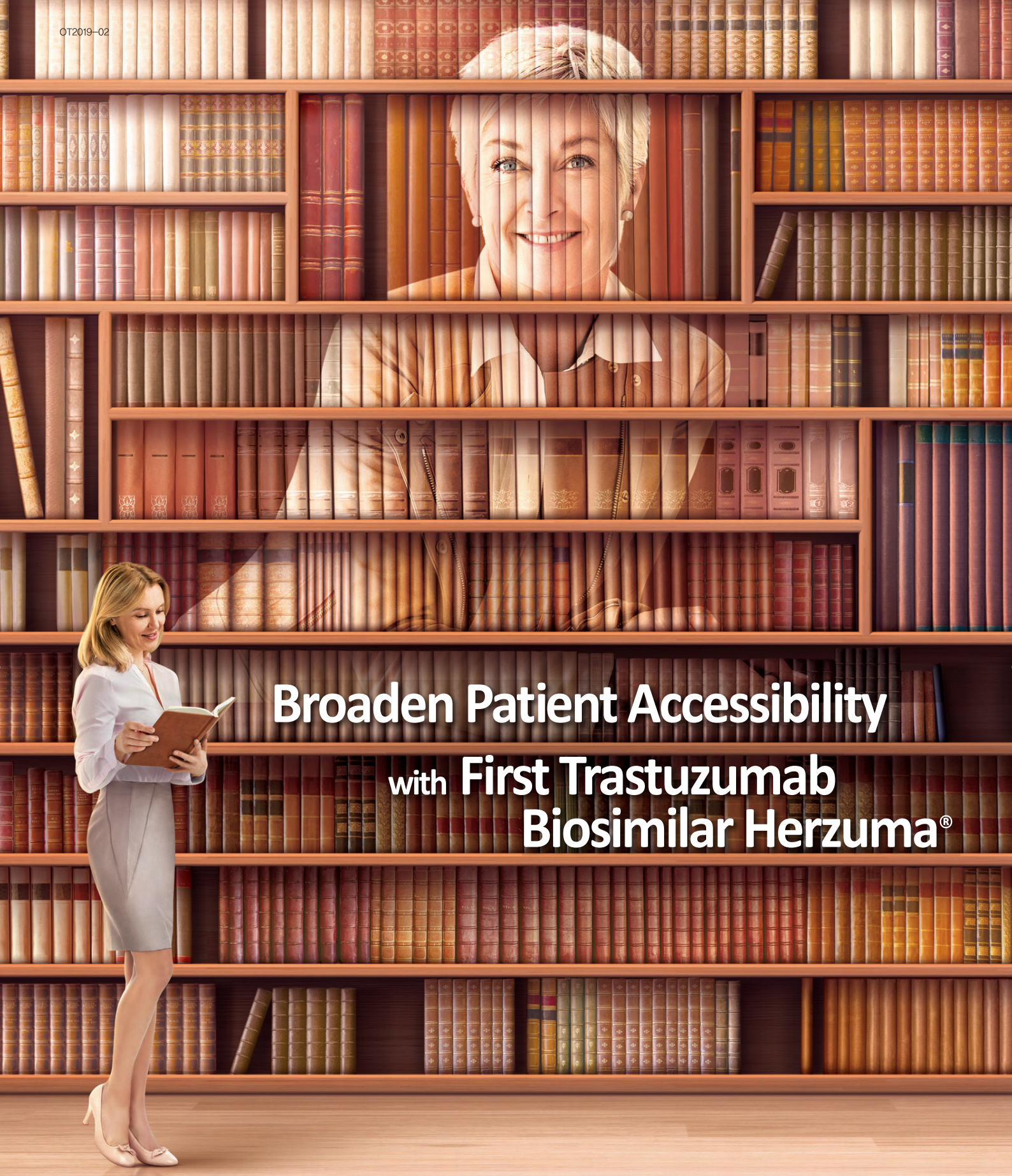

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*CMF, Cyclophosphamide / Methotrexate / Fluorouracil

[1]**Study summary:** An open-label, randomized controlled pilot study to evaluate the safety and efficacy of leuprorelin 11.25mg subcutaneously administered every-3-months for 2 versus 3 or more, up to 5 years, together with daily tamoxifen for 5 years in premenopausal endocrine-responsive breast cancer patients. Primary endpoints were disease-free survival (DFS) and safety. Adjuvant leuprorelin treatment for 3 or more years with tamoxifen showed a survival benefit and safety profile similar to that for 2 years in premenopausal endocrine-responsive breast cancer patients.

[2]**Study summary:** A randomized phase III trial was performed to compare the Leuplin 3 month (n=299) and chemotherapy with CMF (n=300) in pre- or perimenopausal patients with ER-positive, node-positive breast cancer. The primary study objective was to compare RFS between both treatment groups. With a median follow-up of 5.8 years, recurrence-free survival was similar for patients treated with Leuplin 3M or CMF (hazard ratio [HR], 1.19; 95% CI, 0.94 to 1.51; P=0.15) Chemotherapy-related adverse effects were more common with CMF, whereas symptoms of estrogen suppression were initially more pronounced with Leuplin 3M.

[4]**Study summary:** A crossover trial was conducted to compare patient comfort and tolerability between two commonly used LH-RH analogues: goserelin acetate and leuprorelin acetate. A total of 50 patients were randomised into two groups, each receiving 6-monthly injections of leuprorelin acetate (a liquid presentation) and goserelin acetate (a depot pellet) and crossing over between treatments. Patients completed a simple visual analogue score for the discomfort felt from the injections. An analysis of variance model was used, and the results found that patients do tolerate leuprorelin acetate (0.589) better than goserelin acetate (1.343) (P <0.001).

References. 1. Shiba E, *et al.* A randomized controlled study evaluating safety and efficacy of leuprorelin acetate every-3-months depot for 2 versus 3 or more years with tamoxifen for 5 years as adjuvant in premenopausal patients with endocrine-responsive breast cancer. *Breast Cancer.* 2016 May;23(3):499-509. **2.** Schmid P, *et al.* Leuprorelin Acetate Every-3-Months Depot Versus Cyclophosphamide, Methotrexate and Fluorouracil As Adjuvant Treatment in Premenopausal Patients With Node-Positive Breast Cancer : The TABLE Study. *J Clin Oncol.* 2007 Jun 20;25(18):2509-15. **3.** Okada H. One-and three-month release injectable microspheres of the LH-RH super agonist leuprorelin acetate. *Adv Drug Deliv Rev.* 1997 Oct 13;28(1):43-70. **4.** Williams G et al. Randomised crossover trial to assess the tolerability of LHRH analogue administration. *Prostate Cancer Prostatic Dis.* 2003;6(2):187-9.

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* OFS : Ovarian Function Suppression, TAM : Tamoxifen, DFS : Disease Free Survival

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REFERENCES 1. KIM, Hyun-Ah, et al. Adding ovarian suppression to tamoxifen for premenopausal breast cancer: a randomized phase III trial. Journal of Clinical Oncology , 2020, 38.5: 434-443.

PRODUCT INFORMATION

전문의약품

졸라덱스데포주사(고세렐린아세트산염) [성분·함량] 이 약 1 프리필드실린지 (18.0 mg) 중 유효성분: 고세렐린아세트산염 (별규) 3.78 mg (고세렐린으로서 3.6 mg), 첨가제: 락타이드/글리콜라이드공중합체18.0 mg 프리필드시린지 **[성상]** 1회용 실린지 어프리케이터 속에 살균된 흰색-미황색의 원주형 데포가 들어있으며 이 속에 고세렐린아세트산염(고세렐린으로서 3.6mg)이 생체내에서 분해되는 매트릭스에 분산되어 있다. **[효능·효과]** 1. 호르몬요법이 적합한 전립선암 2. 호르몬요법이 적합한 폐경기전 및 주폐경기 여성의 진행성 유방암 3. 조기유방암의 보조요법: 에스트로겐 수용체(ER) 양성인 폐경기전 및 주폐경기 여성의 조기 유방암에 대한 표준 화학 요법의 대체요법 4. 자궁내막증 5. 자궁내막조직의 퇴축: 자궁내막 제거나 절제 전에 자궁내막을 얇게 함을 목적으로 투여함 6. 자궁근종: 자궁근종을 가진 빈혈환자에서 수술 전 철분요법과 병행하여 환자의 혈액상태를 개선함을 목적으로 투여함 7. 보조생식술: 배란촉진 과정 시 뇌하수체 억제 목적 **[용법·용량]** 성인: 고세렐린으로서 3.6 mg을 28 일 간격으로 전방복벽에 피하주사한다. 신장애, 간장애 환자나 고령자의 경우에도 용량을 조절할 필요는 없다. 1. 전립선암, 유방암: 호르몬요법이 적합한 전립선암 또는 유방암의 관리에 고세렐린으로서 3.6 mg 1 데포를 28 일마다 전방복벽에 피하주사한다. 국소진행 전립선암에 있어서 방사선요법과 병용하는 보조 호르몬요법의 경우 36 개월로 사용이 제한된다. 2. 자궁내막증: 자궁내막증을 이 약으로서 6 개월 이상 치료한 임상자료가 없으므로 치료기간은 6 개월 이하가 되도록 한다. 뼈 무기질 밀도 감소의 우려가 있으므로 반복적인 치료는 하지 않도록 한다. 이 약 투여 시 호르몬 대체요법(에스트로겐 및 프로게스테론 제제)을 병행하면 뼈 무기질 밀도 감소 및 혈관운동성 증상이 감소된다. 3. 자궁내막조직의 퇴축: 자궁내막의 퇴축을 목적으로 투여할 때는 4 주 또는 8 주간 치료한다. 자궁의 크기가 큰 환자에게 투여 시 또는 적당한 수술 일정을 결정하기 위해서 2 번째 데포를 투여할 수 있다. 4. 자궁근종: 자궁근종에 의한 빈혈이 있는 여성에게는 고세렐린으로서 3.6 mg 에 철분을 보충하여 수술 전 3 개월까지 투여할 수 있다. 5. 보조생식술: 에스트라디올 농도가 초기 황체기 수준이(약 150 pmol/L) 되도록 뇌하수체를 억제하기 위해 고세렐린으로서 3.6 mg 1 데포를 투여한다. 이는 7~21 일 사이에 일어난다. 뇌하수체가 억제되면 생식샘 자극호르몬(gonadotrophin)으로 배란을 촉진시킨다. 이 약에 의한 뇌하수체 억제는 일정하여 일부 경우, 성선자극호르몬 요구량이 증가될 수 있다. 적당한 시기의 황체기에 성선자극호르몬을 중지하고 사람융모 성생식샘자극호르몬(h-CG)을 투여하여 배란시킨다. 치료관찰 난자 회수 및 임신기법은 각 병원의 일반적 방법에 따른다. **[사용상의 주의사항]** 1. 경고 전이성 척추 손상(metastatic vertebral lesion)이나 요로폐쇄증을 수반한 환자는 치료 초기 몇 주 동안 세심하게 관찰하여야 한다. 2. 다음 환자에는 투여하지 말 것. 1) 이 약의 성분 및 LHRH 유사약물에 대하여 과민반응 환자 2) 임부 및 수유부 3) 호르몬 비의존성 전립선암 환자 4) 양쪽 고환 절제술을 받은 후, 이 약에 의해 더 이상 테스토스테론의 감소를 기대할 수 없는 환자 5) 원인 불명의 질 출혈 환자 6) 소아 7) 진단된 뇌하수체 샘종 환자 3. 다음 환자에는 신중히 투여할 것 1. 조생식술의 경우: 다낭포성 난소 환자 (문헌개정연월일: 2020년8월5일)a ZOL20200924 ※ 보다 자세한 졸라덱스데포주사(고세렐린아세트산염) 제품 정보는 QR 코드 또는 식품의약품안전처 의약품통합정보시스템(https://nedrug.mfds.go.kr)을 통해 확인하여 주시기 바랍니다. ZOL20200924

PRODUCT INFORMATION

전문의약품

아리미덱스 정(아나스트로졸) Arimidex tablet (Anastrozole) [성분·함량] 1정(약 103mg)중 주성분 : 아나스트로졸 (별규) 1.0mg **[성상]** 백색의 원형 필름코팅정 **[효능·효과]** 1. 폐경기 이후 여성의 진행성 유방암의 치료(이 요법 이전의 타목시펜 치료시 임상반응을 나타내지 않는 에스트로겐 수용체 음성인 환자에서, 이 약의 유효성은 입증되지 않았다.) 2. 호르몬 수용체 양성인 폐경기 이후 여성의 조기 유방암의 보조 치료 조기 유방암의 보조 요법으로 2~3 년간 타목시펜을 투여 받아온 호르몬 수용체 양성인 폐경기 이후 여성 환자의 조기 유방암의 보조 치료 **[용법·용량]** 성인: 아나스트로졸로서 1일 1회 1mg을 경구투여한다. ○ 소아 : 18세 이하 소아에게는 투여하지 않는다. 신장애 환자 : 경증 또는 중등도의 신장애 환자는 용량을 변경할 필요가 없다. 중증 신기능장애 환자(크레아티닌청소율이 30 mL/min 이하인 환자)에서는 이 약을 투여하지 않는다. 간장애 환자 : 경증의 간장애 환자는 용량을 변경할 필요가 없다. 중등도 이상의 간장 질환자에서는 이 약을 투여하지 않는다. **[사용상의 주의사항]** 1.경고 1)이 약은 폐경기 이전의 여성에게는 안전성 및 유효성이 입증되지 않았기 때문에 사용하지 않아야 한다. 폐경기 상태가 의심스러운 경우 폐경기 여부를 생화학적으로 확인 하여야 한다. 2)이 약은 중등도 또는 중증의 간장애 및 중증의 신장애 환자(크레아티닌 클리어런스가 30mL/min 이하)에 대해서는 시험되지 않았다. 3)이 약은 순환 에스트로겐을 낮추므로 골무기질 밀도를 감소시켜서 골절의 위험을 증가시킬 수 있다. 4)골다공증 및 골다공증 위험이 있는 환자에게 치료 시작 및 그 후 일정한 간격으로 골밀도에 대하여 시험(예. DEXA scanning)하여야 한다. 골다공증 치료 및 예방법이 적절하게 시행되어야 하고 주의 깊게 모니터링 해야 한다. 2.다음의 환자에는 투여하지 말 것. 1)폐경기 이전의 여성 2)임부 또는 임신하고 있을 가능성이 있는 여성, 수유부 3)중증의 신장애 환자 (크레아티닌청소율이 30mL/min 이하인 환자) 4)중등도 이상의 간장애 환자 5)이 약 또는 이 약의 구성성분에 과민반응이 있다고 알려진 환자 6)타목시펜 병용투여 환자 또는 에스트로겐을 함유하는 요법중인 환자(이 약의 약리작용을 감소시키기 때문에 병용해서는 안된다) 7)이 약은 락토오스를 포함하고 있다. 드물게 나타나는 갈락토오스 불내성(galactose intolerance), Lapp유당분해효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토스 흡수장애(glucose-galactose malabsorption) 등의 유전적인 문제가 있는 환자에게는 투여하면 안 된다. **[저장방법]** 밀폐용기, 30℃ 미만에서 보관 **[포장단위]** 28 정(14 정/PTP×2) ※ 만약 구입시 사용기한이 경과되었거나 변질, 변패 또는 오손된 제품인 경우에는 구입처를 통하여 교환하여 드리며, 공정거래위원회 고시 "소비자분쟁해결기준"에 의거 소비자의 정당한 피해는 보상하여 드립니다. 의약품 부작용 발생 시 한국의약품안전관리원에 피해구제를 신청하실 수 있습니다(피해구제 상담 번호 14-3330, 의약품 부작용 신고/피해구제 상담 번호 1644-6223). aARI20210721

PRODUCT INFORMATION

Nolvadex tamoxifen 놀바덱스정, 놀바덱스디정 (타목시펜시트르산염) Nolvadex Tablets, Nolvadex-D Tablets

[원료약품의 분량] 놀바덱스정: 1정 (184mg) 중 유효성분: 타목시펜시트르산염(별규) 15.2mg (타목시펜베이스로서 10mg) 놀바덱스디정: 1정 (368mg) 중 유효성분: 타목시펜시트르산염(별규) 30.4mg (타목시펜베이스로서 20mg) 첨가제: 유당수화물(동물유래성분, 기원동물:소, 사용부위:우유), 산화티탄, 스테아르산마그네슘, 옥수수전분, 젤라틴, 크로스카르멜로오스나트륨A형, 폴리에틸렌글리콜300, 히프로멜로오스 **[성 상]** 놀바덱스정: 백색의 원형필름코팅정 놀바덱스디정: 백색 내지 회백색의 팔각형정제 **[효능 · 효과]** 유방암 **[용법 · 용량]** 타목시펜으로서 성인 1일 20~40mg을 2회(아침, 저녁)로 분할하여 경구투여 한다. 증상에 따라 적절히 증감한다. **[사용상의 주의사항]** 1. 다음 환자에는 투여하지 말 것. 1) 임부 또는 임신하고 있을 가능성이 있는 여성(임부에 대한 투여 참조) 2) 이 약 및 이 약의 구성성분에 과민반응 환자 3) 아나스트로졸 병용투여 환자 4) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해효소 결핍증(lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galactose malabsorption)등의 유전적인 문제가 있는 환자에게는 투여하면 안 된다. 2. 다음 환자에는 신중히 투여할 것. 백혈구 감소 또는 혈소판 감소 환자 수입자: 한 국 아 스 트 라 제 네 카 문헌개정연월일 : 2024 년 9 월 23 일 수입자 : 한국아스트라제네카 ※보다 자세한 사항은 제품설명서 전문을 참고하시기 바랍니다 . aNOL20240930

KR-19756 | Exp. 2027-05 (Prep. 2025-05)

AstraZeneca **[수입자] 한국아스트라제네카** 서울시 강남구 영동대로 517 아셈타워 21 층 **전화:** (02) 2188-0800 **[공동판매자] 알보젠코리아주식회사** 서울시 영등포구 국제금융로 10 21FC 13층 **소비자상담번호:** 02-2047-7700 Alvogen

의료전문가용

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**TAC: 75 mg/m^2 docetaxel plus 50 mg/m^2 doxorubicin plus 500 mg/m^2 cyclophosphamide on day 1 every 3 weeks.
#ANC: absolute neutrophil count.

GCBP-NLPG-KR00241115-BL-1 (exp. 20261115)

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ref. 1) Lee KH,et al. Support Care Cancer 2016;24:1709-17

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(letrozole) 2.5mg tablets

타이커브정(라파티닙디토실레이트) 전문의약품

[주성분] 라파티닙디토실레이트 **[효능·효과]**1. HER2(Human Epidermal growth factor Receptor 2 protein, 이명 : ErbB2)가 과발현 되어 있고, 이전에 안트라사이클린계 약물, 탁산계 약물, 트라스투주맙을 포함하는 치료를 받은 적이 있는 진행성 또는 전이성 유방암 환자의 치료에 카페시타빈과 병용 투여 (유의사항 : 전이성 유방암 환자는 트라스투주맙의 치료 후 진행한 경우에 사용) 2. 호르몬 수용체가 음성이고 HER2가 과발현 되어 있는 전이성 유방암 환자로, 이전에 트라스투주맙과 화학요법의 병용 투여를 받고 진행된 환자의 치료에 트라스투주맙과 병용 투여 3. 호르몬 수용체 양성이고 HER2가 과발현 되어 있는 전이성 유방암인 폐경 후 여성 환자로, 현재 화학요법이 계획되지 않은 환자의 치료에 아로마타제 저해제와 병용 투여 **[용법용량]**1. 권장 용법, 용량라파티닙은 1일 용량을 나누어 투여하는 것은 권장되지 않는다. 라파티닙은 최소 식사 1시간 전 또는 최소 식사 1시간 후에 복용하여야 한다. 복용을 잊은 경우에 다음날 2배의 용량을 투여해서는 안 된다. 질환 진행 또는 수용불가한 독성이 발생할 때까지 이 약 투여를 지속한다. 카페시타빈과 병용 투여: 21일을 주기로 1일~21일째에 라파티닙 1,250mg(이 약 5정)을 1일 1회 투여하고, 1일~14일째에는 카페시타빈 2,000mg/m^2/일(약 12시간 간격으로 1일 2회 경구 투여)을 병용 투여한다. 카페시타빈은 식사 후 30분 이내에 투여한다. 트라스투주맙과 병용투여: 라파티닙 1,000mg(이 약 4정)을 1일 1회 지속적으로 투여한다. 정맥투여(IV) 부하 용량으로, 트라스투주맙을 4mg/kg을 투여한 후 매주 2mg/kg을 정맥투여(IV)한다. 아로마타제 저해제와 병용 투여: 라파티닙 1,500mg(이 약 6정)을 1일 1회 지속적으로 투여한다. 병용 투여하는 아로마타제 저해제의 용법용량은 각 약물의 허가사항을 참고한다. 2. 용량 조절 지침 이상반응에 따라 이 약 투여의 일시중단, 용량감소, 또는 영구중단이 필요할 수 있다. 심장 관련 : 좌심실 박출률 감소가 미국 국립 암학회(National Cancer Institute, NCI)의 이상반응 표준 용어 기준(Common Terminology Criteria for Adverse Events, CTCAE) 3등급 이상이거나 좌심실 박출률이 해당 의료 기관에서 정한 정상 하한치 미만으로 떨어진 환자에서는 이 약의 투여를 중단하여야 한다. 좌심실 박출률이 정상으로 회복되고 환자가 관련 증상을 보이지 않는 경우 최소 2주 후에 감소된 용량(트라스투주맙과 병용 투여 시 750mg/일, 카페시타빈과 병용 투여 시 1,000mg/일, 아로마타제 저해제와 병용 투여 시 1,250mg/일)으로 이 약 투여를 재개할 수 있다. 간장애 : 간 기능 변화가 중증인 환자의 경우 이 약의 투여를 중단해야 하며 환자에게 재투여 해서는 안 된다. 중등증 또는 중증 간장애 환자에서는 이 약에 대한 노출이 증가될 수 있으므로 주의하여 투여해야 한다. 강력한 CYP3A4 저해제와의 병용 투여 : 이 약을 강력한 CYP3A4 저해제(예, 케토코나졸, 이트라코나졸, 클래리트로마이신, 아타자나비어, 인디나비어, 네파조돈, 넬피나비어, 리토나비어, 사퀴나비어, 텔리트로마이신, 보리코나졸)와 병용 투여하는 것은 피해야 한다. 자몽도 라파티닙의 혈장 농도를 증가시킬 수 있으므로 피해야 한다. 강력한 CYP3A4 유도제와의 병용 투여 : 이 약을 강력한 CYP3A4 유도제(예, 덱사메타손, 페니토인, 카르바마제핀, 리팜핀, 리파부틴, 리파펜틴, 페노바르비탈, 세인트 존스 워트)와 병용 투여하는 것은 피해야 한다. 간질성 폐질환/폐렴: NCI CTCAE 3등급 이상의 폐 증상이 있는 환자에서는 이 약 투여를 중단해야 한다. 기타 독성: NCI CTCAE에서 정하는 2등급 이상의 독성을 나타내는 환자의 경우 이 약 투여의 중단 또는 일시 중단을 고려할 수 있고, 독성이 1등급 이하로 개선되면 트라스투주맙과 병용 투여 시 1,000mg/일, 카페시타빈과 병용 투여 시 1,250mg/일, 아로마타제 저해제와 병용 투여 시 1,500mg/일 용량으로 투여를 재개할 수 있다. 독성이 재발하면 좀더 낮은 용량(트라스투주맙과 병용 투여 시 750mg/일, 카페시타빈과 병용 투여 시 1,000mg/일, 아로마타제 저해제와 병용 투여 시 1,250mg/일)으로 이 약 투여를 재개한다. **[경고]** 간독성이 임상시험 및 시판 후 경험에서 관찰되었다. 간독성은 중증일 수 있으며 사망이 보고 되었으나 이 약이 사망의 원인인지는 불명확하다. **[다음 환자에게는 투여하지 말 것]** 이 약 또는 이 약 성분에 과민증이 있는 환자 **[다음 환자에게는 신중히 투여할 것]** 1) 이 약 투여시 좌심실 기능 부전이 일어날 수 있는 상태인 환자 2) 중증 간장애 환자 **[최신 제품정보 개정일]** 2017.04.21

※ 처방하시기 전, 상세 제품정보를 참조하시기 바랍니다.

페마라정(레트로졸) 전문의약품

[주성분]레트로졸 **[효능효과]** 1. 에스트로겐 또는 프로게스테론 수용체 양성이거나 또는 수용체 상태가 알려지지 않은 폐경후 여성의 국소적으로 진전된 또는 전이성 유방암에서 1차 치료 2. 항에스트로겐 요법후 재발된 자연적 또는 인공적으로 폐경이 된 여성의 진전된 유방암 3. 에스트로겐 또는 프로게스테론 수용체 양성이거나 또는 수용체 상태가 알려지지 않은 폐경후 여성의 침습성 조기 유방암에서 5년동안 타목시펜 보조요법 이후 연장 보조요법 4. 호르몬수용체 양성인 폐경후 여성의 침습성 조기 유방암에서의 보조요법 **[용법용량]** ○ 성인 및 고령자 : 권장용량은 식사와 상관없이 레트로졸로서 1일 1회 2.5 mg을 경구투여한다. 복용을 잊은 경우, 생각난 즉시 복용한다. 하지만 다음 복용시간에 가까운 경우는 복용을 생략하고 정해진 스케줄대로 복용한다. 권장용량인 2.5 mg를 넘지 않도록 두배용량을 복용해서는 안된다. 전이성 질환 환자인 경우에는 암의 진행이 확인될 때까지 투여를 계속한다. 보조요법 및 타목시펜 보조요법 이후의 연장보조요법의 경우 5년 동안 투여할 수 있으며, 투여 중 암이 재발하면 투약을 중지한다 (타목시펜 보조요법 이후의 연장보조요법의 경우, 장기간 투여와 관련한 최적의 치료기간은 확립되어있지 않다.). ○ 간장애 환자 : 간경변으로 인한 중등도의 간기능저하를 갖고 있는 환자에서 이 약의 혈액농도가 약간 증가하나 경증 ~ 중등도 간기능저하 환자의 경우 용량조절은 필요하지 않다. 그러나 중증의 간기능장애 환자 (Child-Pugh score C)에게 이 약을 사용할 경우 지속적이고 세심한 감독이 이루어져야 한다. ○ 신장애 환자 : 크레아티닌청소율 10 mL/min 이상인 신장애 환자에 대한 용량조절은 필요하지 않다. **[다음 환자에게는 투여하지 말 것]** 1) 이 약 또는 이 약의 구성성분에 대한 과민반응이 있는 환자 2) 폐경 전 내분비 상태인 여성 3) 임부 또는 임신하고 있을 가능성이 있는 여성, 수유부 **[다음 환자에는 신중히 투여할 것]** 1) 크레아티닌청소율이 10 mL/min미만인 여성 환자 (이러한 환자에 대한 연구는 시행되지 않았으므로 이 약 치료의 잠재적 유익성 및 위험성을 투여 전에 신중히 고려해야 한다.) 2) 중증 간기능장애 환자 (Child-Pugh score C) (투여시 전신노출 및 소실반감기가 건강한 사람에 비하여 약 두 배정도 증가하는 것으로 나타났으므로 이러한 환자에서는 치료적 유익성이 위험성을 상회하는 경우에 한하여 용량을 감량하여 세심한 관찰 하에 투여하는 것이 권장된다. 반복투여에 대한 임상경험은 없다.) 3) 골다공증 병력 환자 그리고/또는 골절, 골다공증 위험이 높은 환자 (이 약은 강력하게 에스트로겐을 저하시키기 때문에, 골밀도 저하를 일으키는 것이 예측된다. 특히 보조요법 (연장 보조요법 포함)으로 장기간 투여 시 골다공증 환자 또는 골다공증 위험이 높은 여성 환자는 정기적으로 골밀도 검사 (예, DEXA scanning)를 실시하며, 골다공증에 대한 적절한 예방 및 치료를 시작하고 주의 깊게 관찰한다.) 4) 폐경이 확실하지 않은 환자 (이 약을 복용하기 전에 황체형성호르몬 (LH)와 난포자극호르몬 (FSH) 그리고/또는 에스트라디올 수치를 측정해야한다. 폐경 후 내분비 상태인 것으로 확인된 여성만 이 약을 복용해야 한다.) **[최신 제품정보 개정일]** 2017.08.02

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Mini Oral Presentation

Go Beyond Cure of Breast Cancer

Elucidating the Roles of intra-tumoral macrophage subtypes that Drive Immune Exclusion in Triple-negative Breast Cancer

Byung-Kwan Jeong[1], Sowon Choi[2], Minsik Oh[3], Hyun Je Kim[2], Hee Jin Lee[1]

[1]ASAN Medical Center, Department of Pathology, Korea, [2]Seoul National Univ., Department of Biomedical Sciences, Korea, [3]Myongji Univ., Department of School of Software Convergence, Korea

Background: High stromal tumor-infiltrating lymphocytes (sTILs) predict favorable outcomes in triple-negative breast cancer (TNBC). We aimed to elucidate the metabolic and spatial mechanisms distinguishing TIL-high from TIL-low environments.

Methods: We performed single-cell resolution spatial transcriptomics (Xenium 5K) on 21 treatment-nave TNBC samples using tissue microarray, categorized into TIL-high (≥ 60%) and TIL-low (≤ 10%) groups. Spatial domains and cellular neighborhoods were identified using SCIMAP.

Result: TIL-low tumors exhibited a decrease in plasma cell-rich (domain 5) and T-cell (domain 11) niches, with a concomitant increase in CAF-rich niches (domain 1). We identified a specific macrophage subtype, MC2(LDHA-high/PLAUR-high), enriched in the tumor center (domain 9) and edge (domain 0). In TIL-low tumors, MC2 cells in the tumor center (MC2-TC) demonstrated significantly elevated expression of hypoxia and glycolysis-associated genes (HK2, ADM, PLAUR), with an upward trend in SLC2A1 and CA9 ($p = 0.079$ and $p = 0.097$, respectively). In contrast, while cancer cells upregulated CA9, their expression of glycolytic genes (HK2, SLC2A1) remained unchanged. Notably, the hypoxic score of MC2-TC correlated strongly with the depletion of CXCL13+ follicular helper T cells (Tfh) and CD8+ T cells (R = -0.58 and R = -0.46, respectively), and was associated with reduced plasma cell proportions (R = -0.25). Conversely, in TIL-high tumors, MC2-TC demonstrated higher IFN-stimulated gene levels (CXCL9, GBP5), fostering an environment conducive to lymphocyte infiltration.

Conclusions: Metabolic reprogramming of MC2 macrophages, rather than tumor cells, appears to dictate immune exclusion in TNBC. Hypoxic MC2 cells create a metabolic barrier through glucose competition, selectively exhausting CXCL13+ Tfh cells and subsequently collapsing the plasma cell niche. Targeting the metabolic reprogramming of these macrophages represents a promising strategy to transform 'cold' TNBC into 'hot' tumors.

Mini Oral Presentation

Stromal Extracellular Matrix (ECM) Remodeling Drives Aggressive Biology in Young Women with Breast Cancer: Identifying New Therapeutic Targets for an Underserved Population

Lohita Krishna Kanyadhara[1], Aruna Korlimarla[2], Hari P S[2], Guruguhan S[2], Ashitha N N[2], Durgadevi Veeraiyyan[2], Keerthi Shetty[2], Megha Sarvottama[2], Srinath B S[1]

[1]Sri Shankara Cancer Hospital and Research Centre, Department of Surgical Oncology, India, [2]Sri Shankara Cancer Hospital and Research Centre, Department of Molecular Oncology, India

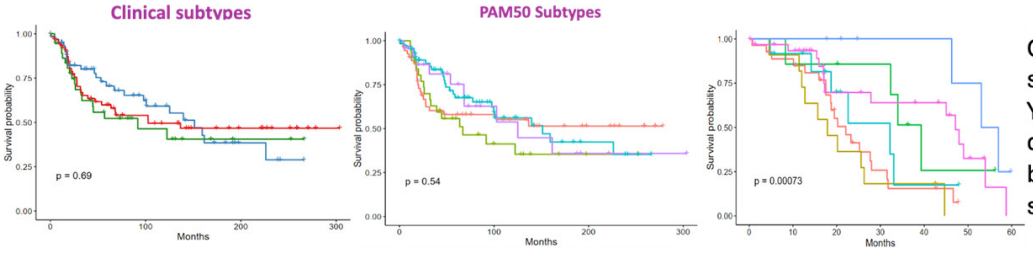
Background: Young onset breast cancer (YOBC, age < 40 years) demonstrates aggressive clinical behavior with higher rates of locally advanced disease, hormone receptor negativity, higher tumor grades, and significantly worse survival independent of molecular subtype, rendering current subtype-driven therapies insufficient. Despite aggressive treatment, young patients experience higher recurrence and mortality. The biological mechanisms underlying this age-related aggressiveness remain poorly understood, representing a critical unmet clinical need.

Methods: We performed comprehensive molecular profiling of 218 YOBC and 1,601 late-onset breast cancer (LOBC) cases from TCGA and METABRIC datasets. Non-negative matrix factorization identified molecular clusters. In a retrospective analysis of uniformly treated patients at our center, we validated differentially expressed genes by RT-qPCR and immunohistochemistry (n = 87), and prospectively through patient-derived primary cultures with separate tumor epithelial and stromal compartments.

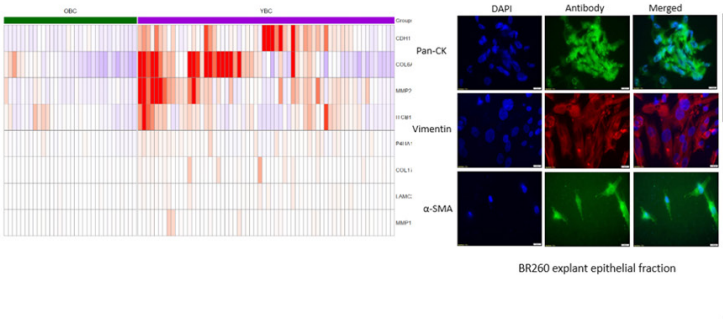
Result: YOBC demonstrated significantly worse disease-free survival independent of subtype ($p < 0.05$). A distinct molecular cluster characterized by extracellular matrix (ECM) organization and integrin signaling emerged. In our institutional cohort, differential expression analysis revealed striking upregulation of ECM genes in YOBC versus LOBC, including collagens (COL6A1, COL4A1), laminins (LAMA1), and ECM regulators. Immunohistochemistry validation (n = 36) demonstrated significantly higher COL6A1 expression at the invasive tumor edge in YOBC stromal compartments ($p = 0.009$), with complete absence in epithelial cells. Patient-derived cultures confirmed differential ECM expression ($p = 0.06$). Independent validation in treatment-naive samples (10,772 cases) confirmed concurrent upregulation of ECM synthesis and degradation pathways, establishing active ECM remodeling as intrinsic age-dependent biology.

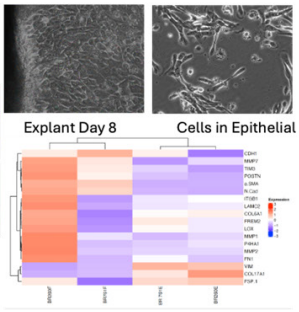
Conclusions: Stromal ECM remodeling represents a novel, age-specific biological mechanism underlying YOBC aggressiveness. The stromal localization identifies ECM components as druggable targets including lysyl oxidase inhibitors, integrin-blocking antibodies, MMP inhibitors, and anti-fibrotic agents. COL6A1 offers potential as a stromal biomarker for risk stratification. These findings provide rationale for prospective trials evaluating ECM-targeted agents specifically for young women with breast cancer, addressing a critical unmet need in this high-risk population.

Mini Oral Presentation



Clinical and PAM50 subtypes in the YOBC category do not dissect biology- NMF subtypes do.





ECM signature significantly different in YOBC and LOBC. Primary cultures of breast tumours seperatedd into non-epithelial component in culture shows enhanced CAF

Mini Oral Presentation

Predicting pCR in Breast Cancer via Integrated ctDNA and AI-based TIL Analysis

Eun Young Kim[1], Jiyeong Kim[2], Minjung Kwon[3], In Gu Do[4], Seoung Wan Chae[4]

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Background: This study evaluated the predictive value of circulating tumor DNA (ctDNA) dynamics and AI-based tumor-infiltrating lymphocytes (TIL) analysis for determining pathologic complete response (pCR) in breast cancer patients receiving neoadjuvant chemotherapy (NAC).

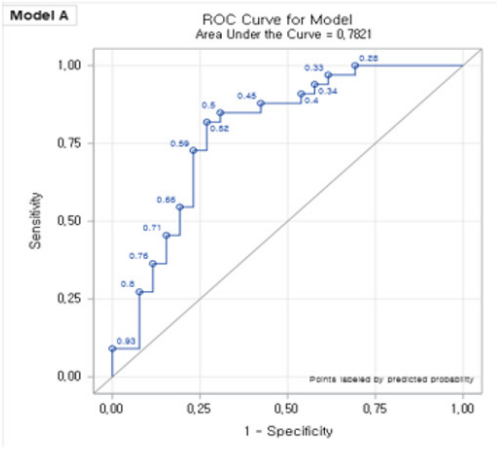
Methods: We prospectively enrolled 103 patients, analyzing core needle biopsy images scanned using an Aperio GT-450 scanner at 0.26 m per pixel for TIL. TIL was computed by counting lymphocytes located in stromal or intratumoral compartments. Plasma samples (pre- and post-NAC) were collected via a 47-gene customized duplex sequencing panel. pCR was defined as absence of invasive cancer only (ypT0/Tis). Statistical analyses were performed using SAS Enterprise Guide 8.4 (SAS Institute Inc., Cary, NC, USA) and R version 4.5.2 (R Foundation for Statistical Computing, Vienna, Austria). A p-value of < 0.05 was considered statistically significant.

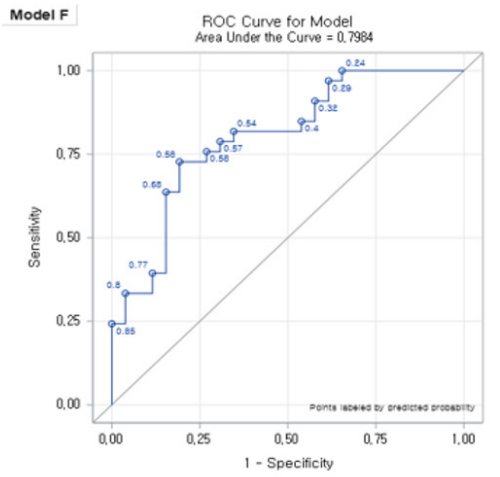
Result: The pCR rate was 39.8%. Baseline ctDNA (T0) detection nor post-NAC ctDNA (T1) detection showed no statistically significant correlation with pCR status ($p > 0.05$). Multivariable logistic regression analysis was performed to evaluate the predictive value of clinical factors, TILs, ctDNA dynamics for pCR. The baseline model (Model A), which included age, clinical stage, and subtype, yielded an AUC of 0.782. The comprehensive model integrating clinical factors, pre-NAC stromal TILs (esTILs), and ctDNA dynamics (Model F) demonstrated the highest predictive performance (AUC 0.798). While, ctDNA clearance showed a trend toward a positive association with the outcome (OR 2.37; 95% CI, 0.64-8.86), statistical significance was not reached, likely due to the limited sample size. ctDNA persistence correlated with residual disease. Age was consistently identified as a significant independent predictor across the models (OR 1.071.09, $p < 0.05$).

Conclusions: Incorporate serial ctDNA dynamics and AI-based TILs monitoring into clinical models improves the stratification of treatment response. This multi-modal approach, combining genomic signals and the immune microenvironment, provides a superior framework for guiding personalized therapeutic strategies in breast cancer.

Table 1. Demographic

Characteristic	Total (N=103)	pCR (N=41)	Non-pCR (N=62)	P-value
Age, years				0.139
Median (Range)	50.0 (32.0-73.0)	49.0 (32.0-73.0)	51.0 (35.0-72.0)	
< 50	50 (48.5%)	23 (56.1%)	27 (43.6%)	
≥ 50	53 (51.5%)	18 (43.9%)	35 (56.5%)	
Clinical T Stage				0.439
T1	6 (5.8%)	4 (9.8%)	2 (3.2%)	
T2	60 (58.3%)	24 (58.5%)	36 (58.1%)	
T3	23 (22.3%)	7 (17.1%)	16 (25.8%)	
T4	14 (13.6%)	6 (14.6%)	8 (12.9%)	
Clinical N Stage				0.232
N0	27 (26.2%)	12 (29.3%)	15 (24.2%)	
N1	51 (49.5%)	19 (46.3%)	32 (51.6%)	
N2	14 (13.6%)	8 (19.5%)	6 (9.7%)	
N3	11 (10.7%)	2 (4.9%)	9 (14.5%)	
Histologic type (before)				0.333
Invasive ductal carcinoma	97 (94.2%)	38 (92.7%)	59 (95.2%)	
Invasive lobular carcinoma	4 (3.9%)	1 (2.4%)	3 (4.8%)	
Other type of cancer	1 (1.0%)	1 (2.4%)	-	
DCIS	1 (1.0%)	1 (2.4%)	-	
Histologic Grade				0.440
None	4 (3.9%)	2 (4.9%)	2 (3.2%)	
Grade 1	1 (1.0%)	-	1 (1.6%)	
Grade 2	46 (44.7%)	15 (36.6%)	31 (50.0%)	
Grade 3	52 (50.5%)	24 (58.5%)	28 (45.2%)	
Subtype				0.004
HR+/HER2-	29 (28.2%)	5 (12.2%)	24 (38.7%)	
HR+/HER2+	18 (17.5%)	7 (17.1%)	11 (17.7%)	
HR-/HER2+	22 (21.4%)	15 (36.6%)	7 (11.3%)	
HR-/HER2-	34 (33.0%)	14 (34.2%)	20 (32.3%)	
NAC Regimen				0.015
Anthracycline + Taxane	62 (60.2%)	18 (43.9%)	44 (71.0%)	
TCHP	40 (38.8%)	22 (53.7%)	18 (29.0%)	
wTaxol/carbo + AC (+ pembrolizumab)	1 (1.0%)	1 (2.4%)	-	
Type of surgery				0.013
Total mastectomy	43 (41.8%)	11 (26.8%)	32 (51.6%)	
Partial mastectomy	60 (58.3%)	30 (73.2%)	30 (48.4%)	
Pre-NAC esTILs (%)				0.184
Mean ± SD (Median)	12.7±9.4 (9.9)	12.7±11.2 (8.3)	12.7±8.1 (11.4)	
Low (< 10%)	52 (50.5%)	24 (58.5%)	28 (45.2%)	
Intermediate/High (≥ 10%)	51 (49.5%)	17 (41.5%)	34 (54.8%)	
Pre-NAC TSR (%)				0.626
Mean ± SD (Median)	0.6±0.1 (0.7)	0.6±0.1 (0.6)	0.6±0.1 (0.7)	
None	3 (2.9%)	2 (4.9%)	1 (1.6%)	
Low (< 0.5%)	15 (14.6%)	6 (14.6%)	9 (14.5%)	
Intermediate/High (≥ 0.5%)	85 (82.5%)	33 (80.5%)	52 (83.9%)	
Baseline ctDNA (T0)				0.716
Not detected	50 (48.5%)	19 (46.3%)	31 (50.0%)	
Detected	53 (51.5%)	22 (53.7%)	31 (50.0%)	
Post-NAC ctDNA (T1)				0.336
Not detected	78 (75.7%)	29 (70.7%)	49 (79.0%)	
Detected	25 (24.3%)	12 (29.3%)	13 (21.0%)	





Mini Oral Presentation

Early Clinical Activity of the Novel SIRPαIgG4 Fc Fusion Protein HCB101 in Combination with AntiPD-1 and Nab-Paclitaxel in Advanced Triple-Negative Breast Cancer

Alvin Luk[1], Langtian Yu[2], Fangling Ning[3], Peijian Peng[4], Fei Mo[2], David Sun[1]

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Background: Triple-negative breast cancer (TNBC) remains a highly aggressive malignancy with limited durable benefits from PD-1 blockade alone. Targeting the CD47-SIRPα macrophage immune checkpoint represents a complementary strategy to enhance innate and adaptive antitumor immunity. HCB101 is a next-generation SIRPα-IgG4 Fc fusion protein engineered to selectively block CD47-SIRPα signaling while minimizing hematologic toxicity. Preclinical studies demonstrated synergistic antitumor activity when combined with PD-1 inhibition and chemotherapy. We report early clinical safety and efficacy of HCB101 in combination with anti-PD-1 therapy and nab-paclitaxel in patients with advanced TNBC.

Methods: HCB101-201 (NCT06771622) is an ongoing Phase 1b study evaluating weekly HCB101 with multiple standard-of-care backbones in patients with advanced solid tumors. The TNBC cohort evaluates HCB101 in combination with anti-PD-1 antibody and nab-paclitaxel. Eligible patients with previously untreated unresectable (local or regional) or stage IV (M1) TNBC and measurable disease by RECIST v1.1. (PD-L1 CPS ≥10 in the U.S.; CPS ≥1 in Mainland China). Endpoints include safety, pharmacokinetics, immunogenicity, receptor occupancy and pharmacodynamic biomarkers.

Result: As of January 2026, six patients with advanced TNBC were efficacy-evaluable across multiple dose levels. Best overall response included three partial responses and three stable diseases, corresponding to an objective response rate of 50% and a disease control rate of 100%. No patient experienced progressive disease at the time of analysis. Clinical activity was observed across a broad PD-L1 range (CPS approximately 2 to >80) and in both HER2-negative and HER2-low tumors. Responses and disease stabilization remain ongoing at 12-18+ weeks of follow-up. The combination regimen was generally well tolerated, with no unexpected safety signals identified in this early cohort.

Conclusions: The triplet combination of HCB101, anti-PD-1 therapy, and nab-paclitaxel demonstrated uniform early disease control and encouraging antitumor activity in this initial TNBC cohort. These findings support further dose expansion and continued clinical development of HCB101-based macrophage-checkpoint immunotherapy combinations in advanced TNBC.

Mini Oral Presentation

Antigen Presentation Loss Under Neoadjuvant Pembrolizumab in Triple-Negative Breast Cancer and Strategies to Mitigate Acquired Resistance Through Evolutionary Modeling

Tilanka Kalanapriya Dahanayake[1,2,3], Heeju Ryu[2,3], Tae Jin Kim[2,3]

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Background: Loss of antigen presentation is a major mechanism of genetic immune escape and acquired resistance to immune checkpoint blockade (ICB). While neoadjuvant ICB can initially enhance tumor immunogenicity, sustained immune pressure will promote selection of antigen-presentation deficient tumor clones. Understanding how immune pressure shapes tumor evolution is essential for optimizing immunotherapy dosing and scheduling strategies.

Methods: We analyzed publicly available single-cell RNA sequencing (scRNA-seq) datasets from triple-negative breast cancer (TNBC) patients treated with neoadjuvant pembrolizumab across sequential treatment cycles, focusing on antigen-presentation related gene programs. To explore the evolutionary consequences of immune pressure, we developed MATLAB-based simulations using modified Lotka Volterra evolutionary dynamics incorporating spatially informed tumor immune interactions. Tumor populations with differential antigen presentation capacity were modeled under continuous versus holidayed immunotherapy regimens.

Result: ScRNA-seq analysis demonstrated an initial upregulation of antigen-presentation machinery in tumor cells following early pembrolizumab exposure in responders and in a subset of non-responders, followed by marked downregulation with the next treatment cycle. This pattern was consistent with immune-mediated selection for antigen-presentation deficient tumor states and was not observed in non-tumor cell populations in the same tumor immune microenvironment. Evolutionary simulations recapitulated these dynamics, showing that sustained immune pressure favored immune-evasive tumor populations, whereas holidayed immunotherapy regimens delayed dominance of immune-escape phenotypes and resulted in lower tumor burden compared with continuous therapy.

Conclusions: Our integrative single-cell and evolutionary modeling analyses suggest that continuous immune checkpoint blockade may inadvertently accelerate immune escape via loss of antigen presentation. Evolution-informed modulation of immune pressure, including treatment dosing sequencing and strategic treatment holidays, may be beneficial under selected circumstances. These findings support further preclinical and clinical investigations into adaptive immunotherapy scheduling strategies aimed at prolonging therapeutic efficacy and delaying resistance.

Enhancing CDK4/6 Inhibitor Efficacy Using Bacteria-Derived Extracellular Vesicles in Breast Cancer

Jeongshin An[1,3], Ji Eun Hong[2], Se-Young Oh[3]

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Background: Despite advances in targeted therapy, primary non-response and acquired resistance to CDK4/6 inhibitors remain major challenges in the treatment of breast cancer. Symbiotic bacteriaderived extracellular vesicles (EVs) represent a non-invasive and biologically active platform with unexplored therapeutic potential.

Methods: Extracellular vesicles derived from novel Bifidobacterium strains (DS4022, DS4148, and DS0019) were isolated from stool and oral samples of healthy donors. Their effects on breast cancer cell proliferation, migration, and cell cycle regulation were evaluated. Mechanistic analyses focused on oncogenic signaling and cell cycle pathways using proteomic profiling, Western blotting, qPCR, and flow cytometry. Antitumor efficacy was evaluated through cell viability, migration assays, and a xenograft mouse model, including combination treatment with palbociclib.

Result: EVs derived from Bifidobacterium DS4022, DS4148, and DS0019 significantly inhibited breast cancer cell proliferation and migration. Among the evaluated strains, DS0019-derived EVs exhibited the most pronounced antitumor activity, exerting potent antiproliferative effects through simultaneous suppression of the PDK1AKT signaling pathway and a CDK1-centered cell cycle regulatory axis, resulting in cell cycle arrest. In vivo, DS0019-derived EVs significantly suppressed tumor growth in a xenograft model. Notably, combination treatment with DS0019-derived EVs (intratumoral) and palbociclib (oral) markedly enhanced antitumor efficacy compared with palbociclib monotherapy, indicating therapeutic synergy.

Conclusions: This study identifies Bifidobacterium DS0019-derived extracellular vesicles as a biologically active anticancer platform that suppresses breast cancer progression and enhances CDK4/6 inhibitor efficacy. These findings suggest that symbiotic bacteria contribute directly to cancer prevention and treatment beyond metabolic support, and support the clinical translation of bacterium-derived EVs as a novel adjunctive strategy in breast cancer therapy.

Mini Oral Presentation

Table 1. Experimental Groups and Treatment Regimens

Group	Treatment	Route of Administration	Schedule
G1	DPBS	Intratumoral (IT)	Twice weekly
G2	Palbociclib	Oral (PO)	Twice weekly
G3	BifidobacteriumDS0019–derived extracellular vesicles (EV)	Intratumoral (IT)	Twice weekly
G4	BifidobacteriumDS0019–derived EV (IT) + Palbociclib (PO)	IT + PO	Twice weekly
G5	*Bifidobacterium* DS0019–derived EV	Intravenous (IV)	Twice weekly

*. Each group included n = 8 mice.

Table 2. Mean tumor volume over time in a xenograft mouse model

Day	G1	G2	G3	G4	G5
0	95	95	95	95	95
5	120	110	105	100	110
10	130	130	125	105	130
12	150	140	135	115	145
15	190	155	150	120	165
19	195	180	160	125	170

*. Values represent mean tumor volume (mm^3).

Mammographic Screening Delays And Higher Breast Cancer Stage at Presentation Observed in a New York City Health System after the Acute Phase of the COVID Pandemic: Effects of Socioeconomic Factors

Leslie Kim, Erin Moshier, Tristen Park, Borna Mohabbatizadeh, Elisa Port, Stephanie Bernik, Tara Balija

Mount Sinai West, Department of Surgery, U.S.A.

Background: We previously reported that breast cancer diagnosed in the post-acute phase of the COVID-19 pandemic in a NYC health system was associated with larger tumor size, grade 3 and node positive disease, a higher odds of stage II and III disease at presentation and a >24 month interval since last screening mammography. This subset analysis examines the effect of race/ethnicity and insurance type on mammographic screening delays.

Methods: We compared a pre-pandemic (PP) cohort (March-August 2019) and a post-acute pandemic (PAP) cohort (March-August 2021) of breast cancer patients within our health system. Variables of interest include patient race and ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, and Asian); insurance type at the time of presentation (private, Medicare - government insurance for patients >65, or Medicaid - government insurance for low-income individuals); and screening delay. Screening delay was defined as >24 months between prior and index mammogram.

Result: We included 676 patients (271 PP and 405 PAP) in our analysis. There was no association between race/ethnicity and screening delay in the PAP cohort since all races and ethnicities experienced screening delays ($p = 0.468$). While all insurance types in the PAP cohort experienced a >24-month screening delay, only patients with Medicare (OR = 2.08, 95% CI: 1.213.59, $p = 0.008$) and Medicaid (OR = 17.45, 95% CI: 2.19139.31, $p = 0.007$) reached statistically significant screening delay (see table 1).

Conclusions: Our analysis demonstrates that the COVID-19 pandemic disproportionately impacted screening delays in Medicaid and Medicare patients. Race/ethnicity was not significantly associated with screening delays. It appears that regardless of race/ethnicity, economically vulnerable populations were more likely to experience disruptions in care after the pandemic.

Mini Oral Presentation

Variable	Overall (N=676)	Pre-pandemic 2019 (N=271)	Post-acute pandemic 2021 (N=405)	p-value
Insurance Type				0.021
Private	337 (49.9%)	30/140 (21.4%)	61/197 (31.0%)	0.068
Medicare	264 (39.1%)	26/108 (24.1%)	62/156 (39.7%)	0.010
Medicaid	75 (11.1%)	1/23 (4.3%)	23/52 (44.2%)	0.006
Race/Ethnicity, n (%)				0.468
Non-Hispanic White	330 (48.8%)	31/149 (20.8%)	65/181 (35.9%)	0.003
Non-Hispanic Black	122 (18.0%)	11/47 (23.4%)	21/75 (28.0%)	0.549
Hispanic	130 (19.2%)	7/43 (16.3%)	33/87 (37.9%)	0.018
Asian	78 (11.5%)	8/30 (26.7%)	20/48 (41.7%)	0.174
Other	16 (2.4%)	2 (0.7%)	14 (3.5%)	
Time Since Prior Mammogram (months), median (IQR)	15.9 (12.0–26.0)	15.0 (12.0–23.0)	17.4 (12.0–28.5)	0.001
Screening Delay >24 months, n (%)	203 (30.0%)	57 (21.0%)	146 (36.0%)	<0.001

Safety and Conspicuity of a Nonmetallic Ultrasound Twinkling Marker Observed for Sonographic Targeting (UTMOST Trial)

Jeffrey Johnson[1], Gina Hesley[2], Blake Kassmeyer[3], Abdullah Al Masud[2], Nicholas Larson[3], Matthew Urban[2], Christine Lee[2], Mara Piltin[1]

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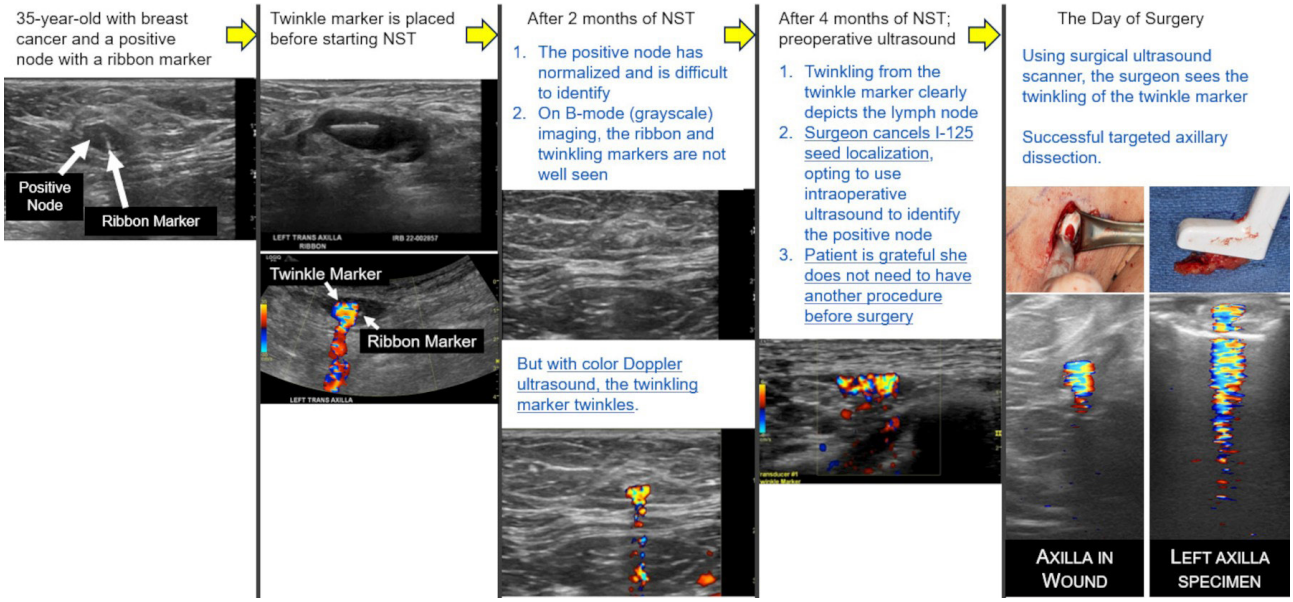
Background: Excision of the biopsy-proven axillary lymph node (ALN) lowers the false-negative rate of targeted axillary dissection after neoadjuvant systemic therapy (NST). Locating a biopsy marker in an ALN by ultrasound after NST can be difficult, and surgical guidance often requires a second localization procedure. We developed a non-metallic biopsy marker (twinkling marker, TM) made from polymethyl methacrylate (PMMA), commonly known as bone cement, with a robust ultrasonographic color Doppler twinkling signature and aimed to assess its safety and utility after NST.

Methods: In this prospective, single-arm Phase 1 trial, the primary aims were: (1) To evaluate long-term safety of the TM; (2) To evaluate the twinkling conspicuity of the TM. Patients had a TM placed alongside a commercial marker in the biopsy-proven ALN before NST. Conspicuity was assessed on an ordinal 0(none) to 4(robust) scale by two experienced breast radiologists using B-mode and color Doppler ultrasound at multiple time points using multiple ultrasound scanners and transducers. Wilcoxon signed-rank test was used to compare scores. ALN were excised per standard of care.

Result: Ten patients receiving NST over median 6.3 months (range: 3.8-7.5) experienced no safety concerns from TM. Using the linear transducer (9L), consensus twinkling scores for the TM were significantly higher than the commercial marker at both implantation ($P = 0.014$) presurgery ($P = 0.020$). The overall confidence score, combining information from B-mode and Doppler twinkling signature, scored 4 in 100% of patients at implantation and pre-surgical timepoints. In 7/10 (70%) cases, the surgeon utilized intraoperative ultrasound alone to localize. Per surgeon report, no TMs migrated outside of the node.

Conclusions: This Phase 1 clinical trial demonstrated that the TM is safe and outperformed commercially available markers in presurgical ultrasound scanning. This may allow for improved confidence for preoperative localizer placement or omission of localizer placement for surgeons using ultrasound guidance.

Mini Oral Presentation



Mini Oral Presentation

A Temporal Attention-Based Deep Learning Model for Breast Cancer Risk Prediction from Longitudinal Screening Mammograms

Lester Leong[1], Xiaohong Wang[2], Weimin Huang[2], Zhongkang Lu[2], Kaishen He[3], Hengji Yao[3], Zhiping Lin[3], Engracia Loh[4], Ryan Tan[5]

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Background: Digital mammograms may contain imaging biomarkers of breast cancer risk beyond breast density that are not readily appreciable by human readers but can be detected using artificial intelligence. Image-based deep learning is increasingly applied to breast cancer risk prediction to identify women who may benefit from enhanced screening strategies. However, most existing models rely on mammograms from a single or randomly selected screening timepoint, limiting their ability to capture progressive longitudinal changes in breast tissue. We propose a temporal attention-based framework that integrates sequential mammogram screens and multi-view information to improve breast cancer risk prediction.

Methods: We developed a temporal attention-based deep learning model that analysed mammograms from three consecutive screening timepoints. For each screening, a multi-view feature fusion module integrated four standard mammographic views. Spatial features were extracted using a Vision Transformer backbone pre-trained with a masked autoencoder framework, then combined with temporal embeddings and processed using a Transformer-based temporal attention encoder. The model was trained and evaluated on a Singapore screening cohort of 511 women with at least three screening rounds, including 156 breast cancer cases. 5-year risk prediction performance was assessed using area under the receiver operating characteristic curve (AUC) and accuracy, and compared across different temporal modelling strategies, the Tyrer-Cuzick traditional clinical risk model, and the MIRAI model, a state-of-the-art deep learning algorithm using randomly selected mammograms.

Result: The model achieved an AUC of 0.88 and accuracy of 0.85 for 5-year risk prediction, outperforming the other temporal approaches using single-timepoint and two-timepoints. The model also outperformed the Tyrer-Cuzick (AUC 0.56) and MIRAI (AUC 0.84, accuracy 0.73) models.

Conclusions: By jointly modelling spatial, multi-view, and temporal mammographic information, the proposed framework substantially improves breast cancer risk prediction and highlights the value of longitudinal imaging and temporal attention mechanisms in risk assessment modelling.

Mini Oral Presentation

Clinical Performance Evaluation of Tumor-Educated Platelet (TEP)-Based Blood Test for Breast Cancer Detection

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Background: Current breast cancer (BC) screening relies mainly on imaging-based approaches, with no reliable blood-based test available for early detection. Tumor-educated platelets (TEPs) undergo dynamic RNA splicing changes in response to cancer-derived signals, offering a minimally invasive avenue for cancer detection. Based on preliminary analysis, we identified specific gene markers of TEP associated with BC from public and prospectively collected RNA sequencing data. This study aimed to develop and validate a novel platelet RNA-based diagnostic algorithms for BC detection using prospectively collected blood samples.

Methods: Isolated platelets were prospectively collected from 204 BC patients (including in situ lesion) and 350 non-cancer controls, and were divided into training and validation datasets. Three analytical modalities were tested: 1) Singleplex qPCR (n = 315) using a logistic regression model, 2) Multiplex qPCR (n = 112) validated by an external reference laboratory, and 3) Image-based AI (n = 554) using the Attune™ CytPix™ Flow Cytometer and developed a morphology-based deep learning classification algorithm. Performance was evaluated using sensitivity, specificity, and area under the curve (AUC) as metrics.

Result: In the validation dataset, Singleplex qPCR analysis demonstrated early-stage BC sensitivity of 87.5% (35/40), overall BC sensitivity of 87.0% (40/46), specificity of 86.0% (49/57), and AUC of 0.892. Multiplex qPCR analysis showed the highest performance with 100% sensitivity for both early-stage and overall BC (45/45), specificity of 86.5% (58/67), and AUC of 0.965. Platelet image-based AI analysis achieved early-stage BC sensitivity of 67.6% (25/37), overall BC sensitivity of 64.4% (29/45), specificity of 86.8% (112/129), and AUC of 0.861 in the validation dataset.

Conclusions: Platelet RNA-based PCR analysis and platelet image-based AI analysis demonstrated excellent performance in BC detection. The integrated utilization of these modalities would enable a multi-layered diagnostic strategy that simultaneously achieves high sensitivity and specificity. These results validate the clinical utility of non-invasive blood-based early BC detection technology.

Mini Oral Presentation

Table. Clinical Performance of Three Platelet-Based Analytical Modalities

Modality	Target Group	Sensitivity	Specificity	AUC
Singleplex qPCR	Stage 0-II	0.875 (35/40)	0.860 (49/57)	0.886
	All Stages (0-III)	0.870 (40/46)	0.860 (49/57)	0.892
Multiplex qPCR	Stage 0-II	1.000 (38/38)	0.865 (58/67)	0.964
	All Stages (0-III)	1.000 (45/45)	0.865 (58/67)	0.965
Platelet Image-based AI	Stage 0-II	0.676 (25/37)	0.868 (112/129)	0.867
	All Stages (0-III)	0.644 (29/45)	0.868 (112/129)	0.861

Clinical Performance of International and Korean Genetic Testing Criteria for Hereditary Breast Cancer: A Large-Scale Cohort Analysis of 2,188 Individuals

Bom-Yi Lee[1], Hyun Jeong Lee[2], Jiyoung Kim[2], Dongwon Kim[2], Jiwon Jeong[3], Kyungah Yoh[3], Eunyoung Kang[2], Sung-Won Kim[2]

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Background: International guidelines, including those from the American Society of Breast Surgeons (ASBrS), the American Society of Clinical OncologySociety of Surgical Oncology (ASCO-SSO), and the National Comprehensive Cancer Network (NCCN), have recently broadened eligibility for germline testing in breast cancer, whereas the Korean Health Insurance Review and Assessment Service (K-HIRA) criteria remain more restrictive. This study evaluated pathogenic variant (PV) prevalence and compared the diagnostic yield of Korean versus international criteria in a high-risk hereditary breast cancer cohort accumulated over 10 years from a single-institution cohort.

Methods: We retrospectively analyzed 2,188 individuals referred for genetic counseling between January 2015 and June 2025. Germline testing included BRCA1/2 sequencing, multiplex ligation-dependent probe amplification, and multigene panels. Eligibility was determined according to ASCO-SSO (Recommendation 1.1), NCCN (v3.2025), and K-HIRA. PV prevalence, sensitivity, and missed cases were compared.

Result: PVs were identified in 178 individuals (8.1%). Among breast cancer patients (n = 1,796), 159 carried PVs (8.9%): 131 (82.4%) in BRCA1/2 and 28 (17.6%) in non-BRCA genes. Across frameworks, PV prevalence among eligible patients was comparable (ASCO-SSO 8.7%, NCCN 9.5%, K-HIRA 10.2%). Sensitivity differed (NCCN 96.9%, ASCO-SSO 92.5%, K-HIRA 89.3%); NCCN was significantly higher than K-HIRA ($p = 0.001$), while the differences were not significant for NCCN vs. ASCO-SSO ($p = 0.071$) and ASCO-SSO vs. K-HIRA ($p = 0.336$). Missed carriers were most frequent under K-HIRA (17/159, 10.7%) compared with ASCO-SSO (12/159, 7.5%) and NCCN (5/159, 3.1%); those missed by K-HIRA often had non-specific family histories (58.8%) or no family history (23.5%).

Conclusions: In this large Korean cohort, the restrictive K-HIRA criteria showed lower sensitivity than international guidelines, leading to missed opportunities for prevention and treatment. Broader eligibility criteria and integration of multigene testing may improve detection of hereditary cancer and optimize clinical management in Korea.

ProMeta-BC: An Integrated Plasma ProteomeMetabolome Framework for Early Detection and Lymph Node Risk Assessment in Breast Cancer

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Background: Early detection of breast cancer and accurate assessment of axillary lymph node metastasis remain challenging, particularly in women with dense breast tissue. Imaging-based screening largely reflects anatomical features and fails to capture early systemic tumor-host interactions associated with tumor initiation and dissemination. We investigated whether integrated plasma proteomic and metabolomic profiling could identify early molecular alterations and support non-invasive diagnosis and risk stratification.

Methods: In a registered multicenter prospective study (NCT06016790) and another independent external validation, 662 women (444 breast cancer and 218 benign breast disease) from nine institutions were enrolled. Plasma samples were analyzed using data-independent acquisition (DIA) proteomics and untargeted metabolomics, followed by targeted validation using parallel reaction monitoring (PRM)based proteomics and targeted metabolomics. Integrative network analysis and machine-learning approaches were applied to identify malignancy-associated molecular features and to develop diagnostic models (ProMeta-BC) for benign-malignant discrimination and axillary lymph node metastasis prediction.

Result: DIA proteomics and untargeted metabolomics quantified 5,549 proteins and 630 metabolites, revealing coordinated systemic remodeling characterized by enrichment of cytoskeleton- and adhesion-related proteins and lipid metabolic reprogramming. Network and trajectory modeling identified 13 malignancy-associated protein modules and two progression-linked metabolic trajectories. Based on these features, ProMeta-BC, integrating 15 proteins and 5 metabolites, achieved robust benign-malignant discrimination (internal AUC 0.935; external AUC 0.931). A complementary model, ProMeta-BC-LN, predicted axillary lymph node metastasis (internal AUC 0.841; external AUC 0.753) and significantly improved diagnostic performance in imaging-discordant and clinically ambiguous cases.

Conclusions: Integrated plasma proteomemetabolome profiling captures early, biologically coherent systemic remodeling in breast cancer. The ProMeta-BC framework provides a scalable and interpretable liquid-biopsy approach for non-invasive early detection and axillary lymph-node risk stratification, with potential to complement conventional imaging-based assessment in clinical practice.

Mini Oral Presentation

Who Really Needs Staging? Using a Simple Blood Test to Guide Care in Clinically Early Breast Cancer

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Background: Distant metastatic disease at diagnosis is uncommon in clinically early breast cancer, yet systemic staging remains frequently performed. They are resource-intensive and lead to unnecessary radiation exposure, incidental findings, and treatment delays. We developed and externally validated a low-cost, biomarker-informed pre-treatment model to quantify metastatic risk at diagnosis and support selective staging.

Methods: We conducted a retrospective cohort study of patients with clinically early-stage invasive breast cancer treated at a tertiary institution. Pre-treatment predictors included imaging tumour size, clinical nodal status, molecular subtype, and serum tumour markers (breast cancer antigen 15-3 [CA15-3] and carcinoembryonic antigen [CEA]). Multivariable logistic regression was used to develop and compare prediction models. Model performance was assessed using discrimination, calibration, and bootstrap internal validation. External validation was performed in an independent temporal cohort. The incremental predictive value of tumour markers beyond standard clinical variables was evaluated, and patients were stratified into actionable risk groups.

Result: The development cohort included over 1,400 patients, with distant metastases present in approximately 5-6% at diagnosis. Although both CA15-3 and CEA were associated with metastatic disease on univariable analysis, only CA15-3 retained a clinically meaningful independent association after adjustment for tumour size, nodal status, and subtype. Incorporation of CA15-3 improved model fit and probability accuracy compared with clinical variables alone and outperformed models incorporating CEA. The final model demonstrated excellent discrimination in the development cohort (AUC ~0.89) with minimal optimism after bootstrap validation and preserved performance with good calibration in the external validation cohort. Risk stratification identified a large low-risk group (< 5% predicted risk) with an observed metastatic rate of 1.3%, compared with 47.0% in a high-risk group (> 15%).

Conclusions: A simple, low-cost CA15-3 informed model accurately stratifies metastatic risk at diagnosis in clinically early breast cancer and supports safe de-escalation of routine staging in low-risk patients while prioritising imaging for those most likely to benefit.

Mini Oral Presentation

MCODE KG-Enhanced LLM for Integrating Cancer Data and Improving Outcome Prediction

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Background: Reliable structuring of unstructured clinical cancer data remains a major challenge in oncology research. This study proposes a framework that integrates a large language model (LLM) with an mCODE-based knowledge graph to automatically extract clinically relevant entities and semantic relationships, thereby enabling cancer outcome prediction.

Methods: This comparative study evaluated the feasibility, validity, and reliability of the proposed LLM-mCODE KG framework. The framework was applied to data from 3,285 patients with breast cancer who underwent neoadjuvant chemotherapy followed by mastectomy at Severance Hospital between 2010 and 2023. Framework-derived datasets were compared with manually curated datasets and a reference standard to assess extraction accuracy across clinical variables. Machine learning-based models for predicting pathologic complete response were trained using both framework-derived and manually extracted datasets. Model performance was evaluated using accuracy metrics and the area under the receiver operating characteristic curve, with comparisons performed using the DeLong test.

Result: The proposed framework achieved extraction accuracies ranging from 93.23% to 99.97% across diverse clinical attributes, including tumor markers, molecular subtypes, staging, and treatment response. Predictive models trained on framework-derived data performed comparably to or better than those trained on manually curated data (LGBM AUROC comparison: $p = 0.16$, DeLong test), with improved specificity and reduced false-positive rates.

Conclusions: This study demonstrates the effectiveness of integrating an mCODE knowledge graph with LLMs to extract oncology-related entities and attribute values from unstructured clinical text. A pCR prediction model trained on a framework-extracted real-world breast cancer dataset demonstrated performance comparable to or superior to models trained on manually curated datasets, particularly in specificity and efficiency. This automated data integration framework has the potential to substantially improve cancer outcome prediction and accelerate clinical research using real-world data.

Mini Oral Presentation

Pathologic Heterogeneity of Breast and Nodal Response to Neoadjuvant Pembrolizumab-based Chemoimmunotherapy in Early Triple-negative Breast Cancer

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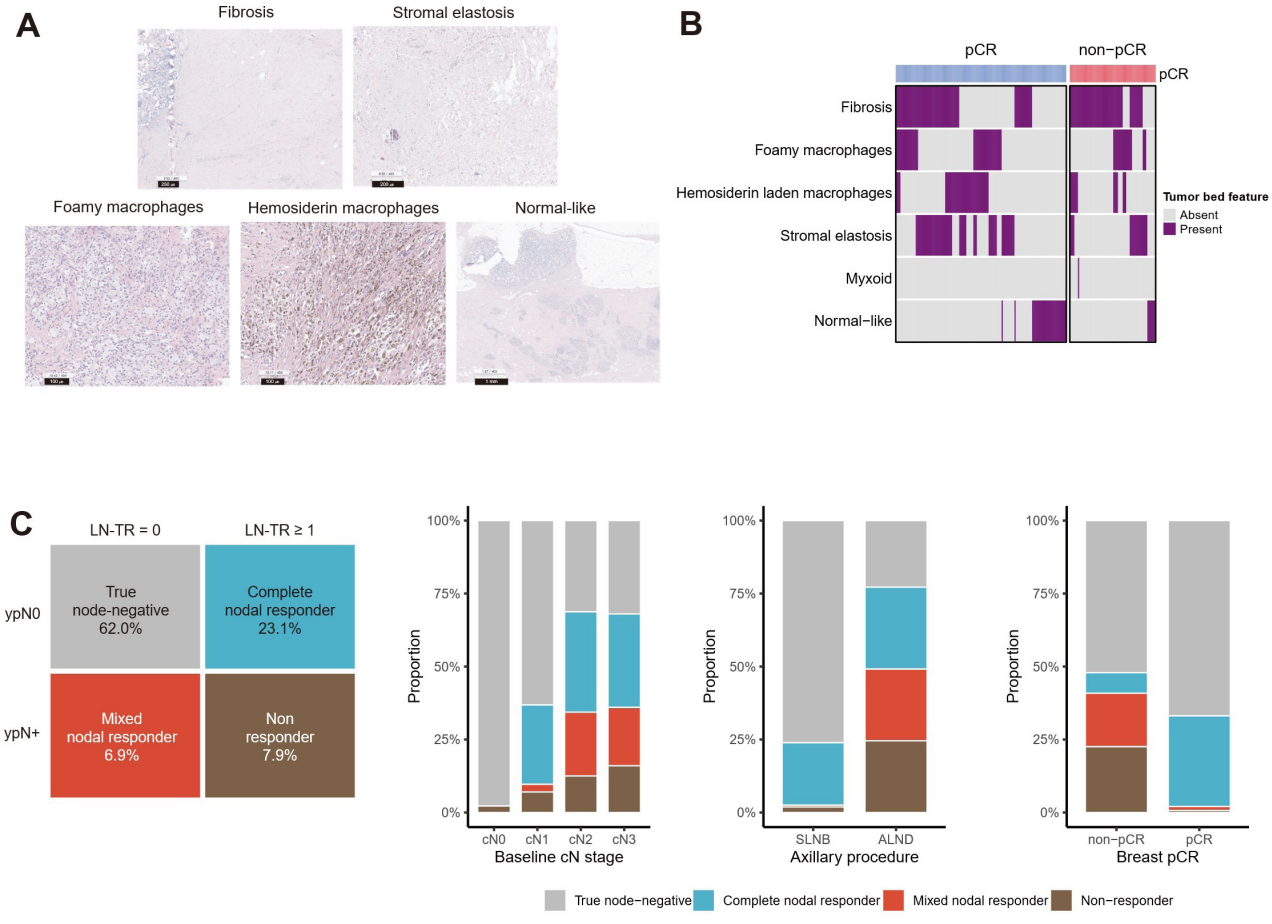
Background: Neoadjuvant pembrolizumab combined with chemotherapy has become the standard of care for early-stage triple-negative breast cancer (TNBC). We aimed to characterize the heterogeneity of pathological responses in the breast and regional lymph nodes and to explore their clinical implications.

Methods: A total of 216 patients with TNBC treated with the KEYNOTE-522 regimen followed by surgery were included. Histopathologic features of baseline biopsy and post-treatment resection specimens from the breast and lymph nodes were systematically reviewed, and their correlations with treatment response and clinical outcome were evaluated.

Result: Pathological complete response (pCR) was achieved in 65.3% of patients. Invasive breast carcinoma of no special type, higher histologic grade, increased tumor-infiltrating lymphocytes (TILs), and higher Ki-67 labeling were independently associated with pCR. Residual carcinoma patterns and tumor bed changes were heterogeneous, with residual disease most commonly presenting as a solitary, confined focus (51.4%). Fibrotic tumor beds were more frequently observed in non-pCR cases, whereas stromal elastosis was enriched among pCR cases. Nodal responses were also heterogeneous, including complete nodal response (23.1%), non-response (7.9%), and mixed nodal response (6.9%). Disease recurrence was more frequent among patients without pCR, those with multifocal baseline tumors, higher cT stage, rare histologic subtypes, low TILs, and residual nodal disease.

Conclusions: This study provides a comprehensive real-world pathological characterization of breast and nodal responses after neoadjuvant chemoimmunotherapy in early TNBC, highlighting heterogeneity beyond pCR and ypN staging that may inform post-neoadjuvant risk stratification.

Mini Oral Presentation



Mini Oral Presentation

Validation of the ASTRRA-derived Composite Risk Model for Ovarian Function Suppression Benefit in Premenopausal HR-Positive Breast Cancer

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Background: The ASTRRA trial's composite risk score (0-5; tumor size, nodal status, tumor grade) stratified ovarian function suppression (OFS) benefit in premenopausal HR-positive, HER2-negative breast cancer. Its 10-year analysis suggested high-risk younger women derived limited benefit from 2-year OFS. We aimed to validate this model in an independent real-world cohort and evaluate whether OFS duration should be risk-adapted.

Methods: We retrospectively analyzed 1,171 chemotherapy-treated premenopausal women (age ≤45) with HR-positive, HER2-negative, stage I-III breast cancer from Samsung Medical Center (2013-2018). The ASTRRA-derived composite risk score was applied, classifying patients into low (0-1), intermediate (2-3), and high (4-5) risk groups. Among tamoxifen plus OFS recipients, breast cancer-free interval (BCFI) was compared between 2-year (n = 159) and 5-year (n = 82) OFS durations using Kaplan-Meier and Cox regression analyses.

Result: At a median follow-up of 94.5 months, the composite risk score significantly discriminated 8-year BCFI among chemotherapy-treated patients: 84.5% (low-risk), 81.6% (intermediate-risk), and 74.8% (high-risk) ($p = 0.001$), demonstrating a concordant prognostic gradient with the original ASTRRA cohort (10-year BCFI: 90.1%, 84.6%, and 72.9%, respectively). Among high-risk patients receiving tamoxifen plus OFS, 5-year OFS was associated with superior 8-year BCFI versus 2-year OFS (91.7% vs 74.4%; HR 0.42, 95% CI 0.14-1.24, $p = 0.115$). This difference was most pronounced in women younger than 40, where 5-year OFS achieved an 8-year BCFI of 100.0% versus 66.5% with 2-year OFS (HR 0.23, 95% CI 0.05-1.00, $p = 0.051$), whereas no significant difference was observed in women aged 40-45.

Conclusions: The ASTRRA-derived composite risk model demonstrated significant prognostic discrimination in an independent real-world cohort. Among high-risk premenopausal women younger than 40, 2-year OFS appears insufficient, and extending OFS to 5 years was associated with substantially improved breast cancer outcomes. These findings support a risk- and age-adapted OFS duration strategy in HR-positive early breast cancer.

Mini Oral Presentation

Limited Benefit of Adjuvant Ovarian Function Suppression in Premenopausal HR+/HER2+ Breast Cancer Patients Achieving Pathologic Complete Response After Neoadjuvant Therapy

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Background: The role of adjuvant ovarian function suppression (OFS) in premenopausal patients with hormone receptor-positive and HER2-positive (HR+/HER2+) breast cancer who achieve pathologic complete response (pCR) after neoadjuvant therapy remains uncertain.

Methods: We conducted a retrospective cohort study of premenopausal patients with HR+/HER2+ breast cancer treated with neoadjuvant chemotherapy and anti-HER2 therapy followed by surgery between 2008 and 2021 at Samsung Medical Center and Asan Medical Center. Patients achieving pCR were included. Adjuvant endocrine therapy was categorized according to the use of gonadotropin-releasing hormone agonists (GnRHa). Disease-free survival (DFS) and distant metastasisfree survival (DMFS) were analyzed using Cox proportional hazards models. Subgroup analyses were performed based on baseline clinical nodal status (cN) and estrogen receptor proportion score (ER PS).

Result: A total of 333 patients achieved pCR and were included; 114 (34.2%) received GnRHa-based endocrine therapy and 219 (65.8%) did not. During follow-up, 21 recurrence-or-death events and 12 distant metastases were observed. GnRHa use was not significantly associated with improved DFS (hazard ratio [HR] 0.68, 95% CI 0.23-1.69) or DMFS (HR 0.27, 95% CI 0.03-1.14). In contrast, baseline clinical nodal status cN3 was strongly associated with inferior outcomes despite pCR (DFS HR 4.29, 95% CI 1.70-10.36; DMFS HR 4.72, 95% CI 1.44-14.88). Higher pre-treatment ER PS was independently associated with improved DMFS (per-point increase HR 0.63, 95% CI 0.43-0.93). Although GnRHa use showed a consistent trend toward reduced distant recurrence, statistical significance was not reached due to limited event numbers.

Conclusions: In premenopausal patients with HR+/HER2+ breast cancer achieving pCR, routine escalation to GnRHa-based OFS did not confer a clear survival benefit. Given the excellent prognosis after pCR, adjuvant endocrine therapy should be individualized, with consideration of baseline nodal burden rather than uniform OFS use.

Mini Oral Presentation

Extended Endocrine Therapy for Premenopausal Invasive Lobular Carcinoma: Integrating a 10-year Exploratory Analysis of the ASTRRA Trial with Multicenter Retrospective Data

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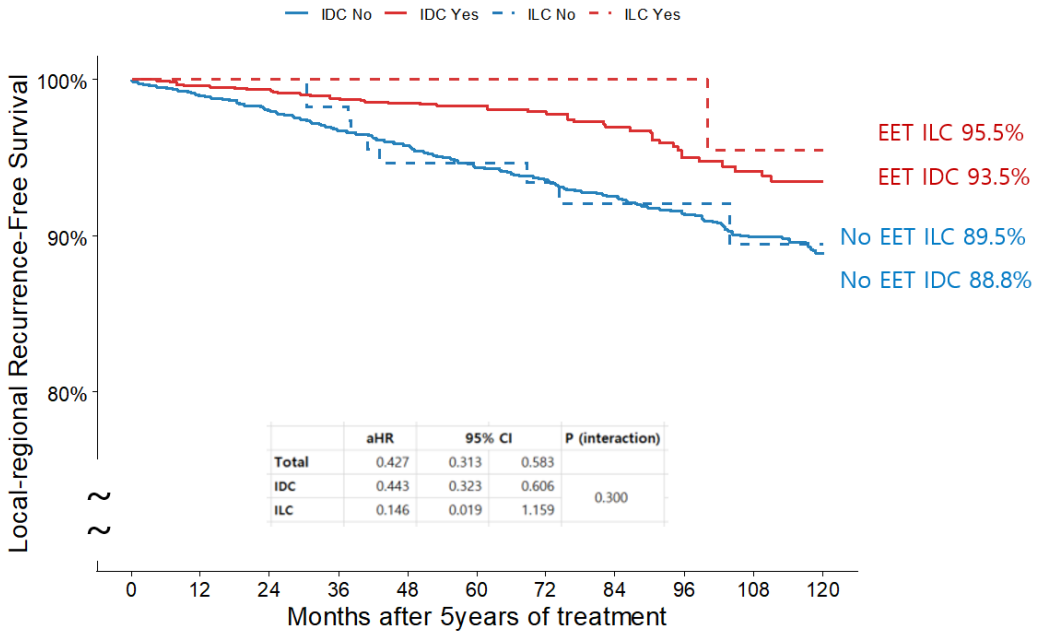
Background: Invasive lobular carcinoma (ILC) shows distinct biological behavior and a higher risk of late recurrence than invasive ductal carcinoma (IDC). Although extended endocrine therapy (EET) is an established strategy for hormone receptor positive breast cancer (BC), its long-term efficacy in premenopausal patients with ILC remains unclear due to the low prevalence of this histologic subtype, particularly in Asia. This study evaluated whether the long-term benefit of EET differs between premenopausal patients with ILC and IDC.

Methods: This study included two cohorts: (1) an exploratory analysis of the ASTRRA randomized trial and (2) a multicenter retrospective cohort. Eligible patients were premenopausal women aged ≤45 years with stage III hormone receptor positive, HER2-negative BC who remained recurrence-free after 5 years of adjuvant endocrine therapy (ET). The primary endpoints were disease-free survival (DFS) and loco-regional recurrence-free survival (LRRFS), defined as events occurring after completion of initial ET.

Result: A total of 5,722 patients were analyzed, including 1,244 who received EET. After a median follow-up of 138.5 months, EET significantly improved DFS (adjusted hazard ratio [aHR], 0.53; 95% CI, 0.41~0.67; $P<0.001$) and LRRFS (aHR, 0.43; 95% CI, 0.31~0.58; $P<0.001$) in the overall population. Subgroup analysis showed significant benefits of EET in patients with IDC for both DFS and LRRFS, whereas the benefits in patients with ILC did not reach statistical significance. No significant interaction was observed between histologic type and the effect of EET on DFS or LRRFS.

Conclusions: Extended hormone therapy significantly improves DFS and LRRFS in patients with hormone receptor-positive BC, particularly in those with IDC. Although statistical significance was not reached in ILC group, likely due to the limited sample size, the overall trend suggests a clinical benefit across both histologic types. These findings support the consideration of EET as a standard strategy to reduce recurrence risk, regardless of the specific histologic type.

Mini Oral Presentation



Number at risk

IDC No	3786	3608	3440	3221	2988	2607	2118	1753	1325	968	709
IDC Yes	1164	1154	1129	1101	1069	967	704	512	401	298	239
ILC No	132	125	119	112	97	90	73	61	41	28	16
ILC Yes	67	67	67	66	63	54	44	32	23	18	16

TroFuse-011: A Phase 3, Randomized, Open-Label Study of Sacituzumab Tirumotecan With or Without Pembrolizumab vs Treatment of Physician's Choice for Previously Untreated Locally Recurrent Unresectable

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Mini Oral Presentation

Background: The standard first-line therapy for most previously untreated locally recurrent unresectable or metastatic triple-negative breast cancer (TNBC) with PD-L1 combined positive score (CPS) <10 is chemotherapy alone. New therapeutic options with superior efficacy are needed. Sacituzumab tirumotecan (sac-TMT; MK-2870/SKB264) is a novel antibody-drug conjugate (ADC) composed of an anti-trophoblast cell surface antigen 2 (TROP2) monoclonal antibody coupled to a cytotoxic belotecan-derived topoisomerase I inhibitor payload via a unique bifunctional linker. Sac-TMT monotherapy has shown promising efficacy with a manageable safety profile in metastatic TNBC. There is strong biologic rationale supporting combination of an ADC with pembrolizumab regardless of PD-L1 expression. The TroFuse-011 study (NCT06841354) evaluates sac-TMT ± pembrolizumab vs treatment of physician's choice (TPC) in participants with previously untreated locally recurrent unresectable or metastatic TNBC with PD-L1 CPS <10.

Methods: Eligible participants (≥18 years) with centrally confirmed locally recurrent unresectable or metastatic TNBC, measurable disease per RECIST v1.1, ECOG performance status 0 or 1, and a tumor tissue sample evaluable for central PD-L1 and TROP2 testing are randomized 2:1:2 to receive sac-TMT 4 mg/kg Q2W (Arm A), sac-TMT 4 mg/kg Q2W + pembrolizumab 400 mg Q6W (Arm B), or TPC (Arm C). TPC consists of one of: paclitaxel, nab-paclitaxel, or gemcitabine plus carboplatin (Table). Primary endpoints are progression-free survival (PFS) per RECIST v1.1 as assessed by blinded independent central review (Arm A vs C and Arm B

vs C) and overall survival (OS; Arm A vs C). Secondary endpoints are PFS (Arm B vs A), OS (Arm B vs C and Arm B vs A), objective response rate (Arm A vs C and Arm B vs C) and duration of response, patient-reported outcomes, and safety. Tumor imaging occurs at baseline, Q8W after randomization until week 48, and Q12W thereafter.

Result: Enrollment is ongoing.

Conclusions: Not applicable.

Table: Treatment arms in TroFuse-011

	Intervention
Arm A	sac-TMT[a]
Arm B	sac-TMT[a] + pembrolizumab[b]
Arm C	Paclitaxel[c] or nab-paclitaxel[d] or gemcitabine[e] + carboplatin[f]

QW, every week; Q2W, every 2 weeks; Q3W, every 3 weeks; Q4W, every 4 weeks; Q6W, every 6 weeks.
[a]4 mg/kg Q2W. [b]400 mg Q6W. [c]80 mg/m^2 on Day 1 QW or 90 mg/m^2 on days 1, 8, and 15, Q4W. [d]100 mg/m^2 on days 1, 8, and 15, Q4W. [e]1000 mg/m^2 on days 1 and 8, Q3W. [f]AUC 2 mg/mL/min on days 1 and 8, Q3W.

Pyrotinib Plus Albumin-Bound Paclitaxel as First-Line Treatment for HER2-Positive Metastatic Breast Cancer in Patients Previously Treated with Trastuzumab: Updated Phase II Results

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Background: Our phase II study demonstrated favorable efficacy and an acceptable safety profile for pyrotinib combined with albumin-bound paclitaxel as first-line therapy in trastuzumab-pretreated patients. However, extended follow-up is needed to fully assess survival outcomes and long-term safety. This study aims to update survival and safety results of pyrotinib plus Albumin-Bound Paclitaxel from our phase II trial.

Methods: This updated analysis is based on patients from our previously published phase II trial. All patients had disease progression after receiving adjuvant or neoadjuvant trastuzumab and followed by pyrotinib plus albumin-bound paclitaxel as first-line therapy. Updated analyses of median follow-up, progression-free survival (PFS), overall survival (OS), and treatment-related adverse events (AEs) were performed. Tumor progression was evaluated according to RECIST 1.1, and treatment-related AEs were graded per CTCAE version 5.0.

Result: From December 2019 to August 2023, 27 eligible patients were enrolled in the study. The median follow-up time was updated to 44.5 months. The median PFS was 15.8 months, and the median OS has not been reached. Grade ≥ 3 AEs occurred in 17 patients (63.0%), with diarrhea and neutropenia each occurring in 33.3% of patients, followed by leukopenia (18.5%), hand-foot syndrome (3.7%), paresthesia (3.7%), and oral mucositis (3.7%). Univariate survival analysis revealed a significant association between PFS and visceral metastasis ($p = 0.027$). No significant associations were found for hormone receptor status ($p = 0.43$), trastuzumab resistance ($p = 0.84$), or BMI ($p = 0.52$).

Conclusions: Pyrotinib combined with Albumin-Bound Paclitaxel is an effective first-line therapy for HER2-positive metastatic breast cancer patients with prior trastuzumab exposure. The combination shows durable efficacy and manageable safety.

Mini Oral Presentation

Giredestrant vs Standard-of-care Endocrine Therapy as Adjuvant Treatment for Patients with Estrogen Receptor-positive, HER2-negative Early Breast Cancer: Results from the Global Phase III lidERA BC Trial

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Mini Oral Presentation

Background: Adj. ET is the mainstay treatment (tx) for ER+ HER2 eBC. However, up to 1/3 of patients (pts) eventually experience recurrence. Giredestrant(Gired), a next-generation oral SERD, was shown to be more potent than other SERDs and demonstrated superior antiproliferative activity vs anastrozole in the neoadj coopERA BC trial. Results of the prespecified interim analysis of the global, randomized lidERA BC trial (NCT04961996) are presented.

Methods: Pts with Stage I-III ER+ HER2- eBC were randomized 1:1 to Gired 30 mg oral daily (with an LHRH agonist in pre- and peri-menopausal) or SoC ET (tamoxifen or AI) for 5 yrs. The 1ry endpoint was IDFS. Key secondary endpoints were OS, DRFI, and safety.

Result: 4170 pts were randomized. Median age was 54.0yr; 59.3% of pts were postmenopausal. Median follow-up at clinical cutoff was 32.3 months, with 336 IDFS events. Gired demonstrated superior IDFS vs SoC ET (HR 0.70; 95% CI, 0.57, 0.87; $p = 0.0014$). 3-yr IDFS rates were 92.4% and 89.6%, respectively. There was a trend towards OS improvement in the gired vs the SoC ET (HR 0.79; 95% CI, 0.56, 1.12). The DRFI HR was 0.69 (95% CI, 0.54, 0.89). The most common AEs in the gired vs SoC ET arms, respectively, were arthralgia (48.0% vs 47.1%), hot flush (27.4% vs 28.8%), and headache (15.3% vs 13.2%).

Conclusions: LidERA is the first Ph III trial to demonstrate benefit with an oral SERD in eBC. Gired resulted in a statistically significant and clinically meaningful IDFS improvement vs SoC ET in ER+, HER2- eBC. OS

trended in favor of the gired arm, and DRFI was improved vs SoC ET. The safety profile was favorable and consistent with known profiles, and the D/C rate was slightly lower with gired compared with SoC ET. Overall, the results support gired as a potential new standard for pts with HR+ eBC.

Table. Efficacy

	Giredestrant (n = 2084)	**Standard-of-care ET (n = 2086)**
IDFS		
Pts with event, n (%)	140 (6.7)	196 (9.4)
Stratified HR (95% CI)	0.70 (0.57, 0.87)	
p-value*	0.0014	
2-yr event-free rate, %	94.6	92.3
3-yr event-free rate, %	92.4	89.6
Interim OS†		
Pts with event, n (%)	57 (2.7)	71 (3.4)
Stratified HR (95% CI)	0.79 (0.56, 1.12)	
p-value*	0.1863	
DRFI		
Pts with event, n (%)	102 (4.9)	145 (7.0)
Stratified HR (95% CI)	0.69 (0.54, 0.89)	

* Stratified Log-rank p-value (2-sided). Stratification factors were risk: Medium- vs high-risk Stage I–III BC; region: USA/Canada/Western Europe v Asia–Pacific vs rest of the world; previous chemotherapy: No vs yes; and menopausal status: Pre- or perimenopausal vs postmenopausal.
† At data cutoff, the first OS interim analysis was conducted.

Mini Oral Presentation

Giredestrant, an Oral Selective Oestrogen Receptor Antagonist and Degrader, Plus Everolimus in ER-positive, HER2-negative Advanced Breast Cancer Treated with CDK4/6 Inhibitor: Phase III evERA BC Trial

Keun Seok Lee[1], Erica L Mayer[2], Sara M Tolaney[2], Miguel Martin[3], Gregory A Vidal[4], Luca Moscetti[5], Komal L Jhaveri[6], Adam Brufsky[7], William J Gradishar[8], Andreas Schneeweiss[9], Naoki Niikura[10], Anne Favret[11], Margarita Alfie[12], Sarah Khan[13], Merilin Feldman[14], Bann-Mo Day[14], Lisa H Lam[14], Walter C Darbonne[14], Pablo Perez-Moreno[14], Hope S Rugo[15]

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Background: CDK4/6i + endocrine therapy (ET) is first-line standard of care (SOC) for pts with ER+, HER2– aBC but effective post-CDK4/6i options are limited. GIRE and E target the ER and PI3K/AKT/mTOR pathways, which are implicated in ET resistance. evERA BC (NCT05306340) is a global, randomised, open-label trial.

Methods: Pts had ER+, HER2– aBC with disease progression (PD) or relapse during/post-CDK4/6i + ET. Randomisation was 1:1 to once-daily oral 30 mg GIRE + 10 mg E or SOC ET (exemestane/ fulvestrant/ tamoxifen) + E until PD or unacceptable toxicity. Co-primary endpoints: Investigator-assessed progression-free survival (INV-PFS; RECIST v1.1) in pts with detectable ESR1 mutation (ESR1m) and the intent-to-treat (ITT) population. Overall survival (OS) was a secondary endpoint.

Result: 373 pts were randomised; 183 to GIRE + E and 190 to SOC ET + E. Data cutoff was 16 July 2025; median follow-up was 18.6 months. ~55% of pts had an ESR1m. Efficacy is shown in the Table. The most common adverse events (AEs) were stomatitis (47.3% in the GIRE + E arm [n = 182] vs 48.9% in the SOC ET + E arm [n = 186]), diarrhoea (26.9% vs 22.6%) and anaemia (23.6% vs 21.0%). The most common grade 3/4 AEs were anaemia (6.0% vs 8.6%), hypokalaemia (3.8% vs 2.7%), pneumonia (1.6% vs 4.3%) and stomatitis (2.7% vs 3.2%). Grade 1 bradycardia was reported (3.8% vs 0.5%) with no treatment interruptions/discontinuations. 8.2% and 6.5% of pts withdrew from GIRE and SOC ET, respectively, due to AEs.

Conclusions: GIRE + E showed statistically significant and clinically meaningful improvements in INV-PFS in ER+, HER2– aBC post-CDK4/6i, for both the ESR1m and ITT pt populations. The safety profile of GIRE + E

Mini Oral Presentation

was manageable with no unexpected findings. GIRE + E may represent a new effective treatment option in the post-CDK4/6i setting.

	*ESR1*m*		ITT	
	GIRE + E	**SOC ET + E**	**GIRE + E**	**SOC ET + E**
INV-PFS				
Median (95% CI), months	9.99 (8.08, 12.94)	5.45 (3.75, 5.62)	8.77 (6.60, 9.59)	5.49 (4.01, 5.59)
HR† (95% CI)	0.38 (0.27, 0.54) *P* < 0.0001		0.56 (0.44, 0.71) *P* < 0.0001	
Interim OS‡				
Median (95% CI), months	NE (20.17, NE)	21.03 (14.78, 26.87)	NE (NE, NE)	26.87 (22.21, NE)
HR† (95% CI)	0.62 (0.38, 1.02) *P* = 0.0566		0.69 (0.47, 1.00) *P* = 0.0473	

* Centrally tested via circulating tumour DNA.
† Stratified by prior fulvestrant (yes vs no), *ESR1*m (yes vs no/indeterminate) and visceral disease (yes vs no).
‡ At data cutoff, OS maturity was 59% in the *ESR1*m population and 67% in the ITT population.
CI, confidence interval; HR, hazard ratio; NE, not evaluable.

Mini Oral Presentation

Long-term Outcomes of Hormone Receptor (HR)-positive/HER2-negative Invasive Lobular Carcinoma (ILC) Based on Multigene Assay (MGA): A Multicenter Real-world Retrospective Study

Ee Jin Kim[1], Seung Ho Baek[2], Ki Jo Kim[4], Soong June Bae[3], Joon Jeong[3], Tae Kyung Yoo[1], Sae Byul Lee[1], Il-Yong Chung[1], Hee Jeong Kim[1], Beom Seok Ko[1], Jong Won Lee[1], Byung Ho Son[1], Jai Min Ryu[4], Sung Gwe Ahn[3], Jisun Kim[1]

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Background: Invasive lobular carcinoma(ILC) is the second most common breast cancer histology, but data on multigene assays(MGA) and chemotherapy benefit in ILC remain limited. This multicenter real-world study compared MGA distribution and prognostic significance between invasive ductal carcinoma(IDC) and ILC in early breast cancer.

Methods: We retrospectively analyzed 6,903 patients who underwent surgery and MGA at four Korean institutions(2011-2023). Genomic risk(G-risk) was defined as Oncotype DX Recurrence Score ≥26 or "high-risk" by MammaPrint/others. Clinical risk was stratified per MINDACT criteria. Disease-free survival(DFS) and distant metastasis-free survival(DMFS) were compared.

Result: Of 6,903 patients, 647(9.4%) were ILC and 6,256(90.6%) were IDC. G-high rate was significantly lower in ILC than IDC(11.4% vs. 23.4%, $p < 0.001$). Among G-high, chemotherapy rates were similar(85.2% vs. 79.3%, $p = 0.423$). ILC showed better DFS and DMFS than IDC($p < 0.05$), with numerical difference among the G-high patients(5yr DFS 93.8% vs 97.4%), and similar in G-low patients(97.2% vs. 96.6%), although neither reached significance($p = 0.09$, 0.30). G-risk stratification was prognostic only in IDC(5yr DFS 91.3% vs 96.2%, HR 2.43, $p < 0.001$), not in ILC(5yr DFS 96.6% vs 97.4%, HR 1.25, $p = 0.78$). In ILC-specific multivariate Cox, only tumor size(>2cm) was an independently prognostic(HR4.70, $p = 0.042$). Notably, G-high distribution varied by MGA type. MMP showed more patients as G-high than ODx in both ILC(22.7% vs. 5.7%, $p < 0.001$) and IDC(43.5% vs. 15.7%, $p < 0.001$), with the relative differences significantly greater in ILC(4-fold vs 2.8-fold, p for interaction <0.001).

Conclusions: ILC showed lower G-high rates and similar chemotherapy utilization compared to IDC following genomic risks. However, MGA-based G-risk stratification failed to predict prognosis in ILC. Survival differences were driven by poor outcomes in IDC G-high patients. Given different G-risk distributions by MGA type and limited prognostic impact among ILC, it should be taken into account when applying MGA-guided treatment decisions to ILC. Further ILC-specific genomic studies are warranted.

Mini Oral Presentation

Effect of Microporous Polysaccharide Haemospheres (Arista™ AH) on Seroma-Related Outcomes Following Mastectomy: A Randomized Controlled Trial

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Background: Seroma formation following mastectomy remains a common postoperative complication. Microporous polysaccharide haemostatic powders such as Arista™ AH have been proposed to reduce postoperative fluid accumulation by promoting haemostasis.

Methods: This single-centre randomized controlled trial evaluated the effect of intraoperative Arista™ AH use during mastectomy with drain placement. Breasts were used as the unit of analysis. Patients undergoing unilateral or bilateral mastectomy were randomized in a 1:1 ratio to Arista™ AH or control groups. The primary outcome was postoperative day 1 drain output. Secondary outcomes were drain duration and number of seroma aspirations following drain removal.

Result: A total of 200 breasts were analysed, with 100 breasts allocated to the Arista™ AH group and 100 to the control group. There were no statistically significant differences in postoperative day 1 drain output, drain duration, seroma aspiration, number of aspirations, or total aspirated seroma volume between the 2 groups. Subgroup analyses by axillary surgery type similarly demonstrated no benefit associated with Arista™ AH use. Multivariable analysis demonstrated no association between Arista™ AH and seroma aspiration as well.

Conclusions: Routine intraoperative use of Arista™ AH during mastectomy does not reduce seroma-related outcomes and is not recommended if used solely for seroma prevention.

Mini Oral Presentation

Decoding Nutrition Linked Epigenetic States in Early-Stage Breast Cancer Using Deep Learning

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Background: Nutritional status influences treatment tolerance, immune response, and survivorship outcomes in early-stage breast cancer. While dietary factors contribute to these effects, epigenetic regulation may capture molecular adaptations linked to nutritional stress. Histone modifications modulate transcriptional programs related to metabolism, inflammation, and cellular repair; however, their computational characterization in relation to nutrition and survivorship remains limited. This study applies machine learning to identify nutrition-associated epigenetic signatures in early stage breast cancer.

Methods: Chromatin immunoprecipitation sequencing (ChIP-seq) data from 250 early-stage breast cancer patients and age-matched controls were analyzed, focusing on activating histone marks H3K4me3 and H3K27ac. Epigenomic features were integrated with whole-genome sequencing and clinical nutritional indicators, including body mass index and treatment-related weight change. Convolutional neural networks (CNNs) were used to learn spatial histone modification patterns, while a random forest classifier integrated epigenetic, genomic, and clinical features to predict nutritional risk and survivorship-related outcomes.

Result: Distinct histone modification patterns were identified in patients with poor nutritional status, particularly in genomic regions regulating metabolic pathways, inflammatory signaling, and stress-response networks. The integrated CNNrandom forest framework achieved 88% accuracy with an area under the curve of 0.94 for nutritional risk classification. Survivorship-related outcomes were predicted with a mean absolute error of 0.4 units. Feature importance analysis highlighted epigenetic regions contributing most strongly to model performance.

Conclusions: This study demonstrates the utility of machine learningbased epigenetic analysis for identifying nutrition-associated molecular phenotypes in early-stage breast cancer. Computational integration of histone modification data with clinical features enables accurate risk stratification and supports precision survivorship modeling, highlighting the role of AI-driven epigenomics in personalized oncology.

Oncological Outcomes of Axillary Surgery in Patients with Residual Nodal Disease After Neoadjuvant Chemotherapy

Serene Si Ning Goh[1,2], Madhumitha Ravichandran[2], Vesa Gashi[2], Rebekah Law[2], Lucy Aitchison[2], Nanda Akriti[2], Evelyn Marshall[2], Mohamed Attia[2], Dalal Alaradi[2], Victoria Sinnett[2], Katherine Krupa[2], Marios Tasoulis[2], Peter Barry[2], Gerald Gui[2], Jennifer Rusby[2], Rachel O'connell[2]

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Background: Targeted axillary dissection (TAD) provides accurate axillary staging and may permit omission of axillary lymph node dissection (ALND) in women who have undergone neoadjuvant chemotherapy. However oncological safety of omitting ALND in patients with residual nodal disease remains uncertain.

Methods: Retrospective analysis of women undergoing TAD after NACT (2018-2023). Magseed-guided excision of clipped node with radiocolloid-guided sentinel lymph node biopsy ± ALND was performed. Outcomes were recurrence and survival. Categorical variables analysed using Fisher's exact test.

Result: Among 179 patients, 79 had HER2-positive, 48 triple-negative, and 52 hormone receptor-positive breast cancer. Residual nodal disease was detected in 69/179 (38.5%). Four underwent upfront ALND and 65 underwent TAD; of these, 18 omitted ALND and 47 underwent completion ALND. In the ALND-omission group (n = 18), a median of 3 nodes were retrieved on TAD (IQR 2-4), with a median of 1 positive node (IQR 1-1). Two patients (10.5%) had isolated tumour cells (ITCs), six (33.3%) had solitary micrometastases, and ten (52.6%) had predominantly low-volume macrometastases; 15 (83.3%) received axillary radiotherapy. In the completion-ALND group (n = 47), the median number of positive TAD nodes was 1 (IQR 1-2). One patient (2.2%) had ITCs, nine (19.1%) micrometastases only, and 37 (78.7%) macrometastases. On ALND, 26/47 (55.3%) had no residual nodal disease; two had atypia, two ITCs, one micrometastasis, and 15 macrometastases (median macrometastatic nodes 0, IQR 0-1.75). At a median follow-up of 48.7 months (IQR 37.0-58.4), there were no isolated axillary or regional nodal recurrences. One (1.4%) had breast recurrence, and 10 (14.5%) developed distant relapse, including two breast cancer-related deaths; none involved the axilla. Omission of ALND was not associated with recurrences (Figure)

Conclusions: In patients with limited residual nodal disease, particularly those with single-node involvement or micrometastases treated with axillary radiotherapy, omission of ALND was not associated with higher risks of axillary recurrence, distant relapse, or mortality.

Variables	Axillary RT (N,%)	Any recurrence (N,%)	Isolated Axillary recurrence (N,%)	Isolated Regional nodal recurrence (N,%)	Local recurrence (N,%)	Distant recurrence (N,%)	Death (N,%)
ALND performed after TAD 47 (reference group)	36 (76.6)	8 (17.0)	0 (0.0)	0 (0)	1 (2.1)	7 (14.9)	2 (4.3)
No ALND 18	15 (83.3)	2 (11.1)	0 (0)	0 (0)	0 (0)	2 (11.1)	0 (0)
Total	51	10	0	0	1	9	2
Odds ratio (95% CI), p value	0.65 (0.16-2.69), p=0.74	1.64 (0.31-8.59), p=0.71	NA	NA	NA	1.40 (0.26-7.47), p=1.00	NA

High TIL Levels Predict Excellent Axillary Nodal Pathologic Complete Response in Triple-Negative Breast Cancer Treated with Pembrolizumab-Based Neoadjuvant Chemotherapy

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Background: Tumor-infiltrating lymphocytes (TILs) have been associated with treatment response in triple-negative breast cancer (TNBC). We evaluated the association between pre-treatment TIL levels and pathologic complete response (pCR) rates, specifically examining axillary nodal pCR across the evolution of neoadjuvant chemotherapy regimens to pembrolizumab-based immunochemotherapy.

Methods: TNBC patients who received neoadjuvant chemotherapy at Gangnam Severance Hospital were retrospectively analyzed between 2011 and 2025. Patients were stratified by core needle biopsy TIL levels into high (≥ 30%) and low (< 30%) groups. Three treatment regimens were evaluated: anthracycline-taxane (AC-T), AC-T with carboplatin (AC-T-Carboplatin), and AC-T-Carboplatin with pembrolizumab. Primary endpoints were overall pCR (ypT0/is ypN0) and axillary pCR (ypN0).

Result: A total of 468 patients were analyzed (291 low TIL, 177 high TIL). High TIL patients showed higher overall pCR rates (59.3% vs 50.2%). Pembrolizumab-based immunochemotherapy significantly elevated the overall pCR rate to 81.8% in high TIL patients, whereas this regimen yielded a pCR rate of 61.6% in low TIL patients. In the high TIL group, axillary nodal pCR rates were 98.2% (54/55) for pembrolizumab-chemotherapy, compared to 82.5% for AC-T and 76.2% for AC-T-carboplatin. Among clinically node-positive patients with high TIL, the axillary nodal pCR rate was 97.9% (46/47). The only case without axillary nodal pCR was clinically N3 at baseline, with residual isolated tumor cells in a single lymph node.

Conclusions: Pembrolizumab-based immunochemotherapy achieved excellent axillary nodal pCR rates and may enable minimization or even omission of axillary surgery in node-positive TNBC patients with high TIL.

Table 1. Pathologic Complete Response Rates by TIL Level and Treatment Regimen

	Low TIL (<30%)			High TIL (≥30%)		
	AC-T	AC-T-carbo	AC-T-carbo +pembro	AC-T	AC-T-carbo	AC-T-carbo +pembro
Overall pCR (%)	27.1	56.7*	61.6	46.3	54.8	81.8*
Axillary pCR (%)	27.1	85.3	89.9	82.5	76.2	98.2*

**Statistically significant improvement ($p<0.05$)*

Mini Oral Presentation

Optimization of Sentinel Lymph Node Biopsy Using a Radiation-Free Dual-Tracer Protocol: A Large-Scale Analysis of 834 Patients Addressing Access Barriers in Asia

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Background: Sentinel lymph node biopsy (SLNB) using radioisotopes is the global standard; however, its implementation is severely hindered in many Asian regions due to high costs, lack of nuclear medicine infrastructure, and strict regulatory licensing. Methylene blue (MB) is a primary alternative but is often limited by inconsistent nodal yield. This study evaluates a synergistic, radiation-free dual-tracer strategy combining MB with carbon nanoparticles (CN) to bridge the gap in surgical care standards in resource-limited settings.

Methods: We analyzed a cohort of 834 female patients with clinically node-negative (cN0) early breast cancer. Patients were stratified into two groups: the MB monotherapy group (n = 415) and the MB+CN dual-tracer group (n = 419). The primary endpoints were the SLN detection rate and mean node retrieval (MNR). The study aimed to validate a high-precision, hardware-independent protocol that could be easily adopted by hospitals without access to nuclear medicine.

Result: The MB+CN group demonstrated a high SLN detection rate of 96.42% (404/419), which was non-inferior to the 96.39% (400/415) observed in the MB group ($P = 0.905$). However, the dual-tracer protocol significantly enhanced the surgical yield, with a mean node retrieval of 2.43 ± 1.64 compared to 2.10 ± 1.35 in the MB-only group ($P < 0.001$). Multivariate regression confirmed that this increased nodal yield remained significant after adjusting for biological factors ($\beta = 0.36$, 95%CI:0.19-0.52, $P < 0.001$). Subgroup analyses revealed that the MB+CN combination was particularly effective in aggressive molecular subtypes (high-Ki67) and T2-stage tumors.

Conclusions: The combined use of methylene blue and carbon nanoparticles significantly improves nodal retrieval efficiency without compromising detection success. By providing a reliable, cost-effective, and radiation-free alternative to radioisotope-based methods, this protocol addresses the systemic inequities in breast cancer surgical care across Asia. It offers a scalable solution for high-precision axillary staging in centers where advanced imaging and nuclear tracers are unavailable.

Mini Oral Presentation

Association of Blood Count-Derived Inflammatory Indices with Capsular Contracture After Post-Mastectomy Radiotherapy in Breast Cancer Patients Undergoing Direct-to-Implant Reconstruction

Jae Young Lee[1], Seung Yong Song[2], Dong Won Lee[2], Eun-Jung Yang[2], Jee Ye Kim[3], Jungwook Shin[4], Nalee Kim[5], Jin Sung Kim[1], Jee Suk Chang[1]

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Background: Direct-to-implant (DTI) breast reconstruction is widely used, but post-mastectomy radiotherapy (PMRT) substantially increases the risk of capsular contracture (CC). Blood count-derived inflammatory indices reflect systemic immune status and may be associated with fibrosis. We evaluated whether these indices could predict CC following DTI with PMRT.

Methods: We retrospectively analyzed 279 patients who underwent DTI, with or without PMRT, between 2019 and 2023. The primary endpoint was CC grade ≥ 2. We evaluated the association between PMRT and CC and whether this effect was modified by inflammatory markers. Multiple inflammatory indices (MLR, dNLR and others) were dichotomized using ROC-derived cut-offs, and interactions between PMRT and each marker were assessed using logistic regression. Among patients who received PMRT, subgroup analyses were performed to examine the association between cumulative blood dose, post-radiotherapy changes in inflammatory indices, and CC, using blood dose estimates derived from a deep learning-based personalized dosimetry platform.

Result: PMRT increased CC risk. This effect was strongly modified by baseline inflammatory status, with high baseline MLR showing a markedly higher CC risk (59% vs. 3%), while baseline MLR had no association with CC in the absence of PMRT. PMRT remained an independent predictor of CC on multivariable analysis (OR 5.2, 95% CI 2.42-11.2), with a significant PMRT × MLR interaction (OR 8.86, 95% CI 1.002-78.3). Among patients who received PMRT, further subgroup analyses demonstrated that higher cumulative blood dose exposure (blood D5% ≥ 3.0 Gy) was associated with post-RT dNLR reduction (OR 2.8). Post-RT dNLR reduction was independently associated with an increased risk of CC (OR 3.00) and significantly improved model performance beyond baseline inflammatory markers.

Conclusions: Baseline blood count-derived inflammatory indices and their RT-associated changes were associated with CC risk after PMRT in DTI reconstruction. These findings are hypothesis-generating and require external validation and mechanistic studies incorporating detailed immune profiling.

Mini Oral Presentation

Figure 1A. CC grade ≥ 2 Incidence by RT and Baseline MLR Group

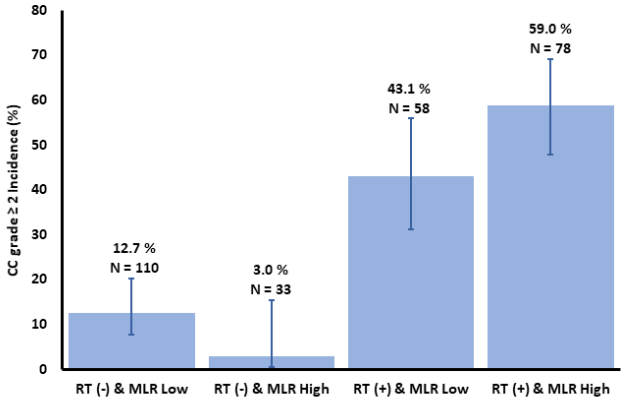
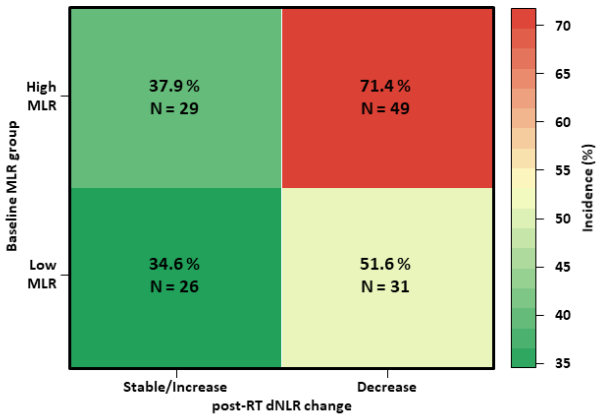


Figure 1B. RT Cohort: CC ≥2 Risk by Baseline MLR and Post-RT dNLR Change



Mini Oral Presentation

Age-Stratified Cardiovascular Risk after Breast Cancer Treatment: A Korean Nationwide Cohort Study

Eunhye Kang[1], Hyeonggeun Cho[1], Changhoon Lee[1], Hong-Kyu Kim[1], Han-Byoel Lee[1], Hyeong-Gon Moon[1], Wonshik Han[1], Hoyoun Won[2]

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Background: Advances in breast cancer treatment have substantially improved survival, making long-term cardiovascular morbidity increasingly relevant. Cardiovascular disease (CVD) has emerged as a leading cause of non-cancer mortality among survivors. While anthracyclines, trastuzumab, and aromatase inhibitors are associated with cardiovascular toxicity, the combined impact of multimodal treatment regimens on CVD risk across different age groups remains unclear.

Methods: We conducted a retrospective cohort study using the nationwide K-cure public database. Female patients diagnosed with invasive breast cancer between 2012 and 2019. The primary outcome was cardiovascular events (heart failure, myocardial infarction, stroke, coronary revascularization, or cardiovascular death) within 5 years after breast cancer diagnosis. Multivariable logistic regression models adjusted for baseline comorbidities and treatment exposures were used.

Result: Among 16,163 patients, 5-year CVD incidence was 5.27% (95% CI 4.93-5.62), 3.78% in patients <50 years and 6.9% in those ≥ 50 years. Treatment effects differed markedly by age. In patients <50 years, anthracycline-based chemotherapy conferred a 2-fold increased CVD risk (OR 2.03, 95% CI 1.51-2.76, $p<0.001$) and anti-HER2 therapy a 3-fold increase (OR 3.04, 95% CI 2.30-4.00, $p<0.001$). In patients ≥ 50 years, chemotherapy showed no significant association with CVD risk (OR 1.14, $p=0.124$), and anti-HER2 therapy effects were substantially attenuated (OR 1.24, $p=0.035$). In patients ≥ 60 years, neither chemotherapy nor anti-HER2 therapy was significantly associated with CVD risk. Baseline comorbidities including hypertension and diabetes, were primary CVD predictors in older patients.

Conclusions: Treatment-related cardiotoxicity predominantly affects younger breast cancer survivors, while pre-existing metabolic comorbidities constitute the principal CVD risk substrate in older patients. Age-specific cardio-oncology surveillance, focusing on early cardiac monitoring for younger patients and aggressive comorbidity management in older patients, is needed to improve long-term cardiovascular outcomes in breast cancer survivorship.

Mini Oral Presentation

Clinicopathological Characteristics and Outcomes of Male Breast Cancer in Japan: A part of the OASIS male BC Project

Akihiko Shimomura[1], Ayumi Saito[2], Takehiko Sakai[3], Yoichi Naito[4], Yuichiro Kikawa[5], Koichiro Tsugawa[6], Mina Takahashi[7], Kumiko Kida[8], Ken-Ichi Watanabe[9], Tomomi Fujisawa[10], Yasuaki Sagara[11], Takashi Kuwayama[12], Yuko Takano[13], Mai Okazaki[14], Toru Hanamura[15], Shinsuke Sasada[16], Akiko Ebata[17], Kosuke Kawaguchi[18], Fumikata Hara[19], Takashi Hojo[20], Chihwan-David Cha[21], Hiroji Iwata[22], Tadahiko Shien[23]

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Background: Male breast cancer (BC) is a rare disease, and evidence guiding its optimal management remains limited. Most treatment strategies are extrapolated from female breast cancer, despite differences in patient background and tumor biology. We conducted a large multicenter retrospective study to clarify the real-world characteristics and outcomes of male BC in Japan.

Methods: Clinical data were retrospectively collected from 51 institutions participating in the OASIS Male Breast Cancer Project. Patient demographics, comorbidities, pathological features, treatment patterns, and survival outcomes were analyzed. Distant disease-free survival (DDFS) and overall survival (OS) were estimated using the Kaplan-Meier method. This analysis represents a preliminary report of the Japanese cohort.

Result: A total of 920 male patients diagnosed with breast cancer between January 2000 and March 2024 were included. The median age at diagnosis was 69 years (interquartile range[IQR], 60-76). Surgery was performed in 90.5% of patients, predominantly mastectomy (85.0%). Comorbidities were present in 57.9% of patients. Pathologically, 46.5% had T1 disease, and 52.3% were node-negative disease. Estrogen receptor positivity was observed in 93.7% of tumors, while HER2 positivity was 7.1%. BRCA testing was performed in only 22.9% of patients, of whom 4% had BRCA1 variants and 14.2% had BRCA2 variants. Adjuvant chemotherapy was administered in 18.4%, endocrine therapy in 73.0%, and radiotherapy in 13.4%. With a median follow-up of 4.6 years (IQR: 2-8.5), 104 DDFS events (11.3%) and 162 OS events (17.6%) were observed. Median DDFS was 12.8 years (95% CI, 11.5-14.7), and median OS was 17 years (95% CI, 14.3-not estimable).

Mini Oral Presentation

Conclusions: This large Japanese multicenter study demonstrates that MBC is characterized by high hormone receptor positivity and favorable long-term outcomes. Limited use of genetic testing and radiotherapy was observed. Future integrated analyses with the KBCSG-29 cohort will enable international comparisons and contribute to the development of evidence-based, male BC-specific management strategies.

Clinical Presentations and Prognostication of HER2-Low and HER2-Zero Early Breast Cancer in Taiwan

Yen-Jen Chen[1,3], Chih-Yi Hsu[2], Chi-Cheng Huang[1,4], Ling-Ming Tseng[1,3]

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Background: With the advent of antibody-drug conjugates (ADCs), HER2-low breast cancer has emerged as a subgroup that may benefit from trastuzumab deruxtecan (T-Dxd) treatment. This study uses the Taiwan Cancer Registry (TCR) to assess the clinical features and prognostic outcomes of HER2-low breast cancer.

Methods: HER2-low breast cancer was defined as immunohistochemistry (IHC) 1+ or 2+ with negative in situ hybridization (ISH), while HER2-zero was IHC 0. A total of 137,840 breast cancer cases from the TCR (2011-2020) were reviewed, with 38,773 stage 0-III HER2-negative cases analyzed for clinical features (IHC, stage, grade) and outcomes (relapse-free and overall survival) comparing HER2-low and HER2-zero groups.

Result: Among HER2-negative breast cancers, 65.4% were HER2-low and 34.6% HER2-zero. HER2-low was more common in HR-positive disease (66.9% vs 56.9%). Median age was similar (56.3 vs 57.1 years, $P < 0.001$). Overall survival was better in HER2-zero for both HR-positive (93% vs 91.8%) and HR-negative groups (86.2% vs 83.3%) ($P < 0.0001$); relapse-free survival showed similar trends. HER2-low tumors were more often stage 0 and III. ER and PR positivity were higher in HER2-low (ER 85.5% vs 80.1%; PR 78.2% vs 72.4%, $P < 0.0001$). In HR-positive disease, HER2-low had more grade III tumors.

Conclusions: HER2-low status was a prognostic factor for Taiwanese breast cancer (hazard ratios: 1.07 for overall survival, 1.25 for relapse-free survival) after adjusting for HR status and pathological stage. The HR-positive HER2-low subset (84.7%) had a slightly younger age of onset, higher ER/PR positivity, more grade III disease, and fewer stage I cases (45.9% vs. 49%). Future studies are needed to further explore the biological and therapeutic significance of this new classification.

Mini Oral Presentation

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Poster Discussion

Go Beyond Cure of Breast Cancer

Integrative Clinical and Transcriptomic Analysis Reveals Prognostic Impact of HER2-Low Expression in ER-Positive Early Breast Cancer

Seul Gi Kim[1], Gae Hoon Jo[2], Joohyuk Sohn[3], Hyung Seok Park[4], Seho Park[4], Seung-Il Kim[4], Seung Ki Kim[5], Seung Ah Lee[5], Isaac Kim[5], Kwanbum Lee[5], Mithun Ghosh[6], Sa Deok Hong[6], Seong Min Park[6], Hee-Jung Ahn[7], Taewoo Kang[8], Wonshik Han[9], Eun-Kyu Kim[10], Hyun Jo Youn[11], Ki-Tae Hwang[12], Korean Breast Cancer Society Kbcs[1], Sohyun Hwang[2,7], Yong Wha Moon[1]

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Background: HER2 expression in breast cancer exists along a spectrum, yet conventional treatment paradigms have historically categorized tumors as either HER2-positive or -negative. HER2-low breast cancer, defined as Immunohistochemistry (IHC) 1+ or 2+ with negative in situ hybridization (ISH), has emerged as a biologically and clinically distinct subgroup, particularly following the recent success of trastuzumab deruxtecan (T-DXd) in metastatic settings. However, the prognostic significance of HER2-low status in early-stage disease, especially in relation to estrogen receptor (ER) status, remains unclear.

Methods: We conducted a retrospective multicenter cohort study including 32,990 patients with HER2-negative early breast cancer from a nationwide Korean registry. Survival outcomes were analyzed according to HER2-low versus HER2-null (IHC 0) expression, stratified by ER status. In parallel, transcriptomic profiling was performed using microarray analysis on patient-derived tumor xenograft (PDTX) models with HER2-low and HER2-null phenotypes. Differentially expressed genes (DEGs) and enriched pathways were identified using bioinformatic analysis.

Result: Among 24,695 ER-positive and 8,295 ER-negative patients, HER2-low expression was significantly associated with worse overall survival in the ER-positive subgroup (log-rank $p = 0.004$), but showed no prognostic impact in ER-negative patients. Microarray analysis of PDTX models revealed key DEGs including MAPK1, PIK3C2B, EGFR, AXIN2, and JAK2. Notably, MAPK1 and JAK2 were up-regulated in HER2-low tumors with ER positivity, and pathway analysis suggested activation of endocrine resistance related signaling. Functional validation further demonstrated that combined inhibition of ER, HER2, and JAK2 synergistically suppressed ER/HER2 cross-talk and downstream STAT3 signaling in ER-positive HER2-low breast cancer models.

Conclusions: HER2-low expression represents a poor prognostic marker in ER-positive early breast cancer. Transcriptomic differences suggest a distinct biology characterized by endocrine resistance. These findings highlight the need for therapeutic strategies beyond endocrine therapy in this emerging subtype.

Type I Interferon-β Mediates Radiation-Induced Abscopal Effects in TUBO Breast Cancer: Synergistic Enhancement with Anti-PD-L1 Immune Checkpoint Inhibition

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Background: The abscopal effect represents a systemic immune response whereby local radiotherapy induces regression of distant, unirradiated metastatic lesions. While this phenomenon holds promise for treating metastatic breast cancer, the mechanistic differences between ablative hypo-fractionated and conventional fractionated radiotherapy remain poorly understood. Moreover, the optimal radiation dosing strategy to reliably induce abscopal responses in breast cancer has not been established.

Methods: We established a metastatic breast cancer model using TUBO cells (BALB/neuT mammary carcinoma cell line) implanted bilaterally in BALB/c mice to investigate abscopal effects. Primary tumors (head flank) received either ablative radiation (15 Gy single fraction) or fractionated non-ablative radiation (4 Gy × 10 fractions), while secondary tumors (tail flank) remained unirradiated. We assessed tumor growth, immune cell infiltration (CD8+ T cells, CD11c+ dendritic cells), and type I interferon signaling through flow cytometry, immunohistochemistry, and RT-qPCR. Additional experiments included IFNAR-1 blockade, recombinant human IFN-β supplementation, and anti-PD-L1 combination therapy.

Result: Ablative radiation (15 Gy single fraction) effectively suppressed both irradiated primary tumors and unirradiated secondary tumors ($p < 0.039$). In contrast, fractionated radiation (4 Gy × 10) failed to induce systemic antitumor responses. The abscopal effect required significant increases in CD107a+ activated CD8+T cells. Ablative radiation induced greater CD11c+ dendritic cell recruitment to irradiated tumors and regional lymph nodes, particularly CD103+ DCs. RT-qPCR analysis revealed upregulation of IFN-β mRNA in CD45+ tumor cells following ablative radiation, with type-I-IFN signaling increase. IFNAR-1 blockade abolished the abscopal effect despite effective primary TUBO tumor control, while recombinant IFN-β supplementation enabled fractionated radiation to induce abscopal responses. Combining IFN-β with anti-PD-L1 therapy further enhanced abscopal tumor control in TUBO tumor model

Conclusions: TUBO tumor-derived IFN-β is necessary and sufficient for radiation-induced abscopal effects. IFN-β supplementation combined with anti-PD-L1 enables fractionated radiotherapy to overcome its limitations, establishing a framework for optimizing radiotherapy in metastatic breast cancer.

Tamoxifen with Versus Without Ovarian Function Suppression in Premenopausal HR-Positive/HER2-Negative Breast Cancer: A Real-World Cohort Study

Dahn Byun, Jihoon Lee, Ki Beom Kim, Ki Jo Kim, Seungah Lee, Doyoun Woen, Su Min Lee, Kawon Oh, Cho Eun Lee, Woong Ki Park, Se Kyung Lee, Byung Joo Chae, Jonghan Yu, Jeong Eon Lee, Seok Won Kim, Seok Jin Nam, Jai Min Ryu

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Background: Randomized trials support adding ovarian function suppression (OFS) to tamoxifen in selected premenopausal patients, but real-world effectiveness and optimal patient selection remain uncertain. In observational settings, OFS initiation timing relative to endocrine therapy may introduce biases affecting effect estimation.

Methods: We retrospectively analyzed premenopausal women aged ≤45 years with HR-positive/HER2-negative stage I-III breast cancer treated surgically at a single center (2013-2018). Time zero was endocrine therapy initiation. We compared tamoxifen alone versus tamoxifen+OFS for disease-free survival (DFS), breast cancer-free interval (BCFI), and overall survival (OS). Cox models adjusted for age (<40 vs 40-45), tumor size (<2.0 vs ≥2.0 cm), nodal status, and grade. Sensitivity analyses included chemotherapy and surgery-year adjustment, 96-month truncation, 1:1 propensity score matching (PSM), and a 6-month landmark analysis. Low-risk was predefined as pN0, tumor <2.0 cm, and grade 1-2.

Result: Among 2,252 patients (1,357 tamoxifen alone; 895 tamoxifen+OFS; median follow-up 95.6 and 89.6 months, respectively), tamoxifen+OFS showed a non-significant trend toward improved DFS (aHR 0.81, 95% CI 0.63-1.04; $p = 0.095$) and BCFI (aHR 0.84, 95% CI 0.66-1.08; $p = 0.172$), but a significant OS benefit (aHR 0.54, 95% CI 0.31-0.93; $p = 0.028$). PSM (n = 685 pairs) showed a significant DFS benefit (HR 0.72, 95% CI 0.52-0.99; $p = 0.046$) and a borderline OS benefit (HR 0.56, 95% CI 0.29-1.08; $p = 0.082$). In the 6-month landmark cohort (n = 2,235), the DFS association was substantially attenuated (aHR 0.94, 95% CI 0.74-1.19; $p = 0.626$). In the low-risk subgroup (n = 900), no DFS benefit was observed (aHR 0.86, 95% CI 0.55-1.35; $p = 0.519$).

Conclusions: Standard adjusted and PSM analyses suggested OFS benefit for DFS and OS; however, the DFS association was substantially attenuated in landmark analysis addressing immortal time bias, and no benefit was seen in low-risk patients. These findings highlight the sensitivity of effect estimates to analytic approach and exposure definitions in observational OFS studies.

Machine Learning Based Individualized Treatment Effect Analysis to Identify Premenopausal Breast Cancer Patients Who Benefit from Extended Endocrine Therapy

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Background: Although large-scale trials have demonstrated the efficacy of extended endocrine therapy (ET), criteria for individualizing treatment remain unclear, particularly given long-term toxicity concerns. We aimed to identify premenopausal patients most likely to benefit from extended ET using a machine learning-based individualized treatment effect (ITE) approach, integrated with conventional late distant recurrence (DR) risk prediction.

Methods: This retrospective multicenter study included premenopausal women aged ≤45 years with ER-positive/ERBB2-negative breast cancer who underwent primary surgery between 2000 and 2011. Two supervised machine learning classifiers were developed using identical clinicopathological features: one among patients receiving extended ET (μ1) and the other among those without extension (μ0), each predicting late distant metastasis-free survival (≥5 years). ITE was defined as the difference between predicted probabilities (ITE = μ1-μ0). Patients with higher predicted metastasis-free probability with extended ET were classified as the predicted-benefit group.

Result: Among 1,213 patients, late DR occurred in 17 of 765 low-risk patients (2.2%) and 75 of 448 high-risk patients (16.7%) according to the DR prediction model. ITE analysis identified a predicted-benefit subgroup of 393 patients within the high-risk population, capturing all 75 patients who developed late DR. This approach reduced the number of patients recommended for extended ET from 448 to 393 while maintaining complete capture of late DR events. Kaplan-Meier analysis showed that the highest incidence of late DR occurred in the high-risk predicted-benefit group, demonstrating improved risk discrimination.

Conclusions: A machine learning based ITE approach refined risk-based stratification by identifying premenopausal patients within the high-risk group most likely to benefit from extended ET. This benefit-enriched strategy may support more individualized decision-making regarding extended ET.

Subtype-Specific Risk and Temporal Dynamics of Brain Metastases in Metastatic Breast Cancer

Kyoo Hyun Kim[1], Joohyuk Sohn[1], Min Hwan Kim[1], Jee Hung Kim[3], Jee Hyun Ahn[2], Jee Ye Kim[2], Hyung Seok Park[2], Seho Park[2], Seung-Il Kim[2], Joon Jeong[4], Gun Min Kim[1]

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Background: Brain metastases (BM) are an increasingly recognized complication in metastatic breast cancer (MBC), with substantial neurologic morbidity and inferior survival. The incidence and timing of BM differ across molecular subtypes; however, real-world longitudinal data describing the metastatic disease course remain limited. This study evaluated subtype-specific BM incidence, temporal patterns, and clinical outcomes in patients with MBC.

Methods: We retrospectively analyzed 2,311 MBC patients treated between 2005-2024 at two tertiary cancer centers in Korea. Clinical and molecular subtype information and BM characteristics were obtained from institutional databases. BM incidence, timing from metastatic diagnosis, and survival outcomes were assessed by subtype. Survival analyses were also performed according to BM burden and local treatment strategies using the Kaplan-Meier method.

Result: BM developed in 525 of 2,311 patients (22.7%) throughout the metastatic disease course, including 178 (33.9%) identified at initial stage IV diagnosis. Lifetime BM incidence differed by subtype and was highest in HER2+ (34.2%) and triple-negative breast cancer (TNBC) (33.0%), and lowest in HR+/HER2- disease (14.4%). Temporal analysis demonstrated an early BM peak in TNBC and HER2+ subtypes, with 94.7% and 82.2% of events, respectively, occurring within three years of metastatic diagnosis. In contrast, HR+/HER2- disease showed a more gradual accumulation without a distinct temporal peak. BM burden was associated with survival; median overall survival (OS) following BM was 23.5 months for single lesions, 13.3 months for 1-10 lesions, and 10.4 months for ≥ 10 lesions ($p < 0.0001$). Leptomeningeal seeding conferred markedly inferior OS (5.4 vs 15.3 months; $p < 0.0001$). Local treatment modality also influenced OS, with surgery and radiosurgery demonstrating longer survival compared with whole-brain radiotherapy.

Conclusions: TNBC and HER2+ subtypes exhibited a high early risk of BM, with most cases occurring within three years of metastatic diagnosis. These findings support the need for early CNS surveillance strategies in high-risk subtypes to enable timely detection and intervention.

Table. Subtype-Specific Incidence and Temporal Risk of Brain Metastases in Metastatic Breast Cancer

Subtype	Lifetime Incidence[a] of Brain Metastases (N/N, %)	Brain Metastases Diagnosed Within the First 3 Years of Stage IV (N, %)	Follow-up duration Median months (95% CI)
HR+HER2-	187/1299 (14.4)	135 (72.2)	67.4 (62.5 - 72.3)
HER2+	191/558 (34.2)	157 (82.2)	84.5 (75.3 - 93.6)
HR+HER2+	92/268 (34.3)	70 (76.1)	92.2 (81.9 - 102.4)
HR-HER2+	99/290 (34.1)	87 (87.9)	73.7 (63.1 - 84.3)
TNBC	133/403 (33.0)	126 (94.7)	46.6 (36.2 - 57.0)
Unknown	14/51 (27.5)	12 (85.7)	21.0 (17.3 - 34.6)
All subtypes	525/2311 (22.7)	430 (81.9)	68.8 (64.2 - 73.4)

Abbreviations: CI, confidence interval; HER2, human epidermal growth factor receptor 2; HR, hormone receptor; TNBC, triple-negative breast cancer

[a]Lifetime incidence includes patients diagnosed with brain metastases at initial stage IV and those who developed them later during disease progression.

Poster Discussion

Impact of Trastuzumab Deruxtecan (T-DXd) and Brain Stereotactic Radiosurgery on Intracranial Control and Radionecrosis Risk in HER2-Positive or -Low Breast Cancer Brain Metastases

Seok-Joo Chun[1], Kyubo Kim[2], Won Ick Chang[3], Yong Bae Kim[4], Sun Ha Paek[5], Kyung-Hun Lee[6], Jin-Ho Song[7], Ji Hyun Hong[7], Jieun Lee[8], Won Il Jang[9], Tae Hyun Kim[10], Kyung Hwan Shin[3]

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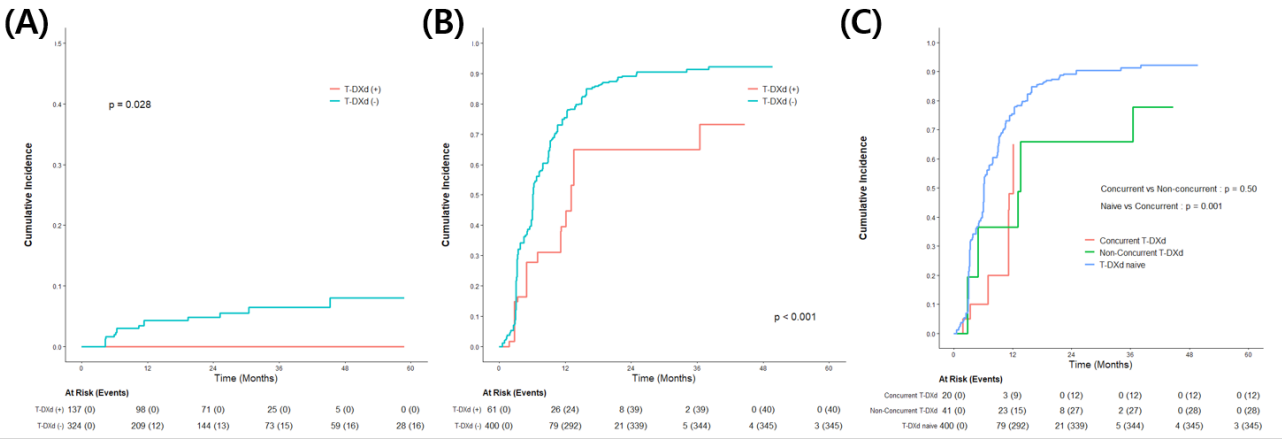
Background: While trastuzumab-deruxtecan (T-DXd) demonstrates intracranial efficacy, the potential for radionecrosis (RN) when combined with stereotactic radiosurgery (SRS) remains a concern, given the established risk with other antibody-drug conjugates like T-DM1. This study evaluated the safety and efficacy of T-DXd and SRS in patients with HER2-positive or -low breast cancer brain metastases (BCBM).

Methods: We conducted a multi-center retrospective analysis of 113 patients (461 SRS treatments) treated with SRS and anti-HER2 agents. Patients were stratified into T-DXd(+) (n = 29 patients, 61 treatments) and T-DXd(-) (n = 84 patients, 400 treatments) groups. Endpoints included RN, radionecrosis-free survival (RNFS), and intracranial control outcomes (any intracranial progression, local failure, and distant intracranial metastasis).

Result: No cases of RN were observed in the T-DXd(+) group, compared with 12 cases in the T-DXd(-) group ($p = 0.028$). On multivariate analysis, T-DXd(+) status remained independently associated with improved RNFS (HR 0.31, $p = 0.009$). On a treatment-level analysis, the 1-year cumulative incidence of RN was 0% for T-DXd(+) versus 4.3% for T-DXd(-) ($p = 0.009$). Additionally, T-DXd(+) was associated with significantly better 1-year outcomes for any intracranial progression (40% vs. 76%, $p < 0.001$), local failure (6.6% vs. 29%, $p = 0.002$), and distant intracranial metastasis (40% vs. 66%, $p = 0.009$). All efficacy endpoints remained significant on multivariate analysis.

Conclusions: Combining T-DXd with SRS demonstrated a favorable safety profile without increasing the risk of radionecrosis. Furthermore, this combination yielded superior intracranial control, encompassing both local and distant outcomes, supporting the potential of T-DXd combined with SRS as an effective and well-tolerated therapeutic approach for HER2-positive or -low BCBM.



Treatment-level analysis of radionecrosis and intracranial efficacy outcomes according to T-DXd status (n=461 treatments). (A) Cumulative incidence of radionecrosis. (B) Cumulative incidence of any intracranial progression. (C) Cumulative incidence of any intracranial progression stratified by the timing of T-DXd administration.

Identification of Continuous Positive Airway Pressure (CPAP)-unfavorable Geometry in Left-sided Breast Radiotherapy Using Free-breathing CT

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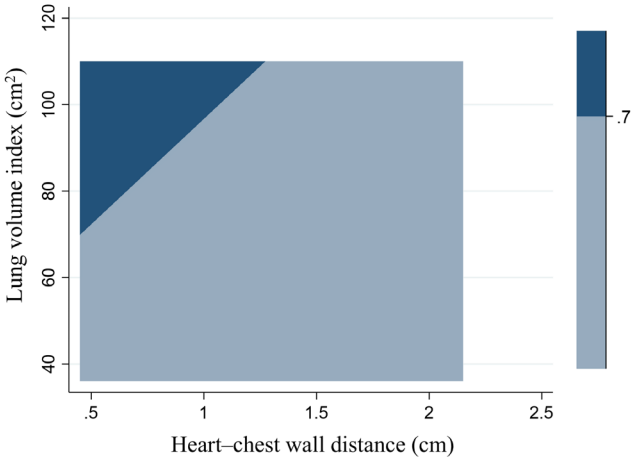
Background: Continuous positive airway pressure (CPAP) is an effective technique for reducing cardiac dose during left-sided breast radiotherapy; however, its benefit varies among patients. This study aimed to identify patient characteristics on free-breathing (FB) CT associated with limited benefit from CPAP.

Methods: We retrospectively analyzed 59 patients who underwent CPAP-assisted breast radiotherapy between 2024 and 2026. CPAP-unfavorable geometry was defined as either reduced heartchest wall (HC) distance on CPAP CT compared with FB CT, or HC distance below the cohort 25th percentile (1.24 cm) on CPAP CT. Anatomical parameters measured on FB CT were evaluated as predictors. Associations with CPAP-unfavorable geometry were assessed using multivariable logistic regression. Predicted probabilities were estimated from the logistic regression model and visualized using predictive margins and contour plots.

Result: CPAP-unfavorable geometry was observed in 18 patients (30.5%), and favorable geometry in 41 patients (69.5%). Larger HC distance was associated with a lower likelihood of CPAP-unfavorable geometry (odds ratio [OR] 0.11, 95% CI 0.02-0.70, $p = 0.018$), whereas a higher lung volume index (ipsilateral lung volume divided by tangential field distance) was associated with an increased likelihood of CPAP-unfavorable geometry (OR 1.05, 95% CI 1.01-1.08, $p = 0.014$). Probabilities of CPAP-unfavorable geometry approached 70% for HC distances of approximately 1.0 cm or less combined with lung volume index values of approximately 80 cm^2 or higher. Although mean heart dose on CPAP plans did not differ significantly between groups, maximum heart dose on CPAP plans was significantly higher in the CPAP-unfavorable geometry group (25.5 ± 8.0 Gy vs. 19.8 ± 7.2 Gy, $p = 0.010$).

Conclusions: A simple FB CT-based model incorporating HC distance and lung volume index may help identify patients unlikely to benefit from CPAP. This geometry-driven approach could support selective use of CPAP while maintaining cardiac dose safety.

Joint geometric patterns associated with a ≥ 70% probability of CPAP-unfavorable geometry



The shaded region indicates combinations of heart–chest wall distance and lung volume index associated with a ≥70% predicted probability of CPAP-unfavorable geometry. These combinations reflect geometries in which effective cardiac displacement with CPAP is less likely.

Poster Discussion

Comparison of Physical and Functional Recovery and Quality of Life between Mini- and Extended Latissimus Dorsi Breast Reconstruction

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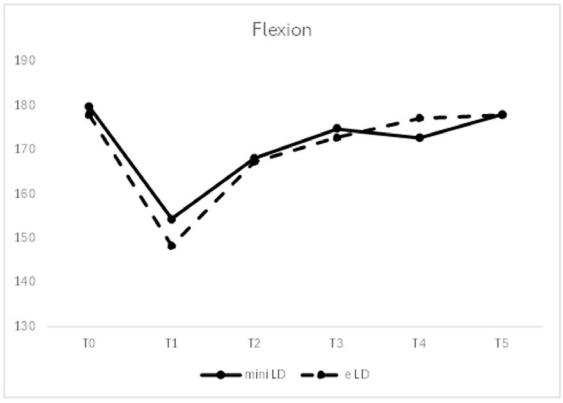
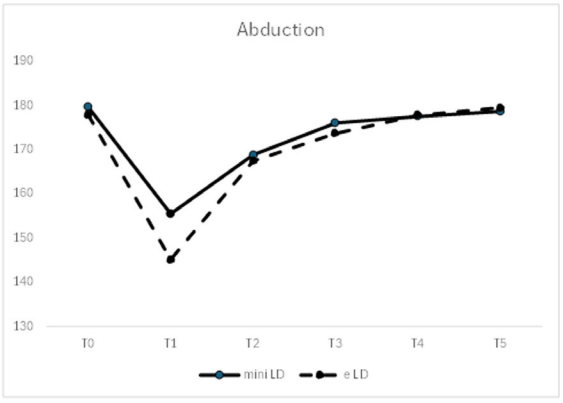
Background: The mini latissimus dorsi (LD) flap was developed as an adaptation of the conventional LD flap with reduced muscle dissection. In this study, we evaluated shoulder function and quality of life prospectively after breast reconstruction with the conventional extended and mini LD flap to compare the functional changes based on the extent of elevation of the muscle.

Methods: Range of motion were evaluated preoperatively and at five postoperative intervals: week 2, week 6, month 3, month 6, and month 12. Functional disability and quality of life were measured using the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire and the 36-Item Short-Form Health Survey (SF-36) at the same intervals.

Result: Most of the range-of-motion scale recovered nearly to preoperative scores at postoperative month 3 after demonstrating the most restricted range at postoperative week 2. For internal and external rotation, the mini LD flap group consistently showed greater range of motion than the extended LD flap group, achieving statistical significance at postoperative weeks 2 and 6 for internal rotation and at postoperative weeks 2, 6, and month 3 for external rotation. Functional disability, as measured by the DASH questionnaire, significantly increased following latissimus dorsi flap surgery. The mental and physical components of the SF-36 improved over time beginning at postoperative week 2.

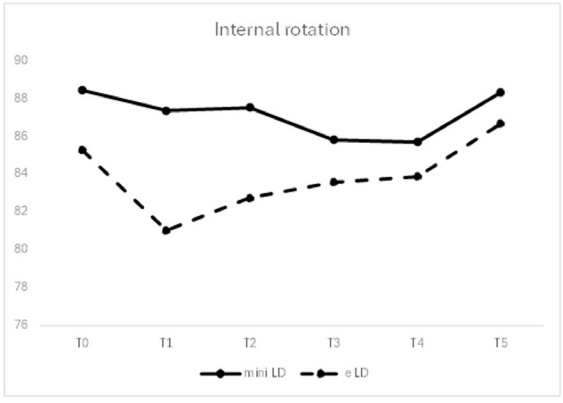
Conclusions: At 1 year postoperatively, both the mini and extended LD flap groups demonstrated recovery of range of motion and SF-36 scores to levels comparable to baseline. However, the mini LD flap group showed less limitation in range of motion and higher SF-36 scores at most postoperative time points compared with the extended LD flap group, with statistically significant differences observed in internal and external rotation. These findings indicate that a greater extent of latissimus dorsi muscle harvest may be associated with increased limitation in internal and external rotation.

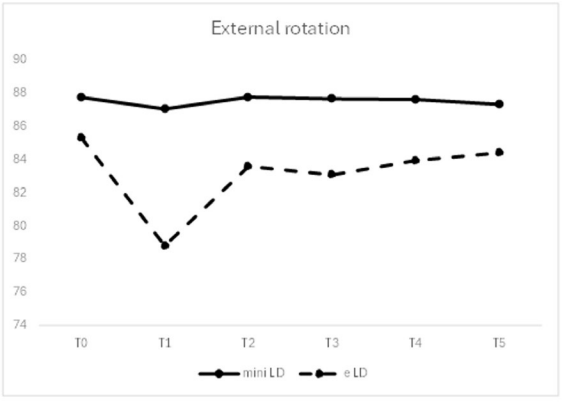




	T0	T1	T2	T3	T4	T5
mini LD	179.74	154.41	168.06	174.7	172.63	178
e LD	177.87	148.31	167.25	172.79	177.12	177.84
P-value	0.0922	0.3395	0.8331	0.5314	0.2934	0.9089

	T0	T1	T2	T3	T4	T5
mini LD	179.74	155.51	168.83	176	177.5	178.67
e LD	177.95	145.17	167.42	173.65	177.79	179.51
P-value	0.0591	0.3396	0.833	0.5314	0.2934	0.9089





	T0	T1	T2	T3	T4	T5
mini LD	88.42	87.35	87.5	85.8	85.69	88.33
e LD	85.25	81.02	82.75	83.56	83.85	86.67
P-value	0.0563	0.017	0.0426	0.6489	0.9596	0.2446

	T0	T1	T2	T3	T4	T5
mini LD	87.75	87.06	87.78	87.67	87.63	87.33
e LD	85.33	78.81	83.59	83.08	83.94	84.41
P-value	0.0564	0.0007	0.0268	0.0095	0.0787	0.0984

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Poster Presentation

Go Beyond Cure of Breast Cancer

Breast Cancer Mortality and Years of Life Lost in China: An Analysis of Trends from 2013 to 2021

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Background: This study aims to analyze breast cancer mortality trends and quantify the burden of premature death among Chinese residents from 2013 to 2021 to inform national prevention strategies and resource allocation.

Methods: Data were obtained from the Chinese Cause of Death Monitoring Dataset. Joinpoint regression models were employed to calculate the Annual Percentage Change (APC) and Average Annual Percentage Change (AAPC) to characterize temporal trends. Furthermore, the study utilized Potential Years of Life Lost (PYLL), Average Years of Life Lost (AYLL), and the Value of Years of Life Lost (VYLL) to evaluate the impact of premature mortality on public health and the economy.

Result: From 2013 to 2021, the national age-standardized mortality rate initially rose and then declined, resulting in no statistically significant net change over the decade (AAPC = -0.03, 95% CI: -0.56~0.51). Rural areas (AAPC = 0.73, 95% CI: 0.13~1.37) and Central region (AAPC = 0.86, 95% CI: 0.24~1.49) exhibited upward trends, contrasting with significant declines in urban areas (AAPC = -1.06, 95% CI: -2.05~0.07) and Eastern region (AAPC = -0.56, 95% CI: -1.08~-0.01). Age-specific analysis showed decreased mortality in the 40-45 age group (AAPC = -1.61, 95% CI: -3.05~-0.55) but significant increases in the 65-70 (AAPC = 1.32, 95% CI: 0.29~2.37) and 70-75 (AAPC = 1.62, 95% CI:0.76~2.50) cohorts. Furthermore, AYLL and VYLL were disproportionately higher in rural populations and the Western region.

Conclusions: While national breast cancer mortality rates have stabilized, the burden is shifting toward rural and Central regions. The persistence of high premature mortality in resource-limited areas highlights an urgent need for equitable resource allocation and targeted early screening programs to address these widening regional health disparities.

An Understudied Disease: Male Breast Cancer Characteristics and Survival from the National Cancer Center of Indonesia

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Background: Male breast cancer (MBC) accounts for approximately 1% of all breast cancer cases and remains understudied. Lack of awareness, stigma, and inadequate healthcare infrastructure often contribute to delayed diagnosis. This limited evidence leading to uncertainty in treatment decision-making and underrepresentation of true incidence rates. This study aimed to describe the 10-year experience of Indonesia's National Cancer Center regarding MBC patients.

Methods: Clinical, histopathological, treatment, and survival outcomes of MBC patients diagnosed between 2015 and 2025 were retrospectively collected from hospital electronic medical records and/or telephone interview and analyzed.

Result: A total of 40 patients were included, with most diagnosed between 50-69 years of age (65.0%). Diagnosis occurred within two years of symptom onset in 87.5% of cases. Hormone receptor-positive/HER2-negative tumors were the most common subtype (85.3%), and 55.9% had low Ki-67 (≤ 20%), among the 34 patients with available pathological data. Advanced disease was frequent, with 61.7% presenting at stage III-IV. Surgical treatment was performed in 33 patients, mainly mastectomy (78.8%). Hormonal therapy was administered to 77.5% of patients, with tamoxifen being the most frequently used agent, while chemotherapy was given to 37.5% of patients, most commonly the FAC (fluorouracil, doxorubicin, cyclophosphamide) regimen. Radiotherapy was used in 25.0% patients. Metastatic disease was observed in 47.5% of patients with the most common sites of metastasis were the lung and bone, followed by the liver and brain. At last follow-up, 67.5% of patients were alive. The overall 5-year survival rate was 58.5% among patients with available survival data (n = 21).

Conclusions: MBC in Indonesia often presents at an advanced stage and is largely hormone receptor-positive. Despite multimodal treatment, nearly half of patients developed metastatic disease, and the 5-year overall survival remained modest at 58.5%. These findings underscore the importance of increasing awareness, promoting earlier diagnosis, and optimizing treatment strategies to improve outcomes in this commonly overlooked population.

Poster Presentation

Table 1. Clinical, Histopathological, Treatment, and Survival of Male Breast Cancer Patients.

Characteristics	n (n = 40)	%
Age at diagnosis		
18-49	8	20.0
50-69	26	65.0
≥70	6	15.0
Years to diagnosis		
0	17	42.5
1-2	18	45.0
3-4	1	2.5
≥5	4	10.0
Family History		
No	27	67.5
Unknown	13	32.5
Smoking history		
No/unknown	23	57.5
Yes	17	42.5
Survival		
Survived	27	67.5
Death	13	32.5
Breast site		
Left	19	47.5
Right	21	52.5
Molecular subtype (n = 34)		
HR+/HER2−	29	85.3
HR+/HER2+	2	5.9
HR−/HER2+	2	5.9
Tripe-negative	1	2.9
Ki-67 (n = 34)		
Low, ≤20%	19	55.9
High,>20%	15	44.1
Stage (n = 34)		
I	2	5.9
II	11	32.4
III	13	38.2
IV	8	23.5
Surgery (n = 33)		
Mastectomy	26	78.8
Without ALND	15	45.5
With ALND	11	33.3
Breast conserving surgery	3	9.1
Lumpectomy	4	12.1
Hormonal Therapy		
No	9	22.5
Yes	31	77.5
Chemotherapy		
No	25	62.5
Yes	15	37.5
Radiation therapy		
No	30	75.0
Yes	10	25.0
Metastases		
No/unknown	21	52.5
Yes	19	47.5

Clinicopathological Characteristics of Young Versus Older Breast Cancer Patients in Indonesia: A Large Real-World Cohort Highlighting Global Disparities

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Background: Breast cancer in young women represents a growing global health challenge, particularly in resource-limited settings where aggressive tumor biology and delayed presentation frequently coexist. Despite this burden, young-age breast cancer remains under-represented in global datasets, which are predominantly derived from high-income countries. Generating robust real-world evidence from under-represented populations is essential to address global disparities in breast cancer care. This study aimed to compare the clinicopathological characteristics of young-age and older-age breast cancer patients using a large real-world cohort from Indonesia.

Methods: We conducted a retrospective cohort study of female breast cancer patients treated at a tertiary referral center in Indonesia between January 2022 and December 2025. Patients were stratified by age at diagnosis into young-age (<40 years) and older-age (≥40 years) groups. Clinicopathological variables, including tumor stage, nodal status, molecular subtype, and Ki-67 index, were analyzed descriptively and compared between groups.

Result: A total of 1,440 breast cancer patients were included, of whom 214 patients (14.9%) were aged <40 years and 1,226 patients (85.1%) were aged ≥40 years. Young-age patients more frequently presented with advanced primary tumors and axillary nodal involvement at diagnosis. A high proliferative index (Ki-67 classified as high) was observed in 52.3% of young-age patients and 58.6% of older-age patients. TNBC was more prevalent among young-age patients (15.4%) compared with older-age patients (9.3%), whereas luminal molecular subtypes predominated in the older-age group.

Conclusions: In this large real-world cohort from a resource-limited setting, young-age breast cancer accounted for approximately 15% of all cases and was characterized by a disproportionate burden of aggressive clinicopathological features, including a higher prevalence of TNBC. These findings highlight persistent global disparities in breast cancer biology and presentation among young women and underscore the need for age-adapted diagnostic, therapeutic, and policy-level strategies to achieve more equitable breast cancer outcomes worldwide.

Disparities of Breast Cancer Mortality and the Associated Risk Factors Across Provinces in Indonesia: Temporospatial Trends from 1990 to 2023

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Background: Proportion of breast cancer mortality is higher in Low and Middle-Income Countries (LMICs). Identification of disparities and risk factors associated with mortality will provide valuable information in the planning cancer control program in national scale.

Methods: Breast cancer incidence and mortality numbers and rates were extracted from the Global Burden of Disease 2023. Mortality rates were compared using logistic regression tests among provinces in Indonesia using national mortality rates as the references

Result: The age-standardized rate (ASR) of breast cancer incidence and mortality in Indonesia increased from 1990 to 2023 with annual percentage changes were higher than global rates (2.6% vs 1.57%, 1.9% vs 0.8%, respectively). Breast cancer-associated mortality number in Indonesia increased from 11,018 [9,466-13,091] in 1990 to 28,263 [19,310-40,100] in 2023. The mortality number was increased by 152% which was larger than global (86%) and in Southeast Asia (132%). In 2023, the total number of newly diagnosed breast cancer was 61,100, and the mortality of 28,263 patients. East Java was the province with the highest number of breast cancer incidence and mortality (9,162 and 5,140; respectively). Provinces with the highest breast cancer-associated mortality were Maluku, Gorontalo, and North Sulawesi (23.5, 17.58, and 16,2 per 100,000 population; respectively). Using the national mortality rate as a reference, breast cancer patients living in Maluku were associated with more than twice higher risk of death (OR = 2.31, 95%CI 1.44-3.61). According to the age group, high body-mass index contributed largely to the breast cancer-associated mortality that gradually increased during 1990-2023 almost in all Indonesian provinces

Conclusions: We find disparities in breast cancer mortality among provinces in Indonesia as those living in Maluku province were at twice risk of mortality compared to the national levels. New strategies in the cancer control programs are urgently required particularly in the provinces with higher mortality rates.

Nationwide Analysis of Male Breast Cancer: Incidence Trends, Treatment Disparities, and Survival Compared With Female Patients

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Background: Male breast cancer (MBC) accounts for less than 1% of all breast cancer cases and is considered a rare disease. However, its incidence is steadily increasing. Despite this trend, comprehensive analyses comparing the clinicopathological characteristics and outcomes between male and female breast cancer (FBC) patients remain limited.

Methods: Using Korean National Health Insurance data, we analyzed 368,577 patients (1,437 men; 367,140 women). Age-standardized incidence rates (ASR), clinicopathological features (age at diagnosis, Charlson Comorbidity Index), treatment modalities, recurrence rates, and mortality outcomes were compared between MBC and FBC. Multivariate Cox proportional hazards regression was performed to assess the association of sex with recurrence and survival.

Result: ASR of MBC doubled (0.59 to 1.19), FBC increased from 67.6 to 157.3. Male patients were older at diagnosis (64 vs. 51 years, $p < 0.001$), had higher comorbidity ($p < 0.001$), and showed worse outcomes. Recurrence was more frequent in men (14.3% vs. 12.5%, $p = 0.038$) as was mortality (31.3% vs. 11.1%, $p < 0.001$). Multivariate analysis confirmed male sex as a significant risk factor for recurrence ($p = 0.010$).

Conclusions: Despite its rarity, MBC incidence is increasing, with distinct clinicopathological features and poorer prognosis compared to FBC. These findings emphasize the need for sex-specific strategies and inclusion of male patients in breast cancer research.

Association Between BRCA1/2 Mutation Loci and Breast Cancer Recurrence in a Korean Multicenter Cohort

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Background: Germline BRCA1/2 pathogenic variants confer an increased risk of breast cancer, yet mutation position within BRCA genes may further influence recurrence patterns. Although breast cancer cluster regions have been described mainly in Western populations, locus-specific oncologic outcomes in Asian cohorts remain limited. This study evaluated associations between BRCA1/2 mutation loci and risks of contralateral breast cancer (CBC) and non-contralateral recurrence in Korean patients.

Methods: We retrospectively analyzed 496 breast cancer patients with germline BRCA1/2 pathogenic or likely pathogenic variants treated at 19 institutions between 2006 and 2022. Mutation loci were categorized using predefined functional domains based on established BRCA protein structures and by nucleotide- and amino acidbased binning aligned with previously reported cluster regions, ensuring adequate event distribution. Recurrence rates were compared across mutation categories using proportion tests, with a two-sided $p < 0.05$ considered statistically significant.

Result: Among BRCA1 carriers (n = 295), CBC recurrence (16.3%) was significantly more frequent in patients with mutations involving functional domains than in those with non-domain mutations ($p = 0.011$). Amino acidbased analysis showed the highest CBC recurrence in variants located at positions ≥ 1718, whereas central regions exhibited the lowest risk. Among BRCA2 carriers (n = 201), CBC recurrence (11.4%) differed by amino acid position, with higher risk observed for variants at positions 23932 compared with 24573383 ($p = 0.026$), while functional domain involvement was not significantly associated. For non-contralateral recurrence (13.9% in BRCA1 and 10.4% in BRCA2), specific nucleotide regions in BRCA2, particularly nucleotides 54467480, were associated with increased recurrence risk, whereas no clear positional association was observed in BRCA1.

Conclusions: BRCA1/2 mutation loci are associated with distinct patterns of breast cancer recurrence in Korean patients. These findings suggest that mutation position may provide additional prognostic information beyond BRCA mutation status alone. Larger, independent studies are required to validate these associations.

Poster Presentation

Incidence and Risk Factors for Stroke Among Breast Cancer Survivors: A Nationwide Population-Based Study in Korea

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Background: Breast cancer is the most commonly diagnosed cancer worldwide, and survival has improved substantially with advances in early detection and treatment. As the number of breast cancer survivors increases, stroke has emerged as an important long-term health concern; however, data on stroke incidence and risk factors among breast cancer survivors remain limited.

Methods: This retrospective cohort study used data from the Korean National Health Insurance Service database between January 1, 2017, and December 31, 2021. Breast cancer survivors were defined as women with breast cancer (ICD-10 code C50 and V193) who underwent surgical treatment. Controls were women without a history of breast cancer who had undergone health screening examinations. Participants were matched 1:1 using propensity scores. Stroke was defined as hospitalization lasting ≥3 days with ICD-10 codes I60-I64, confirmed by brain computed tomography or magnetic resonance imaging. Cox proportional hazards regression models were used to estimate adjusted hazard ratios (aHRs) and 95% confidence intervals (CIs).

Result: A total of 152,238 participants were included, with 76,119 breast cancer survivors and 76,119 matched controls. During a median follow-up of 3.1 years, 1,492 participants (0.98%) experienced stroke. Stroke occurred in 732 breast cancer survivors and 760 matched controls. The incidence rates of stroke were 31.0 per 10,000 person-years among breast cancer survivors and 31.9 per 10,000 person-years among matched controls ($p = 0.54$). Breast cancer survivors had a similar risk of stroke compared with matched controls (aHR, 0.95; 95% CI, 0.86-1.05). Age ≥50 years, hypertension, diabetes mellitus, dyslipidemia, heart failure, atrial fibrillation, coronary arterial disease, and alcohol consumption were identified as risk factors for stroke.

Conclusions: In this nationwide population-based study, breast cancer survivors did not have an increased risk of stroke compared with women without breast cancer. Traditional cardiovascular risk factors were strongly associated with stroke risk in this population.

Breast Cancer Risk According to Metabolic Dysfunction-Associated Steatotic Liver Disease in Korean Women: A Nationwide Population-Based Cohort Study

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Background: Metabolic dysfunction-associated steatotic liver disease (MASLD) is a common chronic liver disorder linked to systemic metabolic imbalance. Although MASLD has been associated with extrahepatic cancers, including breast cancer, evidence is limited, especially among Asian populations. Given the younger peak incidence of breast cancer in Korea, this study examined the association between MASLD and breast cancer risk in middle-aged Korean women.

Methods: We conducted a nationwide, population-based cohort study of 483,279 randomly selected Korean women aged 40-60 years who underwent health checkups from 2012 to 2015. MASLD was defined using the International Classification of Disease-10 (ICD-10) codes or a fatty liver index (FLI ≥ 60) with metabolic criteria. Breast cancer cases were identified using ICD-10 codes (C50, D05) and followed through 2021. Adjusted hazard ratios (HRs) were estimated with Cox proportional hazards models, including subgroup analyses by body mass index (BMI) and menopausal status.

Result: MASLD was not significantly linked to overall breast cancer risk (adjusted HR = 1.089, 95% CI 0.984–1.205, $p = 0.099$). However, women with BMI 25-30 kg/m² showed a significantly higher risk (adjusted HR = 1.077, $p = 0.011$). Although postmenopausal women had a lower overall risk, MASLD was significantly associated with increased risk in postmenopausal women with BMI 25-30 kg/m² (adjusted HR = 1.203, 95% CI 1.029–1.407, $p = 0.021$).

Conclusions: In this large Korean cohort, MASLD was not independently linked to overall breast cancer risk, but moderate obesity and menopause may influence this relationship. These findings highlight the need to consider metabolic and hormonal factors in risk assessment.

Poster Presentation

Characteristics and Treatments of Adenoid Cystic Carcinoma: A Multi-center Retrospective Cohort Study

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Background: Adenoid cystic carcinoma (ACC) of the breast is a rare subtype of triple-negative breast cancer with distinct clinical and pathological features. Despite its favorable prognosis compared to conventional triple-negative breast cancer, comprehensive data on treatment patterns and outcomes in Asian populations remain limited. This study aimed to characterize the clinicopathological features and treatment outcomes of breast ACC in a Korean multi-center cohort.

Methods: We conducted a retrospective analysis of 71 patients diagnosed with breast ACC between January 2008 and March 2025 across multiple institutions in Korea. Data on patient demographics, tumor characteristics, treatment modalities, and survival outcomes were collected. Patients were categorized by menopausal status, BRCA mutation status, surgical approach, and adjuvant therapy. Disease-free survival (DFS) and overall survival (OS) were assessed using Kaplan-Meier analysis.

Result: The median age at diagnosis was 56 years (IQR 51-65), with 59.2% of patients being postmenopausal. Most tumors were stage I-II (95.7%), with median tumor size classified as pT1 (41.4%) and pT2 (54.3%). Nodal involvement was minimal, with 94.0% presenting as pN0. Breast-conserving surgery was performed in 81.7% of patients, and sentinel lymph node biopsy in 91.5%. The majority (81.7%) had triple-negative subtype, while 18.3% were HR+/HER2-. Only 2.8% received neoadjuvant chemotherapy, and 26.1% received adjuvant chemotherapy. During follow-up, no local recurrences occurred, but distant recurrence developed in 6 patients (8.5%). Median DFS was 104.1 months and median OS was 124.8 months, with 5-year survival rate of 93.0%.

Conclusions: Breast ACC in Korean patients demonstrates excellent prognosis with low recurrence rates despite minimal use of systemic therapy and also BCS appear to be adequate for local control. These findings support selective use of adjuvant chemotherapy in breast ACC.

Characteristic	Overall (n=71)
Age, median (IQR)	56.00 [51.00, 65.00]
Age category	
≤40	1 (1.4%)
>40	70 (98.6%)
Menopause	
Premenopause	28 (39.4%)
Postmenopause	42 (59.2%)
Unknown	1 (1.4%)
BRCA status	
BRCA-	11 (15.5%)
BRCA2+	1 (1.4%)
Unknown	59 (83.1%)
Neoadjuvant chemotherapy	
No	69 (97.2%)
Yes	2 (2.8%)
Operation type	
BCS	58 (81.7%)
TM	9 (12.7%)
NSM	2 (2.8%)
SSM	2 (2.8%)
Axillary operation	
SLNB	65 (91.5%)
ALND	2 (2.8%)
No operation	4 (5.6%)
Lymphovascular invasion	
No	65 (91.5%)
Yes	2 (2.8%)
Unknown	4 (5.6%)
Histologic grade	
Grade 1	6 (8.5%)
Grade 2	49 (69.0%)
Grade 3	5 (7.0%)
Unknown	11 (15.5%)
Stage	
I	29 (40.8%)
II	39 (54.9%)
III	3 (4.2%)
Subtype	
HR+/HER2-	13 (18.3%)
HR-/HER2-	58 (81.7%)
Ki-67	
Low (≤20%)	43 (61.4%)
High (>20%)	27 (38.6%)
Endocrine therapy	
No	56 (78.9%)
Yes	15 (21.1%)
Chemotherapy	
No	51 (73.9%)
Yes	18 (26.1%)
Local recurrence	
No	71 (100.0%)
Distant recurrence	
No	65 (91.5%)
Yes	6 (8.5%)
DFS, median (IQR), months	104.08 [56.58, 169.54]
Death	
No	66 (93.0%)
Yes	5 (7.0%)
OS, median (IQR), months	124.83 [64.88, 181.67]

Long-Term Locoregional Recurrence in Young Asian Women with Breast Cancer in the Modern Treatment Era: a Retrospective Cohort Study

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Background: Young age at breast cancer diagnosis has historically been associated with an increased risk of locoregional recurrence (LRR), often influencing decisions in choice of treatment. However, long-term LRR outcomes among young Asian women treated in the modern systemic therapy era remain poorly defined.

Methods: We retrospectively analyzed women under 40 years with stage I-III invasive breast cancer diagnosed between 2004 and 2016 at a tertiary referral center in Korea. Clinicopathologic characteristics, treatments, and recurrence outcomes were reviewed. LRR was defined as ipsilateral breast/chest wall or regional nodal recurrence without synchronous distant metastasis. Cumulative LRR incidence was estimated using the Kaplan-Meier method, and factors associated with LRR were evaluated using Cox proportional hazards models.

Result: A total of 543 patients were included, with a median follow-up of 9.4 years. Molecular subtypes included luminal A (33.3%), luminal B (21.5%), luminal ERBB2-positive (12.2%), ERBB2-positive (7.7%), and triple-negative breast cancer (24.3%). Locoregional treatment consisted of breast-conserving surgery (BCS) in 53.0%, mastectomy without postmastectomy radiation therapy (PMRT) in 26.3%, and mastectomy with PMRT in 20.6%. Overall LRR rates were low across subtypes, with 10-year cumulative LRR rates ranging from 3.4% to 7.6% and no significant differences by molecular subtype. Within each subtype, LRR at 5 and 10 years did not differ significantly according to locoregional treatment strategy. Cox regression analysis for LRR-associated risk factors identified no significant associations between age, stage, molecular subtype, chemotherapy use, or BRCA1/2 status; mastectomy with PMRT showed a non-significant trend toward lower LRR compared with BCS.

Conclusions: In this contemporary cohort of young Asian women with breast cancer, long-term isolated LRR rates were low and comparable across molecular subtypes and locoregional treatment modalities. These findings suggest that young age alone should not drive more aggressive locoregional treatment, supporting individualized, preference-sensitive surgical decision-making.

Two Decades of De-escalation and Remaining Overtreatment: Axillary Surgery Trends in 191,000 Korean Breast Cancer Patients

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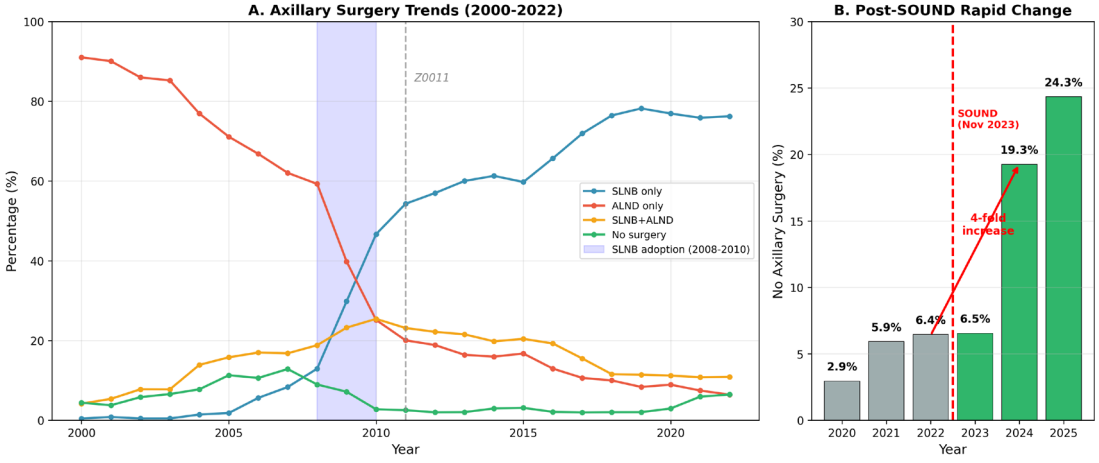
Background: Axillary surgery for breast cancer has undergone stepwise de-escalation over two decades, and recent trials now support complete omission of axillary staging in select patients. How these landmark studies have been adopted into real-world practice has not been well characterized.

Methods: We analyzed 191,264 patients from the Korean Breast Cancer Society registry (2000-2022), stratified by five landmark-defined eras. Joinpoint regression with Monte Carlo permutation testing identified significant trend changes. Cochran-Armitage tests assessed linear trends across eras. Multivariable models evaluated clinicopathologic factors associated with continued axillary lymph node dissection (ALND) use. Post-SOUND/INSEMA adoption was assessed using 2023-2025 preliminary data (n = 6,405).

Result: Over 22 years, sentinel lymph node biopsy (SLNB)-only increased from 0.4% to 76.3%, while ALND-only decreased from 91.0% to 6.4%. Joinpoint analysis identified 2008-2010 as the period of rapid SLNB adoption. However, completion ALND after positive SLNB declined most rapidly during 2015-2018 (4.2%/year), indicating a 4-7 year lag after ACOSOG Z0011 publication. Within each procedure type, the number of harvested nodes remained unchanged over time. In preliminary 2023-2025 data, axillary surgery omission increased from 6.4% to 24.3%a 4-fold increase within 2 years of SOUND publication. ALND rates remained higher in triple-negative (9.9%) compared to HR+/HER2- tumors (6.7%) during 2019-2022.

Conclusions: Korean practice achieved substantial axillary de-escalation over two decades, but adoption of ALND omission lagged 4-7 years behind the ACOSOG Z0011 publication. In contrast, axillary surgery omission has increased rapidly following SOUND/INSEMA, suggesting accelerated translation of recent trial evidence into practice.



Poster Presentation

Survival Changes in Breast Cancer Subtypes According to Immunohistochemical Markers: A Comparison of Two Peruvian Cohorts (2000–2002 and 2010–2012)

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Background: We evaluated changes in survival rates among Peruvian breast cancer (BC) patients according to immunohistochemical (IHC) subtypes (luminal A, luminal B, HER2/neu, triple-negative breast cancer [TNBC]) over two periods

Methods: We conducted a retrospective study in BC patients treated at the Instituto Nacional de Enfermedades Neoplsicas (INEN, Peru) during 2000 to 2002 and 2010 to 2012. Survival analysis was performed using the Kaplan-Meier method, and the log-rank test was applied. Univariate Cox proportional hazards models were conducted to determine the risk ratios associated with clinical characteristics significantly related to overall survival (OS). We applied propensity score matching (PSM) using a 1:1 ratio to reduce confounding bias and ensure comparability between cohorts. Survival analysis was repeated after matching.

Result: We included 3139 Peruvian BC patients diagnosed between 2000-2002 (n = 1292) and 2010-2012 (n = 1847). Latest cohort showed a 21% reduction in the risk of death compared to 2000-2002 (HR = 0.79, 95% CI = 0.70-0.89, $p < 0.001$), even after adjusting for clinical stage and IHC subtype (HR = 0.72, 95% CI = 0.64-0.81, $p < 0.001$). Risk of death also decreased significantly in stage II (HR = 0.81, 95% CI = 0.66-0.99, $p = 0.042$) and stage III (HR = 0.67, 95% CI = 0.57-0.78, $p < 0.001$). Among IHC subtypes, mortality risk decreased for HER2/neu (HR = 0.63, 95% CI = 0.49-0.81, $p < 0.001$) and Luminal A (HR = 0.65, 95% CI = 0.54-0.79, $p < 0.001$), while no improvement was seen for TNBC. Poorly differentiated histological grade increased the risk of death (HR = 1.96, 95% CI = 1.74-2.21, $p < 0.001$), whereas surgery was protective (HR = 0.11, 95% CI = 0.09-0.12, $p < 0.001$). Among TNBC patients aged 40-49, the risk of death was lower (HR = 0.68, 95% CI = 0.48-0.94, $p = 0.022$). Similar survival trends were observed after PSM analysis.

Conclusions: Our study demonstrated improvement in OS among HER2/neu and Luminal A subtypes, as well as patients diagnosed in stage III. However, the poor prognosis of TNBC remains the need for targeted therapeutic strategies to improve outcomes for Peruvian BC patients.

Hidden in Plain Sight: A Retrospective and Literature Review of High-Risk Lesions in Gynaecomastia and Management

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Background: Atypical ductal hyperplasia (ADH) and other high-risk breast lesions are well-recognized precursors of malignancy in women, but their significance in men remains unclear. These lesions may be discovered incidentally during surgical management of gynaecomastia, raising questions about the need for routine histopathological evaluation and optimal follow-up.

Methods: We performed a retrospective review of all male patients undergoing surgical excision of gynaecomastia at our institution from July 2024 to July 2025. Clinical demographics, risk factors, imaging findings, and histopathological results were recorded. (Table 1) In parallel, a literature review was conducted to summarize the incidence, management, and outcomes of high-risk lesions identified in gynaecomastia specimens.

Result: Seven patients aged 19 to 41 years underwent liposuction-assisted excision. Two patients (both of Indian ethnicity, with higher BMI and longer symptom duration) were found to have incidental bilateral ADH in otherwise benign gynaecomastia. Preoperative imaging showed no suspicious features. No ductal carcinoma in situ (DCIS) or invasive carcinoma was identified. Both patients were managed conservatively with surveillance imaging, demonstrating no malignant transformation at follow-up. Published data suggest that high-risk lesions occur in 12% of gynaecomastia specimens, rising to 6% when including DCIS or invasive carcinoma. Long-term follow-up studies, including Coopey et al., report no progression to malignancy over a mean of 6.25 years. While routine histopathology remains debated, occasional reports describe patients undergoing completion mastectomy after ADH detection.

Conclusions: High-risk proliferations are rare and usually incidental in gynaecomastia. Higher BMI, longer symptom duration and Indian ethnicity were associated with pathological findings. There appears to be no clear associated invasive disease on follow-up in our study and literature review. Larger prospective and long-term studies are warranted to clarify their true malignant potential and to define rational follow-up strategies for men with incidental findings in gynaecomastia.

Table 1. Demographics

	High risk lesions (n=2)	No high risk lesions (n=5)
Age (mean)	22-26 (24)	19-41 (30)
Ethnicity (n)	Indian (2)	Chinese (4) Malay (1)
Family history of breast cancer	0	0
BMI (mean)	26.63-29.73 (28.18)	17.29-31.19 (24.29)
Duration of symptoms in years (mean)	11-14 (12.5)	0.08-15 (7.52)
Histopathology	ADH	Gynecomastia
Abnormal imaging	Nil	

Cancer risk management in HBOC and Lynch syndrome: Findings from the Swiss, Korean, and Israeli CASCADE cohorts

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Background: Individuals carrying germline pathogenic/likely pathogenic variants (GPV) associated with Hereditary Breast and Ovarian Cancer (HBOC) or Lynch syndrome (LS) are at increased risk for various common cancers and/or cancers often detected at advanced stages. Evidence-based guidelines recommend early onset intensive surveillance and/or risk-reducing surgeries for cancer risk management to ensure translation of genetic information into clinical practice and public health benefit. This study describes uptake of cancer surveillance and risk-reducing surgeries among carriers of GPV associated with HBOC or LS from Switzerland, Korea, and Israel, evaluates compliance with national guidelines, and explores predictors of compliance.

Methods: CASCADE is an international, open-ended, family-based cohort initiated in Switzerland, and replicated in Korea and Israel. Analyses are based on data collected through questionnaires at cohort entry. Compliance was assessed based on the most penetrant GPV per cancer type, sex, previous cancer diagnosis, completion of prophylactic surgeries, and the recommended age and interval for surveillance and/or risk-reducing surgery according to each country's guidelines.

Result: Across the three countries, the sample included 1,339 carriers of GPV. Most participants were female (86.3%) with average age 49(±13) years. Among HBOC-associated GPV female carriers without bilateral mastectomy and without a prior cancer diagnosis, 24-41% did not receive annual breast MRI and/or mammography and 13-20% had not undergone risk-reducing salpingo-oophorectomy. Among LS carriers without colorectal cancer, <7% were not compliant with colonoscopy recommendations. Higher education and more recent genetic testing were positively associated with compliance, whereas older age and never having been diagnosed with cancer were associated with lower compliance. For both syndromes, compliance was highest in Israel, followed by Switzerland and Korea.

Conclusions: Key areas for improvement in cancer risk-management include increasing provider awareness of prevention and long-term follow-up in hereditary cancer syndromes, greater focus on unaffected carriers of GPV, and addressing country-specific healthcare system barriers.

A Case Series of Male Breast Cancer in Thammasat University Hospital

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Background: Breast cancer is a very rare disease in men. This study aims to collect data on the clinical and pathological characteristics, treatment, and factors affecting prognosis, including survival rates, of male breast cancer patients at Thammasat University Hospital.

Methods: This was a retrospective study including eight male breast cancer patients who were treated at Thammasat Chalerm Prakiat Hospital between January 2011 and December 2023.

Result: Patients included in our study ranged in age from 62 to 83 years (mean age at diagnosis, 71.3 years). All patients presented with a painless palpable breast mass, with nipple retraction in 5 cases. Mammography and ultrasound showed a breast mass in all cases, with regional axillary lymph node enlargement in 3 cases. All patients underwent surgical treatment with total mastectomy. The most common histopathologic type of breast cancer was invasive ductal carcinoma in 7 cases (87.5%), and one case was intracystic papillary carcinoma, with estrogen receptor (ER) and progesterone receptor (PR) positivity in all 8 cases. Most patients were classified as luminal B, HER2-negative. Four patients underwent adjuvant chemotherapy with radiotherapy. Endocrine therapy was prescribed in 7 cases. The median survival time in our study was 3.7 years.

Conclusions: Breast cancer is a rare disease in men. The most common presentation is a painless breast mass, with or without nipple or skin involvement. We observed an older age at diagnosis than in female breast cancer patients at the same institute, as well as more frequent nipple or skin involvement and a higher proportion of advanced stages compared to previous studies. Public education is needed to increase awareness among the Thai population.

Tumor characteristics of male breast cancer in Thailand

	N (%) (Total = 8)
Histology	
- Invasive ductal carcinoma	7 (87.5%),
- Intracystic papillary carcinoma	1 (12.5%)
Grade	
I	1 (12.5%)
II	6 (75%)
III	1 (12.5%)
Estrogen receptor	
Positive	8 (100%)
Negative	0
Progesterone receptor	
Positive	8 (100%)
Negative	0
HER2 for invasive ductal carcinoma only	
Positive (3+)	0
Negative (0,1+)	5 (71.4%)
Inconclusive (2+)	2 (28.6%)
Breast cancer subtype by IHC	
Luminal A	0
Luminal B	7 (100%)
HER2 positive	0
Triple negative	0
Tumor size, mean	3.53 cm (1.5 - 5.2 cm)
Tumor stage	
Tis	1 (12.5%)
T1	1 (12.5%)
T2	1 (12.5%)
T3	0
T4	5 (62.5%)
Nodal stage	
Nx	1 (12.5%)
N0	3 (37.5%)
N1	2 (25%)
N2	1 (12.5%)
N3	1 (12.5%)
AJCC stage, pathologic	
0	1 (12.5%)
1	1 (12.5%)
2	0
3	5 (62.5%)
4	1 (12.5%)

A Rare Metastatic Journey from Thyroid to Breast 18 Years Post-thyroidectomy: A Case Report

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Background: Medullary thyroid carcinoma (MTC) is a rare neuroendocrine malignancy arising from the parafollicular C cells of the thyroid and accounts for approximately 5% of thyroid cancers. It is characterised by calcitonin secretion and has a strong genetic association. While locoregional spread is common, up to 10% of patients present with distant metastases, most frequently involving the liver, lungs, and bone. Metastatic involvement of the breast is exceptionally rare and poses a diagnostic challenge.

Methods: Clinical data, imaging findings, histopathological results, and laboratory investigations were retrospectively reviewed. Functional imaging included PET/CT with somatostatin receptor analogue. Ultrasound-guided core biopsy of a breast lesion was performed, with histopathological and immunohistochemical analysis to confirm tumour origin.

Result: We report the case of a female patient with a history of total thyroidectomy and multiple neck dissections for MTC performed overseas. A progressive rise in serum calcitonin levels prompted further investigation. PET/CT demonstrated multiple bilateral octreotate-avid breast lesions, in addition to nodal, hepatic, and osseous metastases. Core biopsy of a breast lesion confirmed metastatic MTC. Secondary breast involvement from extramammary malignancies is uncommon and can closely mimic primary breast cancer on imaging, potentially leading to diagnostic delay. Breast metastases from MTC are exceedingly rare. To our knowledge, this represents the first reported case of MTC metastasising to the breast in Australia.

Conclusions: This case highlights the importance of considering metastatic disease in the differential diagnosis of atypical breast lesions in patients with a known malignancy. It also emphasises the value of thorough clinical history-taking, particularly in migrant populations with previous cancer treatment abroad.

Metabolic Enzyme PHGDH Acts as an RNA-binding Protein to Directly Promotes Oncogenic Translation

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Background: Phosphoglycerate dehydrogenase (PHGDH), a key metabolic enzyme catalyzing the rate-limiting step of serine biosynthesis, is commonly overexpressed in human cancers. While its metabolic role in supporting tumor growth is well-established, potential non-metabolic functions remain unexplored.

Methods: In this study, through integrated transcriptomic, translatomic, and functional analyses, we demonstrate that PHGDH functions as a non-canonical RNA-binding protein that promotes tumor progression through translation regulation, independent of its enzymatic activity.

Result: Mechanistic studies reveal that PHGDH directly binds to 5' untranslated regions of select mRNAs encoding pro-tumorigenic factors, particularly those involved in cell cycle regulation and invasion programs. This interaction promotes the recruitment of the eukaryotic translation initiation factor 4F (eIF4F) complex to 43S pre-initiation complex formation, ultimately leading to global translational promotion. Specifically, we identify the oncogene MYC as a critical translational target of PHGDH, whose dysregulated expression drives malignant progression upon PHGDH overexpression.

Conclusions: Collectively, our work unveils a non-metabolic role for PHGDH as a translation regulator and reveals a direct mechanism through which a metabolic enzyme can control oncoprotein synthesis beyond its conventional catalytic function, providing new insights into cancer biology and therapeutic development.

Exploring the Role of S100A11 as an Oncogene in Triple-Negative Breast Cancer Progression and Metastasis

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Background: Tumor invasion and metastasis significantly hinder breast cancer treatment, making it crucial to investigate the underlying mechanisms. S100A11, a vital calcium-binding protein in the S100 family, is involved in various biological processes, including cell proliferation, differentiation, and apoptosis. In breast cancer, S100A11 has garnered attention for its role in tumor initiation and progression, often being upregulated in cancerous tissues and correlating with tumor aggressiveness and metastatic potential. Additionally, as a secretory protein, S100A11 may be released into the environment through small extracellular vesicles (sEVs), potentially facilitating tumor development and metastasis.

Methods: In this study, we analyzed S100A11 expression in breast cancer using the TCGA public database, comparing its levels in normal versus cancerous tissues and across various breast cancer subtypes. We employed CRISPR technology to knock out S100A11 in two high-expressing cell lines and overexpress it in two low-expressing lines. Functional assays were conducted to assess cell proliferation, invasion, and migration, in conjunction with animal experiments. sEVs were collected from these cells and used to treat other cells, further validating the role of S100A11 as a secretory protein associated with sEV carriers.

Result: Our analysis of the TCGA public database revealed that S100A11 is significantly upregulated in tumor tissues compared to normal tissues, with a particularly important role in triple-negative breast cancer subtypes. In cellular experiments, S100A11 knockout in MB231 and SUM159PT cell lines led to a marked decrease in cell proliferation, invasion, and migration. Conversely, overexpression of S100A11 in BT549 and HS578T cell lines resulted in enhanced proliferation, invasion, and migration, confirming its critical role in promoting breast cancer progression.

Conclusions: Through bioinformatics analysis and cellular experiments, we conclude that S100A11 acts as an oncogene in triple-negative breast cancer, promoting tumor progression. Future research is needed to further explore its mechanisms in metastasis.

Deciphering the Role of Nidogen-1 in Breast Cancer Tumorigenesis and Metastasis

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Background: The basement membrane is a key barrier to cancer progression, and its disruption marks metastasis. Nidogen-1, a 140 kDa glycoprotein and core basement membrane component, is critical for structural integrity and tissue homeostasis, yet its specific role in breast cancer remains poorly defined, representing a major knowledge gap. Emerging evidence identifies the extracellular matrix (ECM) as an active signalling hub regulating epithelial-mesenchymal transition (EMT) and metastasis, while cancer-derived extracellular vesicles (EVs) drive intercellular communication and pre-metastatic niche formation. This study aims to clarify Nidogen-1's novel function in breast cancer tumorigenesis and whether its EV association facilitates metastatic spread. By linking ECM dynamics and EV-mediated crosstalk, we seek to uncover an unreported metastatic pathway, positioning Nidogen-1 as a potential biomarker and therapeutic target.

Methods: We leveraged the The Cancer Genome Atlas database to characterize NID1 expression in breast cancer, comparing levels between normal and malignant tissues and across molecular subtypes. CRISPR-mediated gene editing was used to generate NID1-knockout models in high-expression breast cancer cell lines, whereas a CRISPR-based Synergistic Activation Mediator system was utilized to develop NID1-overexpressing derivatives in low-expression cell lines. Functional assays (proliferation, invasion, migration) and in vivo animal experiments were performed to assess NID1's biological role.

Result: Analysis of the TCGA database demonstrated that NID1 expression is significantly downregulated in breast cancer tissues relative to adjacent normal tissues, with the lowest expression levels detected specifically in the triple-negative breast cancer (TNBC) subtype. CRISPR knockout of NID1 in BT549 cell line increases its proliferation, invasion, and migration, offering initial insights into NID1's tumour-suppressive activity in breast cancer.

Conclusions: Collectively, our bioinformatics profiling and in vitro cellular assays indicate that NID1 functions as a putative tumour suppressor in triple-negative breast cancer (TNBC), highlighting the need for follow-up studies to dissect its underlying mechanisms governing metastatic dissemination.

Long-term European Validation of a 179-gene NGS-based Gene Expression Risk Score in Early Breast Cancer

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Background: Breast cancer is one of the most commonly diagnosed malignancies in women worldwide. Adjuvant risk stratification is a cornerstone of tailored treatment in a subset of tumors with equivocal prognosis. The present study aims to evaluate the performance of an RNA-sequencing-based prognostic signature in a Hungarian breastcancer cohort.

Methods: A retrospective, single-center pilot study was conducted including patients who underwent surgery at the Buda MAV Hospital, Budapest, Hungary, between 1999 and 2002. This cohort of 142 individuals consisted predominantly (N = 109, 77%) of postmenopausal, hormone receptorpositive, HER2 negative patients (luminal A and B1 with low Ki-67 indices). A next-generation sequencing- based multigene test, OncoFREE, was used, which profiles the expression of 179 genes and produces a Decision Index (DI) that dichotomizes patients into low (DI ≤ 20) and highrisk (DI > 20) groups for distant metastasis.

Result: Luminal A and B1 subtypes were associated with significantly lower DI ($p = 0.0243$), compared to the other breast cancer molecular subtypes (HER2+, TNBC). Necrosis within the tumor sample and adjuvant irradiation regardless of chemotherapy, was also associated with tendentially higher DI. Weak and moderate correlations were found between the DI-scores and the ER, PR and Ki-67 expression levels ($p < 0.0100$). For each unit increase in the DI, the disease has a 4% increased chance of recurrence ($p = 0.0336$). Belonging to the High DI group significantly increases the risk of disease-free survival (DFS), with a 70-month shorter median DFS ($p = 0.0095$). In contrast to DFS, no difference in overall survival was observed.

Conclusions: In patients with early-stage breast cancer, the OncoFREE test is capable of estimating the likelihood of recurrence, which is essential for the selection of appropriate personalized therapy. External validation in non-Asian cohorts was performed herein, particularly in postmenopausal patients who represent the largest segment of breast cancer cases in Western countries.

Tumour-associated Macrophage Profiling Predicts Recurrence in Post-neoadjuvant Residual Breast Cancer Disease: A Biomarker for Treatment Intensification

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Background: Post-Neoadjuvant chemotherapy (NACT) residual disease (RCB-II/III) affects 60-70% of high-risk breast cancer patients, with 3-year recurrence rates of 30-40%. Tumor-associated macrophages (TAMs) mediate chemoresistance through immunosuppressive reprogramming, yet no biomarker identifies patients harboring persistent TAM-driven resistance. We developed an FFPE-deployable TAM score to stratify recurrence risk and nominate candidates for macrophage-modulating therapies.

Methods: TAM score integrated scRNA-seq-derived signatures with IHC polarization markers (CD163/CD206 normalized to CD68/CSF1R) weighted by Cox-derived survival coefficients. Validation used treatment-naive tumors (n = 83; median follow-up 57 months; 24 recurrences) with multivariable adjustment for standard clinicopathologic variables. Predictive utility was assessed in matched pre/post-NACT pairs (n = 45) correlating TAM dynamics with pathologic response (RCB) and recurrence-free survival (RFS).

Result: In treatment-nave disease, TAM-high (≥ median) independently predicted recurrence (HR 3.8, 95% CI 1.6-9.1, $p < 0.05$) with 5-year RFS 68% vs 91% (TAM-low). Prognostic strength persisted in node-negative (HR 4.2, $p = 0.02$) and luminal B disease (HR 3.5, $p = 0.01$), outperforming CD163 alone (HR 2.1). Baseline TAM score inversely correlated with pCR (12% vs 38%, $p = 0.04$). Among RCB-II/III patients (n = 34), persistent TAM-high post-NACT identified 3-year RFS of 52% vs 85% in TAM-low/normalized cases (HR 4.1, $p = 0.01$), independent of RCB classification. CD163/CD206 expansion occurred in 76% of RCB-III vs 29% of RCB-I ($p = 0.008$), demonstrating selective enrichment of immunosuppressive TAMs despite chemotherapy.

Conclusions: This clinically actionable TAM score identifies a chemoresistance phenotype persisting after NACT that independently predicts recurrence beyond conventional RCB stratification. Post-NACT TAM-high patients with residual disease represent a rational, enrichable population for trials combining TAM depletion/repolarization (CSF1R inhibition, CCR2 blockade) with checkpoint therapy. Mechanistic rationale includes preclinical data showing CSF1R inhibition reduces immunosuppressive TAMs, increases M1 programs, decreases TAM-expressed PD-L1/PD-L2, and restores anti-PD-1 efficacy. Phase I/II data (TIE2 blockade plus chemotherapy in HER2-negative metastatic disease) demonstrate clinical feasibility. The FFPE-compatible TAM score enables immediate trial implementation without specialized platforms.

Table: TAM Score Performance Across Clinical Contexts

Endpoint	TAM-High	TAM-Low	HR (95% CI)	p-value
Treatment-Naïve Cohort (n=83)				
5-year RFS (Overall)	68%	91%	3.8 (1.6-9.1)	<0.05
RFS (node-negative)	—	—	4.2 (1.8-9.8)	0.02
RFS (luminal B)	—	—	3.5 (1.4-8.7)	0.01
CD163/CD68 alone	—	—	2.1 (0.9-4.9)	<0.05
Post-NACT Cohort (n=45)				
Baseline pCR rate	12%	38%	—	0.04
3-year RFS (RCB-II/III)	52%	85%	4.1 (1.4-12.0)	0.01

Mutation of BRCA1/2 Gene in Premenopausal Triple-negative Breast Cancer Patients

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Background: Mutation rate of BRCA1/2 was found to be higher in TNBC patients depending on young age, family history of breast and ovarian cancer. Study about BRCA1/2 mutations in TNBC breast cancer in Indonesia has never been done. This study aims to determine the mutation of BRCA1/2 gene in premenopausal triple negative breast cancer patients.

Methods: This is a descriptive study conducted at the Surgical Oncology Division of DR. M. Djamil Hospital, Padang from April to July 2023. This study included patients aged < 50 years who were diagnosed with TNBC subtype at Dr. M. Djamil Hospital, Padang during January 2016 July 2023.

Result: There were 22 patients with TNBC participated in the study. In this study, 4/22 (18.2%) had BRCA2 mutations and no BRCA1 mutation was found. All patients with BRCA2 mutation have the same mutation characteristics, i.e exon 3, genetic variation (c.262_263delCT), amino acids (p.Leu88AlafsTer12) and type of mutation (Frameshift Deletion).

Conclusions: TNBC patients in West Sumatra have much higher BRCA2 mutations than BRCA1 with the same characteristics of the mutations.

Poster Presentation

High Minichromosome Maintenance 2 (MCM2) and Low E-Cadherin Expression as Risk Factors for Distant Metastasis in Breast Cancer Patients

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Background: Metastasis is the leading cause of death in breast cancer. Minichromosome Maintenance 2 (MCM2) and E-cadherin play crucial roles in cell proliferation and adhesion, which are related to the metastatic mechanism, but has not been widely evaluated, particularly in local populations. Therefore, this study aims to determine whether high MCM2 expression and low E-cadherin expression are risk factors for distant metastasis in breast cancer patients.

Methods: This is a case-control study involving 52 breast cancer patients at Prof. Ngoerah Hospital Bali. Inclusion criteria included patients with complete medical records; exclusion criteria included secondary breast cancer, post-therapy/surgery patients, and male breast cancer patients. MCM2 and E-cadherin expression were evaluated using immunohistochemistry. Univariate analysis was used to describe patient characteristics, chi-square tests for bivariate analysis, ROC analysis to determine the optimal cut-off value, and multivariate logistic regression to control for confounding variables. A p-value of < 0.05 was considered significant.

Result: Among the 52 breast cancer patients, high MCM2 expression ($\geq 65\%$) and low E-cadherin expression ($\leq 35\%$) were significantly associated with distant metastasis. Multivariate analysis showed that low E-cadherin expression increased the risk of distant metastasis by 4.84 times ($p = 0.020$; 95% CI = 1.28–18.22), while high MCM2 expression increased the risk by 8.69 times ($p = 0.007$; 95% CI = 1.80–41.90).

Conclusions: High MCM2 expression and low E-cadherin expression are significant risk factors for distant metastasis in breast cancer.

Poster Presentation

A Transcriptional Axis Defines Lobular-like Breast Cancer Biology Beyond CDH1 Mutation

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Background: Invasive lobular carcinoma (ILC) represents a distinct histological subtype of breast cancer; however, its underlying molecular basis remains incompletely defined. Although loss-of-function mutations in CDH1 are considered a hallmark genetic event, substantial biological heterogeneity persists that cannot be fully explained by histology or mutation status alone.

Methods: To address this limitation, we developed a continuous transcriptional framework, termed the ILCness score, to quantitatively capture lobular-like tumor biology. A tightly constrained principal component-based model was trained in the METABRIC cohort and fully fixed without retraining, enabling reproducible projection across independent datasets and expression platforms.

Result: Unsupervised transcriptomic analyses demonstrated that invasive ductal carcinoma (IDC) and ILC did not form discrete expression clusters but instead distributed along a continuous molecular spectrum. The ILCness score robustly captured this continuum, with mixed-histology tumors occupying intermediate positions. Importantly, lobular-like transcriptional programs quantified by ILCness showed limited concordance with CDH1 mutation status. Across tumors, higher ILCness was consistently associated with reduced DNA repair and E2F target activity (Spearman $|\rho| > 0.4$, $p < 0.001$), whereas epithelial mesenchymal transition displayed a context-dependent pattern. Tumor microenvironment analyses revealed that stromal and immune cell infiltration correlated more strongly with ILCness than with CDH1 mutation status. These associations were reproducibly validated in independent cohorts without model recalibration. Clinically, ILCness stratified prognostically distinct subgroups within histologically defined tumors, including IDC, independent of CDH1 mutation (disease-specific survival, $p < 0.01$). Across multiple neoadjuvant and systemic therapy datasets, higher ILCness showed consistent directional associations with reduced pathological complete response to chemotherapy and differential response patterns to immune checkpoint inhibition and endocrine therapy.

Conclusions: These findings establish lobular breast cancer as a continuum of transcriptional states rather than a discrete entity defined by histology or single-gene alterations. The ILCness score provides a scalable RNA-based framework for integrating molecular heterogeneity with tumor biology and clinical behavior, with potential implications for biologically informed patient stratification.

Longitudinal Trajectories of Menopausal Symptoms in Women Receiving Endocrine Therapy for Breast Cancer Compared With Natural Menopause

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Background: Endocrine therapy (ETx) reduces recurrence in hormone receptorpositive breast cancer, but treatment-related menopausal symptoms often limit long-term adherence. However, longitudinal patterns of these symptomsparticularly compared with natural menopauseremain unclear. We evaluated changes in menopausal symptoms among women receiving ETx and compared them with those in women without breast cancer.

Methods: This longitudinal cohort study included 5,734 women (2,583 with breast cancer and 3,151 without). Menopausal symptoms were assessed using the Menopause Rating Scale at baseline and during follow-up for up to 3 years. Longitudinal changes were analyzed using linear mixed-effects models and difference-in-differences estimates, stratified by menopausal status, chemotherapy exposure, and ETx regimen.

Result: At baseline, women receiving ETx reported higher menopausal symptom scores than those not receiving ETx. Among premenopausal women without chemotherapy, ETx was associated with significant increases in vasomotor symptoms at 1 year that persisted through 3 years. Psychological and urogenital symptoms also remained elevated. Symptom burden was greater in women receiving chemotherapy, particularly with ovarian function suppression. In contrast, women without ETx showed stable or declining symptom patterns over time.

Conclusions: This study demonstrates that ETx, particularly when combined with ovarian function suppression and/or chemotherapy, is associated with sustained and clinically meaningful increases in menopausal symptoms over a 3-year follow-up period. The magnitude and persistence of symptom burden were especially pronounced among premenopausal women, suggesting an excess impact beyond the natural course of menopause. Variations in symptom trajectories according to treatment modality further highlight the

need for individualized clinical consideration. Given the long-term nature of ETx in breast cancer survivorship, these findings underscore the importance of early, systematic symptom assessment and ongoing monitoring. Implementation of tailored supportive care strategies based on menopausal status and treatment regimen may improve adherence and ultimately enhance quality of life among breast cancer survivors.

Table 4. Estimated differences in menopausal symptom changes by endocrine therapy types among premenopausal women (N=1,500)

	No ETx (N=234)	Tamoxifen monotherapy (N=700)	Tamoxifen + GnRH agonist (N=328)	Aromatase inhibitor monotherapy (N=23)	Aromatase inhibitor + GnRH agonist (N=215)
Without chemotherapy (N=1,079)	**N=147**	**N=574**	**N=217**	**N=12**	**N=127**
1 year after					
Estimated difference from baseline	0.35 (-0.60, 1.29)	**2.40 (1.91, 2.90)**	**3.67 (2.90, 4.44)**	**6.30 (2.72, 9.88)**	**4.13 (3.10, 5.15)**
Difference in difference	0.00 (Reference)	**2.06 (1.00, 3.12)**	**3.32 (2.11, 4.54)**	**5.96 (2.26, 9.66)**	**3.78 (2.40, 5.16)**
2 years after					
Estimated difference from baseline	-0.61 (-1.64, 0.42)	**1.68 (1.16, 2.21)**	**2.15 (1.35, 2.96)**	**3.96 (0.42, 7.50)**	**4.01 (2.95, 5.08)**
Difference in difference	0.00 (Reference)	**2.29 (1.15, 3.43)**	**2.76 (1.47, 4.05)**	**4.57 (0.88, 8.25)**	**4.62 (3.15, 6.09)**
3 years after					
Estimated difference from baseline	-0.44 (-1.65, 0.76)	**1.64 (0.96, 2.31)**	**1.42 (0.40, 2.43)**	3.19 (-1.66, 8.04)	**2.20 (0.54, 3.86)**
Difference in difference	0.00 (Reference)	**2.08 (0.74, 3.43)**	**1.86 (0.32, 3.4)**	3.64 (-1.35, 8.63)	**2.65 (0.62, 4.67)**
With chemotherapy (N=423)	**N=87**	**N=126**	**N=111**	**N=11**	**N=88**
1 year after					
Estimated difference from baseline	1.21 (-0.05, 2.47)	**2.82 (1.77, 3.87)**	**3.13 (2.02, 4.23)**	**4.60 (1.04, 8.16)**	**4.76 (3.51, 6.00)**
Difference in difference	0.00 (Reference)	1.61 (-0.02, 3.24)	**1.92 (0.25, 3.59)**	3.39 (-0.38, 7.17)	**3.55 (1.78, 5.31)**
2 years after					
Estimated difference from baseline	0.84 (-0.51, 2.20)	1.77 (0.69, 2.84)	**2.70 (1.60, 3.81)**	2.92 (-0.76, 6.61)	**4.64 (3.32, 5.95)**
Difference in difference	0.00 (Reference)	0.93 (-0.78, 2.63)	**1.86 (0.14, 3.59)**	2.08 (-1.83, 5.99)	**3.80 (1.94, 5.66)**
3 years after					
Estimated difference from baseline	-0.90 (-2.62, 0.82)	**1.8 (0.47, 3.14)**	**1.5 (0.06, 2.95)**	2.84 (-2.75, 8.44)	**3.33 (1.70, 4.96)**
Difference in difference	0.00 (Reference)	**2.7 (0.57, 4.83)**	**2.40 (0.20, 4.60)**	3.74 (-2.1, 9.59)	**4.23 (1.91, 6.55)**

Results based on linear mixed effect models. Adjusted for age and body mass index.

Poster Presentation

Functional Role of CD29 in Modulating Intracellular Signaling Cascades of Breast Cancer Stem Cells: Insights from TNBC Organoid and MDA-MB-468 Models

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Background: In the 3D tumor microenvironment, a distinct subpopulation of TNBC cells exhibits a diminished sensitivity to conventional chemotherapy, potentially reflecting the presence of breast cancer stem cells (BCSCs) that facilitate disease progression and clinical relapse. However, the molecular mechanisms underlying this drug-tolerant phenotype remain unclear. This study aims to prove the mechanisms of chemoresistance and metastasis in TNBC and to establish a basis for developing strategies to prevent recurrence. Given the lack of definitive markers for BCSCs, I propose CD29 (integrin β1) as a potential novel marker for drug-resistant, stem-like cancer cell populations.

Methods: Drug responses to the first-line chemotherapeutic agent nab-paclitaxel were compared between 2D monolayer cultures and 3D organoid models using the human TNBC cell lines MDA-MB-468 and HCC1937. Cell viability following chemotherapeutic treatment was assessed using the CellTiter-Glo Luminescent Assay after treatment with nab-paclitaxel at various concentrations under both 2D and 3D culture conditions. In Parallel, BCSC-associated surface marker expression was analyzed by flow cytometry, and activation of intracellular survival signaling pathways was assessed by immunoblot analysis.

Result: In MDA-MB-468 cells, sensitivity to nab-paclitaxel was higher in 2D monolayer culture, whereas chemotherapeutic responsiveness was reduced in 3D organoid culture (IC: 2D, 7.3nM; 3D, 93.4uM). Flow cytometry analysis demonstrated an increase in CD29 expression in MDA-MB-468 cells cultured in 3D organoid conditions, with elevated phospho-AKT levels confirmed by western blot analysis, consistent with CD29-associated survival signaling. In contrast, HCC1937 cells exhibited comparable responses to nab-paclitaxel between 2D monolayer and 3D organoid cultures (IC: 2D, 5.4nM; 3D, 42.3 nM), and no difference in CD29 expression was observed between the two culture systems, suggesting a correlation between CD29 expression and 3D-induced resistance.

Conclusions: Our results suggest that CD29 plays a key role in phenotypic changes associated with drug responsiveness in TNBC, with potential relevance for mechanistic and therapeutic studies in 3D models.

PAK4-Driven Chromosomal Instability as a Subtype-Specific Mediator of Breast Cancer Recurrence: A Multi-Omic Clinical Investigation

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Background: While p21-activated kinase 4 (PAK4) is implicated in oncogenesis of breast cancer, its subtype-specific role in clinical relapse remains poorly characterized. This study investigates the molecular mechanisms by which PAK4 drives recurrence, identifying chromosomal instability (CIN) as a key mediator.

Methods: Initial protein expression was screened in a clinical cohort of 40 breast cancer patients, identifying the HR+/HER2- subtype as the most significantly impacted by PAK4-associated recurrence. To explore underlying mechanisms, multi-omic data from the TCGA Pan-Cancer Atlas (N = 1,084), METABRIC (N = 1,413), and CPTAC (N = 122) datasets were integrated. Findings were validated via bulk mRNA sequencing of 18 HR+/HER2- patient tissues (9 recurred vs. 9 disease-free).

Result: Protein screening revealed significantly elevated PAK4 expression in recurred patients, specifically within the HR+/HER2- subtype. In the METABRIC cohort, high PAK4 expression correlated with reduced recurrence-free survival ($p = 0.0007$) and the CIN70 score ($r = 0.27$, $p < 2.2 \times 10^{-16}$), a relationship consistently replicated in the TCGA Pan-Cancer dataset. CPTAC proteomic analysis further linked PAK4 abundance to the activation of mitotic spindle assembly pathways. mRNA sequencing of the 18-sample validation cohort confirmed that the recurred group is characterized by a distinct enrichment of CIN-related processes, specifically mitotic nuclear division and chromosome segregation.

Conclusions: This study identifies the PAK4-CIN axis as a significant driver of recurrence in HR+/HER2- breast cancer. Our findings suggest that PAK4-mediated chromosomal instability contributes to poorer clinical outcomes in HR+/HER2- tumors, providing a mechanistic basis for its impact on relapse.

Simvastatin Induces a Hot Tumor Phenotype and Synergizes With Immune Checkpoint Blockade in TNBC

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Background: Triple-negative breast cancer (TNBC) lacks effective targeted therapies and shows limited responsiveness to immune checkpoint inhibitors (ICI). Statins are widely used cholesterol-lowering drugs and have recently been suggested to exert immunomodulatory effects. Here, we investigated whether simvastatin could remodel the tumor immune microenvironment and enhance the efficacy of ICI therapy in TNBC.

Methods: Mouse TNBC cell lines and simvastatin were used. In vivo efficacy was tested in syngeneic EMT6 and 4T1 models treated with simvastatin alone or with antiPD-1/PD-L1 antibodies. Tumors were analyzed by flow cytometry, IHC, RNA-seq, and BMDM polarization assays, including in vitro macrophage studies.

Result: Simvastatin monotherapy did not suppress tumor growth in vivo. However, RNA sequencing of tumors from simvastatin-treated mice showed marked immune remodeling, including increased expression of immune regulatory molecules such as Pd-l1 and Pd-1, along with upregulation of cytokines associated with an inflamed tumor phenotype. In vivo, Simvastatin treatment also shifted tumor-associated macrophages (TAMs) from an M2-like to an M1-like phenotype. Consistently, BMDM-derived M2-like macrophages treated with simvastatin exhibited decreased CD206 expression and increased MHC class II expression, indicating a shift toward an M1-like phenotype. This change was accompanied by increased NF-κB phosphorylation and reduced STAT3 and STAT6 phosphorylation. Simvastatin-treated macrophages also showed increased expression of the T cell-recruiting chemokines CXCL9/10. RNA-seq analysis of tumors from simvastatin-treated mice demonstrated increased expression of T cell infiltration markers, which was supported by increased T cell infiltration observed by IHC. Importantly, combination treatment with simvastatin and either anti-PD-1 or anti-PD-L1 antibodies resulted in synergistic antitumor effects compared with ICI monotherapy.

Conclusions: Simvastatin reprograms the tumor immune microenvironment toward a hot tumor phenotype by inducing macrophage repolarization and promoting T cell infiltration, despite lacking direct antitumor efficacy as a monotherapy. These immunomodulatory effects improve responsiveness to immune checkpoint blockade, suggesting simvastatin as a potential adjuvant to enhance ICI efficacy in TNBC.

Poster Presentation

Neutrophil Extracellular Traps Drive ICAM-1-Dependent CTC-Cluster Formation and Invasion in Triple-Negative Breast Cancer

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Background: Metastatic breast cancer has markedly poorer survival than localized disease, particularly in triple-negative breast cancer (TNBC). Circulating tumor cells (CTCs), especially multicellular CTC clusters, are key drivers of metastasis, exhibiting far greater metastatic potential than single CTCs. Intercellular adhesion molecule-1 (ICAM-1) expression is approximately 13-fold higher in lung metastases than in primary tumors and has been shown to promote tumor cell clustering and extravasation. Recent evidence suggests that immune cells, notably neutrophils, may enhance ICAM-1 expression in tumor cells. Here, we investigated how neutrophils regulate ICAM-1 expression to promote CTC-cluster formation and metastatic behavior in breast cancer.

Methods: CTC clusters were generated from human and mouse breast cancer cell lines using ultralow-attachment culture and co-cultured with a human neutrophil cell line or primary mouse neutrophils. Mechanistic studies were performed using transwell invasion assays, Western blotting, flow cytometry, immunofluorescence, and ELISA. In vivo relevance was validated using syngeneic 4T1 and xenograft mouse models.

Result: CTC clusters induced higher levels of reactive oxygen species (ROS) and IL-6 than adherent tumor cells, triggering neutrophil extracellular trap (NET) formation. NET structures were detected adjacent to CTC clusters both in vitro and in vivo. Neutrophils significantly increased ICAM-1 expression in TNBC-derived CTC clusters (~9-fold compared with adherent tumor cells) through NF-κB signaling, independent of AKT and c-JUN pathways. NET-conditioned media accelerated CTC-cluster formation, increased cluster compactness and enhanced invasive capacity. DNase I treatment disrupted NET-derived DNA, reduced ICAM-1 expression by ~60%, and significantly impaired CTC-cluster formation and invasion.

Conclusions: Neutrophils drive ICAM-1-dependent CTC-cluster formation and invasiveness in TNBC via NETs. Targeting NET-derived DNA markedly attenuates these effects, highlighting NETs as a key mediator of CTC-cluster aggressiveness and a promising therapeutic target to suppress early metastatic dissemination.

Exploring the Association between GPX4 A-to-I RNA Editing and Ferroptosis in Triple-Negative Breast Cancer

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Background: Triple-negative breast cancer (TNBC) is an aggressive breast cancer subtype with limited therapeutic options and poor clinical outcomes. TNBC is characterized by abnormal iron availability and susceptibility to ferroptosis, an iron-dependent cell death. Glutathione peroxidase 4 (GPX4) is a central regulator of ferroptosis; however, the role of GPX4 A-to-I RNA editing and its association with ferroptosis sensitivity in TNBC remain unclear. This study aimed to investigate the status of GPX4 A-to-I RNA editing and its association with ferroptosis resistance in TNBC cell lines.

Methods: GPX4 A-to-I RNA editing was examined in 13 breast cancer cell lines. Sanger sequencing of cDNA and genomic DNA was performed to distinguish RNA editing from gDNA variants. GPX4 and ADAR1 p150 expression levels were assessed by qRT-PCR and Western blot analysis. Ferroptosis sensitivity was evaluated using ferroptosis inducers followed by CellTiter-Glo viability assays. Lipid peroxidation under oxidative stress induced by tert-butyl hydroperoxide (TBHP) was quantified using BODIPY™ 581/591 C11 staining and flow cytometry

Result: GPX4 A-to-I RNA editing was detected in T47D and Hs578T, representing luminal A and basal-like subtypes, respectively. ADAR1 p150 expression was not correlated with GPX4 RNA editing status but was higher in basal-like subtypes than in other cell lines (0.75 ± 0.12 vs. 0.47 ± 0.17, $p = 0.28$). Hs578T exhibited resistance to ferroptosis inducers compared with cell lines harboring GPX4 gDNA variants. Notably, under combined oxidative stress and GPX4 inhibition, lipid peroxidation did not markedly increase in Hs578T cells compared with ferroptosis inducersensitive cell lines MDA-MB-468 (w/FIN56-30 min; 1.32 ± 0.05 vs. 6.23 ± 0.75, G/R ratio, $p < 0.01$).

Conclusions: These results suggest that GPX4 A-to-I RNA editing is associated with ferroptosis resistance in TNBC by limiting lipid peroxidation under oxidative stress. GPX4 RNA editing may confer tolerance to ferroptosis in TNBC and serve as a potential biomarker for ferroptosis-based therapeutic strategies.

Poster Presentation

Triple-negative Breast Cancer Is Independently Associated With Lower Femoral Neck T-score at the Time of Bone Metastasis

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Background: Bone metastasis is a common and clinically significant outcome of advanced breast cancer. While bone-modifying agents are routinely administered, skeletal vulnerability may vary according to molecular subtype; however, molecular subtype-specific differences in bone mineral density in patients at the time of bony metastasis remain poorly defined.

Methods: This single-center retrospective cohort study included patients with breast cancer and confirmed bone metastasis treated between January 2002 and December 2023. Molecular subtypes were classified as luminal A, luminal B, HER2-enriched, or triple-negative breast cancer (TNBC). T-scores of femoral neck and lumbar spine at the time of bone metastasis were the primary skeletal outcome, and serum 25-hydroxyvitamin D and pyridinoline were analyzed as representative bone metabolism markers. Multivariable linear regression was used to evaluate factors associated with bone mineral density.

Result: A total of 184 patients with bone metastasis were analyzed (luminal A, n = 104; luminal B, n = 41; HER2-enriched, n = 16; TNBC, n = 23). The interval from initial diagnosis to bone metastasis differed significantly by molecular subtype, with luminal subtypes showing the longest latency and TNBC the shortest. Femoral neck T-scores varied significantly across subtypes, with TNBC demonstrating the lowest mean values, whereas lumbar spine T-scores did not differ significantly. Biochemical markers of bone metabolism also showed subtype-specific patterns. TNBC patients had lower serum 25-hydroxyvitamin D levels and higher pyridinoline levels, consistent with increased bone turnover. The prevalence of osteoporosis, vitamin D deficiency, and a composite high-risk skeletal phenotype was highest in TNBC compared with other subtypes. In multivariable analyses adjusting for age, body mass index, and treatment-related factors, TNBC remained independently associated with lower femoral neck T-scores.

Conclusions: TNBC is associated with pronounced skeletal vulnerability, characterized by reduced bone mineral density and adverse bone metabolic profiles, independent of endocrine therapy exposure.

Poster Presentation

The Missense Mutation in BRCA2 Suppressed Its Degradation and Caused an Increase in ATP Production and Cell Proliferation

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Background: Breast cancer susceptibility gene 2 (BRCA2) is a genome maintenance mediator during the S phase of the cell cycle, with important implications for replication stress, centrosome replication, and cytokinesis

Methods: In this study we tried to elucidate the expression level of BRCA2 protein and its correlation with HSP27. BRCA2 expression levels are regulated in a cell cycle-dependent manner, with highest level reached during the S phase and the lowest level observed during the M phase respectively, and small heat shock protein Hsp27 may have an impact on it; however, little is known about the regulation of BRCA2 levels. In this study, we identified HSP27 as interacting with BRCA2 using mass spectrometry following treatment with estradiol in MCF-7 cells. Also, a specific ubiquitin site in the helical domain (HD) of BRCA2 may be involved in the proteasome-mediated degradation of BRCA2. Herein, we identify the ubiquitin sites involved in BRCA2 degradation.

Result: The potential ubiquitylation candidate region in the HD is located in the 2491-2590 a.a, with lysine substituted by alanine, and arginine expressed in DLD-1 (knock out-BRCA2) cells. Then, cycloheximide was added to the cells and protein degradation was detected by immunoblotting after 4 and 8 h. We observed that one of the candidate sites for ubiquitination may involve lysine 2497.

Conclusions: The results show that mutated 2497 a.a introduced BRCA2 cell growth observed significantly higher than wild type BRCA2. Related to this result, we measured the ATP source and quantified L-lactate level and determined upregulation by calibration curve.

Cell Tumor in a BI-RADS 5 Breast Lesion: A Diagnostic Pitfall in Surgical Decision-making

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Background: Granular cell tumor is a rare benign neoplasm of Schwann cell origin and is exceptionally uncommon in the breast. Despite its benign nature, breast GCT frequently mimics invasive carcinoma on imaging, often presenting with spiculated margins and irregular contours that lead to BI-RADS 4 or 5 classification. This radiologic resemblance poses a significant diagnostic pitfall and may result in unnecessarily aggressive surgical management. Awareness of this entity is therefore crucial for appropriate surgical decision-making.

Methods: We report the case of a 45-year-old woman with a non-palpable right breast lesion detected on routine imaging. Ultrasonography revealed an irregular solid mass with microlobulated contours and spiculated extensions, classified as BI-RADS 5. An ultrasound-guided Tru-Cut biopsy was performed. Histopathological and immunohistochemical findings were evaluated. Surgical management consisted of wire-localized wide local excision, and final pathology was reviewed.

Result: Histopathological examination of the biopsy demonstrated tumor cells with abundant granular cytoplasm. Immunohistochemistry showed positivity for S100, SOX10, and CD68, while cytokeratin, estrogen receptor, and progesterone receptor were negative. The Ki-67 proliferation index was below 1%, consistent with a benign granular cell tumor. Wide local excision confirmed the diagnosis, and all surgical margins were negative. No lymph node surgery or adjuvant treatment was required. The postoperative course was uneventful.

Conclusions: Granular cell tumor of the breast, although rare, should be considered in the differential diagnosis of BI-RADS 5 lesions. Preoperative histopathological confirmation is essential to prevent overtreatment. Wide local excision with negative margins is sufficient in benign cases and allows breast-conserving management. Accurate diagnosis plays a pivotal role in avoiding unnecessary radical surgery.

Glycosylation Determinants of Clinical Heterogeneity and Aggressive Outcomes in Nottingham Histologic Grade II Breast Cancer

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Background: Nottingham histologic grade II breast cancer represents a clinically challenging subgroup due to substantial heterogeneity in tumor behavior and patient outcomes that is not adequately resolved by conventional pathological grading. Identifying biologically informed markers that capture epithelial state-related differences may improve risk stratification within this intermediate-grade category. Galactose metabolism-associated glycosylation is fundamental to epithelial cell surface organization, yet its contribution to clinical heterogeneity in grade II breast cancer remains poorly defined.

Methods: An outcome-driven analysis was conducted focusing on genes annotated within the Gene Ontology galactose metabolic process pathway. Associations with overall survival were evaluated across breast cancer cohorts with stratification by Nottingham histologic grade. Protein expression of UDP-galactose 4-epimerase (GALE) was examined by immunohistochemistry in breast cancer tissues. Functional consequences of GALE loss were assessed using GALE knockout luminal breast cancer cells (MCF-7), with analyses of glycosylation patterns and cellular phenotypes related to migration, invasion, and viability.

Result: Among galactose metabolic pathway genes, UDP-galactose 4-epimerase (GALE) showed the strongest association with poor overall survival, with its prognostic impact most pronounced in Nottingham histologic grade II breast cancer. GALE protein was overexpressed in breast cancer tissues and exhibited expression patterns associated with epithelial architectural features. In luminal breast cancer cells, GALE loss induced galactosylation remodeling, as demonstrated by lectin-based analyses, and significantly suppressed migration and invasion, accompanied by a reduction in cell viability at later time points.

Conclusions: These findings identify GALE as a clinically relevant component of galactose metabolism associated glycosylation programs that contribute to biological and prognostic heterogeneity in Nottingham histologic grade II breast cancer. GALE represents a pathology-compatible biomarker with potential utility for refining risk stratification in this clinically ambiguous subgroup.

MicroRNA Expression Signatures Associated with ER and HER2 Status in Breast Cancer

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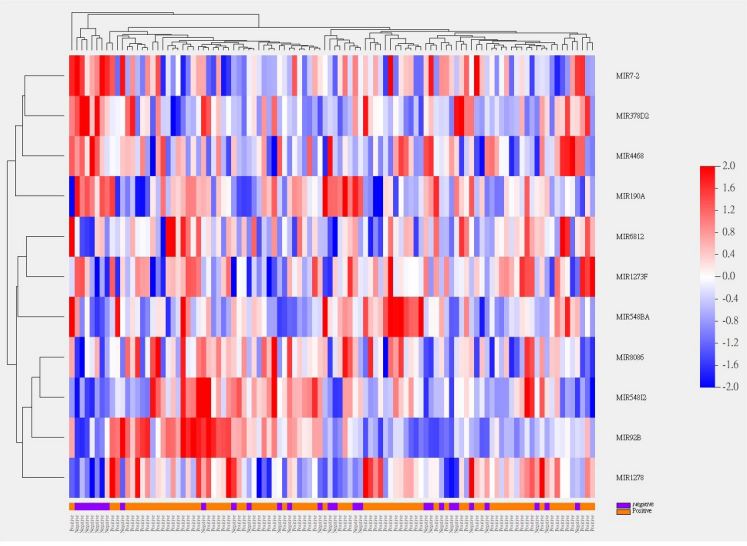
Background: Molecular heterogeneity in breast cancer remains a major challenge for precise diagnosis and treatment selection. MicroRNAs (miRNAs) are critical post-transcriptional regulators and have emerged as potential biomarkers reflecting tumor biology. This study aimed to identify ER- and HER2-associated miRNA expression signatures in breast cancer and to explore their potential clinical and biological relevance using high-throughput microarray profiling.

Methods: Tumor samples from 104 patients with breast cancer were analyzed using the Affymetrix Clariom™ D microarray platform, which enables comprehensive transcriptome assessment, including miRNA expression. After stringent quality control and filtering, 1,629 miRNAs were included for downstream analysis. Differential expression analyses were performed using two-sample t-tests with ER and HER2 status as class variables. A nominal significance threshold of 0.01 was applied.

Result: Among the analyzed tumors, 76 were ER-positive. Eleven miRNAs were significantly differentially expressed in ER-positive breast cancer, including miR-7-2, miR-4468, miR-6812, miR-548I2, miR-1278, miR-548BA, miR-8086, miR-378D2, miR-190A, miR-92B, and miR-1273F. Notably, miR-7 is implicated in lipid metabolism regulation through peroxisome proliferator-activated receptor signaling and in suppression of epithelialmesenchymal transition via targeting T-box transcription factor 2, suggesting a functional link to ER-driven tumor biology. In the HER2-positive subgroup (n = 18), eighteen miRNAs were differentially expressed, with miR-4728 demonstrating marked upregulation. miR-4728, encoded within the ERBB2 locus, has been reported to exhibit a dual role in HER2-positive breast cancer by exerting tumor-suppressive effects while modulating responsiveness to anti-HER2 therapies.



Conclusions: Distinct miRNA expression signatures are strongly associated with ER and HER2 status in breast cancer. These findings highlight the potential of miRNA profiling to refine molecular subclassification and provide insights into subtype-specific therapeutic vulnerabilities, supporting its future integration into precision oncology strategies.

Poster Presentation

Diverse anti-cancer functions of STING pathway activation in ER-positive breast cancer

Chun-Yu Liu[1,2,3], Ji-Lin Chen[2,3], Chun-Teng Huang[4], Pei-Yi Chu[5], Mei-Fang Tseng[1], Yu-Hsuan Lee[1], Wan-Lun Wang[2], Ling-Ming Tseng[2,3,6]

[1]Taipei Veterans General Hospital, Department of Medical Oncology, Taiwan, [2]Taipei Veterans General Hospital, Department of Comprehensive Breast Health Center, Taiwan, [3]National Yang Ming Chiao Tung Univ., Department of School of Medicine, Taiwan, [4]Yang-Ming Branch of Taipei City Hospital, Department of Medicine, Taiwan, [5]Show Chwan Memorial Hospital, Department of Pathology, Taiwan, [6]Taipei Veterans General Hospital, Department of Surgery, Taiwan

Background: Estrogen receptor (ER)-positive, or luminal, subtypes account for approximately 70% of all breast cancer cases. The cGAS-STING pathway has emerged as a central mediator of host defense and tumor-associated inflammation, primarily through sensing cytosolic DNA and enhancing antitumor immunity. Although downregulation of STING expression has been reported in breast tumor tissues, its biological role in luminal breast cancer remains insufficiently characterized.

Methods: Gene expression profiles and clinical data from patients with breast cancer were analyzed using public databases. In vitro functional assays were performed to assess cell aggressiveness. Phospho-kinase array and Western blot analyses were used to investigate downstream molecular signaling. Female BALB/c nude mice were employed for xenograft studies.

Result: Luminal breast cancer tissues and cell lines exhibited lower STING transcript levels compared with other molecular subtypes. Patients with higher STING expression showed improved relapse-free survival within the luminal breast cancer cohort. STING knockdown enhanced cell migration, invasion, and sphere-forming capacity, accompanied by reduced expression of epithelial markers and increased expression of mesenchymal and stemness-associated proteins. Conversely, STING overexpression suppressed these aggressive phenotypes in luminal breast cancer cells. Treatment with STING agonists produced effects similar to those observed with STING overexpression. Data from the phospho-kinase array revealed that STING overexpression increased ERK phosphorylation, a signaling molecule known to be involved in autophagic cell death. STING overexpression or STING agonist treatment induced LC3 cleavage, whereas ERK1/2 knockdown or MEK inhibition attenuated STING-induced LC3 processing. In vivo, nude mice bearing STING-overexpressing MCF7 tumors developed significantly smaller tumors than control mice, with increased markers of apoptosis and autophagy observed in tumor xenografts.

Conclusions: These findings suggest that STING may function as a tumor suppressor in luminal breast cancer, potentially through the induction of apoptosis and autophagy.

Single-cell Analysis of Triple-negative Breast Cancer Reveals Subtype-specific Therapeutic Vulnerabilities for ADC and Immune Checkpoint Inhibitors

Jiun-I Lai, Chun-Yu Liu, Chi-Cheng Huang, Ta-Chung Chao, Ling-Ming Tseng

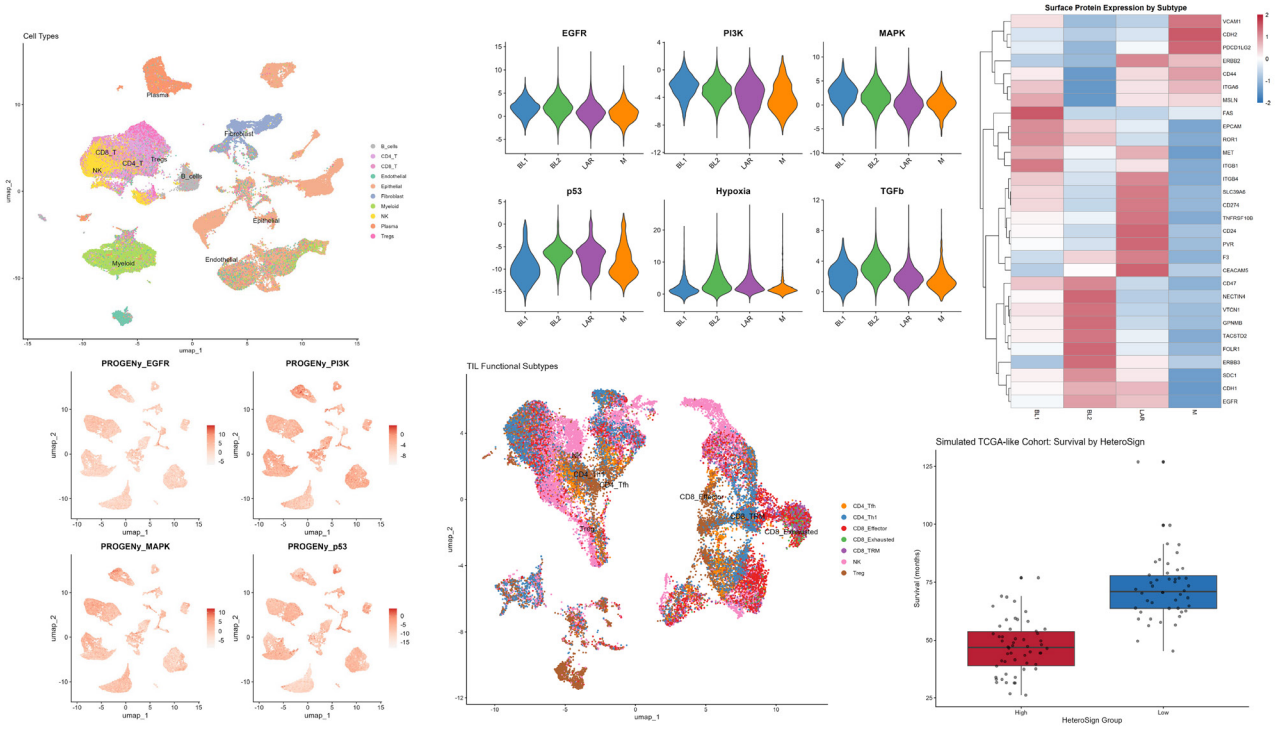
National Yang Ming Chiao Tung Univ., Department of Medical Oncology, Taiwan

Background: Triple-negative breast cancer (TNBC) has an aggressive clinical course and is currently still a therapeutic challenge. In recent years, molecular subtypes have been proposed for TNBC, however the clinical implications and the antigen landscape from an ADC development standpoint have not been characterized, especially from a single-cell level.

Methods: In this project, we performed rigorous single-cell RNA sequencing analysis of 99,039 cells from 18 treatment-naive primary TNBC patients (from public datasets in GEO database), applying stringent quality control for analysis.

Result: Single-cell Lehmann molecular subtyping revealed that 50% of tumors harbor significant intratumoral heterogeneity (Shannon diversity index >0.95), with BL1-M subtype co-occurence was rare (Jaccard index 0.72). Pathway analysis demonstrated subtype-specific signaling dependencies, with BL1 cells exhibiting elevated MAPK/PI3K activity while BL2 cells showed TGF-β / NF-κB pathway enrichment. Importantly, we discovered that TROP2, the target of the ADC sacituzumab govitecan, was nearly absent in mesenchymal (M)-subtype cells, suggesting potential treatment resistance in M-dominant tumors. Alternative ADC targets VCAM1 and CDH2 were identified as M-subtype-specific surface proteins, providing potential ADC targets. Tumor-infiltrating lymphocyte analysis revealed striking immune microenvironment differences: BL2-dominant tumors exhibited marked regulatory T cell enrichment (median 57% of TILs) with complete absence of tissue-resident memory CD8+ T cells, indicating potential checkpoint inhibitor resistance mechanisms. We derived a 50-gene heterogeneity signature (HeteroSign) that significantly correlated with subtype diversity ($\rho = 0.49$, $p = 0.043$) and independently predicted inferior overall survival across three validation cohorts (combined HR = 1.44, 95% CI 1.28-1.63, $p < 0.001$).

Conclusions: Our signature had strong predictive power for sacituzumab govitecan, checkpoint inhibitor monotherapy, or combination immunotherapy. These findings establish single-cell profiling as essential for precision therapeutic selection in TNBC and provide a clinically applicable prognostic biomarker derivable from bulk RNA sequencing.



Poster Presentation

Elevated Circulating Humanin Correlates with Poor Prognostic Features in Invasive Breast Carcinoma

Li-Kun Ko[1,2], Li-Ju Huang[3], Chia-Ning Yang[4]

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Background: Humanin is a mitochondrial-derived peptide known for its cytoprotective and anti-apoptotic properties. Although its involvement in cancer biology is emerging, its specific clinical relevance in breast cancer remains unclear. This study aimed to investigate humanin expression in invasive breast carcinoma and evaluate its correlation with key clinicopathological features to assess its potential as a prognostic biomarker.

Methods: A total of 115 patients with invasive ductal carcinoma (IDC) and 65 controls with benign breast tumors were prospectively enrolled. Plasma humanin concentrations were quantified using enzyme-linked immunosorbent assay (ELISA). Additionally, humanin protein expression in paired tumor and adjacent non-cancerous tissues was analyzed via Western blot. Statistical analyses, including the Mann-Whitney U test and ANOVA, were performed to assess associations between circulating humanin levels and clinicopathological parameters, such as tumor size, stage, histological grade, and molecular subtypes.

Result: Plasma humanin levels were significantly elevated in IDC patients compared to the benign control group. Western blot analysis corroborated this upregulation, revealing approximately 82% higher humanin protein expression in tumor tissues than in adjacent non-cancerous tissues. Elevated plasma humanin was significantly associated with indicators of poor prognosis, including larger tumor size ($p = 0.002$), higher histological grade ($p = 0.01$), advanced clinical stage ($p = 0.003$), and a high Ki-67 proliferation index ($p = 0.016$). However, no significant correlations were observed with axillary lymph node metastasis or specific molecular subtypes.

Conclusions: This study demonstrates that elevated circulating humanin is characteristic of invasive breast carcinoma and strongly correlates with aggressive clinicopathological features. Consequently, plasma humanin holds significant promise as a novel, non-invasive biomarker for prognostic risk stratification in breast cancer. Future studies are warranted to validate its clinical utility and elucidate the underlying mechanisms promoting tumor progression.

Fewer Breast Cancers During Post-treatment Surveillance Among Patients Initially Staged Using Contrast-imaging

Wilson Yang[1,2,3], Allison Rose[2,6], Julia Matheson[2,3], Kenneth Elder[2], Caroline Maccallum[2], Carolyn Nickson[4,5], Gregory Bruce Mann[2,3,4]

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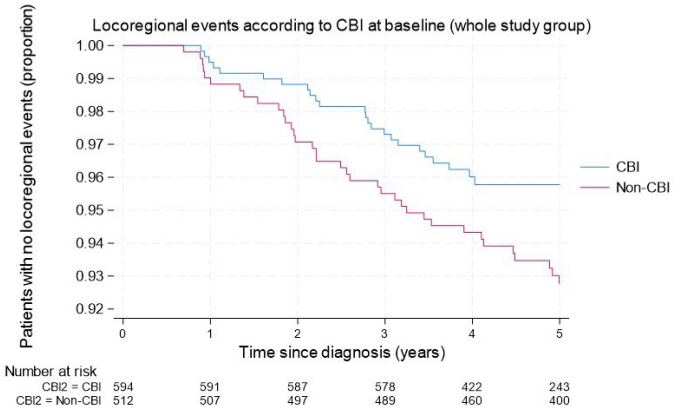
Background: The role of contrast-based imaging (CBI) for local staging at diagnosis in early breast cancer remains debated. More sensitive baseline staging may identify synchronous disease that would otherwise present as early ipsilateral recurrence or contralateral events. We examined whether the use of CBI at diagnosis is associated with differences in early locoregional outcomes.

Methods: We performed a retrospective cohort study of women with early invasive breast cancer or ductal carcinoma in situ (DCIS). Patients were grouped according to whether they underwent CBI (contrast-enhanced mammography (CEM) or MRI) at diagnosis. All patients underwent mammographic surveillance including CEM. Locoregional events from diagnosis to 30 June 2025 were identified and evaluated. Cox proportional hazards models assessed associations between CBI use and subsequent locoregional events, adjusting for age, calendar period, mammographic density (MD), and stage.

Result: Among 1,106 women (594 CBI, 512 non-CBI) diagnosed between April 2015 and June 2022, there were 60 locoregional events (39 invasive, 21 DCIS). Patients staged with CBI had fewer subsequent locoregional events over follow-up [Figure 1]. After adjustment, CBI use at diagnosis was associated with significantly lower 5-year locoregional event rates among women with invasive cancer ($p = 0.044$), particularly those with Luminal A/B phenotypes ($p = 0.025$), with low MD ($p = 0.010$), and with fewer contralateral events in invasive index cases ($p = 0.014$). Features of subsequent events (including tumour grade, behaviour, and invasive size) did not differ between groups.

Conclusions: Inclusion of CBI in local staging of early breast cancer was associated with lower rates of locoregional events over five years. These findings support broader consideration of CBI use for local staging at diagnosis and suggest that improved baseline detection may reduce early post-treatment locoregional events.



[Figure 1. Observed locoregional event-free survival according to CBI use for local staging at diagnosis]

Poster Presentation

Artificial Intelligence in Mammography for Breast Cancer Detection and Diagnosis: A Systematic Review

Michael Co, Ava Kwong, Billy Cheung

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Background: Mammography plays a critical role in early detection and treatment, improving survival rates and reducing treatment expenses. This systematic review aims to evaluate the application of artificial intelligence in mammography interpretation for breast cancer detection.

Methods: The review was conducted in line with the PRISMA protocol. 12 studies comprising 267948 women and 268021 mammograms were included for data analysis in this systematic review. An online search in PubMed and EMBASE for studies that were published in English from August 2020 to August 2025 was conducted. Keywords used for literature search included "Mammogram OR Mammography"; AND "Artificial intelligence"; AND "Detection OR Diagnosis".

Result: The pooled estimates clearly indicate that standalone AI systems achieve higher diagnostic accuracy, sensitivity, and specificity than radiologists working without AI assistance. The superior AUC of AI (0.92 vs. 0.86) underscores its robust overall performance in distinguishing between malignant and benign cases. Crucially, the marked improvement in sensitivity (0.81 vs. 0.76) suggests AI's potential to reduce false negatives, a critical factor in early cancer detection. This performance advantage was consistent across both single-center and multi-center settings, with the gains in specificity being particularly pronounced in the more diverse and generalizable multi-center studies. In addition, the "human-in-the-loop" model, where AI assists radiologists, also yields significant benefits. AI-assisted readings consistently outperformed traditional readings across all metrics, with an 8-percentage-point increase in sensitivity being the most notable improvement. This demonstrates that AI's primary value in the immediate future may lie in its role as a powerful decision-support tool, helping radiologists identify subtle lesions they might otherwise miss, thereby improving diagnostic confidence and outcomes.

Conclusions: This study affirms that AI is no longer a speculative technology but a clinically viable tool for breast cancer detection. It demonstrates superior standalone performance and a significant augmentative effect on radiologists.

Reducing Ambiguity in BI-RADS 3 and 4 Microcalcifications Using Bayesian Deep Learning and Uncertainty-Guided Classification

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Background: Microcalcification-dominant lesions remain a major diagnostic challenge in mammography, with BI-RADS 3 and 4 categories frequently exhibiting substantial inter-reader variability. Conventional AI models lack mechanisms to quantify uncertainty, limiting their clinical reliability. We aimed to develop an uncertainty-aware Bayesian deep learning model to improve interpretability, diagnostic accuracy, and clinical decision-making in ambiguous microcalcification cases.

Methods: A total of 930 patients (544 BI-RADS 3; 386 BI-RADS 4) imaged from 20102020 at Chungnam National University Hospital were used for training and internal validation. External testing utilized 143 patients (76 BI-RADS 3; 67 BI-RADS 4) from Sejong Chungnam National University Hospital (20212024). Mammograms were obtained using the Hologic Selenia Dimensions system. A Bayesian convolutional neural network incorporating Monte Carlo dropout was developed to classify BI-RADS 3 vs. 4 while estimating epistemic and aleatoric uncertainty. Performance metrics included AUC, accuracy, calibration (ECE), and uncertainty-thresholded accuracy.

Result: The model achieved an AUC of 0.88 with excellent calibration (ECE = 0.037). Applying uncertainty thresholds significantly improved diagnostic reliability by selectively deferring low-confidence predictions. This approach reduced false-positive biopsy recommendations by up to 10%. Uncertainty heatmaps corresponded strongly with radiologists' assessments, consistently highlighting morphologically ambiguous lesions.

Conclusions: Uncertainty-aware Bayesian deep learning enhances the accuracy, interpretability, and safety of BI-RADS classification for microcalcifications. By identifying low-confidence cases and reducing unnecessary biopsies, this framework demonstrates strong potential as a clinically meaningful AI-assisted decision-support tool in breast imaging.

Poster Presentation

Real-world Diagnostic Characteristics of Breast Cancer in a Regional Women's Hospital in Korea: A Comparison Between Screening-detected and Symptomatic Presentations

Jiwon Park

Saintmary's Women's Hospital, Department of Surgery, Korea

Background: Regional women's hospitals represent an important real-world clinical setting. Breast imaging is mainly performed for screening, and symptomatic patients often present as their first point of medical contact. However, real-world data on how breast cancer is detected and diagnosed in regional hospitals remain limited. This study aimed to characterize real-world diagnostic features of breast cancer and to compare screening-detected and symptomatic presentations in a regional women's hospital.

Methods: We retrospectively analyzed patients diagnosed with breast cancer at Saintmary's women's hospital between April 2023 and December 2025. Patients were classified as screening-detected or symptomatic at initial presentation. Clinical, imaging, and pathological characteristics, including tumor size and BI-RADS categories at first imaging, were compared between groups.

Result: Of the 75 patients, 37 (49.3%) were screening-detected and 38 (50.7%) were symptomatic. Among screening-detected cancers, 21 of 37 cases (56.8%) were initially detected by ultrasonography. Screening-detected breast cancers had significantly smaller tumor sizes at diagnosis than symptomatic cancers (1.14 ± 0.54 cm vs. 3.38 ± 2.71 cm, $p < 0.001$). BI-RADS distribution differed significantly between groups, with symptomatic cancers showing higher BI-RADS scores ($p < 0.001$). Suspicious axillary lymph nodes on imaging were less frequent in screening-detected cancers (5.4% vs. 31.6%, $p = 0.009$), while ductal carcinoma in situ was more commonly identified in screening-detected cases (37.8% vs. 5.3%, $p = 0.002$).

Conclusions: In a real-world regional women's hospital setting in Korea, screening-detected breast cancers were associated with smaller tumor burden, lower BI-RADS categories, and less frequent suspicious axillary lymph nodes on imaging compared with symptomatic breast cancers. These diagnostic features are consistent with cancers identified at an earlier stage of disease and highlight the clinical value of screening-based detection in routine practice.

Intraductal Papilloma Diagnosed by Core Needle Biopsy with Consideration of Non-Mass Lesions: A Single-Institutional Quantitative Analysis Following Vaccum Assisted Breast Excision

Junho Cho, Junghoon Cho, Seongmun Park, Minseo Kang, Hyun-Soo Shin, Eun-A Min, Soo-In Lee, Minhyuk Lee

Dr. Cho Breast and Thyroid Clinic, Department of Surgery, Korea

Background: To evaluate the cancer upgrade rate and underestimation rate of intraductal papilloma (IDP) diagnosed on core needle biopsy (CNB) following vacuum-assisted breast excision (VABE), and to quantitatively analyze cancer risk of benign IDP and identify candidates for surveillance.

Methods: All patients underwent histopathological diagnosis by VABE following CNB. The primary objective was to determine the cancer upgrade rate of IDP, while the secondary objective was to assess the cancer upgrade rate of IDP without atypia. Each variable was analyzed using the chi-square test, and univariate and multivariate analyses were performed using a binary logistic regression model.

Result: In our institutional dataset, 277 cases of benign IDP underwent VABE. The overall cancer upgrade rate of IDP was 6.4% (18/277), while the upgrade rate for IDP with atypia was 36% (7/19). In multivariate analysis, independent risk factors for malignancy included the presence of atypia, older age, larger tumor size, and marked vascularity. In the subgroup of 258 IDP cases without atypia, the cancer upgrade rate and the underestimation rate were 4.2% and 8.5%, respectively. Significant risk factors for cancer upgrade included older age, larger tumor size, larger tumor height, tumor base characteristics, and higher elastography score.

Conclusions: In cases IDP without atypia, the overall cancer upgrade rate was 4.2%. Among these, patients aged ≥ 50 years (12%), with lesion size ≥ 1.5 cm (9.8%), elastography score ≥ 30 (10.5%), lesion height ≥ 0.7 cm (7.6%) and absence of a clearly defined narrow base (7.28%) demonstrated higher upgrade rates, suggesting that VABE. For IDPs without the above risk factors, the cancer upgrade rate was 1.28% (1/78) and the underestimation rate was 2.56% (2/78), supporting their suitability for future active surveillance studies.

Development and Training Status of Breast Imaging in Mongolia

Tugsjargal Purevsukh[1,2], Asai Ramish[2], Ankhzaya Batmunkh[2,3], Tuvshinjargal Dashjamts[1]

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Background: Breast imaging and diagnostics in Mongolia have progressed significantly since the establishment of the Mongolian Society of Breast Imaging (MSBI) in 2014. Created to strengthen physician expertise and improve breast healthcare, MSBI has promoted professional capacity building, multidisciplinary collaboration, and alignment with international standards. In response to increasing breast disease incidence and the need for early detection, the Society has worked with international partners such as JABTS and supported the integration of breast imaging into medical education and clinical practice.

Methods: This qualitative research paper describes how structured training programs, institutional collaboration, and adoption of advanced technologies have improved diagnostic accuracy and professional competency in Mongolia's breast health sector, and outlines future opportunities for sustainable national training.

Result: MSBI has implemented diverse educational initiatives, including international observerships, fellowships, hands-on workshops, annual national forums, and regional training programs. Since 2018, members have completed one- to three-month clinical training abroad in breast ultrasound and MRI. The first national forum on Diagnosis and Treatment of Breast Diseases launched in 2018 with over 220 participants and continues annually, alongside practical workshops on ultrasound-guided breast biopsy. Regional conferences in western provinces expanded outreach, while during the COVID-19 pandemic MSBI maintained education through quarterly online case conferences with Japanese Association of Breast and Thyroid Sonology (JABTS). In 2021, Mongolia's first formal postgraduate breast imaging training program was established, producing seven specialists; five additional trainees are currently enrolled. More than 500 healthcare professionals have received breast diagnostics training through MSBI activities. Technological progress has advanced from analog mammography to tomosynthesis, contrast-enhanced MRI, ultrasound elastography, stereotactic biopsy, and AI-assisted diagnostics, now available in major national and regional centers.

Conclusions: Systematic training, international collaboration, and technology adoption have strengthened breast imaging capacity in Mongolia. Continued curriculum development, research, and expanded access to specialized education are essential for further improving diagnostic quality and accessibility nationwide.

Applying Artificial Intelligence For The Combined Diagnosis And Treatment Of High-Risk B3 Breast Lesions

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Background: High-risk B3 breast lesions are increasingly being diagnosed following the biopsy of screen-detected abnormalities. Current recommendations are for complete excision, preferably with minimally invasive vacuum-assisted excision (VAE), to exclude malignant upgrade. We developed an artificial intelligence ultrasound model to identify high-risk lesions as a distinct category so as to facilitate VAE without prior biopsy.

Methods: The model was trained on 60,000 breast lesions (57,200 benign, 720 high-risk, 2,115 malignant) and validated on an independent test set of 1,975 lesions (1,091 benign, 230 high-risk, 654 malignant).

Result: For benign lesions, the model achieved a sensitivity of 0.822 and specificity of 0.915. High-risk lesions were detected with a sensitivity of 0.786 and specificity of 0.868, and cancer with a sensitivity of 0.658 and specificity of 0.917 (corresponding AUC was 0.935, 0.883, and 0.887, respectively). A prospective pilot study of 35 women with BIRADS 4A/4B lesions who were scheduled to undergo VAE was conducted. In total, there were 51 BIRADS 4A/4B lesions and 188 BIRADS 2/3 lesions. Model predictions agreed with groundtruth for 175 lesions (73.2%). False-positive predictions occurred in 24 lesions; 19 predicted as high-risk and 5 predicted as malignant, all proven benign on histology. Among the lesions with histological confirmation on VAE, there were 6 false positives; 4 lesions predicted as high-risk and 1 predicted as malignant were benign, another lesion predicted as malignant was atypical ductal hyperplasia (ADH). Three cancers were misclassified: 2 predicted as high-risk and 1 invasive lobular carcinoma was predicted as benign. Another 13 high-risk lesions were predicted as benign. Of these 13, 3 were benign intra-ductal papilloma, 2 were fibroadenoma with incidental ADH, 1 a benign phyllodes tumour. The remaining 6 were ADH and 1 radial scar.

Conclusions: The model misclassified 1 cancer and 6 ADH. However, it could be potentially useful in downgrading benign lesions to avoid biopsy.

CT-US Fusion for Pre-operative Perforator Mapping Before DIEP Flap Breast Reconstruction

Tze Gek Ho, Eelin Tan, Nadia Hui-Shan Sim, Alison Mei-Fern Quah, Geraldine Hwee-Ping Lee, Allen Wei-Jiat Wong, Yijia Wong, Gervais Wansaicheong

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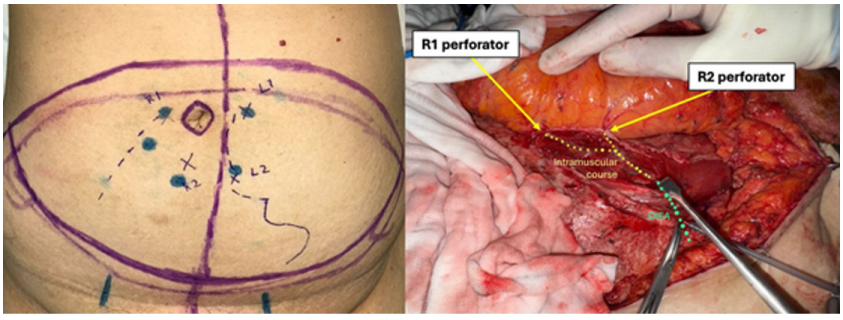
Background: CT-US fusion for pre-operative perforator mapping before DIEP flap breast reconstruction as it eliminates donor site morbidity associated with musculocutaneous flaps. However, the anatomical variability of abdominal perforators poses significant challenges for microsurgical planning, making the knowledge of perforator mapping essential to optimize surgical outcomes and minimize donor site morbidity by limiting intramuscular dissection. Computed tomography (CT) angiography of the deep inferior epigastric arteries (DIEA) is widely regarded as the preferred imaging modality, offering high-resolution visualization of DIEA branching pattern, perforator location, size and intramuscular course. Following CT angiography, surgeons mark the perforator location on the patient's skin using Doppler ultrasound (US) on the day of the surgery as per standard practice. As much as the interpretation of the CT angiography is experience dependent, the use of Doppler US for perforator mapping is operator dependent and time-consuming. Moreover, the actual real-time perforator locations can differ greatly from those of static CT images. Various methods such as US-guided perforator mapping by sonographers trained in vascular US the day before surgery and use of bespoke templates based on life-size CT angiography images have been devised to improve procedural efficiency and minimize mapping errors.

Methods: In this technical note, we describe how CT-US fusion can be leveraged for efficient mapping and accurate skin marking of the DIEA perforators. The axial CT angiography images are selected for fusion. Similar to many surgical navigation systems, the system (Smart Fusion, Canon Medical Systems, Tochigi, Japan) uses electromagnetic tracking.

Result: Intraoperative assessment revealed that perforator locations mapped by the CT-US fusion technique were more accurate and demonstrated reduced localization error compared to those mapped by surgeon-performed Doppler US. CT-US fusion also provided better detail on intramuscular course and branching pattern of the perforators. This contributed to more efficient flap harvest.



Conclusions: The CT-US fusion system is a valuable modality for surgery.

BreastLAP: An Automated 3D Deep Learning Framework for Predicting Axillary Lymph Node Metastasis on Routine Chest CT in Breast Cancer Patients

Chia Hua Liu[1,3], Chih Yean Lum[1], Chieh Ting Lin[2], Nai Wen Shih[1], Jen Jee Chen[2]

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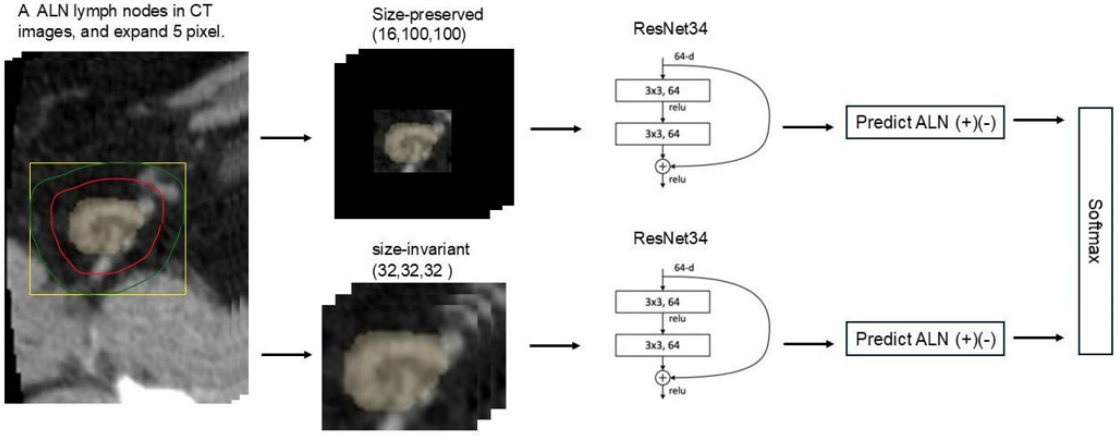
Background: Accurate assessment of axillary lymph node (ALN) status is essential for breast cancer staging and treatment planning. To overcome the invasiveness of sentinel lymph node biopsy and the variability of traditional imaging, we developed BreastLAP, a three-dimensional (3D) deep learning model designed to automate ALN localization and metastasis prediction using standard chest CT scans.

Methods: This retrospective study evaluated two core components. For classification, a ResNet34-based model was trained on 490 lymph nodes and tested on 120 (totaling 296 patients, 610 nodes). Two preprocessing strategiessize-preserved and size-invariant, were evaluated against a Support Vector Machine (SVM) baseline. For segmentation, 346 patients (1,940 nodes) were used to train and validate a 3D segmentation model. Finally, an integrated pipeline was tested where automated segmentation outputs served as inputs for the classification task.

Result: The BreastLAP classification model achieved an AUROC of 0.91, significantly outperforming the SVM baseline. The size-preserved approach yielded an accuracy of 0.86 (sensitivity: 0.78, specificity: 0.93). The segmentation model achieved a Dice Similarity Coefficient (DSC) of 0.74. In the integrated pipeline, the model maintained high diagnostic value with an AUROC of 0.89 and a sensitivity of 0.90.

Conclusions: BreastLAP provides a robust, non-invasive decision-support tool for predicting ALN metastasis from standard CT imaging. While manual delineation remains the gold standard for accuracy, the integrated automated pipeline demonstrates high sensitivity and clinical utility. Future refinement will incorporate clinicopathological parameters to further optimize predictive performance.



Re-excision Rates for Invasive Lobular Carcinoma: Impact of Pre-operative Breast MRI on Surgical Outcomes

Theadora Forster-Anderson[1], Shanta Velaiutham[2], Rita Poon[1]

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Background: Invasive lobular carcinoma (ILC) presents management challenges due to its infiltrative growth pattern, tendency for multifocal disease, and being relatively imaging-occult, contributing to higher rates of positive margins and re-excision following breast-conserving surgery (BCS). Sensitivity of breast tomosynthesis for ILC ranges from 80-88%. Mammographic sensitivity is variable and influenced by breast density. Breast MRI demonstrates high sensitivity for ILC detection (93%), however its impact on re-excision rates remains uncertain. This study aimed to evaluate the association between pre-operative MRI and re-excision rates in patients undergoing surgery for ILC.

Methods: A multi-centre retrospective cohort study was conducted of patients with histologically confirmed ILC who underwent BCS in NSW between 2019 and 2024. Patients were stratified according to use of pre-operative breast MRI. Demographic, pathological, and operative data were collected. Primary outcome was re-excision following initial breast-conserving surgery. Categorical variables were compared using Fisher's exact test. Multivariable logistic regression was performed to adjust for potential confounders including age, histological grade, and presence of ductal carcinoma in situ (DCIS).

Result: A total of 147 patients were included, of whom 54 (36.7%) underwent pre-operative MRI. Re-excision was required in 16/54 (29.6%) patients in the MRI group and 27/93 (29.0%) in the non-MRI group ($p = 1.00$). On univariable analysis, MRI was not associated with re-excision (OR 1.03, 95% CI 0.492.15). On multivariable logistic regression adjusting for age, grade, and DCIS, MRI was not independently associated with re-excision (OR 0.81, 95% CI 0.341.89; $p = 0.62$). Presence of DCIS demonstrated non-significant trend toward increased re-excision (OR 1.002; $p = 0.096$).

Conclusions: Pre-operative MRI was not associated with reduced re-excision rates following BCS for ILC. These findings support selective rather than routine use of MRI in surgical management of ILC, with clear pre-operative counselling regarding its limitations. Larger prospective studies are required to identify subgroups most likely to benefit.

CTC Dynamics Pre and Post Chemotherapy in Advanced Breast Cancer

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Background: CTCs play a role in monitoring breast cancer patients undergoing therapy. The existence of CTCs is a sign of therapy resistance and affects patient prognosis. This study aims to examine whether there are changes in CTC values in patients with locally advanced or advanced breast cancer.

Methods: 30 samples of locally advanced or advanced breast cancer patients receiving Anthracycline and Taxane-based chemotherapy. Pre-chemotherapy, peripheral blood, was drawn and CTCs were examined using flow cytometry with EpCAM antibody. Patients then undergo a complete chemotherapy cycle. After that, the patients were again taken peripheral blood and examined for post- chemotherapy CTC values.

Result: The study was conducted at Cipto Mangunkusumo Hospital, from December 2022-2023. The mean age was 47.93 ± 7.30. A total of 56.7% (n = 17) were not menopausal, 43.4% of tumor status with the T3 and T4 and ymph node status with N0 and N1 (43.4%). Two patients were found to have metastasis. 56.7% of patients had grade 3 and the most common subtype was luminal B (63.4%, n = 19). There were 22 patients (73.3%) with ER positive, 14 patients (46.7%) with PR positive, 11 patients (36.7%) with Her2 positive, and 21 patients (70%) with Ki67 high proliferation. Pre-chemotherapy CTC results obtained a mean value of 18313.90 and a median of 1460.50. Post- chemotherapy CTC obtained a mean value of 638.80 and a median of 415.50. Wilcoxon test was performed and the difference was significant ($p = 0.002$). Multivariate linear regression analysis was correlated between the decrease in CTC with age, menopause status, subtype, metastasis, and grading. The menopause status has significant association changes in CTC values.

Conclusions: CTC in locally advanced and advanced breast cancer patients after chemotherapy was significantly lower than before chemotherapy. Menopause status has a significant association with decreased CTC values.

Poster Presentation

Demographic Determinants of Timeliness in the Breast Cancer Diagnostic Interval in Indonesia

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Background: Time interval of breast cancer diagnosis and treatment initiation are an indices of health care accessibility that might reflect inequality in the cancer care and complexity in the hospital administration. Identification of variables associated with delayed diagnostic interval is important information to improve cancer care.

Methods: A retrospective cohort study was performed in a tertiary hospital by recruiting all newly diagnosed breast cancer patients during 2015-2020. Total time between first presentation in the hospital to the final pathological diagnosis and staging of breast cancer was compared with demographic variables.

Result: A total of 1372 breast cancer patients were included. Time interval of breast cancer diagnosis was defined as date of first presentation in the hospital to the date of pathological report. Mean and median time intervals of diagnosis were 19 days and 14 days, respectively. Time interval of diagnosis less than 3 weeks were found in 1202 patients (87.6%) and more than 3 weeks were observed in 270 patients (12.4%). Being not married and advanced stage presentation were significantly associated with time interval diagnosis more than 3 weeks (OR = 1.976, 95%CI = 1.127-3.460 and OR = 1.553, 95%CI = 1.049-2.298). Living in rural area, smoking status, high body mass index, having children, educational status, menopausal status, and having metabolic comorbidity were not significantly associated with longer interval time of breast cancer diagnosis. Time interval of diagnosis more than 3 weeks was significantly associated with higher risk of locoregional recurrences (OR = 1.488, 95%CI = 1.051-2.107) but was not significantly associated with risk of distant metastases (OR = 1.251, 95%CI = 0.847-1.846).

Conclusions: More advanced stage of breast cancer presentation and being not married are associated with delayed time of breast cancer diagnosis interval. In addition, delayed time of breast cancer diagnosis interval is associated with higher risks of locoregional recurrences. Further study is needed to assess the complexity in the hospital administration to the time interval of diagnosis.

Deep Learning-based Analysis of Breast Ultrasound Images to Complement US-TILs Scoring and Stratification of Neoadjuvant Chemotherapy Response

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Background: Tumor-infiltrating lymphocytes (TILs) are immune biomarkers associated with neoadjuvant chemotherapy (NAC) response in triple-negative (TN) and HER2-positive breast cancer. Previously, we have reported the clinical use of ultrasound-based TIL assessment (US-TILs scoring) as a noninvasive surrogate for pathological TILs; however, its predictive ability is limited to cases with low-to-intermediate scores. This study aimed to investigate whether deep learning analysis of breast ultrasound images can complement US-TILs scoring and improve stratification of pathological complete responses (pCR).

Methods: We retrospectively analyzed 236 patients with TN or HER2-positive breast cancer who underwent NAC. All patients underwent pretreatment breast ultrasonography, pretreatment TILs were assessed using core needle biopsy specimens, and treatment response was determined as pCR based on surgical pathology after neoadjuvant chemotherapy. Experienced clinicians manually assigned US-TILs scores. A vision-transformer-based deep learning model was trained to obtain image features from ultrasound images, and image-level predictions were aggregated at the case level. Model performance was evaluated using five -fold cross-validated out-of-fold predictions. Associations among AI-derived prediction probabilities, US-TILs scores, and pCR were analyzed.

Result: Patients with high US-TIL scores (≥ 6) showed a high pCR rate (80.0%), whereas those with low-to-

Poster Presentation

intermediate scores (≤ 5) had approximately 50%. Among patients with low-to-intermediate US-TIL scores, stratification by AI prediction tertiles showed a gradual increase in pCR rates from the low to high AI groups (48.4%, 51.6%, and 54.8%, respectively), although not statistically significant (χ^2 test, $p = 0.77$). Subtype-stratified analyses suggested that this tendency is more apparent in TN breast cancer than in HER2-positive breast cancer.

Conclusions: US-TILs scoring is useful for stratifying NAC responses. Deep learning-based ultrasound image analysis may provide complementary hooking stratification signals in patients with low-to-intermediate US-TIL scores in TN breast cancer. Further studies with larger cohorts are required to clarify the subtype-specific use of this approach.

Evaluation of a Serum Small RNABased Diagnostic Model for Breast Cancer

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Background: Breast cancer is the most common malignancy among women in Japan. However, the participation rate in breast cancer screening remains low, at 47.4% as of 2022, highlighting the need for more accessible diagnostic approaches for early detection. Incidence rises sharply from the late 30s to the late 40s, an age group in which dense breast tissue is highly prevalent and reduces the sensitivity of mammography. Although combined mammography and ultrasonography has been explored as a supplemental approach, its impact on mortality reduction remains inconclusive. MicroRNAs (miRNAs), small non-coding RNAs of 21-23 nucleotides involved in post-transcriptional gene regulation, have shown distinct expression profiles between breast cancer patients and healthy individuals, suggesting their potential utility as minimally invasive biomarkers.

Methods: Patients diagnosed with breast cancer at our institution or collaborating centers were enrolled, with a target sample size of over 350 cases. Controls were women without a history of cancer who had previously provided serum samples and clinical information. Short RNAs were extracted from serum samples, and comprehensive miRNA profiling was performed using next-generation sequencing. Differential expression analyses were conducted, and combinations of miRNAs were selected to construct a discriminative model for breast cancer detection.

Result: A total of 346 breast cancer cases and 373 control samples collected between November 2023 and October 2025 were included in the analysis. The miRNA-based diagnostic model demonstrated robust performance, yirlding an area under the curve of 0.871, with a sensitivity of 0.77, and specificity of 0.85. Subgroup analyses revealed no significant differences in predictive performance across mammography category or breast density levels.

Conclusions: The serum miRNA-based diagnostic model exhibited favorable accuracy for breast cancer detection and appeared unaffected by breast density or mammographic category. With further validation and standardization, this approach has the potential to serve as a novel, broadly applicable diagnostic tool across age groups.

Introduction to a Deep Learning System for Breast Ultrasound Diagnosis for Clinical Application

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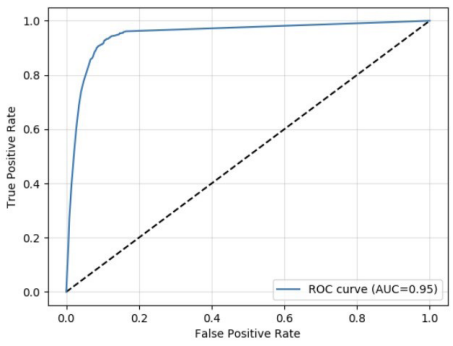
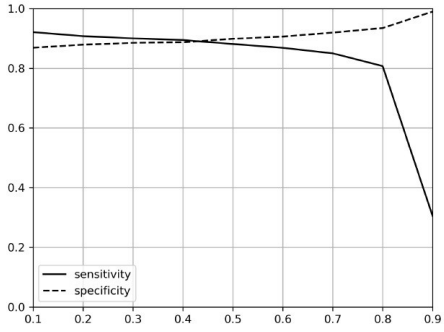
Background: Breast ultrasound is widely used for the evaluation of breast lesions; however, differentiation between BI-RADS category 3 or lower and BI-RADS category 4a or higher remains challenging and is subject to interobserver variability. We developed a novel artificial intelligence (AI) system to assist in the classification of static breast ultrasound images according to BI-RADS categories.

Methods: A total of 7,194 breast ultrasound images were retrospectively collected and annotated, comprising 4,028 images for training and 3,166 images for testing. The AI system was optimized using a threshold that maximized the area under the receiver operating characteristic curve (AUC). Diagnostic performance of the AI model was evaluated using AUC, sensitivity, and specificity. To assess its clinical utility, a reader study was conducted in which physicians independently reviewed ultrasound images and assigned BI-RADS classifications. The same images were subsequently re-evaluated with access to the AI output, and physicians were allowed to revise their initial assessments. Diagnostic accuracy, sensitivity, and specificity before and after AI-assisted review were compared.

Result: The AI system achieved an AUC of 0.95, with a sensitivity of 91.2% and a specificity of 90.7% in the test dataset. A total of 24 physicians participated in the reader study. The mean diagnostic accuracy significantly increased from 69.3% prior to AI-assisted review to 73.1% after AI-assisted review ($p = 0.00548$). Furthermore, sensitivity improved significantly from a mean of 88.8% before AI-assisted review to 99.7% after AI-assisted review ($p < 0.01$), while maintaining acceptable specificity.

Conclusions: The proposed AI system demonstrated high diagnostic performance in distinguishing BI-RADS category 3 or lower from category 4a or higher breast lesions on ultrasound images. When integrated into clinical practice, AI-assisted interpretation significantly improved physicians' diagnostic accuracy and sensitivity. These results indicate that the AI system may serve as a reliable and effective decision-support tool for breast ultrasound evaluation.





Poster Presentation

Photon Counting Breast CT Versus Breast MRI in Preoperative Evaluation of Breast Cancer: A Multi-center Prospective Pilot Study

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Background: To evaluate the performance of photon-counting breast CT for preoperative evaluation of breast cancer, compared with breast MRI.

Methods: Thirty-four patients diagnosed with breast cancer and scheduled for preoperative evaluation were prospectively enrolled from three tertiary referral hospitals. All patients underwent preoperative breast MRI as part of the standard clinical workup, and additional photon-counting breast CT was performed for research purposes. The detectability and measured size of the index cancer, as well as the presence of additional lesions on breast CT and MRI, were analyzed in comparison with postoperative pathological findings. Differences between CT and MRI were also evaluated.

Result: Index cancer detection was achieved in 33 of 34 patients (97.1%) on both CT and MRI. CT missed one 0.8-cm inferomedial mass near the chest wall due to limited scan coverage, while MRI missed one 0.3-cm mass because it was indistinguishable from background parenchymal enhancement. After excluding four patients who underwent neoadjuvant chemotherapy, tumor size on CT and MRI showed excellent agreement with the final pathological tumor sizes; the intraclass correlation coefficient (ICC) was 0.8338 (95% CI, 0.65530.9199) for CT and 0.7971 (95% CI, 0.57910.9022) for MRI. Although CT demonstrated slightly higher agreement with pathology, the difference between CT and MRI was not significant. Of the 22 additional lesions identified in 20 patients, both CT and MRI detected 18 of these lesions; however, two lesions detected on MRI were not visible on CT, and two lesions detected on CT were not identified on MRI

Conclusions: Photon-counting breast CT showed diagnostic performance comparable to breast MRI in the preoperative evaluation of breast cancer. While CT was limited in detecting lesions outside the scan field, it was less susceptible to obscuration by background parenchymal enhancement than MRI.

Association of Breast Density with Breast Cancer Risk and Stage at Diagnosis: A Korean Nationwide Cohort Study

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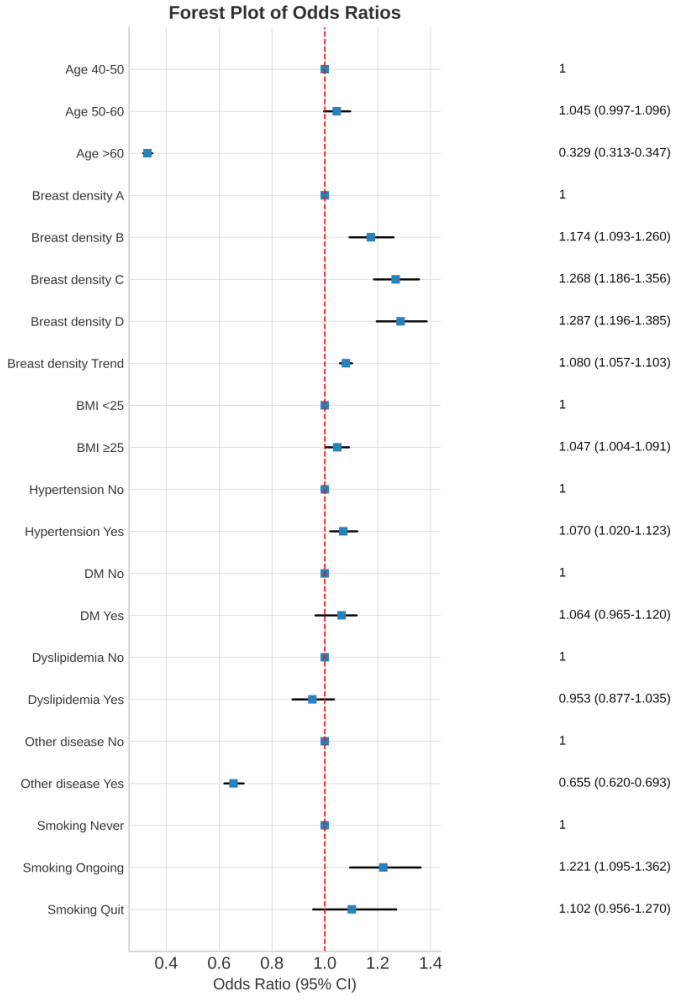
Background: Breast density, as defined by the Breast Imaging Reporting and Data System (BI-RADS), reduces mammographic sensitivity and is a risk factor for breast cancer. However, its association with cancer risk and stage at diagnosis remains debated, with limited large-scale evidence.

Methods: We conducted a nationwide retrospective cohort study of 952,755 Korean women who underwent screening mammography between 2013 and 2014, with breast cancer diagnoses identified over a 5-year follow-up period. Breast density was categorized by BI-RADS criteria (A-D). Breast cancer risk was evaluated using logistic regression, with odds ratios representing relative odds of developing breast cancer during the 5-year interval. Stage at diagnosis was classified as localized versus regional/distant disease according to national cancer registry records.

Result: During 5 years of follow-up, 11,286 women (1.2%) were diagnosed with breast cancer. Higher breast density was significantly associated with increased breast cancer risk: multivariable-adjusted odds ratios (ORs) were 1.174 (95% CI, 1.093-1.260), 1.268 (95% CI, 1.186-1.356), and 1.287 (95% CI, 1.196-1.385) for BI-RADS B-D, respectively, compared with BI-RADS A (all $p < 0.001$). However, the risk of advanced stage (regional/distant vs. localized) disease at diagnosis did not significantly differ across breast density categories except for a modest association in BI-RADS B (OR 1.16, 95% CI, 1.01-1.33; $p = 0.035$).

Conclusions: Higher breast density was independently associated with increased breast cancer risk but not with advanced-stage disease at diagnosis. These findings underscore the importance of individualized screening strategies for women with dense breasts.



Poster Presentation

Clinical Significance of Mastocheck Biomarker in Breast Cancer Patients: A Retrospective Cohort Study

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Background: Mastocheck is a novel proteomic biomarker initially developed for breast cancer screening. While its diagnostic utility is established, its dynamic changes during treatment and potential role in monitoring therapeutic response remain unclear. This study aimed to evaluate the longitudinal patterns of Mastocheck levels in breast cancer patients undergoing treatment and analyze correlations with disease stage, molecular subtypes, and pathological response to neoadjuvant chemotherapy.

Methods: We conducted a retrospective cohort study of 232 female patients diagnosed with invasive breast cancer at Myongji Hospital between 2022 and 2024. Mastocheck levels were measured at diagnosis (MC1) and during/after treatment (MC2). Patients were stratified by cancer stage (I-III), molecular subtype, and treatment response. Change patterns were categorized as decrease, increase, or stable. Statistical analyses assessed the correlation between biomarker dynamics and clinical parameters, particularly pathologic complete response (pCR) in neoadjuvant settings.

Result: The cohort had a median age of 60.8 years. A significant decrease in Mastocheck levels was observed in 67.2% of patients, with a mean reduction of 41.3% from baseline. Baseline levels (MC1) correlated positively with disease stage, with Stage III patients exhibiting higher levels (78.3 ± 105.2) compared to early-stage patients. Among molecular subtypes, Triple-Negative Breast Cancer (TNBC) demonstrated the highest rate of biomarker reduction (73%). In the neoadjuvant chemotherapy group, patients achieving pCR presented with significantly lower baseline MC1 levels (42.8 ± 34.9) compared to the non-pCR group (69.5 ± 98.7), suggesting potential prognostic value.

Conclusions: Mastocheck demonstrates significant dynamic changes during breast cancer treatment, reflecting tumor burden and therapeutic response. The substantial reduction observed in the majority of patients, particularly in TNBC, supports its potential utility as a monitoring biomarker. Furthermore, lower baseline levels may predict favorable pathological response to neoadjuvant therapy. Future prospective studies are warranted to validate these findings and establish standardized monitoring protocols.

Effect of a Real-time Artificial Intelligence-assisted Ultrasound System on BI-RADS C4 Breast Lesions Based on Breast Density

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Background: Artificial intelligence-based computer-aided diagnosis (AI-CAD) systems are increasingly used in breast ultrasonography; however, their diagnostic performance may vary with breast density. Given that dense breasts are highly prevalent among Asian women, understanding this relationship is essential for optimizing AI-assisted imaging strategies. Therefore, this study aims to evaluate the effect of breast density on the diagnostic accuracy of an AI-CAD ultrasound system in BI-RADS category 4 (C4) breast lesions.

Methods: Overall, 110 consecutive BI-RADS C4 lesions were reviewed between January and December 2023. An AI-CAD ultrasound system automatically assigned BI-36 RADS categories and calculated the probability of malignancy (POM) using static ultrasound images. Histopathology served as the reference standard, with atypia and malignancy combined into a non-benign category. Diagnostic performance-including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy-was analyzed based on breast density (BI-RADS BD), determined using AI-assisted mammography.

Result: Overall, the sensitivity and NPV were 81.3% and 87.5%, respectively, while the specificity and PPV were lower at 53.8% and 41.9%. All diagnostic performance metrics improved with increasing breast density. In the density D category, sensitivity (92.3%), specificity (61.5%), NPV (96.0%), and accuracy (69.2%) were highest. Additionally, concordance between AI-assigned BI-RADS categories and histopathologic diagnoses increased with density (B: 50.0%, C: 57.5%, D: 67.3%). Across all density groups, non-benign lesions consistently demonstrated higher POM values.

Conclusions: Breast density significantly affects the diagnostic performance of AI-CAD ultrasound in BI-RADS C4 lesions. The AI system demonstrates higher accuracy and concordance in dense breasts, suggesting more consistent lesion interpretation in high-density environments. These findings highlight the potential utility of AI-assisted ultrasound as a diagnostic adjunct, particularly for Asian women, who commonly have dense breast composition. Further multicenter, real-time validation studies are warranted to validate these findings.

Multiplex Droplet Digital PCR-Based Detection of ESR1 and PIK3CA Mutations in HR+/HER2- Breast Cancer

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Background: ESR1 and PIK3CA mutations are clinically important biomarkers in HR+/HER2- breast cancer, and accurate detection of these mutations is essential for comprehensive molecular profiling. Although next-generation sequencing (NGS) is widely used, its clinical application is limited by high cost, long turnaround time (TAT), and complex workflows. Multiplex droplet digital PCR (ddPCR) represents a simple alternative that provides high sensitivity and specificity with a shorter turnaround time.

Methods: The Droplex series, developed by GENCURIX Inc. is a diagnostic platform optimized for the high-sensitivity detection of clinically significant somatic mutations from FFPE tissue and plasma samples, based on the Bio-Rad QX200 digital PCR system. The Droplex ESR1 Mutation Test v2 detects 22 ESR1 mutations located in exons 5, 7, and 8 from plasma samples, while the Droplex PIK3CA Mutation Test detects 11 PIK3CA mutations located in exons 7, 9, and 20 from both tissue and plasma samples. The performance evaluation of each kit was conducted using reference materials with defined low mutant allele frequencies and contrived samples under conditions representative of clinical testing.

Result: On the ddPCR platform, both ESR1 and PIK3CA assays demonstrated high accuracy and sensitivity for mutation detection based on performance evaluation. Precision and reproducibility assessments showed consistent results across replicate experiments, confirming the robustness of the kits. In addition, in a recently published a German multicenter study involving 32 breast cancer samples, the Droplex ESR1 Mutation Test v2 demonstrated high concordance with next-generation sequencing (NGS), with a concordance rate of 96.8%.

Conclusions: In conclusion, multiplex ddPCR-based assays for ESR1 and PIK3CA mutation detection were successfully developed and validated. These assays provide a practical alternative to sequencing-based approaches for molecular diagnostics in HR+/HER2- breast cancer, and can support individualized molecular diagnosis and CDx-based therapeutic decision-making.

Blindsided: A Rare Case of Symptomatic Choroidal Metastasis In Breast Cancer

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Background: Ocular metastasis has been shown to be common in metastatic disease, with breast cancer followed by lung cancer accounting for the majority of cases. Ocular metastasis often remains subclinical. The incidence of clinically symptomatic cases is rare, with an estimated incidence between 2-3%. The choroid is the most common site of metastasis possibly due to anatomical reasons and blood vessel supply although the exact pathogenesis is unknown. Symptomatic choroidal metastasis (CM) often presents with visual field defects, deterioration of visual acuity, retinal detachment, photophobia and floaters. CM confers a poor prognosis as its presence often indicates systemic disease. It is associated with the occurrence of brain metastasis. External beam radiation therapy (EBRT) remains the standard of care and yields high remission rates with significant improvement in visual acuity.

Methods: We report a case of a 62-year-old woman with a history of left breast infiltrating ductal carcinoma post-surgery and chemoradiotherapy 5 years ago, who presented with sudden onset painless right eye visual impairment for 3 days.

Result: Slit lamp examination revealed right eye choroidal elevation with basillary layer detachment. Magnetic resonance imaging (MRI) of the brain and orbit showed right posterior globe focal thickening, favouring choroidal metastasis.

Conclusions: With this case report, we intend to highlight that although rare and unexpected, breast cancer patients can develop ocular metastases. It is important for clinicians to consider this during follow-up of patients with breast cancer and in patients with breast cancer who present with ocular symptoms. In such cases, a multidisciplinary team approach is invaluable.

Correlation of Cytopathology with Histopathology in Breast Neoplasms: A Current Study from Hospital Al-Sultan Abdullah UiTM

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Background: The diagnosis of breast neoplasms frequently relies on cytopathological evaluation as an initial diagnostic tool, with histopathology remains the gold standard for identification of malignant cases. Correlating cytopathological findings with subsequent histopathological results is essential to assess diagnostic accuracy, guide clinical management, and optimize patient outcomes which ultimately lead to informed clinical decision making. This study aims to evaluate the correlation between cytopathological diagnoses and histopathological findings in breast neoplasm cases in Hospital Al-Sultan Abdullah UiTM.

Methods: A retrospective cross-sectional study was conducted between 2020 and 2024, involving patients who underwent cytopathological assessment of breast lesions by fine needle aspiration cytology (FNAC), followed by histopathological examination (HPE). Cytopathological diagnoses obtained from FNAC were compared with corresponding HPE results. Concordance rates, sensitivity, specificity, and diagnostic accuracy of cytopathology were analyzed accordingly.

Result: A total of 17 cases with paired cytopathology and histopathology were reviewed. 4 cases (23.5%) were inconclusive due to insufficient histopathological material. The remaining 13 cases showed concordant cytopathological and histopathological diagnoses, yielding a concordance rate of 100%. The sensitivity and specificity were also 100%, as the similar result findings were reported for all positive and negative cases. These findings suggest that cytopathology may demonstrate high accuracy in distinguishing malignant from benign breast lesions. However, given the small sample size, the high concordance rate may not reflect the true concordance in the wider population.

Conclusions: Cytopathology shows strong correlation with histopathology in the diagnosis of breast cancer in Hospital Al-Sultan Abdullah UiTM, supporting its role as a reliable, minimally invasive diagnostic modality. Awareness of its limitations and continuous cytology-histology correlation are crucial to enhance diagnostic precision and patient care.

Diagnostic Accuracy and Histopathological Concordance of BIRADS Categories 4 and 5 in Patients Evaluated at Capitol Medical Center - A Retrospective Study

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Capitol Medical Center, Department of Surgery, Philippines

Background: Breast cancer is the leading malignancy among Filipino women, with high mortality due to late-stage diagnosis. The Breast Imaging-Reporting and Data System (BIRADS) provides a standardized framework for breast imaging interpretation, but local validation of its diagnostic accuracy remains limited.

Methods: This retrospective study reviewed all patients who underwent breast imaging with BI-RADS 4a, 4b, 4c, and 5 assessment followed by histopathological diagnosis. Demographic and clinical profiles were described. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and Cohen's Kappa were computed to determine diagnostic accuracy and concordance.

Result: BI-RADS categories 4 and 5 demonstrated a high proportion of malignant histopathologic outcomes, with increasing malignancy rates observed across BI-RADS 4 subcategories and the highest rates seen in BI-RADS 5 lesions. Diagnostic accuracy analysis showed that BI-RADS had high sensitivity for detecting malignancy, with substantial agreement between imaging assessment and histopathologic diagnosis based on Cohen's Kappa.

Conclusions: This study provides institution-specific evidence supporting the diagnostic value of BIRADS in predicting malignancy in the Filipino population. Findings may contribute to optimizing breast cancer diagnostic pathways in low- to middle-income settings.

Idiopathic Granulomatous Mastitis in a Tuberculosis-Endemic Country – A Case Series

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[1]Chinese General Hospital and Medical Center, Department of Surgery, Philippines, [2]Chinese General Hospital and Medical Center, Department of Pathology, Philippines

Background: Idiopathic granulomatous mastitis (IGM) is an uncommon, chronic inflammatory condition of the breast characterized histologically by non-caseating granulomatous inflammation centered on the lobules in the absence of a known cause. This case series highlights the diagnostic complexities and therapeutic challenges posed by idiopathic chronic granulomatous mastitis in a setting where tuberculosis is prevalent.

Methods: We report multiple cases seen at our institution of women aged 24-50 seen from the years 2020-2026 who generally have the same history of recurrent breast abscesses initially treated with oral antibiotics, then with multiple incisions and drainages, however would recur on the same site as a tender mass after an average period of 2-4 months, causing breast disfiguration and mental and emotional anxiety.

Result: A review of previous records and now an active practice at our institution is to do a core needle biopsy of the complex, solid mass and/or aspiration of any overlying purulent fluid at the same setting. These would be sent for histopathology, bacterial and fungal stains and culture, and MTB GeneXpert. If histopathology shows giant cells and non-caseating granuloma, with MTB GeneXpert and bacterial cultures negative, then the patient would be treated as a case of IGM. We start them on oral Prednisone at 20 mg/day, then gradually taper down by 5 mg every 2 weeks. Bi-monthly follow-up of patients show that documented success in reducing inflammation, resolving symptoms, and avoiding unnecessary surgical intervention.

Conclusions: Definitive diagnosis relies on histopathologic confirmation of non-caseating granulomas and exclusion of specific causes such as infections, autoimmune disorders, and systemic granulomatous diseases. Histopathologic exclusion of tuberculosis and other infectious etiologies is especially critical in regions where tuberculosis is prevalent. In these settings, tuberculous mastitis must be carefully differentiated from IGM, as both conditions may present with similar clinical and radiologic features, yet require fundamentally different treatments.

Is Ultrasound Strain Elastographic Assessment Reliable in Mucinous Breast Carcinoma? A Retrospective Single-Institution Experience

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Background: Breast elastography aids in differentiating malignant from benign breast masses by assessing tissue stiffness, as most malignancies are intrinsically stiff and induce a surrounding desmoplastic reaction. Mucinous breast carcinoma (MBC), however, is a distinct subtype of invasive breast cancer characterised by abundant extracellular mucin and typically minimal desmoplastic response, potentially resulting in softer elastography appearances. This study aimed to evaluate the diagnostic performance of strain elastography in MBC and to identify factors influencing its accuracy.

Methods: This single-institution retrospective study included histologically confirmed cases of mucinous breast carcinoma diagnosed between 2000 and 2020, identified from the institutional breast cancer registry. Ninety cases with available ultrasound strain elastography assessments were included. Quantitative elastography size ratio (cut- off > 1.1 classified as suspicious, ≤ 1.1 as benign) and qualitative strain patterns (hard versus soft/intermediate) were evaluated. Subgroup analyses compared pure mucinous carcinomas with mixed mucinous carcinomas containing co-existing invasive non-mucinous components.

Result: Using an elastography size ratio cut-off of > 1.1, only 60.0% (54/90) of MBCs were classified as suspicious, while 40.0% (36/90) were classified as benign, indicating reduced sensitivity of elastography in this subtype. Mixed mucinous tumours demonstrated a higher proportion of suspicious size ratios compared with pure mucinous carcinomas (90.0% vs 56.3%, $p = 0.046$), suggesting that non-mucinous invasive components are more likely to elicit a desmoplastic response. Qualitative assessment showed stiff internal strain patterns in 74.4% (67/90) of lesions. No significant difference in qualitative stiffness was observed between mixed and pure mucinous tumours (hard appearance 60.0% vs 76.3%, $p = 0.270$).

Conclusions: A substantial proportion of mucinous breast carcinomas appear soft on strain elastography and lack an enlarged elastography size ratio, limiting diagnostic sensitivity, particularly in pure mucinous tumours. Awareness of this limitation is essential to avoid false-negative interpretation, and elastography findings should be interpreted in conjunction with conventional ultrasound features.

Poster Presentation

Early Outcomes of a Breast Cancer Screening Programme at a Regional Tertiary Hospital in Singapore

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Background: BreastScreen Singapore (BSS) is a national population-based mammographic screening programme established for the early detection of breast cancer. Our hospital has started its participation in breast cancer screening since May 2025. This study aims to evaluate the clinicopathologic outcomes of patients screened at a single tertiary centre, determine the proportion of patients advised to undergo biopsy and their compliance rates, and characterize the histologic outcomes of biopsied lesions, including the upgrade rate of screen-detected lesions to carcinoma.

Methods: A retrospective study was conducted from May to December 2025. All patients screened under BSS during the study period were included. Data consists of the following: number of patients who underwent screening mammogram, those recalled for further imaging, and those advised to undergo biopsy. The final histopathological diagnoses of those biopsied and the subsequent management outcomes were also reviewed.

Result: A total of 372 patients were seen during the study period. Of these, 172 patients (46.2%) were advised to undergo biopsy. 158 patients (91.8%) proceeded with biopsy, while 14 patients (8.2%) declined. Histopathological results among biopsied patients showed 95 benign lesions (60.1%), 25 indeterminate lesions (15.8%), and 38 malignant lesions (24.0%). Among the patients with indeterminate lesions, 3 were upgraded to ductal carcinoma in situ (DCIS) on final surgical pathology. Of the malignant lesions diagnosed on biopsy, 23 were invasive carcinomas, 14 were DCIS, and one was pleomorphic lobular carcinoma in situ. Among the 14 DCIS patients diagnosed with DCIS on biopsy, 3 were found to have invasive carcinoma on definitive surgery.

Conclusions: This single-centre study shows a high biopsy compliance rate among patients undergoing breast screening. A substantial proportion of screen-detected malignancies was also identified. These findings provide updated local data on the outcomes of the breast screening programme in Singapore, which may help in further planning of population-based health screening strategies.

Evaluating the Correlation Between Bone Scintigraphy and PET/CT in the Diagnosis of Bone Metastasis in Breast Cancer

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Background: Bone scintigraphy with Tc99m MDP is a highly sensitive but low-specific method. Recently, PET/CT scans have been used to assess distant metastases. Therefore, this study investigates the value of these two imaging methods in detecting and diagnosing bone metastases and estimates the correlation between these two methods.

Methods: The study objects were invasive breast cancer patients who underwent diagnosis by 18F-FDG PET/CT scans and bone scintigraphy with Tc99m-MDP at Ho Chi Minh City Oncology Hospital from January 2023 to June 2025. The study design was a descriptive cross-sectional study.

Result: The study population consisted of 168 patients with an average age of 52.8 ± 11.03 (27-79), with 51.19% of patients having left breast cancer. PET/CT scans showed a sensitivity of 88.9%, a specificity of 93.2%, a positive predictive value (PPV) of 78%, and a negative predictive value (NPV) of 96.9% in detecting abnormal skeletal lesions. Bone scintigraphy showed a sensitivity, specificity, PPV, and NPV 72.2%, 84.8%, 56.5%, 91.8%, respectively. The AUC of bone scintigraphy and PET/CT scan were 0.79 and 0.91, with a *p*-value of 0.0193. While PET/CT scan clarified the bone status diagnosis for 97.7% patients, bone scintigraphy made it clear for 72.61% of patients. Specifically, for definitive diagnosis of bone metastasis, the sensitivity, specificity, PPV, and NPV of PET/CT scan were 88.57%, 93.02%, 83.78%, and 96.85%, respectively. Bone scintigraphy had sensitivity, specificity, PPV, and NPV 41.2%, 99.1%, 87.5%, and 91.8%, respectively.

Conclusions: PET/CT scan is more advanced than bone scintigraphy in diagnosing abnormal bone lesions and definitively diagnosing bone metastases of breast cancer patients. The AUC of bone scintigraphy is lower than that of PET/CT scans and is statistically significant. Therefore, in invasive breast cancer, bone scintigraphy may not be necessary if a PET/CT scan has been performed prior. Keywords: breast cancer, bone metastases, PET/CT scan, bone scintigraphy.

Application of the Cribriform Fascia in Axillary Sentinel Lymph Node Biopsy

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Background: Sentinel lymph node biopsy (SLNB) is the gold standard for axillary staging in early breast cancer, with accurate SLN localization being critical for surgical efficacy. Conventional localization relies on dye or radionuclide tracing with inherent limitations, while the anatomical correlation between axillary cribriform fascia and SLNs remains unclarified, a key for SLNB approach innovation.

Methods: Breast cancer patients in Tangshan People's Hospital from June 2023 to January 2025 were enrolled per the strict inclusion and exclusion criteria. Before SLNB, the lymph node closest to the cribriform fascia was localized with an UltraClip™ breast tissue marker under ultrasound guidance. Intraoperative methylene blue staining was performed to verify SLNs, so as to confirm the anatomical relationship between the axillary cribriform fascia and SLNs and its clinical significance in SLNB.

Result: A total of 140 patients were included, with 142 lymph nodes marked (138 patients with 1 node, 2 with 2 nodes). Among them, 38 (26.76%) were adjacent to the deep surface of the cribriform fascia and 104 (73.24%) in the deep adipose tissue of the axilla. Intraoperatively, 634 lymph nodes were resected, including 40 positive ones. 104 patients had no SLN metastasis, and all 36 metastatic patients had at least one positive node marked. 141 marked nodes were resected (139 blue-stained, 2 unstained), with 1 marker dislodged. The consistency rate that the marked nodes were identified as SLNs reached 97.89%.

Conclusions: The axillary cribriform fascia has a stable and definite anatomical relationship with axillary SLNs. The cribriform fascia approach may enable accurate and rapid SLN localization in SLNB without relying on dyes or radionuclides.

Single-Port Endoscopic Nipple-Sparing Mastectomy Using the HandX™ Articulating System: Feasibility and Early Outcomes

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Background: Endoscopic nipple-sparing mastectomy (eNSM) offers excellent cosmetic and functional outcomes, but remains technically demanding when performed with conventional laparoscopic instruments. The HandX™ (HumanTouch Surgical Ltd, Israel) is a 5-mm handheld, software-driven motorized articulating system that provides wrist-like motion. We report an initial clinical series of single-port eNSM using this system, evaluated through perioperative and early patient-reported outcomes.

Methods: Five consecutive patients (eight breasts) underwent single-port eNSM with immediate implant-based reconstruction. The cohort included three bilateral prophylactic cases and two therapeutic cases. All procedures were performed through a lateral incision using a single-port system under CO_2 insufflation. Dissection was completed using the HandX™ articulating monopolar scissors. Reconstruction involved prepectoral placement of permanent implants wrapped in an acellular dermal matrix (Braxon® FAST). Operative variables, hospital stay, and complications were recorded. Patient-reported outcomes were assessed using BREAST-Q scores.

Result: All procedures were completed successfully without complications or conversions. Mean operative time was 230 minutes for unilateral cases (including axillary procedures) and 240 minutes for bilateral cases. All patients were discharged within 48 hours. Drains were removed on day 7 in four patients and on day 12 in one patient. No severe 30-day complications were observed. One patient developed a postoperative seroma requiring percutaneous drainage. BREAST-Q data demonstrated stability in Satisfaction with Breasts (mean Rasch score 84.3 preoperatively vs. 83.0) and Psychosocial Well-being (77.7 vs. 78.0) at 1 month postoperatively. A clinically meaningful decrease was observed in Sexual Well-being (66.3 to 52.7), consistent with early postoperative recovery at the 1-month time point.

Conclusions: Single-port eNSM using the HandX™ articulating system is technically feasible and safe. The system facilitates precise dissection in anatomically challenging regions, bridging the gap between conventional endoscopy and robotic platforms. Maintenance of patient-reported satisfaction and the low complication rate in this early series support further evaluation of this approach in larger cohorts with longer follow-up.

Is Chest Wall Resection in Locally Advanced or Recurrent Breast Cancer Worthwhile? A Contemporary Case Series in Hong Kong

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Background: Chest wall resection (CWR) is an aggressive surgical approach for locally advanced breast cancer (LABC) or chest wall recurrence. While multimodal therapy has improved outcomes in breast cancer, data on CWR long-term benefit remains limited, particularly in Asian cohorts. This case series aims to evaluate the safety profile and oncological outcomes of CWR in a Hong Kong population.

Methods: We retrospectively reviewed all patients undergoing CWR for LABC or chest wall recurrence at a Hong Kong institution. Patients with post-irradiation induced sarcoma were excluded. Data including demographics, tumor characteristics, treatment received and clinical outcomes including operative outcomes, 30-day complications, long term morbidity, oncological outcomes were collected.

Result: Five patients underwent CWR from 2015 to 2022. Median age was 56 years. Tumors were predominantly invasive ductal carcinoma (80%), hormone receptor-positive (100%), with low Ki67 (median 10%). HER2-positive in 20%. Three cases were chest wall recurrences after prior mastectomy with clear margins; two primary LABC. None had distant metastases at preoperative staging scan. Neoadjuvant chemotherapy was given in 80%. All had full-thickness CWR. Defects were repaired with a combination of Permacol or Gortex patches, Titanium ribs and/or flap coverage. Resection margins were clear in 80%. For adjuvant therapy, 80% received radiotherapy, all received hormonal therapy. For 30-day complications, one flap failure required revision; one hematoma required wound exploration; one had cellulitis requiring antibiotics. Upon follow-up (median: 81 months), 100% overall survival; local and distant recurrence in 40%, occurring 2 to 9 years post-surgery. Long term morbidity was minimal.

Conclusions: In this Hong Kong series, CWR combined with reconstruction and multidisciplinary care provided excellent survival in selected patients with breast cancer, despite moderate recurrence risk. Favorable biology and clear margins appeared protective. These findings support CWR as a worthwhile option in fit patients, though larger studies are needed to refine indications and optimize strategies.

From Phantom to Practice: Multimarker Breast and Axillary Localisation for Breast Conserving Surgery and Targeted Axillary Dissection

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Background: Accurate localisation of non-palpable breast cancers and suspicious axillary lymph nodes is increasingly important with widespread adoption of breast conserving surgery (BCS) and targeted axillary dissection (TAD). Wireless markers offer advantages over traditional hookwires, providing patient comfort and scheduling flexibility. Previous ex vivo research at our centre has demonstrated the feasibility of close Magseed-SaviScout placement, reduced MRI artefacts with TumarkVision and SaviScout as compared to Magseed, and Sentimag signal instability when Magseed was positioned near metallic markers. We report our initial clinical experience in deliberately combining multimarker localisation to address specific clinical challenges.

Methods: Retrospective review of all marker localisations in United Christian Hospital from January to December 2025 was conducted using Radiology Information System. Cases utilising two or more markers in the same breast or axilla, or marker combined with skin marking, were included. Data on marker types, intermarker distance, imaging guidance, margin clearance, retrieval rate and complications were analysed. Representative images were reviewed to illustrate marker selection strategies in various clinical scenarios.

Result: Among sixty eight localisation procedures, four intentionally employed multimarker strategies, including: Magseed with SCOUT-Mini for TAD of closely-spaced axillary lymph nodes; SaviScout, TumarkVision and SCOUT-Mini for post-neoadjuvant cases; TumarkVision with skin marking for cost reduction; SaviScout for pre-existing nitinol ring. All markers were placed under ultrasound guidance, with a mean placement time of 26.6 minutes and a minimum intermarker distance of 0.86 cm. We achieved 100% marker retrieval and margin clearance with no re-excision or complications. On follow-up MRI, TumarkVision produced minimal artefacts as compared to SaviScout, allowing accurate assessment of treatment response.

Conclusions: This case series demonstrates safe and effective application of our phantom study into clinical practice. Combining different markers enables individualised and cost-effective lesion localisation for BCS and TAD, addressing challenges related to MRI artefacts, and magnetic interference.

Age Is Not the Risk, Obesity Is: Reframing Surgical Safety in Breast Cancer

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Background: Surgical risk in elderly breast cancer patients is often attributed to age. This study challenges that paradigm by assessing whether age is a true independent risk factor for postoperative complications in a Chinese population.

Methods: We conducted a retrospective review of consecutive Chinese patients undergoing primary breast cancer surgery between July 2019 and June 2025. The primary outcome was defined as the occurrence of one or more complications within 30 days postoperatively. Multivariate logistic regression was used to evaluate the association between the primary outcome and independent variables, including age, body mass index (BMI), comorbidities, and surgical type, calculating odds ratios (OR) with 95% confidence intervals (CI).

Result: Among 1903 identified patients, 447 (23.5%) were aged 70 or above. Breast-conserving surgery (BCS) was performed in 31.7% of patients under 70 versus 20.8% of those 70 and above. Mastectomy rates were 47.7% in the younger group compared to 77.0% in the older group. Breast reconstruction was markedly less common in the elderly (1.6% vs. 20.2%). As expected, elderly patients had a significantly higher prevalence of concomitant diseases ($p < 0.001$). However, the 30-day postoperative morbidity rate was statistically equivalent between groups (2.8% for < 70 years vs. 2.5% for ≥ 70 years; $p = 0.687$). After controlling for confounders via multivariate analysis, age was not an independent risk factor for complications (OR 1.11, 95% CI 0.49-2.66, $p = 0.762$). The analysis identified obesity (elevated BMI) and the presence of an open wound at surgery as the only significant independent risk factors for adverse surgical outcomes.

Conclusions: Age itself is not a risk factor for postoperative complications in breast cancer surgery. The true surgical risk is driven by modifiable factors, primarily obesity. Clinical focus must shift from chronological age to targeted risk assessment and optimization, reframing safety around specific patient factors rather than age alone.

Diagnostic Accuracy of Tumor Bed Biopsy for Predicting Pathological Complete Response in Breast Cancer Patients Achieving Clinical Complete Response After Neoadjuvant Chemotherapy: A Meta-Analysis

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Background: With growing interest in surgical de-escalation for breast cancer, tumor bed biopsy (TBB) after neoadjuvant chemotherapy (NACT) has been proposed as a tool to predict pathological complete response (pCR). This meta-analysis assessed the diagnostic accuracy and clinical applicability of TBB in breast cancer patients achieving complete clinical response (cCR) post-NACT.

Methods: PubMed, Embase, and online clinical trial registries were systematically searched up to April 2025 for studies evaluating TBB in cCR patients after NACT. Pooled sensitivity, specificity and false-negative rate (FNR) were calculated using a random-effects model. Heterogeneity was quantified using the I^2 statistic.

Result: : Eight studies met inclusion criteria. Pooled sensitivity was 0.58 (95% CI: 0.510.65), specificity was 1.00 (95% CI: 0.991.00) and the pooled false-negative rate was (42%, 95% CI 3549%) with I^2 values (65.8% for sensitivity; 0% for specificity).

Conclusions: In this cCR-restricted meta-analysis, tumor bed biopsy (TBB) demonstrated excellent specificity but only modest sensitivity with a high false-negative rate, indicating that a negative biopsy cannot reliably confirm pathological complete response after neoadjuvant chemotherapy. While the ability of TBB to accurately confirm residual disease is consistent across studies, its limited sensitivity and substantial heterogeneity preclude its use as a standalone tool for safely omitting breast surgery in routine clinical practice. Techniques incorporating vacuum-assisted sampling and meticulous radiologic-pathologic correlation may enhance diagnostic performance, but the evidence remains insufficient and heterogeneous. Based on these findings, the certainty of evidence particularly for sensitivity is low, and the overall clinical confidence in TBB as a replacement for surgical pathology remains limited. Further large, protocol-driven studies are required before TBB can be considered for response-guided surgical de-escalation in cCR patients.

Does Tumor Marking before Neoadjuvant Chemotherapy Help Achieve Better Outcomes in Patients Undergoing Breast Conservation Surgery? A Randomized Controlled Trial

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Background: Neoadjuvant chemotherapy (NACT) has expanded the eligibility for breast-conserving surgery (BCS) in patients with downstaged breast cancer. Accurate intraoperative localization of the original tumor bed remains a concern, particularly when clinical and radiological responses are substantial. Tumor marking prior to NACT has been advocated to improve margin negativity; however, there is no randomized data on this, especially in settings where oncoplastic breast surgery (OBS) is routinely practiced.

Methods: This is an ongoing randomized controlled superiority trial comparing BCS after NACT with versus without pre-NACT tumor marking. Based review a total sample size of 276 patients (138 per arm) was calculated to achieve 80% power at a two-sided α of 0.05 with 1:1 allocation. At the time of this interim analysis, 145 patients have been recruited, with 70 randomized to the tumor-marked arm and 75 to the non-marked arm. The primary endpoint was margin positivity on final histopathology. Secondary endpoints include surgical feasibility, pathological outcomes, cosmesis, and health-economic implications.

Result: Results: At the current interim analysis, no patient in either arm had a positive surgical margin on final histopathology. Margin clearance was consistently achieved despite variable radiological responses to NACT. Limitations: A key limitation is that all patients underwent oncoplastic procedures, which may have mitigated the potential benefit of tumor marking by enabling wider, anatomically planned resections.

Conclusions: Interim results demonstrate excellent oncological safety with zero positive margins in both marked and unmarked groups when BCS is performed using oncoplastic principles after NACT. These findings suggest that high-quality OBS may offset the theoretical advantages of routine tumor marking, with important implications for cost-effectiveness and workflow, particularly in resource-constrained settings. Final analysis (138 patients in each arm) and longer follow-up will clarify whether tumor marking provides incremental benefit beyond contemporary oncoplastic surgery.

Autologous Flaps Covering Large Defects of Mastectomy On Breast Cancer: A Case Series

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Background: Large thoracic defects following radical mastectomy in locally advanced breast cancer (LABC) present significant reconstructive challenges. Autologous flaps are preferred because of their superior long-term integration and biocompatibility. This case series evaluates the surgical feasibility and clinical outcomes of three distinct regional pedicled flapsHorseshoe, latissimus dorsi (LD), and transverse rectus abdominis myocutaneous (TRAM) flapsfor coverage of extensive post-mastectomy defects.

Methods: We report three female patients diagnosed with LABC (three with invasive mammary carcinoma and one with invasive ductal carcinoma) who underwent immediate reconstruction following mastectomy. All patients completed three cycles of neoadjuvant chemotherapy prior to surgery. Reconstruction was performed using regional pedicled flaps without microvascular anastomosis. Patients were clinically monitored over a 12-month follow-up period, focusing on flap survival, wound healing, functional recovery, and aesthetic outcomes.

Result: At the one-year follow-up, all flaps demonstrated 100% survival with robust vascularity and no major complications or flap failure. Despite prior neoadjuvant chemotherapy, wound healing was optimal in all cases. Functional evaluation showed that all patients returned to baseline activities of daily living without restriction. Aesthetic outcomes were rated as good in terms of volume and contour, although mild asymmetry compared with the contralateral breast was observed in all patients. The Horseshoe flap provided effective coverage for specific lateral and inferior defects, whereas the TRAM and LD flaps remained the preferred options for larger volume requirements.

Conclusions: Horseshoe, LD, and TRAM flaps are reliable and versatile options for reconstructing large defects in patients with advanced breast cancer. Each technique offers a distinct balance between surgical feasibility and aesthetic potential. These regional pedicled flaps provide a dependable approach for immediate reconstruction, ensuring adequate oncologic coverage and functional restoration without the need for complex microvascular procedures.

Thoracoabdominal Flap for Malignant Phyllodes Chest Wall Defect

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Background: Phyllodes tumor is a rare fibroepithelial tumor that accounts for less than 1% of all breast neoplasm. The malignant type itself only represents around 25% of all phyllodes tumor cases. They usually have bad prognosis, high local relapse and distant metastasis. Malignant phyllodes tumors are associated with 6.2-25% of distant metastasis and the most common site is the lung. The best option for malignant phyllodes tumor would be wide excision and sometimes the chest wall defect that's being left is challenging to close.

Methods: This is a case report of a 52 years old woman with a metastatic malignant right phyllodes tumor. She already had 3 cycles of doxorubicin-cyclophosphamide-mesna chemotherapy regimen and the lung nodules were lessening in number. However, the ulcer on her breast is not showing any improvement so we decided to perform simple mastectomy for this patient.

Result: A simple mastectomy was performed and we could not close the defect primarily. Hence, we decided to do a medially-based thoracoabdominal flap to close the wound. After 3 months of follow-up, the patient showed no local recurrence and the flap is vital. She was later referred to the radiotherapy to get adjuvant whole breast irradiation.

Conclusions: A surgery for large malignant phyllodes tumor is challenging usually due to the large defect. Due to its necessity to have adjuvant radiotherapy, surgeon needs to choose a thicker layer to close the defect with lower complication rate so the wound would heal faster. The thoracoabdominal flap can be an option for shorter operative time, faster healing, and for surgeon who's not familiar doing more complex flap such as myocutaneous pedicled flap or free flap.

Poster Presentation

Reducing Seroma Formation after Mastectomy Using Modified Flap Fixation with Suture by Closure of the Dead Space: A Single-Center Study

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Background: Seroma after mastectomy is a common complication. Seroma is associated with wound dehiscence, increased medical costs, and delayed postoperative therapy. Recently, the usefulness of flap fixation with suture (FFS), which fixes the skin flap to the chest wall with sutures to reduce seroma, has been reported in Europe. We devised Modified FFS (M-FFS), which involves fixing the lateral skin flap to the serratus anterior fascia using Vicryl 3-0 sutures with 4-5 nodular sutures spaced 5 cm apart. Our retrospective analysis of 469 cases reported that this technique contributes to reducing seroma (Surg Today, 2025).

Methods: Among 62 patients diagnosed with Stage 0-II breast cancer who underwent mastectomy +SLNB at Aichi Medical University between June and December 2025, 14 cases underwent M-FFS (M-FFS group) and 48 cases did not (Control: CON group). This study aimed to prospectively assess the effect of M-FFS in reducing seroma. The number of days until drain output reached ≤ 50 cc, total seroma volume during hospitalization and outpatient visits, and the proportion not requiring outpatient aspiration were statistically compared.

Result: The mean ages in the M-FFS group and CON group were 64 years and 63.5 years, respectively. The number of days until drainage volume decreased to 50 cc or less was 1.6 ± 1.2 days versus 2.9 ± 1.9 days ($p < 0.01$). Total seroma volume during hospitalization and outpatient visits was 221.7 ± 144.1 mL versus 365.7 ± 221.7 mL ($p < 0.01$). The rate of no outpatient drainage was 57.1% versus 47.9%. The M-FFS procedure time was less than 5 minutes in all cases, and no complications such as late bleeding or postoperative wound infection were observed.

Conclusions: The combination of mastectomy with M-FFS was suggested to reduce seroma, contribute to shorter hospitalization, and alleviate the burden of outpatient care.

Intercostobrachial Nerve (ICBN) Preservation Versus Sacrifice in Axillary Dissection Randomized Controlled Trial

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Background: Whether to preserve or sacrifice of Intercostobrachial nerves (ICBN) is a controversial issue. In this trial we aim to assess the effects of preservation of ICBN during axillary dissection for patients with breast cancer in terms of pain score immediately postoperative & several hours later, need for simple analgesia, narcotics, numbness & arm swelling.

Methods: This is a single-institution, single-surgeon RCT where a sample of 48 patients with breast cancer, of various age groups, were allocated randomly to any of the two; preservation or sacrifice categories. Postoperatively, patients were asked by a physician to fill a pre-designed questionnaire to assess the studied items during hospitalization and after discharge.

Result: Among 48 included patients, ICBN was sacrificed in 24 patients; of which 18 patients (75%) developed numbness in the inner aspect of the arm. While in the ICBN preservation group (24 patients) only 6 patients suffered numbness (25%) with significant *p*-value (0.001). Estimated duration of surgery with ICBN preservation was 100 ± 22.02 minutes, while it is significantly shorter in the ICBN sacrifice group (83.48 ± 21.55). However, with regard to other variables of pain, seroma formation, need of simple analgesia & narcotics, hospital admission days & arm swelling, there was no significant difference between the two groups.

Conclusions: Among the 48 included patients, ICBN was sacrificed in 24 patients; of which 18 patients (75%) developed numbness in the inner aspect of the arm. While in ICBN preservation group (24 patients) only 6 patients suffered numbness (25%) with significant *p*-value (0.001). Estimated duration of surgery with ICBN preservation was 100 ± 22.02 minutes, while it is significantly shorter in the ICBN sacrifice group (83.48 ± 21.55). However, with regard to other variables of pain, seroma formation, need of simple analgesia & narcotics, hospital admission days & arm swelling, there was no significant difference between two groups.

Feasibility of Papilla Resection in Patients with Suspected Nipple Invasion: A Strategy to Preserve the Nipple-Areolar Complex

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Background: Preoperative breast MRI often demonstrates a low positive predictive value for nipple invasion, potentially leading to the unnecessary removal of the entire nipple-areolar complex (NAC). This pilot study evaluates the feasibility of papilla resection—the selective removal of the central papilla and duct bundle while preserving the nipple skin envelope and areola—as a diagnostic and therapeutic strategy to balance oncologic safety with aesthetic preservation.

Methods: We retrospectively analyzed 15 consecutive breast cancer patients treated between November 2022 and May 2023. Inclusion criteria involved suspected nipple invasion on MRI (abnormal enhancement or tumor-to-nipple distance $\leq$ 2.0 cm) without clinical evidence of involvement. Patients underwent partial mastectomy (n = 7) or nipple-sparing mastectomy (n = 8) using a central nipple coring technique. The central papilla was excised for intraoperative frozen section analysis; if margins were negative, the remaining nipple skin and areola were preserved.

Result: Intraoperative frozen sections were negative for malignancy in all 15 patients (100%), allowing for the preservation of the entire NAC skin envelope in every case. Postoperative vascular complications were observed in 3 patients (20.0%): two experienced transient ischemia and one developed superficial partial-thickness necrosis. All resolved with conservative management without the need for surgical revision. At a median follow-up of 24 months, no local recurrences were observed in the preserved NAC or ipsilateral breast.

Conclusions: Papilla resection is a technically feasible and safe intermediate approach for patients with MRI-suspected nipple invasion. By eradicating high-risk central ductal tissue while preserving the nipple skin envelope and areola, this technique prevents unnecessary total NAC ablation in cases of false-positive imaging, ensuring oncologic thoroughness while maintaining the natural nipple-areolar silhouette with low morbidity.

A Comparative Analysis of Oncologic Safety Between Conventional Total Mastectomy (CTM) and Skin/Nipple-Sparing Mastectomy (SSM/NSM) Techniques

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Background: With increasing attention to aesthetic and quality-of-life outcomes in breast cancer surgery, skin-sparing mastectomy (SSM) and nipple-sparing mastectomy (NSM) have gained popularity as alternatives to conventional total mastectomy (CTM). However, concerns remain regarding their oncologic safety compared with CTM. This study aimed to evaluate the long-term oncologic outcomes of SSM/NSM versus CTM in patients with breast cancer.

Methods: A total of 383 patients who underwent total mastectomy at Korea University Ansan Hospital between July 2010 and February 2020 were retrospectively reviewed. Patients who underwent palliative surgery were excluded. Among them, 104 patients received nipple- or skin-sparing mastectomy (SSM/NSM), and 279 underwent conventional total mastectomy (CTM). Clinicopathologic characteristics and survival outcomes were compared between the two groups.

Result: In both surgical groups, higher N stage was associated with increased mortality. However, there were no statistically significant differences in overall survival between the SSM/NSM and CTM groups. Patterns of recurrence and disease-free survival were also comparable between the two surgical approaches.

Conclusions: SSM and NSM showed no inferiority to CTM in terms of oncologic safety and clinical outcomes. These techniques may serve as safe and effective alternatives to conventional mastectomy, providing favorable cosmetic outcomes without compromising oncologic efficacy.

Comparison of Early Clinical Outcomes between Robotic and Endoscopic Breast-Conserving Surgery

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Background: Breast-conserving surgery (BCS) has increasingly incorporated minimally invasive approaches to improve cosmetic outcomes while maintaining oncologic safety. Robotic breast-conserving surgery (R-BCS) and endoscopic breast-conserving surgery (E-BCS) have recently been introduced as minimally invasive options; however, direct comparisons between these two techniques remain limited. This study aimed to compare the feasibility and early clinical outcomes of R-BCS and E-BCS.

Methods: We retrospectively reviewed patients who underwent minimally invasive BCS at a single institution between September 2025 and January 31, 2026. A total of 47 patients were included, of whom 37 underwent R-BCS and 10 underwent E-BCS. Patient age, pathologic diagnosis, tumor stage, nodal stage, operative time, resection margin status, and early postoperative outcomes were analyzed.

Result: The mean age was 54.1 ± 8.1 years in the R-BCS group and 56.0 ± 8.9 years in the E-BCS group, with no significant difference between the groups ($p = 0.63$). There were no significant differences in tumor stage or nodal stage between the two groups. In the R-BCS group, 3 patients (8.1%) had ductal carcinoma in situ (DCIS) and 34 patients (91.9%) had invasive ductal carcinoma (IDC), while in the E-BCS group, 1 patient (10.0%) had DCIS and 9 patients (90.0%) had IDC ($p = 0.87$). All procedures were completed without conversion to open surgery. The mean operative time was 131.4 ± 30.2 minutes in the R-BCS group and 118.8 ± 36.9 minutes in the E-BCS group, with no significant difference ($p = 0.34$). Negative resection margins were achieved in all patients, and no major perioperative complications were observed.

Conclusions: Both robotic and endoscopic breast-conserving surgery were feasible and safe minimally invasive approaches in this early experience. Baseline oncologic characteristics and early surgical outcomes were comparable between the two groups. Larger studies with longer follow-up are required to further clarify the role of each technique in breast-conserving surgery.

Radiation-Modulated Tissue Remodeling According to Acellular Dermal Matrix Form: Comparative Evaluation of Sponge and Powder Configurations in a Rat Defect Model

Hunhwi Cho[1], Da Eun Seo[1], Nomin Erdene Tumursukh[1], Joo Heung Kim[2]

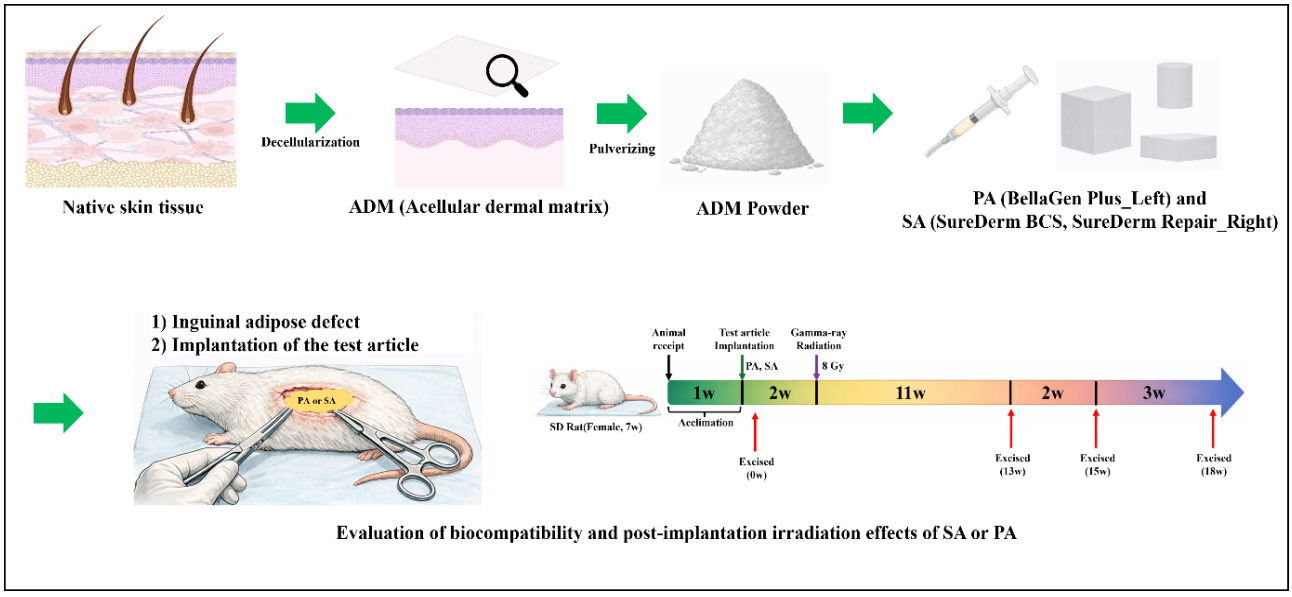
[1]Hans Biomed Corp., Department of Tissue Engineering, Korea, [2]Yonsei Univ. College of Medicine, Department of Surgery, Korea

Background: Breast-conserving surgery (BCS) is widely accepted as a standard treatment for early-stage breast cancer, providing oncologic safety while preserving breast contour and patient-reported quality of life. However, BCS inevitably results in partial tissue defects and followed by adjuvant radiation therapy, both of which can influence wound healing and long-term tissue remodeling. Acellular dermal matrix (ADM) have been increasingly utilized to support structural reinforcement and defect management following BCS. Various ADM configurations are currently available, including sheet, particulate, and moldable forms. Nevertheless, prospective, mechanistic evidence for the application of ADM to irradiated surgical defects is still limited. Because ADM structural properties may influence cellular infiltration, angiogenesis, and fibrotic remodeling, it is important to understand how ADM forms interact with host tissue under radiation exposure. This study aimed to evaluate radiation-modulated tissue integration and remodeling associated with different ADM configurations in a controlled preclinical defect model.

Methods: To replicate the surgical environment of breast cancer accompanied by radiation therapy, a rat partial fat depletion and radiation induced model was established. Powdered and sponge type ADMs were applied to the resected fat cavity and then irradiated. Weight changes, biocompatibility, self-organization, angiogenesis, fibrosis, and degradation patterns were then histologically compared and evaluated.

Result: Powdered and sponge type ADM demonstrated stable retention in the body after implantation and biocompatibility without excessive fibrosis. Furthermore, after radiation therapy, they exhibited gradual degradation without structural shrinkage or stiffness. Histopathological findings showed that the ADM promoted tissue regeneration in different ways.

Conclusions: In this preclinical model, powdered and sponge-configured acellular dermal matrices demonstrated favorable tissue integration and regenerative remodeling without evidence of excessive fibrotic response under radiation exposure. These findings suggest that alternative ADM configurations may provide structural support and promote biologically compatible healing in irradiated defect settings. Such properties support their potential role as biomaterial options for cavity management following breast-conserving surgery.



Evaluation of biocompatibility and post-implantation irradiation effects of SA or PA

Poster Presentation

Revisiting the Safety of Close Surgical Margins in Ductal Carcinoma in Situ of the Breast: A Real-world Analysis of Recurrence in the Modern Era

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Background: Current guidelines recommend a 2 mm surgical margin for ductal carcinoma in situ (DCIS) treated with breast conserving surgery (BCS). However, past studies included many patients who did not undergo adjuvant radiotherapy (RT). The necessity of re-excision for negative margins < 2 mm remains controversial, especially with increasing use of RT. We investigated ipsilateral breast tumor recurrence (IBTR) rates according to margin width.

Methods: We retrospectively reviewed 248 patients with DCIS who underwent BCS at a single institution between January 2017 and December 2022. Patients were categorized into a close margin group (< 2 mm, n = 58) and a wide margin group (≥ 2 mm, n = 190). The primary endpoint was IBTR. Clinicopathologic factors were analyzed.

Result: Patients were followed until January 2026, and 9 patients (3.6%) developed IBTR. The IBTR rate was lower in the close margin group (1.7%, 1 of 58) than in the wide margin group (4.2%, 8 of 190), although not statistically significant ($p = 0.69$). Comparing the two groups, the close margin group was more likely to include larger tumors > 2 cm (67.2% vs 52.1%, $p = 0.08$) and to undergo immediate re-excisions due to positive resection margins (17.2% vs 8.9%, $p = 0.09$). It also had a higher rate of hormone receptor (HR)-positive tumors (94.8% vs. 82.6%, $p = 0.04$). Most patients received appropriate adjuvant treatments; 97.6% of patients received radiotherapy, and 98.1% of HR-positive patients received hormonal therapy. All patients with IBTR received appropriate adjuvant treatments, and the median time to recurrence was 27.9 months.

Conclusions: In this cohort, a surgical margin of < 2 mm was not associated with an increased risk of IBTR, achieving a low recurrence rate of 1.7%. This finding suggests that, with adjuvant radiotherapy, surgical margin width may not be as important as tumor biology, and a narrower surgical margin may not always require re-excision. Further studies with a larger number of patients may be needed.

	Surgical Margin		
	<2mm	≥2mm	*p*
n (%)	58	190	
Age			0.76
≤50	31 (53.4)	95 (50.0)	
>50	27 (46.6)	95 (50.0)	
Diagnosis before Op			0.11
Benign	8 (13.8)	13 (6.8)	
Cancer	50 (86.2)	177 (93.2)	
Size			0.08
≤2cm	19 (32.8)	87 (45.8)	
>2cm	39 (67.2)	99 (52.1)	
N/A	0 (0)	4 (2.1)	
Nuclear Grade			0.17
1	15 (25.9)	52 (27.4)	
2	30 (51.7)	74(38.9)	
3	13 (22.4)	62 (32.6)	
N/A	0 (0)	2 (1.1)	
Comedo Necrosis			0.70
Yes	40 (69.0)	123 (64.7)	
No	18 (31.0)	66 (34.7)	
N/A	0 (0)	1 (0.5)	
Multifocality			0.31
Yes	1 (1.7)	12 (6.3)	
No	57 (98.3)	178 (93.7)	
HR Status			0.04
Positve	55 (94.8)	157 (82.6)	
Negative	3 (5.2)	32 (16.8)	
N/A	0 (0)	1 (0.5)	
HER2 Status			1.00
Positive	22 (37.9)	72 (37.9)	
Negative	26 (44.8)	87 (45.8)	
Unknown	10 (17.2)	31 (16.3)	
Immediate Re-Op			0.09
Yes	10 (17.2)	17 (8.9)	
No	48 (82.8)	173 (91.1)	
Hormonal Therapy in HR-positive patients			0.28
Received	53 (96.4)	155 (98.7)	
Not Received	2 (3.6)	2 (1.3)	
Radiotherapy			0.63
Received	56 (96.6)	186 (97.9)	
Not Received	2 (3.4)	4 (2.1)	
IBTR			0.69
Yes	1 (1.7)	8 (4.2)	
No	57 (98.3)	182 (95.8)	

Table 1. Characteristics by surgical margin. Op, operation; N/A, not available; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; IBTR, ipsilateral breast tumor recurrence

Comparison of Oncologic and Surgical Outcomes Between Robotic Mastectomy and Conventional Mastectomy Followed by Reconstruction After Neoadjuvant Chemotherapy in Breast Cancer Patients

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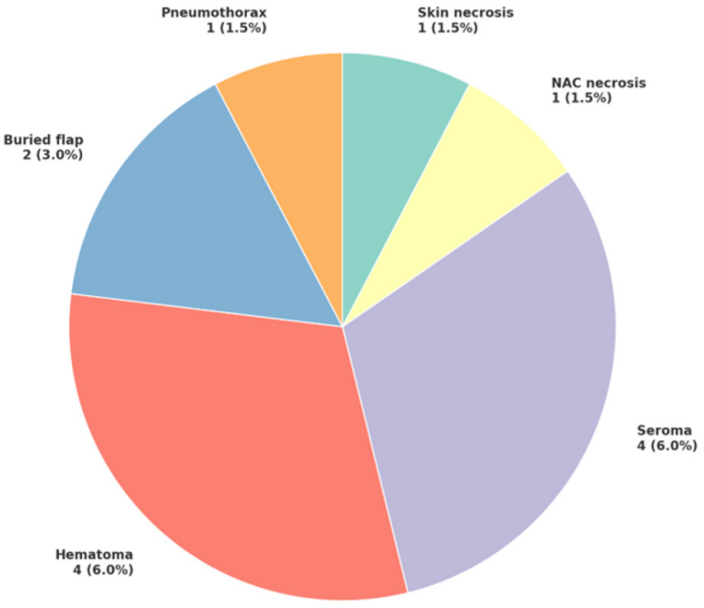
ASAN Medical Center, Department of Surgery, Korea

Background: Robot-assisted mastectomy (RAM) has been increasingly adopted in breast cancer surgery with immediate reconstruction. However, evidence comparing surgical and oncologic outcomes between RAM and conventional mastectomy (CM) among patients treated with neoadjuvant chemotherapy (NAC) remains limited. This study aimed to compare surgical and oncologic outcomes between RAM and CM in patients who underwent mastectomy with immediate reconstruction after NAC.

Methods: This retrospective cohort study included breast cancer patients who underwent mastectomy with immediate reconstruction after NAC between January 2021 and December 2024. Patients were categorized according to the surgical approach (RAM or CM). A 1:2 matching procedure was performed based on age, body mass index (BMI), and clinical T/N stage. The final cohort comprised 67 patients in the RAM group and 134 patients in the CM group. Outcomes were compared using Student's t-test, chi-square test, and KaplanMeier analysis.

Result: Among 778 eligible patients, 201 patients (RAM, n = 67; CM, n = 134) were included after matching, with balanced baseline characteristics between groups. Postoperative complication rates did not differ significantly. KaplanMeier analysis showed no significant difference in overall survival (OS) or disease-free survival (DFS). In the RAM and CM groups, the 3-year OS was 100.0% and 98.5%, respectively ($p = 0.853$), and the 3-year DFS was 93.2% and 92.8%, respectively ($p = 0.889$).



Conclusions: In comparison with CM, RAM following NAC demonstrated non-inferior outcomes in terms of postoperative complications, OS, and DFS. These findings support the clinical safety and feasibility of RAM in patients undergoing mastectomy after NAC. However, longer follow-up and prospective studies are warranted.

Poster Presentation

Long-Term Oncologic Outcomes After Breast-Conserving Surgery with Radiotherapy Compared with Total Mastectomy in Early Breast Cancer

Kibeom Kim, Ki Jo Kim, Seung Ah Lee, Do Youn Woen, Su Min Lee, Kawon Oh, Cho Eun Lee, Jihoon Lee, Dahn Byun, Seok Jin Nam, Seok Won Kim, Jeong Eon Lee, Jong Han Yu, Byung Joo Chae, Se Kyung Lee, Woong Ki Park, Jai Min Ryu

Samsung Medical Center, Department of Surgery, Korea

Background: Breast-conserving surgery followed by radiotherapy (BCS+RT) has been considered oncologically equivalent to total mastectomy (TM) in early breast cancer based on previous randomized trials. However, relatively few studies have specifically evaluated distant metastasis-free survival (DMFS) and disease-free survival (DFS), particularly in contemporary treatment settings. Whether the choice of surgical approach influences long-term oncologic outcomes remains clinically relevant.

Methods: We retrospectively analyzed female patients with T1-2, N0-1, M0 invasive breast cancer treated between 2008 and 2019. Patients who received neoadjuvant chemotherapy, had bilateral disease, or carcinoma in situ were excluded. Propensity score matching (1:1) was performed to balance clinicopathologic characteristics between patients treated with BCS+RT and TM. DMFS was defined as the primary endpoint, while DFS, overall survival (OS), breast cancer-specific survival (BCSS), and local recurrence-free survival (LRFS) were secondary endpoints. Cox proportional hazards models with robust standard errors were applied. Subgroup analyses were conducted to assess the consistency of treatment effects.

Result: After propensity score matching, 2,577 patients were included in each group with well-balanced baseline characteristics. In unadjusted analyses, BCS+RT showed favorable trends for DMFS and OS compared with TM. After adjustment, BCS+RT was associated with improved DMFS (adjusted hazard ratio [HR] 0.75, 95% [CI] 0.580-0.96) and OS (adjusted HR 0.76, 95% CI 0.59-0.99). Among all evaluated endpoints, DFS demonstrated the most consistent benefit, with BCS+RT significantly reducing the risk of recurrence compared with TM (adjusted HR 0.76, 95% CI 0.65-0.89). No significant differences were observed in BCSS or LRFS. The DFS benefit associated with BCS+RT was consistently observed across major clinicopathologic subgroups.

Conclusions: In propensity score matched cohort of early breast cancer, BCS+RT was associated with improved DMFS and demonstrated the most pronounced and consistent benefit in DFS compared with total mastectomy. These findings suggest that BCS+RT is an oncologically local treatment strategy with favorable long-term outcomes in appropriately selected patients.

Comparison of Nipple-sparing Mastectomy with Skin-sparing Mastectomy in Breast Cancer Patients Underwent Immediate Breast Reconstruction: A Single Center Registry

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[1]Yonsei Univ. College of Medicine, Department of Surgery, Korea, [2]Yonsei Univ. College of Medicine, Department of Plastic Surgery, Korea

Background: Nipple-sparing mastectomy (NSM) is considered to be safe option compared to skin-sparing mastectomy (SSM) for breast cancer patients undergo immediate breast reconstruction. Surgical margins including beneath nipple-areolar complex (NAC) are evaluated to achieve oncologic safety. However, positive subareolar margin by frozen section does not always mean the presence of tumor in NAC. This study was aimed to investigate clinicopathological characteristics of NSM or SSM and to analyze survival outcome.

Methods: A total of 2,466 breast in 2,323 patients were retrospectively selected at Severance Hospital between 2016 and 2022. All underwent NSM or SSM with immediate reconstruction. Breast surgery was categorized as conventional NSM (c-NSM), robot/endoscopy-assisted NSM (r/e-NSM) and SSM groups. Univariate and multivariate analyses were conducted and survival outcomes were compared.

Result: C-NSM and r/e-NSM were 1,234 (50%) and 355 (14.4%), respectively. Of 877 (35.6%) SSM, 140 (10.2% of NAC initially tried to preserve) and 2 cases of r/e-NSM using mid-axilla incision were converted to SSM. Permanent pathology in SSM group revealed 20.9% showed tumors in the NAC. Approximately 20% of cases received neoadjuvant chemotherapy (NCT). r/e-NSM showed significantly younger age at diagnosis, lower multifocality and lower TNM stage. SSM demonstrated significantly higher grade II/III disease, ER or PR-negativity, higher HER2-positivity, and higher Ki-67 levels. Disease-free survival (DFS) including locoregional failure and overall survival (OS) were not different according to types of surgery during follow-up duration of 54.1 months. DFS and OS were significantly associated with age, use of NCT, multifocality, TNM stage, ER, HER2 and Ki-67 status.

Conclusions: Oncologic outcomes were not significantly different among c-NSM, r/e-NSM, and SSM in breast cancer patients underwent immediate reconstruction. Careful patient selection and discussion of pros and cons were needed to choose type of surgery. Further radiological studies and longer follow-up periods were required to set up highly-selective criteria and to confirm oncologic safety.

Role of an Indocyanine Green-hyaluronic Acid Mixture (LuminoMark™) in Localization of Robot-assisted Breast-conserving Surgery: Initial Experiences

Sehyun Paek[1], Hee Jun Choi[4], Jun-Hee Lee[3], Jai Min Ryu[2], Ku Sang Kim[5]

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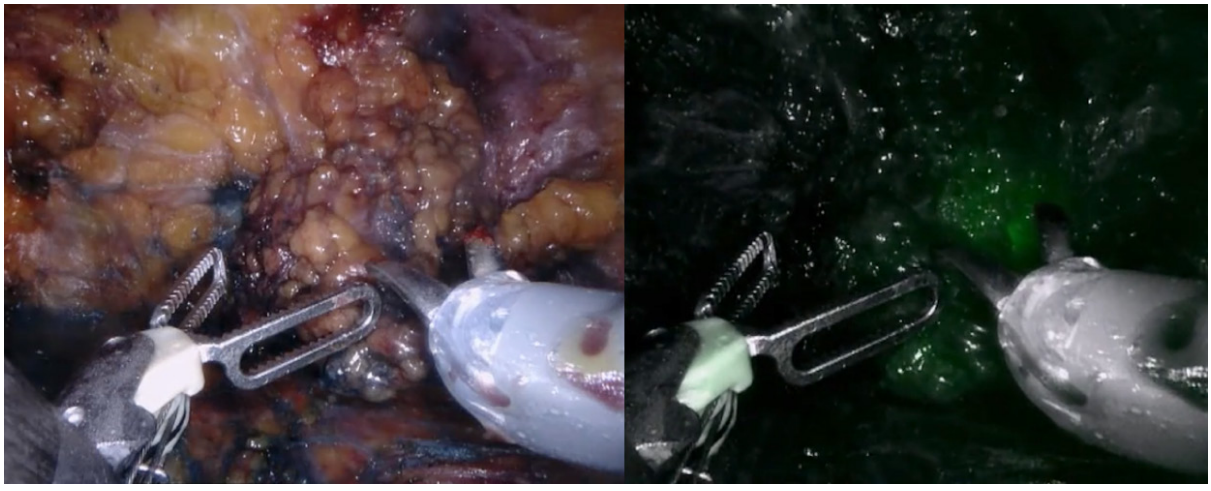
Background: Surgical excision is the definitive treatment for breast cancer patients. Precise localization for surgery is challenging, especially for robot-assisted breast conserving surgery (BCS). We investigated localization and safe resection margins for breast cancer patients undergoing robot-assisted BCS using ultrasound-guided LuminoMark™ marking.

Methods: From Jan. 2023 to Oct. 2024 we enrolled 12 patients who underwent robot-assisted BCS using ultrasound-guided LuminoMark™. Patient demographics, pathologic features, and operation results were reviewed. All surgical procedures were performed in concordance with traditional BCS operation.

Result: The median patient age was 47.76 years, and median BMI was 22.67 kg/m². There were Invasive breast cancer in 9 cases and DCIS in 3 cases. SLNBx. was performed in 8 cases, and ALND was performed in 3 cases. Mean tumor size was 0.8 cm. The LuminoMark™ identification rate was 100% (12/12). The mean approach time for resection of the lesion ICG-F using group was about 13 min. The positive rate of frozen resection margins was 8.3% using ICG-F. The rate of final positive resection margins was 0%. The rate of re-operation was none. At follow-up after the operation, there was no recurrence.

Conclusions: Preoperative ultrasound-guided luminomark localization appears to be a feasible and safe procedure for robot-assisted breast conserving surgery. Further evaluation is warranted in larger patients' cohorts.



Outcomes of Breast Cancer Patients with Residual Sentinel Lymph Node Metastasis after Neoadjuvant Chemotherapy: Sentinel Lymph Node Biopsy Alone versus Axillary Lymph Node Dissection

Seung Hwan Lim, Woo Chul Noh, Young Bum Yoo, Kyoung Sik Park, Sang Eun Nam, Jong Hyun Kim

Konkuk Univ. Medical Center, Department of Surgery, Korea

Background: Current guidelines recommend axillary lymph node dissection (ALND) for patients with residual sentinel lymph node (SLN) metastasis after neoadjuvant chemotherapy (NAC). However, in real-world practice, there is a growing tendency to omit ALND in selected patients with favorable responses to NAC. Further investigation is needed to support the oncologic safety of the de-escalated axillary approach.

Methods: This study analyzed breast cancer patients who underwent either sentinel lymph node biopsy (SLNB) alone or ALND after NAC, irrespective of residual tumor status in the sentinel lymph nodes. A total of 121 patients between January 2021 and December 2025 were included. Of these, 58 patients underwent SLNB alone and 63 patients underwent ALND. Overall survival (OS) and disease-free survival (DFS) were defined from the date of definitive breast surgery. Survival outcomes were evaluated using Kaplan-Meier analysis and compared with the log-rank test.

Result: The median follow-up duration was 23 months, with longer follow-up in the SLNB-alone group compared with the ALND group (27 vs. 19 months). KaplanMeier analysis demonstrated no significant difference in overall survival between the SLNB-alone and ALND groups (log-rank $P = 0.31$). Similarly, disease-free survival did not differ significantly between the two groups (log-rank $P = 0.21$). During follow-up, no axillary recurrence was observed among patients treated with SLNB alone, whereas two axillary recurrences occurred in the ALND group.

Conclusions: In this cohort study of breast cancer patients with residual SLN metastasis after NAC, omission of ALND was not associated with inferior overall or disease-free survival. The absence of axillary recurrence in the SLNB-alone group further supports the potential oncologic safety of selective axillary de-escalation. Further prospective studies are needed to define selected patient subgroups in whom ALND can be safely omitted after NAC.

Breast-Conserving Surgery with Radiotherapy for Patients with Prior Augmentation: A Multidisciplinary Study on Capsular Contracture

Woosung Jang[1], Myeong Jae Kang[1], Mi Young Kim[2], Jongmoo Park[2], Byeongju Kang[3], Jeeyeon Lee[3], Ho Yong Park[3], Jeong Yeop Ryu[1], Joon Seok Lee[1], Mansoo Suh[1], Kang Young Choi[1], Ho Yun Chung[1], Jung Dug Yang[1]

[1]Kyungpook National Univ. School of Medicine, Department of Plastic Surgery, Korea, [2]Kyungpook National Univ. School of Medicine, Department of Radiation Oncology, Korea, [3]Kyungpook National Univ. School of Medicine, Department of Surgery, Korea

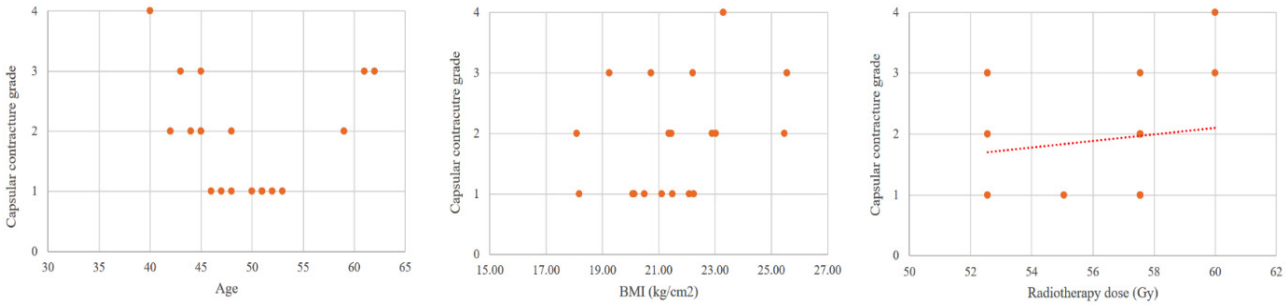
Background: Breast augmentation using implants is common, and breast cancer can also occur in women with augmented breasts. Historically, total mastectomy was often recommended because of concerns regarding margin positivity and cosmetic failure. With advances in diagnostic techniques and screening programs, breast-conserving surgery (BCS) combined with radiotherapy (RT) has become a viable alternative. However, BCS with RT is still less frequently performed in patients with prior breast augmentation, mainly due to concerns about capsular contracture.

Methods: This retrospective single-center study included patients with prior breast augmentation who underwent BCS followed by RT between January 2018 and June 2024. Nineteen patients with a minimum follow-up of six months were analyzed. BCS was performed by a single breast surgeon, and immediate breast reconstruction with glandular reshaping was performed by a single plastic surgeon. Postoperative RT was administered by two radiation oncologists. Capsular contracture was evaluated using the Baker classification, and radiotherapy-related factors were analyzed.

Result: Capsular contracture of Baker grade 3 or higher occurred in five patients (26.3%). Age, body mass index, tumor location, and reconstruction-related factors were not significantly associated with capsular contracture. The mean total radiotherapy dose was significantly higher in patients who developed capsular contracture than in those who did not (56.54 Gy vs. 55.95 Gy, $p = 0.0489$). Scatterplots analyzing the relationship between age, body mass index, and radiotherapy dose in relation to capsular contracture grades demonstrated a positive trend between RT dose and capsular contracture severity (Figure 1).

Conclusions: In patients with prior breast augmentation, breast-conserving surgery followed by radiotherapy can achieve relatively satisfactory outcomes. Although capsular contracture remains a concern, this complication may be reduced through multidisciplinary collaboration among breast surgery, plastic surgery, and radiation oncology. Careful consideration of radiotherapy dose through multidisciplinary discussion may help optimize outcomes in selected previously augmented patients.

Figure 1.


Capsular contracture grade
Age
BMI (kg/cm2)
Radiotherapy dose (Gy)

Comparison of the Rates of Fat Necrosis and Surgical Outcome after Oncoplastic Breast-Conserving Surgery with Acellular Dermal Matrix: Single-center Study

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Background: Acellular dermal matrix (ADM), derived from human dermis, has traditionally been used for wound healing and tissue repair and is increasingly applied in breast cancer surgery. In breast-conserving surgery (BCS), flap-based oncoplastic techniques are commonly used to preserve breast shape but may cause long-term complications such as breast deformity, fat necrosis after radiation therapy, and radiologic interference, which can lead to unnecessary biopsies or additional surgery. This study aimed to evaluate the feasibility and surgical outcomes of ADM-assisted oncoplastic BCS by comparing it with conventional flap-based oncoplastic surgery.

Methods: Medical records of patients who underwent breast-conserving surgery at a single institution between January 2022 and December 2024 were retrospectively reviewed. A total of 350 patients were included: 125 who underwent ADM-assisted surgery and 225 who underwent flap-based oncoplastic surgery. Demographic characteristics, pathological findings, operative time, and postoperative complications were analyzed. Serial postoperative imaging, including breast MRI and mammography, was evaluated to compare the incidence of fat necrosis, particularly calcification and mass formation.

Result: There were no significant differences between the two groups in demographic characteristics, pathological findings, or length of hospital stay. The ADM group showed a significantly shorter operative time (45.2 ± 14.5 vs. 60.5 ± 15.2 minutes) and a lower overall complication rate than the flap group (4% vs. 12%, $P < 0.001$). Rates of hematoma and infection were comparable. The ADM group had fewer remnant calcifications (2% vs. 11.2%) and palpable lumps (2% vs. 18%) but a higher incidence of seroma (30% vs. 12%).

Conclusions: ADM-assisted breast-conserving surgery may reduce fat necrosis and imaging-related abnormalities without compromising oncologic outcomes, while helping preserve breast contour and improve long-term patient comfort.

Transaxillary Retromammary Robotic Breast Conserving Surgery for Operable Breast Cancer - Three Pilot Cases -

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Background: Breast conserving surgery has undergone another transformation with the introduction of the oncoplastic operation concept, but there are still areas for further improvement, and with robotic or robot-assisted approaches gaining ground in many surgical procedures, the field of breast cancer surgery awaits new challenges.

Methods: We performed robotic breast conserving surgery on three operable breast cancer patients with index tumor located in the upper inner, lower inner and lower outer quadrant. The dissection plane was maintained by dropping the retromammary fat down and raising the breast parenchyma up, and when the dissection edge reached the farthest part of the cancer, it went up by cutting the parenchyma vertically toward the skin in the form of a cylindrical column encompassing the cancer, and when the parenchyma was completely separated from the subcutaneous fat layer, the cancer was dropped down. The excised cancer column was taken out followed by filling defect after partial mastectomy was filled with diced acellular dermal matrix(dADM), followed by sentinel lymph node biopsy.

Result: All safety surgical margins were negative, and the operative time did not exceed 50 minutes. All patients had no local or distant metastases at 2-year postoperative follow-up. All three patients had no problems related to robotic breast conserving surgery.

Conclusions: When it comes to the upper inner, lower inner and lower outer quadrants, various considerations are required to achieve oncoplastic outcomes with a single incision not compromising vascular and sensory network around nipple-areolar complex and within a short operative time. Robotic approaches are gaining ground for this purpose in many surgical procedures, and we demonstrated in these three pilot cases that transaxillary retromammary robotic breast conserving surgery and volume replacement with dADM can be safely performed for operable breast cancer in all quadrants, providing patients with improved oncoplastic outcomes and comfort.

Learning Curve Comparison Between Frontier and Follower Surgeons in Robot-Assisted Nipple-Sparing Mastectomy: A Multicenter Study

Young-Joon Kang[1], Joo Heung Kim[2], Ku Sang Kim[10], Nak-Hoon Son[13], Sae Byul Lee[3], Jung Eun Choi[4], Moo Hyun Lee[5], Jeeyeon Lee[6], Young Woo Chang[7], Se Hyun Paek[8], Sun Young Min[9], Ji Young You[7], Chihwan Cha[11], Yong Yeup Kim[7], Hee Jun Choi[12], Eun-Shin Lee[7], Jai Min Ryu[7], Hyung Seok Park[2]

[1]The Catholic Univ. of Korea, Incheon St. Mary's Hospital, Department of Surgery, Korea, [2]Yonsei Univ. College of Medicine, Department of Surgery, Korea, [3]Ulsan Univ. Hospital, Department of Surgery, Korea, [4]Yeungnam Univ. College of Medicine, Department of Surgery, Korea, [5]Keimyung Univ. School of Medicine, Department of Surgery, Korea, [6]Kyungpook National Univ. School of Medicine, Department of Surgery, Korea, [7]Korea Univ. College of Medicine, Department of Surgery, Korea, [8]Ewha Womans Univ. School of Medicine, Department of Surgery, Korea, [9]Kyung Hee Univ. Medical Center, Department of Surgery, Korea, [10]Kosin Univ. College of Medicine, Department of Surgery, Korea, [11]Hanyang Univ. College of Medicine, Department of Surgery, Korea, [12]Sungkyunkwan Univ. School of Medicine, Department of Surgery, Korea, [13]Keimyung Univ. School of Medicine, Department of Statistics, Korea

Background: Robot-assisted nipple-sparing mastectomy (RANSM) requires surgical skill acquisition, but training approaches for RANSM have not been systematically compared. This study compared learning curves between early adopters (frontier group) who developed the technique through trial-and-error versus later adopters (follower group) who benefited from structured training protocols.

Methods: This retrospective multicenter study analyzed 306 patients who underwent RANSM between November 2016 and October 2022 across 16 academic hospitals in South Korea. Seventeen breast surgical oncologists were categorized into frontier group (n = 8, first RANSM November 2016-January 2020) and follower group (n = 9, first RANSM February 2020-July 2022). Learning curves were assessed by analyzing mastectomy operation time reduction across sequential cases using linear regression slope analysis.

Result: The follower group demonstrated a significantly steeper learning curve (slope -3.18) compared to the frontier group (slope -0.86), representing 3.7-fold faster operation time reduction per case ($p < 0.0001$). Despite treating patients with higher complexity (older age, higher ptosis grades, advanced staging, increased neoadjuvant therapy), the follower group achieved lower complication rates (2.04% vs 7.69%, $p = 0.0461$). Surgeon characteristics were comparable between groups except for higher participation in cadaver workshops (66.7% vs 37.5%) and observerships (55.6% vs 37.5%) in the follower group.

Conclusions: Surgeons adopting RANSM with structured training achieved faster learning curve progression than early adopters, approaching plateau around 10-15 cases. Training quality through systematic education (cadaver workshops, observerships, proctorship) appears more determinant of learning velocity than case volume accumulation alone.

Poster Presentation

	N	slope	slope (SE)	p-value
Frontier	199	-0.8625	0.1079	<.0001
Follower	96	-3.1768	0.5262	

Current Status and Practice Patterns of Robot-Endoscopic Minimal Access Breast Surgery in South Korea: A National Survey (KoREa-BSG 19)

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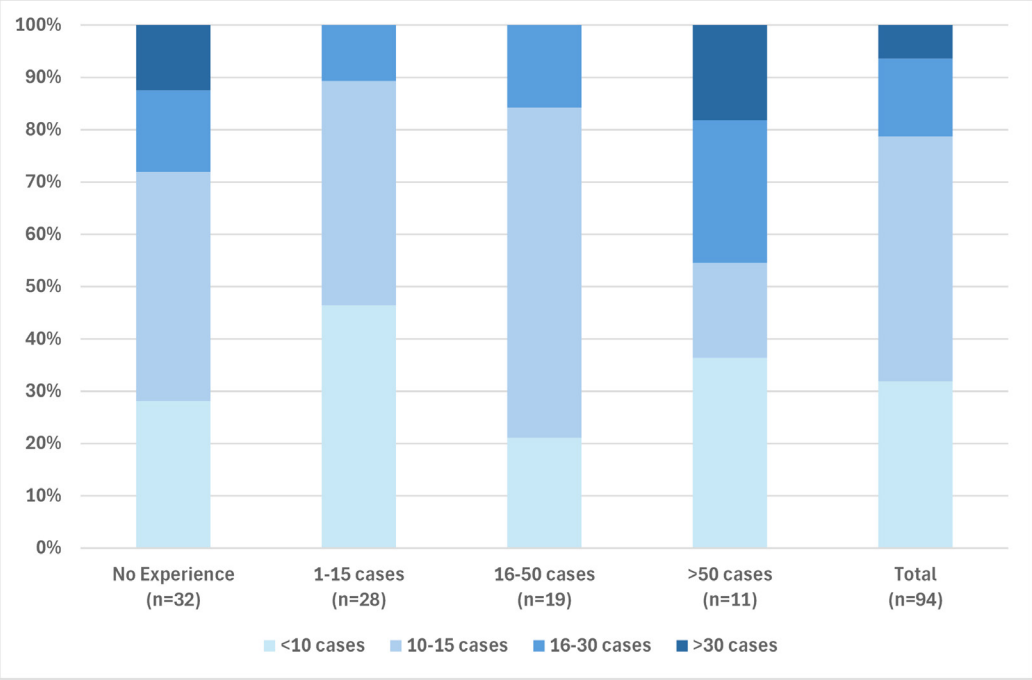
Background: Minimal access breast surgery utilizing robotic and endoscopic technologies has gained attention; however, data on adoption patterns, technical preferences, and implementation barriers among surgeons remain limited. This study investigated the current status and practice patterns of robot-endoscopic minimal access breast surgery in South Korea.

Methods: A cross-sectional web-based survey was distributed to members of the Korean Breast Cancer Society between March and April 2025. The survey assessed adoption rates, surgical volumes, technical preferences, patient selection criteria, perceived barriers, and factors associated with implementation. Descriptive statistics and comparative analyses were performed.

Result: Among 98 respondents (16.5% response rate based on board-certified breast surgical oncologists), 71.4% had performed minimal access breast surgery. Robot-assisted nipple-sparing mastectomy was the most common procedure (63.3%), followed by endoscopic-assisted mastectomy (27.6%). Primary barriers to broader adoption included conventional methods achieving sufficient results (36.2%), cost and patient financial burden (24.6%), and limited equipment accessibility (23.2%). Mid-volume surgeons (50-100 cases/year) demonstrated higher adoption rates (85.0%) compared to high-volume surgeons (> 200 cases/year, 73.1%) and low-volume surgeons (< 50 cases/year, 40.0%; $p < 0.05$). Most respondents (75.5%) believed 15 or fewer cases were sufficient for proficiency in robotic breast surgery. Experienced surgeons (> 50 cases) were more likely than novices (1-15 cases) to include N1 disease in patient selection (100.0% vs 57.1%, $p = 0.009$). Most respondents (81.4%) perceived no oncological difference between minimal access and conventional mastectomy.

Conclusions: Substantial adoption of minimal access breast surgery exists among Korean breast surgeons, with robot-assisted approaches predominating. However, standardization of training, technique, and patient selection criteria remains incomplete. Our counterintuitive finding that mid-volume surgeons show higher adoption rates warrants further investigation into factors influencing technology adoption patterns.


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
No Experience (n=32)
1-15 cases (n=28)
16-50 cases (n=19)
>50 cases (n=11)
Total (n=94)
<10 cases
10-15 cases
16-30 cases
>30 cases

Three-Dimensional (3D) Versus Two-Dimensional (2D) Endoscopic-Assisted Nipple Sparing Mastectomy: Comparison of Clinical, Oncologic and Patient-Reported Outcome Measurements

Cher Hui Koh[1], Jun Su[2], Dineshwary Periasammy[3], Nurul Hidayah Abdul Rauf[4], Yi-Yuan Lee[5,6], Hung-Wen Lai[5,7,8,9,10,11]

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Background: Endoscopic nipple-sparing mastectomy (E-NSM) has gained increasing popularity in appropriately selected patients with breast cancer, as it enhances aesthetic outcomes through the use of small, concealed incisions in the lateral chest wall or axilla without compromising oncologic safety. However, similar to other laparoscopic procedures, E-NSM remains technically challenging because of limitations in spatial orientation and depth perception. We hypothesize that the usage of three-dimensional (3D) videoendoscopic visualization may improve postoperative surgical outcomes as well as patient-reported outcomes in E-NSM compared to two-dimensional (2D) system.

Methods: This study is a retrospective analysis of 303 patients who underwent (E-NSM) in a single centre. Of these, 113 procedures were performed using 2D visualization and 190 using 3D visualization. Clinical, oncologic, and patient-reported outcome measures were compared between the two groups

Result: The median blood loss volume was significantly lower for the 3D E-NSM group (40 mL vs 80 mL, $p < 0.01$). The 3D E-NSM group also had shorter mean operative duration of 257.8 ± 118.5 min compared to 319 ± 189.6 min in the 2D E-NSM group ($p < 0.01$). The 2D E-NSM group had a higher proportion of patients with ischemia/necrosis of the nipple-areolar complex (NAC), (22.1% vs 10%, $p < 0.01$). Patient-reported outcome measurements showed comparable BREAST-Q scores between the two groups, although our institutional questionnaire showed improved post-operative breast appearance favouring the 3D E-NSM group.

Conclusions: Our current study demonstrates that 3D E-NSM provides improved visualization with reduced intraoperative blood loss and shorter operative duration compared to 2D E-NSM.

Single Axillary Incision for Minimal Access Nipple-sparing Mastectomy: Axillary Crease or Lateral Chest Incision?

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Background: Minimal-access nipple-sparing mastectomy (MA-NSM), including endoscopic- and robotic-assisted techniques, enables NSM to be performed through aesthetically favourable incisions without compromising oncologic safety. While early MA-NSM used dual incisions, current practice favours a single axillary incision (SAI), most commonly placed at the axillary crease or along the lateral chest wall on the anterior axillary line at the level of the nipple–areolar complex.

Methods: This is a retrospective review of all patients who underwent MA-NSM via a SAI either the axillary or lateral chest wall approach between January 2012 to June 2025. Clinicopathologic characteristics, surgical outcomes, postoperative complications and patient reported outcome measures were analyzed.

Result: The study included 371 MA-NSM cases, of which 222 (59.8%) were performed via an axillary crease incision and 149 (40.2%) via a lateral chest wall incision. The mean breast weight excised was greater in the lateral chest wall group than in the axillary crease group (330.7 ± 162 vs. 299.5 ± 131.8 g, $p = 0.05$). Mean operative time (205.7 ± 108.2 min vs. 222.2 ± 113.8 min, $p = 0.16$) and intraoperative blood loss (37 ± 26.6 mL vs. 37 ± 27.8 mL, $p > 0.99$) were comparable between the axillary crease and lateral chest wall groups, respectively. Delayed wound healing is significantly higher in the lateral chest wall group compared to the axillary crease group (6.7% vs 0.5%, $p < 0.001$). Patient-reported outcomes demonstrated comparable BREAST-Q scores and post-operative sensory outcomes between the two groups.

Conclusions: In this study, there were no significant differences in surgical outcomes, postoperative complications and patients' satisfaction between the axillary and lateral chest approach MA-NSM, except for a higher incidence of delayed wound healing associated with the lateral chest wall approach. Both techniques are reasonable options for MA-NSM.

Single Port (SP) Three-Dimensional (3D) Endoscopic Assisted Partial Mastectomy (E-PM) for Breast Lesions With Single Aesthetic Scar: Technique, Clinical Results, Learning Curve and Patient Reported Outcomes

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Background: Endoscopic assisted breast surgery was developed over 20 years now for breast lesion. We performed SP-3D Endoscopic Partial mastectomy for benign lesion and breast cancers. This minimally invasive surgical procedure with single small incision lead to better aesthetic outcomes without compromising oncology safety.

Methods: Retrospective cohort study of 230 patients with breast lesions who underwent single port 3D Endoscopic partial mastectomy with axillary/lateral chest wall incisions from July, 2022-December, 2025 in a single institution. Clinical outcomes, learning curve analysis and patient-reported outcomes using Breast-Q were analyzed.

Result: 230 SP 3D E-PM was performed via single axillary/lateral chest incisions axillary incisions for breast lesions. Breast cancers in this study underwent surgery via single axillary incision which is used for axillary surgery. Mean age in this study was 56 and BMI of 23.8. Success rate of S-P 3D E-PM was 100%. Most common malignancy was invasive ductal carcinoma with 85cases, 59.4% while most common benign lesion was fibrocystic change with fibroadenoma with 42cases, 39.6% among benign lesion. 60cases, 56.6% were microcalcifications where hook wire guided SP 3D E-PM performed. Benign lesion which reported as malignancy in postoperative pathological report are 20, 18.9%. 1, 0.7% patient underwent SP 3D E-PM with breast reconstruction with omental patch and 1, 0.7% with latissimus dorsi flap. Median E-PM surgical time was 154 ± 61 min for cancer and benign was 111.5 ± 34.7 min and median blood loss was 21.2 ± 18 mL for cancer and 11.9 ± 2.8 mL for benign. Learning curve analysis revealed significant p value < 0.05 for initial and later mature phase for cancer at 24th and benign at19th case. Focally microscopic margin involvement was reported in 10, 6.9% and 2 underwent SP-3D E-Nipple Sparing Mastectomy. Complication was 13, 9.1% for cancer and 15, 19% for benign with all being minor complication (Clavien-Dindo I and II). Overall satisfactions of the cosmetic outcomes was 98.2%. During the median follow up of 24 months, no patients reported locoregional recurrence, distant metastasis/mortality.

Conclusions: SP 3D Endoscopic partial mastectomy is very feasible with good cosmetic outcomes, oncology safety, cost effective and improved overall survival.

Postoperative Analgesia Efficacy of Pectoral Nerve Block in Mastectomy in a Tertiary Hospital, Malaysia

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Background: Pectoral nerve (PEC) blocks are a novel technique to reduce postoperative pain, opioid usage, postoperative complications and aid in early mobilisation of the limb. This study aimed to compare the postoperative analgesic efficacy of PEC block with our standard practice of opioids and non steroidal anti inflammatory drugs.

Methods: A total of 80 patients who underwent unilateral modified radical mastectomy or simple mastectomy over 12 months at a single centre were divided into group 1 (General anaesthesia and Intravenous analgesia) and Group 2 (General anaesthesia and intraoperative Pectoral blocks). Data collected include demography, type of surgery, intraoperative pectoral blocks, postoperative pain control first 24 hours till discharge, mobility of limb full abduction and complications. Excluded were patients with diagnostic excision/margin clearance, bilateral mastectomy, bleeding disorders and patient refusal. Subanalysis of intraoperative Pectoral 1 and 11 block performed in 40 patients. Pectoral 1 block is direct infiltration of bupivacaine 0.25% 2 mg/kg between pectolaris major and minor muscle. Pectoral 11 block is infiltration of bupivacaine 0.25% 2 mg/kg between pectoralis minor and serratus anterior. Data entered and analyse using SPSS. Group comparision analyse using Chisquare and Mann – Whitney u test.

Result: There were 80 patients with breast diseases who underwent modified radical or simple mastectomy age ranging from 30 to 80 years old. 40 patients were included in the Intraoperative Pectoral block after removal of mastectomy specimen. Significant difference were found in pectoral block group in postoperative pain first 24 hours of surgery without opioid usage ($p < 0.005$). There is significant reduction in opioid usage postoperatively till discharge in pectoral block group($p < 0.005$). Full abduction of limb noted on postoperative day 1 in PEC block group ($p < 0.005$). No significant differences in complications such as seroma, hematoma or surgical site infection

Conclusions: Pectoral block is effective in reducing postoperative pain and opioid consumption.

Poster Presentation

Scarless Totally Implantable Venous Access Port (TIVAP) Implantation: Surgical Technique, Results, Learning Curve and Patient-reported Outcome Among 246 Breast Cancer Patients

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Background: Minimal-access breast surgery reported remarkable oncology safety and good cosmetic outcome. Chemotherapy significantly improved the overall survival and scarless TIVAPP benefit patient in this modern era. We published a preliminary study on scarless totally implantable venous-access ports (TIVAP) in 2024 which concluded as a safe and reliable procedure with high patients-reported satisfaction. We would like to update the improvised technique with intravenous anesthesia, clinical outcome, learning curve and patient reported satisfaction outcome

Methods: Retrospective cohort study with 246 patients who underwent scarless TIVAP with a small scar at axillary skin crease from May 2018 to December 2025 in a single institution. Surgical techniques, clinical outcome and patient reported outcomes were evaluated and analyzed

Result: 246 patients of breast cancer underwent scarless TIVAP with 130 for neoadjuvant chemotherapy and 116 for adjuvant chemotherapy. Primary success rate was 100%. The mean operative time was 45 ± 13.8 min and estimated blood loss were 8 ± 2.7 mL. Learning curve CUSUM plot demonstrated the mean operative time improved after 24th case but deteriorated from 167th to 191st case due to change of Port A catheter brand and improved after that. No pneumothorax or catheter thrombosis noted. Most of the complications were minor and treated conservatively except 2 cases required surgical revision for catheter kinking and infection. Patient reported satisfaction outcomes were good where 206 responded well satisfied aesthetic outcome with improved body image perception, good surgical procedure experience, administration of chemotherapy and easy removal

Conclusions: Scarless TIVAP is feasible, safe and reliable surgery with patient reported well satisfied aesthetic outcome, good surgical experience, easy systemic chemotherapy administration and easy removal.

Poster Presentation

Overcoming Upper-Inner Quadrant Challenges: Matrix Rotational Flap Reconstruction in Breast Conservation Surgery

Yi Ping Lim, Ven Qing Shim, Kah Seng Khoo, Joanne Moisun, Yoke Kiet Doon, Mee Hoong See

Univ. Malaya Medical Centre, Department of Surgery, Malaysia

Background: Tumours of the upper-inner quadrant pose significant oncoplastic challenges due to their proximity to the upper pole and visible breast contour. Wider excisions in this region, particularly in patients with small breast volumes, increase the risk of contour deformity and compromised cosmetic outcomes.

Methods: A 62-year-old woman presented with a palpable lump in the upper-inner quadrant of the left breast. She was cup B size, with a 1.5 cm lesion located 15 cm from the nipple-areolar complex and no palpable axillary lymphadenopathy. Imaging demonstrated a solitary 1.1 cm lesion without suspicious nodes, and staging PET-CT confirmed cT1cN0M0 disease. Core biopsy showed grade 1 invasive carcinoma; ER/PR positive and HER2-negative on SISH testing.

Result: The patient underwent ultrasound-guided hookwire localisation, wide local excision, matrix rotational flap reconstruction, and sentinel lymph node biopsy. The excised specimen weighed 53 g and measured 9.0 × 5.5 × 3.5 cm. Final histopathology revealed a 1.2 cm invasive carcinoma with associated intermediate-grade ductal carcinoma in situ, clear margins, and no nodal metastases. Recovery was uneventful, with satisfactory wound healing, no flap necrosis, preserved upper limb mobility, and early return to daily activities.

Conclusions: Upper-inner quadrant tumours are technically demanding for breast conservation due to limited local tissue and a high risk of postoperative contour deformity. In patients with smaller breast volumes, level I oncoplastic techniques may be inadequate when wider excisions are required. Matrix rotational flap reconstruction allows effective redistribution of adjacent glandular tissue to restore breast contour while maintaining oncological safety. Although a longer upper-breast scar is produced, careful incision planning enables concealment with normal clothing, resulting in acceptable cosmetic outcomes. Matrix rotational flap reconstruction is a reliable and versatile oncoplastic option for upper-inner quadrant breast tumours, even in patients with small breast volumes and lesions distant from the nipple-areolar complex, achieving satisfactory oncological and aesthetic outcomes.

Early Outcomes of a Modified LICAP Flap – A Single-Centre Experience

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Background: Breast-conserving surgery (BCS) aims to achieve oncological clearance while preserving acceptable cosmetic outcomes. Tumours located in the lateral breast present specific oncoplastic challenges and are frequently associated with contour deformity and asymmetry following standard wide local excision. Volume replacement techniques such as the lateral intercostal artery perforator (LICAP) flap were developed to address these limitations. We adopted a modified LICAP technique that differs from the traditional design to reduce scar visibility, facilitate axillary access, and eliminate the need for intraoperative patient repositioning.

Methods: All patients who underwent a modified LICAP flap between 2021 and 2025 were identified from a prospectively maintained database. Lateral intercostal artery perforators were identified preoperatively using ultrasound, and the flap was designed using two lazy S markings. Wide local excision, with or without concurrent axillary surgery, was performed, followed by flap mobilisation to reconstruct the breast defect.

Result: Thirty-two patients underwent the modified LICAP procedure with a mean specimen weight of 82 g. The mean age was 52 years (± 13.8). Malignant disease accounted for 81% of cases, all of which required axillary surgery, and 28% received neoadjuvant chemotherapy. Re-excision for positive margins was required in two patients (6%). In all cases, the scar did not extend beyond the posterior axillary line, no separate axillary incision was required, and patient repositioning was avoided. Short-term complications included superficial surgical site infection in four patients (12.5%) and seroma in two patients. Local recurrence occurred in two patients (6.25%).

Conclusions: Compared with traditional LICAP approaches that require posterior incisions, additional axillary access, or intraoperative repositioning, this modification simplifies operative workflow while maintaining effective volume replacement. Longer-term follow-up is required to assess cosmetic durability after adjuvant radiotherapy, and future work will also evaluate patient-reported satisfaction to better inform oncoplastic decision-making in lateral breast conserving surgery practice across diverse patient populations and clinical settings.

Pre-Operation

Tumour at the Left Lower Quadrant 4oc region with palpable lymph nodes

Post-Operation 6 weeks

Poster Presentation

Delayed Cutaneous Metastasis Occurrence After Skin-Sparing Radical Mastectomy: A Case Report

Erdenetogtokh Erdenetuya[1], Oyudari Sodnomgeleg[2], Khiabar Tulyeubai[2], Orgilbold Enkhbat[2], Munkhzul Munkhnyam[3], Davaadash Batsaikhan[3], Bilguunzaya Batmunkh[3], Gerelmaa Enkhbat[2], Shirnen Odnasan[2], Odbaatar Myagmar[2], Khurelbaatar Sainbaatar[2], Bold Altangerel[2]

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Background: Breast cancer most commonly metastasizes to the bone, lung, liver, and brain, whereas involvement of the skin is relatively uncommon. Despite definitive surgery, approximately 5-10% of patients with operable breast cancer experience chest wall recurrence within 10 years after mastectomy. Among the various forms of local recurrence, cutaneous metastasis represents one of the most distressing and challenging clinical manifestations.

Methods: A 61-year-old woman was diagnosed in October 2018 with triple-positive, invasive ductal carcinoma (IDC) of the right breast. She underwent skin-sparing radical mastectomy, planned reconstruction but cancelled due to an unknown reason, and followed by adjuvant targeted therapy (17 cycles), chemotherapy (4 cycles), and three years of endocrine therapy. In 2024, the patient developed a small ulcerative lesion on the right anterior chest wall, which gradually enlarged over one year. Given clinical suspicion of malignancy, an excisional biopsy was performed on October 2, 2025. Histopathological examination confirmed metastatic carcinoma consistent with breast origin. Immunohistochemical analysis demonstrated retained ER and PR positivity with loss of HER2 expression, indicating receptor status conversion.

Result: Based on current NCCN guidelines and multidisciplinary team evaluation, systemic therapy with a cyclin-dependent kinase 4/6 (CDK4/6) inhibitor in combination with endocrine therapy was initiated, with a planned treatment duration of two years. The postoperative course was uneventful.

Conclusions: Despite advances in multimodal treatment strategies of breast cancer, including surgery, chemotherapy, radiotherapy, and endocrine therapy, locoregional recurrence and distant metastasis continue to occur. Mastectomy does not guarantee a cure in invasive breast cancer, as the risk of late recurrence persists. This case emphasizes the importance of long-term surveillance and reassessment of receptor status in recurrent disease, as early detection and appropriate systemic therapy may improve clinical outcomes, reduce economic burden, and enhance patients' psychological well-being.

A Rare Case of Gestational Gigantomastia and Outcomes Following Bilateral Mastectomy and Prosthetic Reconstruction

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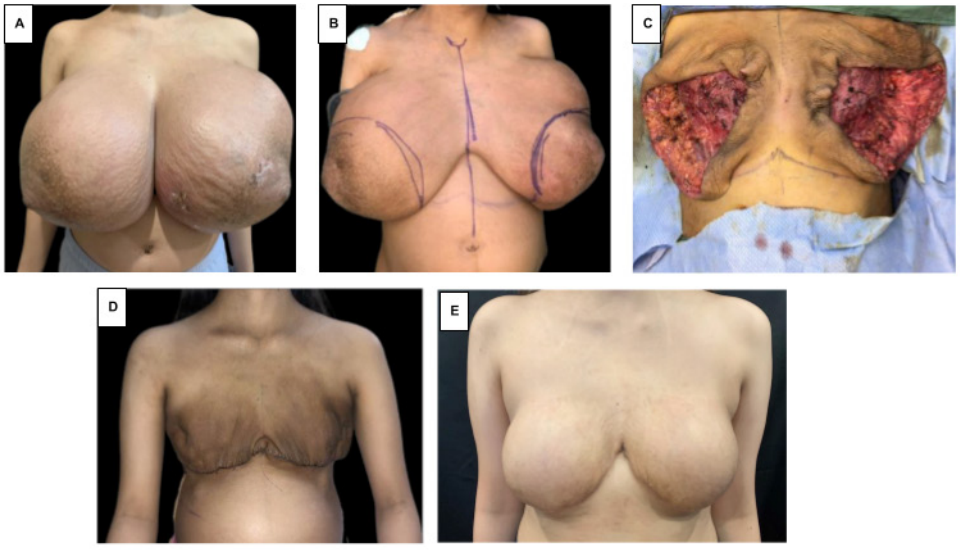
Background: Gestational gigantomastia is a rare condition characterized by excessive breast growth during pregnancy, with an estimated incidence of 1 in 28,000 to 100,000. While the exact etiology is unknown, theories suggest hormonal hypersensitivity. Patients often present with breast pain, skin ulceration, and respiratory or postural instability. Management varies, but reduction mammoplasty or mastectomy are often necessary.

Methods: We report a 22-year-old Filipina (G2P0) who presented with massive breast enlargement. Rapid growth began at 12 weeks gestation, causing severe back pain, dyspnea, and superficial skin breakdown at the inframammary folds. Breast ultrasound (BIRADS 3) showed diffuse parenchymal thickening and subcutaneous fluid. Solid masses were identified bilaterally (up to 4.8 cm). Axillary regions were unremarkable.

Result: A multidisciplinary team elected for bilateral mastectomy with immediate tissue expander reconstruction at 32 weeks gestation. Specimen weights were 2650 grams on the right and 3290 grams on the left. The patient recovered successfully, and histopathology confirmed no malignancy. Labor was induced at 39 weeks due to intrauterine growth restriction. Exchange for silicone gel implants was completed five months post-initial surgery.

Conclusions: Early recognition and a multidisciplinary approach are essential for favorable maternal and fetal outcomes. This is the first reported case of gestational gigantomastia in the Philippines managed with total mastectomy and immediate reconstruction during pregnancy. This approach proved effective for symptom resolution while providing excellent aesthetic results.



22 y/o woman presented with massive breast enlargement with ulceration at 25 weeks (FIGURE A). Preoperative (FIGURE B) and intraoperative (FIGURE C) photographs of mastectomy followed by two-stage breast reconstruction with (FIGURE C) tissue expanders and (FIGURE E) silicone breast implants.

Incidence and Surgical Outcomes of Contralateral Prophylactic Mastectomy in a Single Private Tertiary Hospital in the Philippines

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Background: Contralateral prophylactic mastectomy (CPM) is a widely accepted procedure for women with unilateral breast cancer, yet its increasing utilization often exceeds objective risk criteria. This study aimed to characterize the incidence and document the short-term surgical outcomes of CPM performed concurrently with therapeutic mastectomy during a single high-volume tertiary hospital five-year period.

Methods: A retrospective descriptive cohort study design was utilized, analyzing electronic health records of all adult female patients aged ≥18 years diagnosed with a first primary unilateral invasive breast cancer who underwent CPM concurrently with their therapeutic mastectomy between 2020 and 2024.

Result: 132 health records of patients who met the study criteria revealed a cumulative 270% increase in CPM incidence over the five-year period. This upward trend was supported by a strong positive Pearson correlation ($r = 0.97$, $p < 0.01$) and linear regression demonstrating an average increase of 6.75 cases per year. Only 6.1% of the cohort possessed a known high-risk BRCA1/2 mutation, indicating that the decision for CPM is predominantly driven by psychosocial factors and the pursuit of aesthetic symmetry (40.2% receiving immediate reconstruction). Pathologic examination of the prophylactic tissue yielded an unexpected therapeutic finding: 8.3% of the specimens contained occult malignancy (7 ductal carcinoma in-situ, 4 invasive carcinoma). The overall 30-day major complication rate was low at 3.0%.

Conclusions: The study discussion emphasizes that the high, non-genetic-driven utilization of CPM is justified by low surgical morbidity and its dual role in offering psychological relief and removing occult cancers. The study concludes that CPM incidence is rising and is safe; it necessitates enhanced pre-operative risk counseling to ensure patient expectations are aligned with actual risks, while still recognizing the procedure's psychological and therapeutic value. Future research should explore long-term outcomes and patient satisfaction.

Factors Affecting Recurrence Among Diagnosed Cases of Phyllodes Tumor: A Single Center Retrospective Cohort Study

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Background: Clinical management of Phyllodes tumor (PT) is complicated by conflicting international data regarding risk factors for recurrence. Given the scarcity of local data on PT in the Filipino population, this study aimed to identify factors affecting recurrence following surgical management.

Methods: This was a retrospective cohort study which included adult female patients who underwent surgery for PT in a tertiary hospital in the Philippines from January 2015 to December 2022. Clinicopathologic characteristics, including age, menopausal status, tumor size, histologic type, and margin status, were collected. Differences in clinicopathologic profiles of benign and non-benign (borderline and malignant) groups were analyzed. The incidence rate of recurrence was reported. Recurrence risk factors were analyzed using multivariable Cox proportional hazards regression. 5-year disease-free survival (DFS) was assessed using Kaplan-Meier analysis.

Result: The study identified a low recurrence rate of 8.08% (n = 99). The 5-year DFS rate was high at 91.5% (95% CI: 0.8480.982), and the mean time to recurrence was 28.37 months, with a range from 3 to 57 months. The multivariable analysis found no statistically significant association between any clinicopathologic variable and the risk of recurrence. Comparative analysis between benign and non-benign groups revealed that non-benign PTs were significantly associated with post-menopausal status and larger tumor size (> 5 cm). The majority of recurrences were local (7 out of 8 recurrences). The total person-months of the eight recurrences is 553.067 with an incidence rate of 0.1446. Change in histologic type of recurrence was observed in 2 out of 8 cases (from borderline to malignant).

Conclusions: Findings suggest a low recurrence rate and high 5-year DFS in this cohort, despite non-wide surgical margins. Histopathologic type is not significantly associated with recurrence. No significant histologic upgrading was observed among recurrent cases.

Locoregional Treatment Versus Systemic Therapy Alone in De Novo Metastatic Breast Cancer: An Updated Meta-analysis

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Background: The role of locoregional treatment (LRT) in de novo metastatic breast cancer (dnMBC) remains controversial, with inconsistent oncologic outcomes reported in the literature and differing recommendations for clinical practice. We performed an updated meta-analysis to evaluate the impact of LRT on oncologic outcomes in patients with dnMBC.

Methods: The following databases were searched for articles published from January 2010 to January 2026: PubMed, Cochrane Library, Scopus, and Web of Science. Randomized controlled trials (RCTs) comparing LRT plus systemic therapy versus systemic therapy alone in patients with dnMBC were included. The primary outcome was overall survival (OS), and the secondary outcome was locoregional control (LRC). Random-effects inverse-variance meta-analysis using restricted maximum likelihood estimation was performed. Statistical heterogeneity was assessed using the I^2 statistic.

Result: Five RCTs were included, comprising 1,368 patients. LRT did not significantly improve OS compared to systemic therapy alone (HR 0.87, 95% CI 0.68-1.13; $p = 0.21$; $I^2 = 52\%$). Only one trial demonstrated a statistically significant OS benefit with LRT, while the remaining trials showed no consistent survival benefit between treatment arms. LRT was associated with a trend toward improved LRC (HR 0.29, 95% CI 0.08-1.02; $p = 0.052$; $I^2 = 84\%$).

Conclusions: In patients with dnMBC, the addition of LRT to systemic therapy did not provide a survival advantage but may be associated with improved LRC. Prospective studies are warranted to better define patient subgroups that may derive a survival benefit from LRT.

Comparison of Low Thermal Dissection Cautery and Conventional Electrocautery in Nipple-Areola Sparing Mastectomy with Immediate Silicone Implant-Based Reconstruction

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Background: Surgical tools such as scalpels and electrocautery devices are commonly used for dissection and hemostasis control. Low thermal dissection cautery operates at lower temperatures than conventional electrocautery by using intermittent high-frequency electric currents, thus reducing collateral thermal damage by using less energy. This study aims to compare the efficacy of low thermal dissection cautery and conventional electrocautery in patients undergoing nipple-sparing mastectomy (NSM) with immediate reconstruction using silicone breast implants.

Methods: Between April 11, 2023 and May 8, 2025, a total of 38 patients and 48 surgical procedures were performed by a single surgeon at our center, involving NSM and immediate reconstruction with silicone implants. Patients were divided into two groups: those treated with low thermal dissection cautery (n = 19 patients, n = 24 procedures) and those treated with conventional electrocautery (n = 19 patients, n = 24 procedures). Demographic data, operation time, drain volume, duration of draining, postoperative pain scores (Visual Analog Scale-VAS), hospital stay and complication rates were compared.

Result: The low thermal dissection cautery and conventional electrocautery groups were similar in terms of age (45.32 ± 4.75 vs. 46.95 ± 6.98 years; $p = 0.405$), body mass index (BMI) (24.21 ± 2.72 vs. 25.82 ± 4.73 kg/m^2; $p = 0.207$), smoking status (47.4% vs. 42.1%; $p = 0.744$), and neoadjuvant chemotherapy rates (52.6% vs. 42.1%; $p = 0.516$). In the low thermal dissection cautery group, operation time (115.00 ± 23.86 vs. 135.26 ± 28.94 minutes; $p = 0.024$), drain volume (823 vs. 1545 cc; $p = 0.006$), and drain duration (14.25 ± 5.59 vs. 18.83 ± 7.48 days; $p = 0.020$) were significantly lower. Pain scores were also significantly lower in the low thermal group on postoperative days 0, 3, and 7 (VAS: 3.37 ± 1.74, 3.26 ± 1.63, 2.26 ± 1.41, respectively) compared to the electrocautery group (VAS: 5.95 ± 1.72, 4.74 ± 2.16, 3.68 ± 1.80; T0 $p < 0.001$, T3 $p = 0.023$, T7 $p = 0.010$). Both surgical techniques had similar complication rates (12.5% vs. 16.7%; $p > 0.05$).

Conclusions: The use of low thermal dissection cautery in patients undergoing NSM with immediate silicone implant-based reconstruction significantly reduces operation time, drain volume, drain duration and postoperative pain.

Table 1: Patient Demographic and Clinical Characteristics

Variables	Low Thermal Dissection Cautery	Conventional Electrocautery	Total	χ^2/t	*P*-value
Number of patients	19	19	38		
Number of breasts operated	24	24	48		
Age (years)#	45.32 ± 4.75	46.95 ± 6.98	46.13 ± 5.95	0.842[a]	0.405
BMI (kg/m²)#	24.21 ± 2.72	25.82 ± 4.73	25.01 ± 3.89	1.290[a]	0.207
Smoking status, n(%)				0.106[b]	0.744
No	10 (52.6)	11 (57.9)	21 (55.3)		
Yes	9 (47.4)	8 (42.1)	17 (44.7)		
Chronic disease, n(%)				0.991[b]	0.319
No	13 (68.4)	10 (52.6)	23 (60.5)		
Yes	6 (31.6)	9 (47.4)	15 (39.5)		
ASA score, n(%)				-[c]	0.486
I	2 (10.5)	0 (0.0)	2 (5.3)		
II	17 (89.5)	19 (100)	36 (94.7)		
Neoadjuvant chemotherapy, n(%)				0.422[b]	0.516
Not received	9 (47.4)	11 (57.9)	20 (52.6)		
Received	10 (52.6)	8 (42.1)	18 (47.4)		
Indication for Nipple Sparing Mastectomy (NSM), n(%)				1.547[c]	>0.999
Unilateral cancer	13 (68.4)	12 (63.2)	25 (65.8)		
Unilateral cancer + Contralateral prophylactic	4 (21.1)	5 (26.3)	9 (23.7)		
Bilateral prophylactic	1 (5.3)	0 (0.0)	1 (2.6)		
Unilateral prophylactic	1 (5.3)	2 (10.4)	3 (7.9)		

p>0.05; **a**: Independent samples t-test; **b:** Pearson chi-square test, **c**: Fisher's exact test, #Mean, ±Standard deviation

Poster Presentation

Management of a Massive Metastatic Malignant Phyllodes Tumour

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Background: Metastatic malignant phyllodes tumour (MMPT) is a rare clinical entity that is seldom reported in literature, and its optimal management is thus not well described.

Methods: We report a case of MMPT. presenting as a fungating breast tumour with lung metastases. Literature review of similar cases was performed, as we sought consensus on the optimal management for MMPT.

Result: A 55-year-old lady presented with a large left breast mass measuring 30 cm × 30 cm. She was socially isolated due to its appearance and foul odour, and gradually became bedbound due to tumour bulk and low mood. On presentation, she was hypotensive, had severe anaemia and leucocytosis. Incisional biopsy revealed malignant spindle cell neoplasm. Staging scans revealed left axillary lymphadenopathy, scattered pulmonary metastases, thrombosis of the external iliac veins, and bilateral pulmonary embolism. In view of significant debilitating symptoms and complications, she was offered a palliative mastectomy. A rotational external oblique flap was performed for cover. The resected specimen weighed 3.7 kg. Final histology confirmed the diagnosis of MPT with clear surgical margins. She declined palliative chemotherapy and unfortunately developed metastatic disease in the contralateral breast one month later and died six months after initial diagnosis. Phyllodes tumours account for < 1% of breast tumours, and 1.5% of MPT cases are metastatic at diagnosis. Recurrence risk is high at around 22%.

Conclusions: Literature review suggests that in most MMPTs, patient may benefit from surgery for the primary tumour, and metastatectomy in appropriate cases. A multidisciplinary approach is essential to provide individualised care that suits the patient's best interests. As this patient was young and suffered from significant symptoms and complications, palliative mastectomy was deemed appropriate to improve her quality of life. Although the disease quickly recurred, she was able to enjoy a few more months of quality time with her family without being immobilised by the tumour.

PRoMISing II: Prospective Real-World Evidence From the Largest Single-Institution Minimally Invasive Breast Surgery Experience in Southeast Asia

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Background: Whether minimally invasive breast surgery (MIS), including robotic-assisted and endoscopic techniques, can be safely scaled beyond expert pioneers into routine clinical practice remains one of the most critical unanswered questions in contemporary breast surgery. Although MIS offers advantages, adoption remains constrained by concerns regarding oncologic safety, reproducibility, and scalability. Within a mature program exceeding 100 MIS breast cases and operating within a structured training ecosystem with regional proctorship impact, we evaluated whether MIS breast surgery can be delivered safely and consistently in real-world practice.

Methods: We analysed prospectively data from consecutive patients undergoing minimally invasive breast surgery within a tertiary breast unit. Demographic, operative, pathological, and outcome data were captured in a structured institutional database. Primary endpoints were conversion to open surgery, margin status, and major 30-day morbidity. Secondary endpoints included operative metrics, reconstruction integration, and early oncologic outcomes.

Result: Ninety-two MIS procedures were performed in 75 patients (mean age 56.5 years), comprising 45 robotic (48.9%) and 47 endoscopic (51.1%) cases, representing the largest MIS surgery experience in Southeast Asia. Indications included breast cancer (67.4%), risk-reducing surgery (21.7%), and gynaecomastia (10.9%). Mastectomy accounted for 95.7% of procedures, with nipple-sparing mastectomy performed in 54.5%. Reconstruction was achieved in 51.9% using autologous techniques. Among malignant cases (n = 62), mean invasive tumour size was 16.0 mm, early-stage disease. There were no conversions to open surgery (0%), no positive margins (0%), and no 30-day complications, including infection, necrosis, haematoma, or anaesthesia-related adverse events. Mean mastectomy duration was 44.3 minutes (endoscopic) and 49.2 minutes (robotic). Disease-free survival was 15.2 months.

Conclusions: In this prospectively captured consecutive cohort from a mature high-volume MIS program, minimally invasive breast surgery was delivered safely, reproducibly, and at scale, achieving benchmark outcomes. These findings move beyond feasibility and provide pragmatic evidence supporting wider implementation, training, and standardisation of MIS techniques in breast surgery globally.

Endoscopic Nipple-sparing Mastectomy via Single Incision at the Upper Outer Quadrant of the Breast for a Recurrent Breast Cancer

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Background: Conventionally, endoscopic mastectomy is performed using a 5 cm incision at the lateral border of the breast, extending from 2 cm above and 3 cm below the nipple line. This allows access for the sentinel lymph node biopsy (SLNB), and placement of the port for optimal access to the breast.

Methods: A 39-year-old patient had a history of a DCIS at the right upper outer quadrant (UOQ) of the breast. She underwent wide excision of the cancer with clear margins in 2018 and radiation therapy. She presented with a recurrence at the previous surgical site. The tumour was located close to the surgical scar, and measures 4 mm on ultrasound. The biopsy shows an IDC, ER+ PR+, HER2-negative.

Result: She underwent endoscopic nipple sparing mastectomy with SLNB. The incision was a 5 cm elliptical incision encompassing the previous scar (UOQ) as the tumour was close to this scar. Flap was raised towards the axillary tail, where the sentinel lymph node biopsy was performed. Intra-op frozen section of the sentinel lymph node was negative. The posterior flap continued to be raised, using the endoscopic vein harvestor at the medial aspect of the breast. Anterior flap was raised with care (due to the history of irradiation) using the open method until there was sufficient space for the glove port to be inserted. The endoscope was then inserted to complete the anterior dissection. Nipple base was harvested endoscopically and intra-operative frozen section was negative. Reconstruction was performed using the DIEP flap with a thoracodorsal anastomosis. Final histology showed a T1 (6 mm) invasive ductal carcinoma, with clear margins.

Conclusions: Endoscopic mastectomy has been performed conventionally via a lateral breast incision or an infra-mammary fold incision. Modification of the incision may be required if there is previous surgery, and can be safely performed from an UOQ incision.

"Going Flat" in Nipple-sparing Mastectomy: An Analysis of Patient-reported Outcome Measurements of Preliminary 57 Procedures

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Background: Nipple sparing mastectomy (NSM) with immediate breast reconstruction (IBR) has become an increasingly popular procedure offering satisfactory aesthetic outcomes with adequate oncologic safety. However, outcomes of NSM without IBR have been rarely evaluated. We aim to assess the clinical outcomes of NSM in patients refusing IBR with a focus on patient-reported outcome measurements.

Methods: This retrospective study enrolled female breast cancer patients who underwent NSM but refused IBR IBR from February 2010 to April 2022 in a single institution. Clinical outcomes and patient-reported aesthetic results were evaluated and analysed.

Result: During the study period, there were 57 cases of primary breast cancer patients who underwent NSM but refused IBR. The mean operative duration was 186.6 minutes and median length of hospital stay at 4 days. Median intra-operative blood loss was 30 mL with the median resected specimen weight at 360.5g. There was no incidence of margin involvement in this study. The complication rate was 12.3% with all of them being minor complications with Clavien-Dindo I and II scores. Locoregional recurrence and distant metastasis during the study period were 5.3% and 1.8%, respectively with a mean follow-up period of 64.4 months. There was no mortality during the study duration. Aesthetic outcomes assessed via the BREAST-Q questionnaire were satisfactory with mean scores ranging between 35.1 to 68.4.

Conclusions: This study concludes that NSM in patients refusing IBR is an alternative compared to conventional mastectomy with acceptable aesthetic outcomes. These findings underscore the importance of individualized patient choices in breast cancer treatment.

MCW- LiCAP Study: Outcomes of Modified Chest Wall Lateral Intercostal Artery Perforator Flap Reconstruction in Contemporary Oncoplastic Breast Surgery

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Background: Modified Chest Wall Lateral Intercostal Artery Perforator Flap(MCW LiCAP) was previously described by our group as a safe and versatile reconstruction option following breast-conserving surgery and selected mastectomy cases, with a short learning curve and low mobidity. This study aimed to evaluate whether these favorable outcomes are maintained in a larger contemporary cohort and to compare outcomes between MCW LiCAP and non-MCW LiCAP chest wall perforator flap reconstruction.

Methods: We performed a retrospective cohort study of patients undergoing chest wall perforator flap-based reconstruction following breast-conserving surgery or mastectomy at a single high-volume breast unit. The primary exposure was flap type, categorized as MCW LiCAP vs non-MCW LiCAP reconstruction. Outcomes assessed included intraoperative complications, short-term (=< 30days) and long term(>30days) postoperative complications, margin status, operation duration and hospital stay. Multivariable logistic regression was used to identify predictors of postoperative complications.

Result: A total of 102 patients were included, with 82 patients having complete flap-type date for comparative analysis (62 MCW LiCAP and 20 non-MCW LiCAP reconstructions). The overall postoperative complication rate was 4.9% (4/82). Complications rate was 3.2% (2/62) in the MCW LiCAP group and 10.0% (2/20) in the non-MCW LiCAP group($p = 0.25$). Median operative duration was 149 minutes (IQR 121-147) for MCW LiCAP reconstructions and 155 minutes (IQR 148-195) for non-MCW LiCAP reconstructions($p = 0.13$). Marginal involvement after initial surgery was rare, and no patient experienced a clinical meaningful delay to adjuvant therapy. On multivariable analysis, increasing operative duration was independently associated with postoperative complications (OR 2.08 per 30-minute increase), whereas flap type was not.

Conclusions: In this expanded cohort, MCW LiCAP demonstrates a low complication rate and comparable outcomes to non-MCW LiCAP chest wall perforator flaps. Postoperative morbidity is primarily driven by operative complexity rather than flap selection. MCW LiCAP is a reproducible and reliable workhorse flap for contemporary oncoplastic breast surgery.

Economic Benefits of Same-Day Discharge for Breast Cancer Surgery, Cutting Costs, Not Corners

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Background: Changi General Hospital Breast Centre's patients are routinely monitored overnight after breast cancer surgery (BCS), discharging home the next day. However, with advances in surgical techniques and anesthetic protocols, we have successfully discharged suitable patients on the same day of surgery. Our previously published results showed that same day discharge (SDD) allows for early home recovery, is safe and improves patient outcomes. This study aims to ascertain the cost impact of SDD after BCS.

Methods: All patients who underwent BCS between January 2022 and October 2025 were divided into SDD group and next day discharge (NDD) group. To account for confounding variables, propensity score matching (PSM) was applied using a 1:2 ratio (SDD: NDD), with patients matched on demographics, surgery details and Charlson's Comorbidity Index (CCI). Additionally, post-operative care and outcome information were collected. Cost differences were analyzed using ordinary least squares regression. Chi-square analysis was used for 30-day readmission and 30-day return-to-operation rates.

Result: The SSD group had 87 patients while NDD group had 174. There were no differences in demographics, CCI, surgery type and duration. Cost for surgical consumables, facility fee, histology charges and doctors' fees were similar. Overall mean bill size was significantly lower in the SDD group (S$10,256 vs S$11,121, $p < 0.05$). Cost reductions were due to lower ward charges (S$146.31 vs S$182.97, $p < 0.05$), nursing care cost (S$182.23 vs S$212.63, $p < 0.05$), and medication cost (S$42.39 vs S$50.03, $p < 0.05$). There were nil 30-day readmission and 30-day return-to-operation for the SDD group.

Conclusions: Our study shows that SDD following BCS for selected patients results in cost savings without compromising care and safety. This would also allow for better bed utilization, higher bed turnover rate and improved operational efficiency for beds availability. Lessons learnt from our study may be applied to other procedures to scale up and benefit more patients.

Breast Conserving Surgery Margin Re-excision Rates and Operative Techniques: New Centre Experience

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Background: Breast conserving surgery (BCS) for breast cancer has been demonstrated to have superior patient-reported outcomes and non-inferior rates of local recurrence and survival when compared to breast sacrificing surgery (BSS). However, it is limited by margin involvement (reported rates range widely from 14-70%) necessitating re-excision. Contributing factors include tumour size, multifocality, lymphovascular invasion and presence of ductal carcinoma in-situ (DCIS). This negatively impacts adjuvant therapy timelines, cosmetic outcomes, and resource utilization. Identifying factors contributing to margin involvement and strategies to reduce margin involvement is critical.

Methods: This retrospective cohort study reviewed breast cancer patients undergoing BCS at a new tertiary centre from July 2024 to September 2025 (15 months). The centre's standardised protocol included gross margin assessment, intra-operative specimen imaging and routine cavity shaving. Adjuncts, such as fluorescence and magnetic localisation, were utilized based on surgeon's discretion. Data collected included patient demographics, imaging findings, tumour biology, and use of intra-operative adjuncts.

Result: There were a total of 128 breast cancer surgeries in the first 15 months. A total of 54 (42.2%) BCS procedures were analysed, yielding a margin involvement and re-excision rate of 3.7% (n = 2); significantly lower than international benchmarks. Both cases were DCIS and noted a discrepancy between radiological and pathological tumour size. Neither case utilised intra-operative adjuncts.

Conclusions: The implementation of a standardised strategy with adjuncts successfully achieved an exceptionally low margin involvement rate (3.7%) in this cohort. While limited by sample size, this data supports the use of multi-modal, standardised margin assessment protocols to optimize outcomes in BCS. Larger studies are warranted to evaluate the impact of intra-operative adjuncts and tumour biology on margin status and re-excision rates.

From Wire to Wireless: Initial Experience with Magseed® versus Hookwire Localisation for Breast Excision in a Newly Established Peripheral Breast Unit

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Background: Most studies comparing Magseed® and hookwire localisation for non-palpable breast lesions are conducted in large tertiary hospitals with mature workflows and abundant resources. This study aims to evaluate localisation accuracy, extra time incurred, clinical outcomes (positive margin and re-excision rates), complication rates, and patient experience of Magseed® versus hookwire localisation in a newly established peripheral breast unit.

Methods: A retrospective study was conducted at Woodlands Hospital, Singapore, from March 2025 to January 2026, involving ultrasound-guided breast lesion localisation. Data were collected from three breast surgeons. Thirty-two patients were included: 9 Magseed® insertions in 9 patients and 28 hookwire insertions in 23 patients. Localisation was considered satisfactory if the device tip was within 1 cm of the target lesion. Extra time was defined as the duration from patient registration for localisation to the start of surgery.

Result: All Magseed® localisations (100%) were satisfactory, whereas only 21%(n = 6) of hookwire localisations met the criteria (mean tip-to-lesion distance 1.35 cm, $p < 0.001$, 95% CI 1.15-1.55). Mean operative times were similar (Magseed® 104.4 minutes vs hookwire 109.5 minutes; $p = 0.822$, 95% CI 52.76 to 42.61). Hookwire localisation incurred an average extra time of 317 minutes. One of nine patients (11.1%) in the Magseed® group had positive margins requiring re-excision, compared with one of 28(3.6%) in the hookwire group. Complications occurred in the hookwire group (bleeding 21%, n = 5; pain 4%, n = 1) but not in the Magseed® group. Patient satisfaction was high (hookwire 95.7%, Magseed® 100%).

Conclusions: In this small retrospective cohort, Magseed® localisation was technically feasible and demonstrated accurate lesion localisation with operative times comparable to hookwire localisation. Prolonged extra time with hookwire may represent an indirect resource and financial burden, suggesting a potential workflow benefit with Magseed® localisation. Differences in re-excision rates should be interpreted cautiously due to limited sample size. Further studies with larger cohorts are required to confirm these findings.

Safety and Feasibility of Concurrent Surgical Resection for Synchronous Primary Breast and Lung Cancer: A Single-Center Experience of 13 Cases

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Background: The incidence of synchronous multiple primary malignancies (SMPM) involving the breast and lung has risen due to improved diagnostic imaging. However, the optimal management and safety of concurrent surgical intervention for both primary cancers remain relatively under-reported. This study evaluates the clinical outcomes of patients undergoing concurrent surgery for primary breast and lung cancer.

Methods: We retrospectively analyzed 13 female patients who underwent concurrent surgical resection for primary breast and lung cancer at our institution between 2021 and 2024. Data including patient demographics, clinicopathological characteristics, surgical procedures, perioperative outcomes, and survival status were reviewed.

Result: The mean age of the cohort was 61.4 years (range: 41.7). Regarding pathology, the majority of breast cancers were infiltrating ductal carcinoma (IDC), while 92.3% of lung cancers were adenocarcinomas, predominantly staged as IA. Surgical interventions included a combination of mastectomy/breast-conserving surgery and video-assisted thoracoscopic surgery (VATS) or robotic-assisted thoracoscopic surgery (RATS) for lung resection (wedge resection or segmentectomy). The median postoperative hospital stay was 6 days (range: 410). No major perioperative complications or mortality occurred. At the last follow-up, all 13 patients (100%) remained alive with no evidence of systemic recurrence, except for one patient with suspected brain metastasis.

Conclusions: Concurrent surgical resection for synchronous primary breast and lung cancer is safe and feasible. A multidisciplinary approach is crucial for early diagnosis and treatment planning. The use of minimally invasive thoracic surgery allows for rapid recovery and excellent short-term outcomes, making simultaneous surgery a viable option for this patient population.

Robotic-Assisted Nipple-sparing Mastectomy and Immediate DIEP Flap Reconstruction: A Case Series Report

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Background: Robotic-assisted nipple-sparing mastectomy (RNSM) combined with autologous deep inferior epigastric perforator (DIEP) flap reconstruction represents an emerging approach that optimizes oncologic safety while achieving superior aesthetic outcomes. This study presents our institutional experience and technical approach in performing combined mastectomy and microsurgical anastomosis through a single minimally invasive incision.

Methods: We retrospectively reviewed four consecutive patients who underwent RNSM with immediate DIEP flap reconstruction. Surgical parameters including docking time, robotic console time, and reconstruction duration were analyzed. Postoperative recovery data were collected.

Result: The mean patient age was 48 years. Pathological findings included ductal carcinoma in situ (DCIS) in three patients and stage IIB (pT2N1a) disease in one patient. All procedures were successfully completed via a single minimal axillary incision. Mean docking time was 10.5 minutes, mean robotic console time was 136.3 minutes, and mean reconstruction time was 467.5 minutes, yielding a mean total operative time of 642.5 minutes. Postoperatively, all flaps demonstrated viability at discharge with a mean hospital stay of 9 days. One early case required re-exploration for venous congestion.

Conclusions: Integrating robotic mastectomy with immediate DIEP flap reconstruction via a single-incision approach is technically feasible and oncologically safe. Standardization of both robotic and reconstructive phases ensures predictable surgical efficiency and delivers high-quality cosmetic outcomes.

Botulinum Toxin for Improving Pain and Asymmetry in Breast Cancer Reconstruction and Augmentation: 3 Cases Report

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Background: Growing Demand: Breast reconstruction/augmentation is now common in breast cancer treatment. Clinical Challenges: Unlike cosmetic cases, oncology patients face higher risks of unilateral deformity, asymmetry, and persistent pain. Surgical Complexity: These issues are exacerbated by extensive mastectomy, pectoral muscle injury, and aggressive tissue dissection. Proposed Solution: Localized Botulinum Toxin (Botox) injection into the asymmetry musculature offers a targeted approach to reduce muscular tension and provide effective pain relief.

Methods: Over a one-year period, we conducted a clinical evaluation of three breast cancer patients who presented with persistent post-operative pain and visible asymmetry following unilateral breast reconstruction/augmentation. Intervention: Botulinum Toxin Type A (Botox) was administered via localized intramuscular injection. The toxin was targeted at the midpoint of the affected pectoralis musculature to achieve optimal muscle relaxation and tension reduction. Assessment: The primary outcome was patient-reported pain intensity, measured using the Numerical Rating Scale (NRS), ranging from 0 (no pain) to 10 (worst imaginable pain). Pain scores were recorded and compared before and after the intervention.

Result: Pre-treatment: The mean subjective pain score was 3.33 on the NRS. Post-treatment: Following Botox injection, the mean pain score decreased to 1.67, demonstrating a significant clinical improvement in patient comfort.

Conclusions: Local injection of Botulinum Toxin Type A is an effective and minimally invasive intervention for managing post-operative pain and muscular asymmetry in breast cancer patients. By reducing hypertonicity in the pectoralis musculature, Botox significantly lowered NRS pain scores (from 3.33 to 1.67) and improved overall symmetry. This approach offers a promising solution for enhancing the quality of life and aesthetic satisfaction in oncoplastic surgery patients.

Feasibility and Oncological Outcomes of Sentinel Lymph Node Biopsy in Early-stage Breast Cancer Using Blue Dye Alone in Limited-resource Country Compared to Dual Tracers and the Landmark Studies

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Background: Sentinel lymph node biopsy (SLNB) become the main axillary staging in early breast cancer, offering less morbidity without compromising oncological outcomes. However, resource limitations in developing countries challenge the usage of dual tracers for SLNB. Our study aimed to investigate the feasibility and oncological outcomes of SLNB using blue dye alone.

Methods: The study included breast cancer patients who underwent SLNB using either isosulfan blue dye alone (S group) or dual agents (dye and radio-isotope, D group) from May 2016 to May 2021 at a single institution. The SLN identification rate and oncological outcomes were compared between two groups and previous landmark studies.

Result: A total of 300 patients were enrolled in this study, with 272 (90.7%) in the S group and 28 (9.3%) in the D group. The SLN identification rate in the S group was 98.9%, comparable to the D group (100%, $p = 0.745$), regardless of total mastectomy or breast conserving surgery. Over a median follow-up of 64 months, rates of locoregional recurrence (1.1%, 3/270) and distant recurrence (3%, 8/270) were not significantly different between the two groups. The Kaplan-Meier curves demonstrated no significant differences in recurrence-free, breast cancer-specific, and overall survival between the S and D groups. Comparisons with results from landmark trials (ACOSOG Z0011, AMAROS, NSABP B-32) showed comparable SLN identification rates and oncological safety.

Conclusions: Using blue dye alone for SLNB provides comparable effectiveness and survival outcomes in breast cancer patients, especially advantageous in developing countries with limited radio-isotope availability.

A Case of Metastatic Breast Cancer with Abdominal Wall Metastasis

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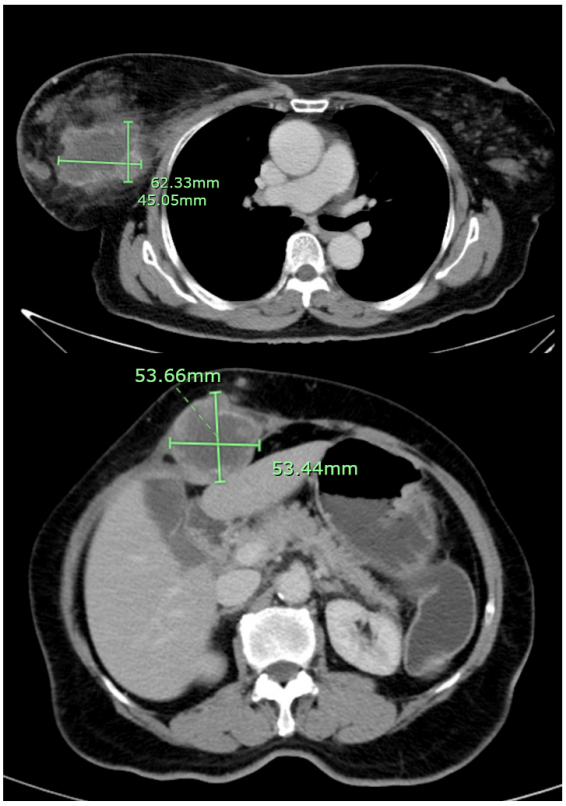
Background: Metaplastic breast cancer is a rare and aggressive subtype of breast cancer, found in only 1% of patients with invasive breast cancer. This subtype shows poor response to chemotherapy. Due to its aggressive nature, the cancer may spread to distant organs. There have been case reports of metaplastic breast cancer patients with metastasis to the retro-peritoneum or small bowel. There is one case report for abdominal wall metastasis, which developed later post mastectomy.

Methods: A case report of a 65 years old female presenting with simultaneous right breast mass and abdominal mass from Thammasat University Hospital, Thailand.

Result: A 65 years old female patient presents with right breast mass and palpable abdominal mass. Her initial mammogram and ultrasound reads that there is a 5×6×7 cm lobulated, hypo-echoic mass at the upper outer quadrant of her right breast (BIRADs 5). A fixed abdominal mass was also palpable. A CT scan of the abdomen showed a well-defined poorly enhanced mass at the right rectus abdominis muscle. There was also lung metastasis. A core needle biopsy was done to suspect malignant round cell neoplasm with differentials of malignant phyllodes tumor. Staining for ER, PR and HER-2 were negative. Ki-67 was at 90%. The breast mass showed poor response to neoadjuvant Doxorubicin. The patient underwent right total mastectomy with sentinel lymph node biopsy along with excision of right abdominal wall.

Conclusions: The final pathology results report that the most likely final diagnosis is metaplastic breast cancer with metastasis to the abdominal wall. The tumour showed heterologous mesenchymal differentiation. Staining was positive for EMA, CK14, CK5/6, p63 and S100. Axillary lymph nodes were negative for metastasis.



CT scan showing a 4.5x6.2cm irregular enhancing mass at right breast with a 5.4x5.3 heterogenous enhancing mass at right upper anterior abdominal wall.

Poster Presentation

Patient-Reported Outcomes of Minimally Invasive vs. Conventional Nipple-Sparing Mastectomy with Direct-to-Implant Reconstruction: A Comparative Pilot Study

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Background: Minimally invasive nipple-sparing mastectomy (NSM), including robotic-assisted (R-NSM) and endoscopic (E-NSM) approaches, aims to optimize cosmetic results while maintaining oncologic safety. Despite increasing adoption, comparative data regarding patient-reported outcomes (PROs) remain limited. This study compared postoperative complications and BREAST-Q outcomes between R-NSM, E-NSM, and conventional NSM (C-NSM) with immediate direct-to-implant (DTI) reconstruction.

Methods: We conducted a single-center retrospective pilot study of women undergoing NSM with immediate subpectoral DTI reconstruction (January 2023April 2025). Patients were grouped (1:1:2) into R-NSM (n = 10), E-NSM (n = 10), and C-NSM (n = 20). PROs were assessed at 3 and 6 months using BREAST-Q v2.0 converted to 0-100 Rasch scales. Group differences were analyzed using one-way ANOVA with Tukey's post-hoc test, longitudinal changes via paired t-tests, and categorical data using Fisher's exact test.

Result: At 6 months, Satisfaction with Breasts was significantly higher in R-NSM (86.0 +/- 3.7) and E-NSM (84.6+/-3.8) compared to C-NSM (80.5+/-4.7, $p = 0.004$). Minimally invasive groups also demonstrated superior outcomes in Psychosocial Well-being ($p = 0.001$), Physical Well-being: Chest ($p = 0.005$), and Sexual Well-being ($p = 0.014$). Impact on Work did not differ significantly ($p = 0.314$). Complication rates were comparable across groups ($p > 0.05$), with no major complications or flap losses observed. While C-NSM showed significant PROs improvement from 3 to 6 months ($p = 0.012$), it remained inferior to minimally invasive techniques at 6 months.

Conclusions: R-NSM and E-NSM achieved superior patient satisfaction and well-being compared to conventional techniques, with comparable safety profiles. These findings support the utility of minimally invasive NSM in enhancing survivorship outcomes. Larger prospective studies are warranted to validate long-term benefits and oncologic safety.

Shifting the Surgical Paradigm: A Retrospective Cohort Study of Clinicopathological and Radiological Correlates of Residual Microcalcifications Post Neo-Adjuvant Chemotherapy

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Background: Breast cancer-associated mammographic microcalcifications (MCC) frequently persist after neo-adjuvant systemic therapy (NST) and do not necessarily predict prognosis when pathological response (pCR) is achieved. Previous studies demonstrate uncertainty between residual MCC and the extent of residual invasive disease, complicating surgical decision-making and limiting opportunities for surgical de-escalation. The aim of this study is to determine the clinicopathological and radiological correlates of residual mammographic MCC after NST.

Methods: Retrospective cohort study of patients with MCC extending beyond the primary tumour who were treated with NST followed by breast conserving surgery (BCS) between March 2012 and June 2018. Clinicopathological data were extracted from institutional records and post-NST mammograms were assessed for residual MCCs. Simple descriptive statistics and restricted mean time-to-event estimates (RMST) analysis were performed.

Result: 41 patients demonstrated microcalcifications beyond the primary tumour at diagnosis with a median (IQR) age of 51 (40.5-59) years. 6 patients (14.6%) were ER-positive/HER2-negative, 14 (34.1%) were ER-positive/HER2-positive, 9 (22%) were ER-negative/HER2-positive, and 12 (29.3%) had triple-negative disease. 26 patients (63.4%) had residual MCC mammographically post-NST. 28 patients (68.3%) that were considered ineligible for BCS at diagnosis, were de-escalated from mastectomy to BCS post-NST. 4 patients (9.8%) achieved pCR defined as the absence of in-situ or invasive disease (ypT0) in the breast on post-operative histology. Median (IQR) follow-up was 70 (61-78.75) months. The recurrence rate was 7.3% and the restricted mean 5-year OS, DFS and LRFS were 57.4 months (95% CI 54.7-59.4), 32.4 months (95% CI 24.7-40.8) and 55.8 months (95% CI 52.5-59.0) respectively.

Conclusions: Residual MCCs were frequently observed post-NST however, local control remained high following BCS even after de-escalation from mastectomy. These findings support a shift in the surgical paradigm to a more individualised surgical approach incorporating tumour biology.

Exploratory Study on Upper Limb Lymphatic Drainage and Axillary Anatomical Substructures in Breast Cancer Patients

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Background: Breast cancer-related lymphoedema (BCRL) remains the most frequent iatrogenic complication of modern axillary treatment; both nodal surgery and regional radiotherapy disrupt the delicate balance between arm lymph production and drainage. Precise knowledge of how upper-limb lymphatics interface with axillary sub-compartments is therefore essential if we are to spare critical channels. This study used high-resolution molecular lymphatic mapping to define these relationships in vivo.

Methods: Women with biopsy-proven early-stage breast cancer were enrolled. After intradermal deposition of a 99mTc-labelled small-molecule dextran tracer, planar lymphoscintigraphy and low-dose SPECT/CT of the ipsilateral breast and contralateral (healthy) arm were acquired. Tomographic datasets were co-registered to delineate every collecting vessel and sentinel node draining the limb versus the breast, followed by statistical comparison of frequency, location and depth of drainage pathways.

Result: Between October 2025 and January 2026, ten patients were recruited. Ipsilateral sentinel nodes were identified in 60% of cases versus 80% in the contralateral axilla. Planar imaging revealed epitrochlear collectors in 40% of healthy arms. Axillary reverse mapping (ARM) nodes were visualised in 90% of examinations; tomographic localisation placed 57% (8/14) in area A, 29% (4/14) in area D, and 7% (1/14) each in areas C and E. A complete upper-extremity lymphatic map was obtained in nine women; one subject showed partial drainage only.

Conclusions: 99mTc-sodium-phytate lymphoscintigraphy with SPECT/CT reliably defines the topography of arm lymphatics relative to axillary sub-compartments, furnishing surgeons and radiation oncologists with a high-resolution anatomical template to preserve critical nodes and vessels during axillary surgery and nodal radiotherapy planning.

Minimally Invasive and Precise: Robotic-Assisted Axillary Lymph Node Dissection in Breast Cancer Management

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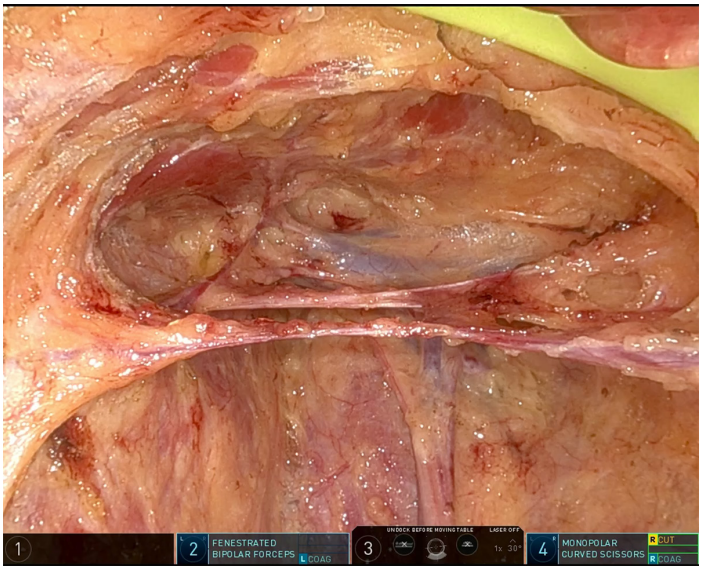
Background: Traditional axillary lymph node dissection (ALND) carries the risk of injuring the nerves and lymphatic vessels, which may lead to upper limb lymphedema, sensory disturbances, pain, and reduced quality of life. Our previous studies suggested that robot-assisted ALND (R-ALND), with its three-dimensional visualization and flexible instruments, could enable more precise dissection and reduce related complications. However, clinical experience with R-ALND remains limited.

Methods: This study included 90 breast cancer patients who underwent R-ALND between 2024 and 2025. The surgery followed a systematic "bottom-up and posterior-to-anterior" sequence, summarized as an "H-shaped" anatomical landmark method. The dissection proceeded from axillary floor dissection, sequentially addressing the posterior, medial, lateral, and anterior walls, culminating in intercostobrachial nerve dissection.

Result: Clinical and pathological characteristics, surgical outcomes, complications, and recurrence were recorded and analyzed. The mean operative time for R-ALND was 45.99 ± 8.31 minutes, with minimal intraoperative blood loss (3.71 ± 1.99 mL). The mean number of lymph nodes dissection was 18.07 ± 6.38. Mean postoperative drainage volume was 193.78 ± 135.20 mL, with drainage duration of 7.96 ± 3.02 days and postoperative hospital stay of 9.29 ± 2.77 days. During a median follow-up of 11.36 months, only 2 cases had postoperative bleeding, 1 case had seroma, and 2 cases had poor wound healing. No common complications such as hematoma, lymphedema, or infection were observed, and no local recurrence, distant metastasis, or death occurred. Compared with the historical data from our previously published studies on traditional or endoscopic ALND, all surgical outcomes and complication rates were superior in the robotic cohort.



Conclusions: R-ALND is a safe and precise technique. This study preliminarily confirms the short-term safety and feasibility of R-ALND. Standardized technique may shorten the learning curve and promote the adoption of robotic surgery in breast cancer.

Poster Presentation

Applicability of SENOMAC Trial in Hong Kong Breast Cancer Patients

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Background: The SENOMAC trial supports omitting axillary lymph node dissection (ALND) in breast cancer patients with 1-2 sentinel lymph node (SLN) macrometastases. However, its generalizability to Asian populations, characterized by distinct tumor biology and higher mastectomy rates, remains unverified. This study evaluates the applicability of SENOMAC trial in a Hong Kong cohort.

Methods: A retrospective analysis of breast cancer patients from 2014 to 2024 in the Queen Elizabeth Hospital, HKSAR was performed. 125 SENOMAC-eligible patients (cT1-3, cN0, 1-2 macrometastases in sentinel nodes) were compared against 1,335 patients from the SENOMAC trial's SLNB-only arm. Patient demographics, tumor characteristics, and survival outcomes were compared.

Result: The Hong Kong cohort exhibited significantly more aggressive tumor biology than the SENOMAC cohort. Mastectomy rates were markedly higher (76.0% vs. 36.7%, $p = 0.005$). Patients presented with more advanced T2/T3 tumors (64.8% vs. 46.8%, $p < 0.001$) and more lymphovascular invasion (54.4% vs. 28.4%, $p < 0.001$). There was also a significantly higher prevalence of HER2-positive and triple-negative subtypes in Hong Kong (18.4% combined vs. 6.0%, $p < 0.001$). While 5-year overall survival and recurrence-free survival were comparable, the Hong Kong cohort had significantly lower 5-year breast cancer-specific survival (90.1% vs. 97.1%, $p = 0.024$) and a higher rate of distant metastatic recurrence (11.2% vs. 3.3%, $p < 0.001$). Multivariate analysis identified total axillary nodal burden as a significant predictor of mortality (HR 1.19, $p = 0.007$). Conversely, adjuvant radiotherapy (HR 0.29, $p = 0.043$) and hormone therapy (HR 0.31, $p = 0.030$) were independent protective factors.

Conclusions: SENOMAC-eligible patients in Hong Kong represent a higher-risk population with biologically aggressive features and a predominance of mastectomy. SENOMAC findings should be extrapolated with caution. Omitting ALND in this setting is feasible only if strict adherence to adjuvant radiotherapy and systemic treatment is ensured to mitigate undertreatment risks.

Lymph Node Positivity Ratio as a Prognostic Indicator in Post-Neoadjuvant Chemotherapy for Locally Advanced Breast Carcinoma: A Single institution study

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Background: Axillary lymph node involvement is the most important prognostic factor in BC and correlated with poor survival outcomes. In the neoadjuvant setting, Pathologic complete response (pCR) isassociated with a better long-term survival among BC patients treated with NAC. Lymph node ratio (LNR) is the ratio between positive lymph nodes and the total number of retrieved lymph nodes LNR categories (LNRC) ≤0.2 (low), 0.21-0.65 (intermediate), >0.65 (high). This study aims to understand the role of LNR in predicting Recurrence and thereby Survival of the patient.

Methods: This observational study included a sample size of 52 patients with LABC who received NAC followed by Modified radical mastectomy. Patients with incomplete data, <10 nodes retrieved, distant metastasis and synchronous 2nd primary malignancy were excluded. The primary endpoint was disease-free survival (DFS). Secondary endpoints included overall survival (OS) and loco regional recurrence-free survival. Follow-up period: 12–70 months

Result: 20 patients had low LNR, 17 had LNR 0. 9 patients had pCR of whom 1 had regional recurrence. 43 patients had partial or no response to chemotherapy-Intermediate or High LNR, out of which 3 patients had recurrence-1 with distant recurrence and 2 with both regional and distant recurrence. None of the Hormone positive cases showed pCR. 7 out of the 9 patients with pCR had LNR 0. Total number of events-local regional or distant recurrence and deaths were 4. There were no local recurrences or deaths. Intermediate and high LNR showed a significantly lower DFS and OS compared to those with a low LNR. Median time to recurrence was 21.5 months. Median PFS was 44.5 months.

Conclusions: Intermediate or High LNR correlates with recurrence, hence has a role in predicting recurrence in LABC. LNR may not be an independent factor. It may be confounded by hormonal status. PCR may not only assess response to NACT, but can correlate with recurrence and be used along with LNR in predicting outcome.

Poster Presentation

Utility of Frozen Section in Axillary Conservation of Breast Cancer Patients Post-Neoadjuvant Chemotherapy

Ayushi Sahay[1], Sabaris Pushpanathan[1], Mansi Atal[1], Pallavi Daphale[2], Vaibhav Vanmali[2], Trupti Pai[1], Poonam Panjwani[1], Asawari Patil[1], Tanuja Shet[1], Shalaka Joshi[3]

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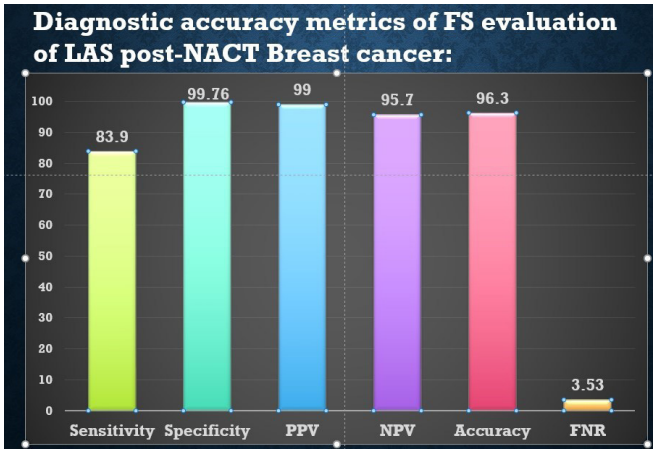
Background: Intraoperative frozen section (FS) evaluation of low axillary sampling (LAS) is routinely done in upfront breast conservation surgeries (False negative rate (FNR) < 5%) for axillary staging and reducing morbidity of complete axillary lymph node dissection (C-ALND) in clinically node-negative cases. But its utility in post-chemotherapy (NACT) cases remains uncertain due to the possibility of being obscured by therapy-related changes (TRC). We prospectively evaluated the FS accuracy in LAS post-NACT with a detailed analysis of all false results.

Methods: Histologically proven, non-metastatic breast cancer patients, clinically node-negative post-NACT (n = 538), undergoing FS for LAS (1/1/2023-31/5/2025), as part of randomized trial of "post-chemotherapy axillary conservation surgery (PACS)" were included (Project ID-3809).

Result: Patients' Median age was 47 years (range: 25-70years). On FS, positive-ALN were reported in 100 (18.6%) and negative-ALN in 438 (81.4%) cases. Median dissected and positive ALN were 4(range1-11) and 1(range1-5), respectively. All FS-positive cases underwent C-ALND. On paraffin section (PS) evaluation, 19 LAS cases with negative ALN in FS were found positive(FN 3.53%), including isolated tumor cells (n = 1), micrometastasis (n = 3) and macrometastasis(n = 15). One case with positive reported FS showed only TRC on PS-evaluation (false positive,0.18%). The sensitivity of FS-evaluation was 83.9%, specificity was 99.76%, positive predictive value (PPV) was 99%, negative predictive value was 95.7%, with overall diagnostic accuracy of 96.3%. TRC were seen in 77/419 (18.37%) true-negative cases and 11/19 (57.89%) FN cases where they obscured scattered metastatic foci (p-value < 0.001). On slide review, possible causes of false results on FS were:1)TRC (12/20, 60%); 2)Deeper cuts on PS (1/20,5%); 3) Missed metastasis (5/20,25%); 4) both deeper cut and TRC (2/20,10%).



Conclusions: High specificity, high PPV and low FNR make FS-evaluation a useful modality for axillary preservation post-NACT. Taking deeper recuts and screening at high power when TRC are seen in FS may reduce FNR, improve outcomes and reduce re-surgery costs.

Poster Presentation

Ligaclip-assisted Targeted Axillary TAD in Node-positive Breast Cancer Patients: An Innovative, Cost-effective, and Promising Approach

Lohita Krishna Kanyadhara[1], Sasimouli V V H P K[1], Bharat K S[2], Sunil Kalmath[2], Jismy Mathew[2], Sulakshana M S[3], Srinath B S[1]

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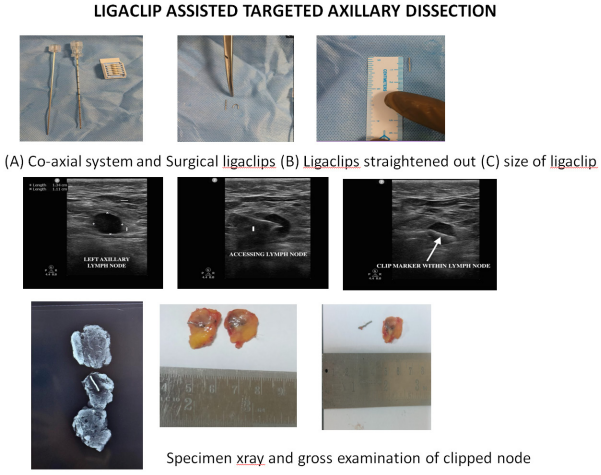
Background: Targeted axillary dissection (TAD) combines sentinel lymph node biopsy (SLNB) with excision of a previously marked metastatic node, enabling axillary de-escalation in node-positive breast cancer patients who convert to node-negative status following neoadjuvant chemotherapy (NACT). Localization of the marked node is a major barrier to wider implementation of TAD. We evaluated low-cost titanium surgical Ligaclips for lymph node marking in cN1 breast cancers treated with NACT through analysis of clipped node (CN) identification rate and concordance with sentinel lymph nodes (SLNs).

Methods: This prospective single-institution feasibility study was conducted at Sri Shankara Cancer Hospital and Research Centre, Bangalore, between January 2024 and January 2025. Patients with cN1, FNAC/biopsy-proven nodal metastasis undergoing axillary lymph node clipping before NACT were included. The most suspicious lymph node was clipped using a coaxial system to deploy a titanium Ligaclip (1.2 cm when straightened); CN was localized using ultrasound and direct skin marking. Dual-tracer SLNB followed by ALND was performed in all patients.

Result: Twenty-eight patients (mean age 50.8 years) were included. The CN identification rate was 100%, with average CN size of 20 mm. The CN corresponded to SLN in 92.5% of cases. The success rate of SLNB mapping was 91.6% (11/12), with ICG+RI and 86.6% (13/15), with ICG+MB. A median of four lymph nodes were retrieved during TAD. Nodal pathological complete response was achieved in 77.7% (21/27) of patients, more among triple-negative (9/21) and HER2-positive (8/21) subtypes.

Conclusions: Ligaclips demonstrated no migration and 100% identification of CN with high SLN concordance. Ligaclips induced localized fibrosis, with the LN encapsulating the marker and maintaining an average node size of 20 mm post-NACT, ensuring reliable ultrasound visibility and palpability, eliminating secondary localization procedures. Ligaclip-assisted TAD is clinically feasible, reproducible, and cost-effective for node-positive breast cancer following NACT, particularly in resource-constrained settings, addressing a major constraint in global TAD adaptation.



(A) Co-axial system and Surgical ligaclips (B) Ligaclips straightened out (C) size of ligaclip

Specimen xray and gross examination of clipped node

Poster Presentation

ICG Fluorescence-Guided Sentinel Lymph Node Biopsy for cT1N0 Breast Cancer: A Retrospective Cohort Study of Sentinel Node Negativity, Postoperative Treatment, and Axillary Recurrence

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[1]Kansai Medical Univ. Hospital, Department of Surgery, Japan, [2]Kansai Medical Univ. Medical Center, Department of Surgery, Japan

Background: Sentinel lymph node biopsy (SLNB) is the standard axillary staging procedure for clinically node-negative (cN0) invasive breast cancer. Although recent randomized clinical trials (RCTs) have shown non-inferiority of omitting SLNB, they mainly included patients with ER-positive/HER2-negative disease, required breast-conserving surgery (BCS) with radiotherapy, and excluded those who received preoperative chemotherapy. Thus, the applicability of these findings to real-world Japanese practice, particularly for indocyanine green (ICG) fluorescence-guided SLNB, remains uncertain.

Methods: We retrospectively analyzed 443 patients with cT1N0 breast cancer who underwent ICG fluorescence-guided SLNB between 2012 and 2020, assessing sentinel node (SN) negativity, postoperative treatment, and recurrence.

Result: The median age was 64 years; 88.5% were ER-positive, 79.0% had ER-positive/HER2-negative disease, and 12.6% HER2-positive. BCS was performed in 78.6%, and 9.5% received preoperative chemotherapy. The SN negativity rate was 87.6%. Among 388 SN-negative patients, three had metastases in non-sentinel nodes (ICG-negative surrounding nodes or palpation-suspicious nodes). Of the 55 SN-positive patients, eighteen (32.7%) underwent axillary dissection, with additional metastases in eleven, including seven with ≥pN2. Eighteen of the SN-positive patients received adjuvant chemotherapy. Axillary recurrence occurred in seven patients (1.6%), all initially pN0; distant recurrence occurred in eight (1.8%), and four (0.9%) died from breast cancer.

Conclusions: The negativity rate of ICG fluorescence-guided SLNB was comparable to that of the conventional technique and the rate of ≥pN2 and axillary recurrence were higher. This was because this cohort included higher-risk patients (lower proportions of ER-positive/HER2-negative tumors and BCS) and cN0 status was not uniformly defined by cytology or needle biopsy for suspicious nodes. If SLNB had been omitted, 18 patients would not have received adjuvant chemotherapy but the prognostic impact of this remains uncertain. A prospective cohort study is planned to clarify the feasibility of omitting SLNB in Japan.

Table. Sentinel lymph node positivity and clinical outcomes

	This study	SOUND (SLNB arm)	INSEMA (SLNB arm)
Sentinel node positive	12.4%	13.7%	15.0%
Axillary recurrence	1.6%	0.4%	0.3%
Ipsilateral breast recurrence	1.1%	1.0%	1.1%
Distant recurrence	1.8%	1.8%	2.7%
Death from any cause	2.9%	3.0%	2.4%
Death from breast cancer	0.9%	1.0%	1.1%

Lymph Node Metastasis in ER+/HER2- Breast Cancer Who Are cN0 on Both Axillary Ultrasound and MRI

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Background: Previous studies have reported no difference in prognosis based on whether axillary surgery was performed in clinically node-negative (cN0) breast cancer. In particular, for ER+/HER2- tumors, these studies have suggested that omission of axillary surgery, may be considered in actual clinical practice. However, approximately 15% of patients-despite being assessed as cN0 by axillary ultrasound-were found to have pathologic lymph node (LN) metastasis. In such cases, omission of axillary surgery may negatively impact on patients' prognosis. Therefore, the aim of our study was to evaluate whether MRI could aid in predicting LN metastasis in cN0 ER+/HER2- patients. Additionally, we sought to identify clinicopathologic factors associated with LN metastasis.

Methods: We collected ER+/HER2- breast cancer patients who were cN0 on both axillary ultrasound and MRI between January 2012 and December 2024 from two institutions. Among these patients, we investigated the proportion with LN metastasis. In addition, we analyzed the clinicopathologic characteristics of patients with LN metastasis using a binary logistic regression model.

Result: A total of 423 patients were included, with a mean age of 54.6 years. Among them, 125 patients (21.8%) had LN metastasis, including 11 patients (2.1%) classified as pN2. Patients with LN metastasis were more likely to have a ductal histologic type, larger tumor size, and a higher proportion of lympho-vascular invasion (LVI) positivity. In multivariate analysis, the factors predictive of LN metastasis were tumors size ≥ 20 mm (Odds ratio [OR], 1.97; 95% confidence intervals [CI], 1.20-3.24; $P = 0.008$) and positive LVI (OR, 4.77; 95% CI, 2.93-7.76; $P < 0.001$). Young age, histologic type, tumor grade, and Ki-67 labelling index were not significant predictors of LN metastasis.

Conclusions: In our study, adding MRI to axillary ultrasound did not reduce the proportion of patients with LN metastasis compared to previous studies. Furthermore, larger tumor size and LVI positivity were identified as predictive pathologic factors for LN metastasis.

Low Axillary Nodal Metastasis Rates in Selected HER2-Positive and Triple-Negative Breast Cancer Patients: Toward De-escalation of Sentinel Lymph Node Biopsy

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Background: The necessity of sentinel lymph node biopsy (SLNB) is being reconsidered in early breast cancer (BC) patients with clinically node-negative disease. However, most de-escalation trials have excluded aggressive subtypes, such as human epidermal growth factor receptor 2 (HER2)-positive BC and triple-negative breast cancer (TNBC), leaving limited data to guide omission of axillary surgery in these populations.

Methods: This multicenter retrospective cohort study included 1,571 patients from four academic institutions diagnosed with early-stage HER2-positive BC or TNBC who had clinically node-negative status on preoperative ultrasonography and underwent upfront breast-conserving surgery (BCS) with axillary surgery between January 2010 and December 2023. We evaluated rates of pathologic nodal metastasis (pN+) to identify subgroups in which SLNB omission may be feasible.

Result: Among 1,571 BC patients, 429 (27.3%) had hormone receptor (HR)+HER2+, 359 (22.9%) had HR-HER2+, and 783 (49.8%) had TNBC. Overall, 163 patients (10.4%) had pN+ disease. Independent predictors of pN+ status included suspicious axillary lymph nodes on breast magnetic resonance imaging (MRI) (odds ratio [OR], 2.28; 95% confidence interval [CI], 1.383.75), larger tumor size (> 1.5 cm: OR, 1.99; 95% CI, 1.263.15), and lymphovascular invasion (LVI) (OR, 4.86; 95% CI, 3.207.36). In a low-risk group (n = 689 [43.9%]) defined by the absence of suspicious MRI findings and tumors ≤ 1.5 cm, the overall pN+ rate was 5.1%, with subtype-specific rates of 7.0% (HR+HER2+), 6.4% (HR-HER2+), and 3.2% (TNBC). When LVI absence was added to the low-risk definition, the overall pN+ rate declined to 3.2%.

Conclusions: Among clinically node-negative HER2-positive BC or TNBC patients undergoing upfront BCS, axillary nodal involvement was uncommon with favorable imaging and pathologic features. These findings support the potential feasibility of omitting SLNB in selected patients with aggressive subtypes and low predicted axillary burden, warranting validation in prospective trials.

Pathologic Predictors of Axillary Metastasis in cT1N0 Breast Cancer: Identifying Candidates for Partial Breast Irradiation without Sentinel Lymph Node Biopsy

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Background: Recent trials have demonstrated the safety of sentinel lymph node biopsy (SLNB) omission in selected patients with early breast cancer. However, criteria for identifying patients suitable for partial breast irradiation (PBI) without surgical axillary evaluation remain undefined. This study aimed to identify low-risk candidates for SLNB omission.

Methods: A retrospective analysis was conducted on 5,097 patients with pT1 breast cancer who underwent breast surgery with axillary evaluation 2016 and 2020. All patients had clinically node-negative disease (cN0) confirmed by preoperative axillary ultrasound. Univariable and multivariable logistic regression analyses were used to identify independent predictors of axillary lymph node metastasis (ALNM), and a hierarchical risk classification was developed.

Result: The overall ALNM rate was 13.9% (708/5,097). The mean age was 51.3 years. Multivariable analysis identified LVI as the strongest independent predictor (OR 5.54, 95% CI 4.58-6.70, $p < 0.001$), followed by pT1c stage (vs. pT1a-b, OR 2.10, 95% CI 1.69-2.61, $p < 0.001$). LVI-positive patients (14.3%) had a 42.1% ALNM rate. Among LVI-negative patients, ALNM rates increased with tumor size: 2.8% for tumors ≤0.5 cm, 4.9% for ≤1.0 cm, and 13.0% for >1.0 cm. A simple classification using LVI and tumor size stratified patients into three groups: low-risk (LVI-negative, tumor ≤1.0 cm; 40.1% of patients), intermediate-risk (LVI-negative, tumor >1.0 cm; 45.7%), and high-risk (LVI-positive; 14.3%), and the ALNM rate was 4.9%, 13.0%, and 14.3%, respectively.

Conclusions: Patients with pT1a-b tumors without LVI represent a low-risk population with an axillary metastasis rate below 5%. These findings suggest the feasibility of PBI in this low-risk subgroup without SLNB, warranting validation through prospective randomized trials.

Poster Presentation

De-escalation of Axilla Surgery in Early Invasive Lobular Carcinoma: Diagnostic Performance and Oncologic Outcomes

Charmagne Loren Ramos[1,2,3], Eunhye Kang[2], Changhoon Lee[2], Dong-Seung Shin[2], Hong-Kyu Kim[2,4,5], Hyeong-Gon Moon[2,4,5], Wonshik Han[2,4,5], Han-Byeol Lee[2,4,5]

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Background: Omission of sentinel lymph node biopsy (SLNB) is oncologically safe in postmenopausal women with luminal cT1N0 breast cancer. However, data is insufficient for invasive lobular carcinoma (ILC) despite being the second most common histologic type after invasive ductal carcinoma (IDC). We evaluated whether this de-escalation approach could be safely applied for ILC

Methods: We retrospectively analyzed 3,331 patients with clinical T1-2N0 breast cancer who underwent surgery at Seoul National University Hospital from 2005-2022. False-negative rates (FNR) of preoperative axillary ultrasound and distant metastasis-free survival (DMFS) were compared and analyzed according to tumor size and molecular subtypes between ILC and IDC.

Result: There were 639 (19.18%) ILC patients in the cohort. There are more pT2 tumors than IDC patients (46.7% vs. 29.3%, $p < 0.001$), but demonstrated more favorable tumor biology; including lower histologic grade (1&2) (78.8% vs 65.7%, $p < 0.001$) and Ki-67 index ($\leq 10\%$) (95.5% vs 82.1%, $p < 0.001$). Preoperative axillary ultrasound showed comparable FNR between ILC and IDC (17.4% vs. 19.9%, $p = 0.167$), consistent in both cT1 (13.9% vs. 16.1%, $p = 0.327$) and cT2 tumors (24.8% vs 25.1%, $p = 0.988$). Clinical T1 tumors with hormone receptor-positive/HER2-negative in particular also showed no difference in FNR between ILC and IDC (14.2% vs 17.2%, $p = 0.198$). There was no significant difference in 10-year DMFS of ILC vs. IDC (97.2% vs. 95.4%, $p = 0.092$) and likewise for hormone receptor-positive/HER2-negative patients (97.2% vs. 96.4%, $p = 0.092$).

Conclusions: ILC demonstrates diagnostic accuracy of axillary lymph node status and oncologic outcomes equivalent to IDC in patients indicated for axillary surgery de-escalation. These findings support extending axillary surgery omission strategies to carefully selected ILC patients.

Poster Presentation

Comparative Effectiveness of Sentinel Lymph Node Tracers in Breast Cancer: A Network Meta-analysis of 53 Randomised Trials

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Background: While the dual-tracer technique with radioisotopes (RI) and blue dye (BD) has traditionally been used in sentinel lymph node biopsy (SLNB), novel tracers have emerged. However, their direct comparison has not been systematically evaluated. This network meta-analysis aimed to compare SLN identification rates across single- and multi-tracer strategies.

Methods: A systematic search of PubMed, EMBASE, Cochrane Library, Web of Science, and Scopus identified studies evaluating SLNB using BD, RI, superparamagnetic iron oxide (SPIO) nanoparticles, indocyanine green (ICG) fluorescence, carbon nanoparticles (CN), and contrast-enhanced ultrasound (CEUS) from 1 January 2020 to 29 April 2025. Outcomes were SLN identification rates, defined as the proportion of patients with SLN identified per modality. A random-effects network meta-analysis was performed to estimate comparative effectiveness across all direct and indirect comparisons. BD served as the reference comparator.

Result: 53 randomised controlled trials were included, evaluating 9689 patients in total. 12 studies included a proportion of patients who received neoadjuvant chemotherapy. Techniques studied included single (50/53 studies), dual (34/53) and triple (3/53) modality tracers. Triple-agent mapping with BD + ICG + RI yielded the highest odds of successful SLN identification (OR 18.58, 95% CI 3.22-107.25, $p = 0.001$). Dual-tracer combinations such as BD + CEUS (OR 10.54, 95% CI 1.51-73.45, $p = 0.017$) and RI + SPIO (OR 8.63, 95% CI 1.52-49.15, $p = 0.015$) were also significantly superior to BD. Among single tracers, ICG (OR 2.42, 95% CI 1.56-3.74, $p < 0.001$), SPIO (OR 2.43, 95% CI 1.17-5.03, $p = 0.017$), and RI (OR 2.22, 95% CI 1.34-3.66, $p = 0.002$) demonstrated markedly better identification rates than BD. CN and CEUS alone did not significantly outperform BD.

Conclusions: Multi-tracer mapping proves superior to single-tracer mapping in SLN detection. Among single agents, ICG, SPIO, and RI significantly outperform BD. These findings highlight the potential for cost-effective, radiation-free, or logistics-friendly alternatives in diverse healthcare settings.

Choosing Wisely: Omission of Intraoperative Frozen Section for Sentinel Lymph Node Assessment in Early Breast Cancer

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Background: Intraoperative frozen section (FS) assessment of sentinel lymph nodes (SLNs) in early breast cancer may detract from deescalation strategy following pivotal trials ACOSOG Z0011, AMAROS, IBCSG 23 01, and SENOMAC which demonstrated that axillary lymph node dissection (ALND) can be safely omitted in patients with low volume nodal disease. The aim of the study is to evaluate the validity of FS in determining need for ALND and to identify patients who may safely forgo FS without increasing rate of return to OT for completion ALND.

Methods: We performed a retrospective review of all patients undergoing breast surgery with SLN evaluation from 2021 to 2024. Clinical, operative, and pathologic variables were analysed to determine need for ALND according to published deescalation strategies.

Result: Among 1037 patients, 797 had SLN biopsy. FS was negative in 693 cases (86.8%), while 104 patients (13.0%) proceeded to immediate ALND. 78 patients in the ALND cohort had cT1-2 disease (n = 78), 21 had ≥ 3 positive SLNs which would necessitate ALND. 11 remained N1 status and 10 upgraded to N2 disease. 57 remained within study criteria in Z0011/ AMAROS/ SENOMAC to qualify for adjuvant radiotherapy and hence deemed as unnecessary ALND. All 21 patients with ≥ 3 positive nodes were at least clinical T2, frequently with multifocality (n = 7), or indeterminate axillary nodes on preoperative imaging (n = 7), or dermal or nippleareolar complex involvement (n = 5). These characteristics suggest a higher pretest probability of heavier nodal disease and a greater likelihood that intraoperative FS meaningfully altered axillary management. Conversely, in patients with unifocal, clinical T1 (≤ 2 cm), no suspicious lymph node or suspected dermal/ NAC involvement, the incidence of detecting 3 or more positive lymph nodes is zero.

Conclusions: Our institutional experience demonstrates that the intraoperative FS may be safely omitted in this select group of patients and support a more selective FS strategy.

Poster Presentation

An Evaluation of the Use of Superparamagnetic Iron Oxide (SPIO) with Blue Dye as a Dual-tracer Method for Sentinel Lymph Node Biopsy (SLNB)

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Background: This study evaluates the use of SPIO with blue dye as a dual-tracer method for SLNB. Currently, the gold standard for SLNB is the combined use of radioisotope and blue dye. However, radioisotope usage requires strict compliance with local regulations on the management of radioactive waste, and is not available in some centers such as ours, which routinely performs SLNB with blue dye as a single agent instead. SPIO offers another non-radioactive technique for the detection of SLNs, which we have used in conjunction with blue dye as a dual-tracer option.

Methods: A retrospective analysis of 62 breast cancer patients who underwent SLNB at our center between January-December 2025 was conducted. All patients had SLN localization using either blue dye only, or blue dye and SPIO (dual tracer).

Result: 41 patients received blue dye only and 21 patients received dual tracer. SLN identification rate was 97.6% (CI 87.1-99.9%) for blue dye only and 100% (CI 83.9-100.0%) for dual tracer. The mean number of SLNs removed per patient was greater with dual tracer at 4.67, compared to 3.15 with blue dye only ($p = 0.002$). Subgroup analysis of the dual tracer group was also performed. The identification rate was 95.2% (CI 76.2-99.9%) with blue dye and 100% (CI 83.9-100.0%) with SPIO. A total of 99 SLNs were removed in the dual tracer group -89.9% were successfully detected with SPIO, and 79.8% with blue dye. Concordance rates were high at 100% per patient and 88.6% per node. There was no statistically significant difference between the mean number of SLNs detected with blue dye (3.76) versus SPIO (4.24), $p = 0.463$.

Conclusions: SPIO is comparable to blue dye for SLN detection and may improve detection rates when used together with blue dye as a dual-tracer method, offering a feasible alternative to the use of radioactive isotope.

Novel Technique of Intra-operative Sonography Targeting Localization of Sentinel Lymph Node: A Comparative Study to Demonstrate Decreasing Operation Time and Blood Loss

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Background: Sentinel lymph node biopsy (SLNB) remains an important component in axillary staging for clinically node-negative breast cancer patients. However there remains no standardized protocol for SLNB. We hypothesize that the use of intra-operative sonography in targeting SLNB localization would reduce operative duration and improve clinical outcomes.

Methods: A retrospective analysis of a prospectively collected database was conducted in a single institute to compare the clinical outcomes of patients who underwent SLNB by the principal investigator with intra-operative sonographic targeting localization versus conventional SLNB from January 2020 to December 2024.

Result: During study, 448 SLNB procedures were performed. After inclusion and exclusion criteria, 351 SLNB procedures were analyzed. These included 129 SLNB procedures with successful intra-operative sonographic targeting localization and 222 conventional SLNB cases. The targeting localization group had reduced median total blood loss (25 mL vs. 30 mL, $p < 0.01$) and shortened mean SLNB operative duration (18.2 minutes vs. 29.2 minutes , $p < 0.01$). The mean number of excised SLN was 1.7 ± 1.1 in the targeting localization group and 3.4 ± 2.8 in the non-localization group. Locoregional recurrence and distant metastasis showed no significant difference. Subgroup analysis of procedures involving the excision of 1-2 SLN showed shorter mean SLNB operative duration (17.1 minutes vs. 24.3 minutes, $p < 0.01$) and reduced blood loss (median 25 mL vs. 30 mL, $p < 0.01$) in the targeting localization group.

Conclusions: Our study demonstrates that intra-operative sonographic targeting localization for SLNB reduces operative duration and lower blood loss, thereby improving clinical outcomes of SLNB.

The Pattern of Axillary Surgical Management and Axillary Relapse in Triple-negative Breast Cancer after Neoadjuvant Chemotherapy and Immunotherapy: A Single Medical Center Experience

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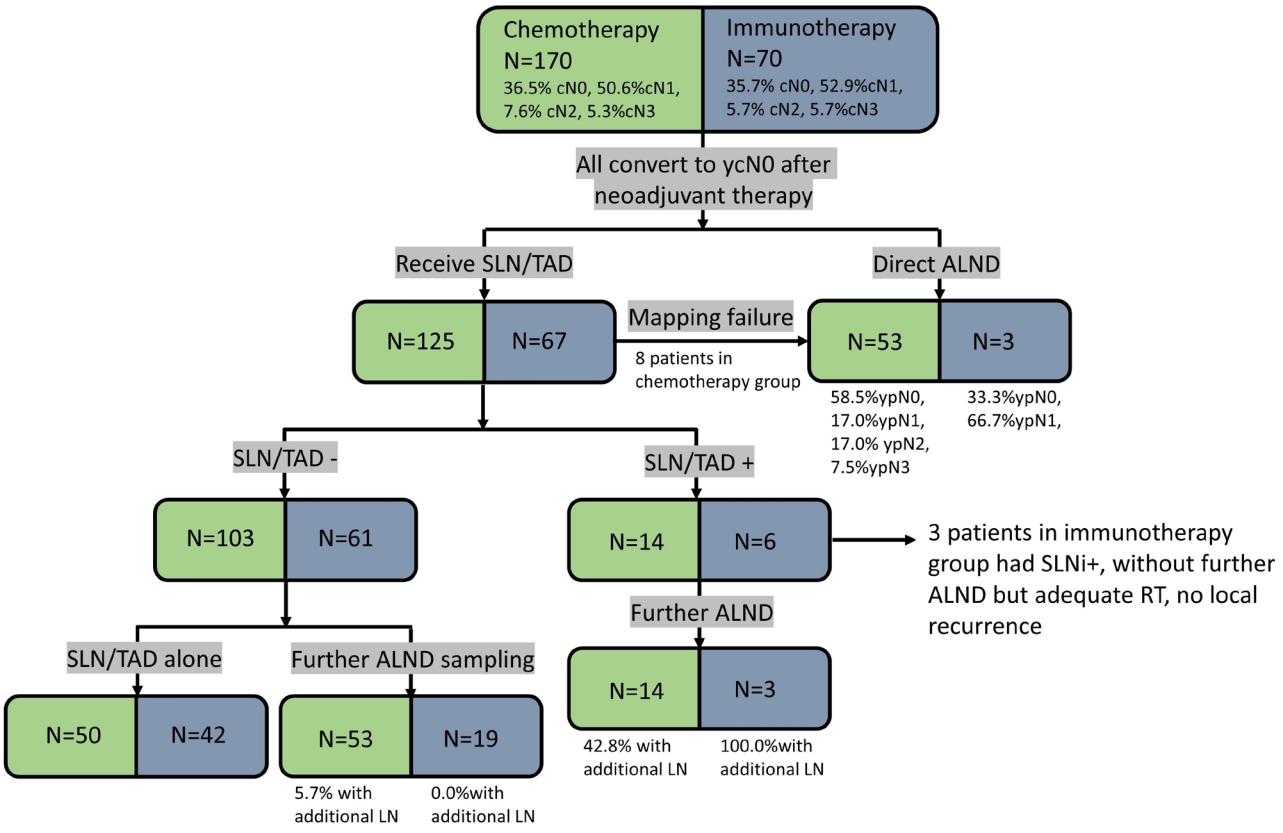
Background: With the broad application of immunotherapy in the past five years, we aimed to investigate axillary surgery patterns and survival outcomes in triple-negative breast cancer (TNBC) patients receiving neoadjuvant chemotherapy or chemo-immunotherapy, and to evaluate the pattern of axillary management and outcome in the immunotherapy era.

Methods: We retrospectively reviewed 240 TNBC patients receiving neoadjuvant therapy from 2005 to 2022 at Chang Gung Memorial Hospital. All patients were ycN0 before surgery. Axillary surgery patterns and oncologic outcomes were compared between chemotherapy (n = 170) and immunotherapy (n = 70) groups.

Result: Clinical stage before neoadjuvant therapy was balanced between the chemotherapy and immunotherapy groups. Nodal positivity was observed in 63.5% and 64.3% of patients, respectively. A higher pCR rate was observed in the immunotherapy group (61.4% vs. 34.7%), along with a higher proportion of patients receiving sentinel lymph node biopsy (SLNB) alone. The SLN identification rate was 93.6% in chemotherapy group and 100% in immunotherapy group. Factors associated with mapping failure included nodal non-pCR and simple mastectomy. Among 70 patients who underwent further axillary lymph node dissection (ALND) after negative SLN, the false-negative rate was 5.7% (3 in 53) in chemotherapy group and 0.0% (0 in19) in immunotherapy group. Among 56 patients who underwent direct ALND due to physician decision or mapping failure, 57.1% (n = 32) were ypN0, 19.6% had N1-3 disease, including 16.1% N2 and 7.1% N3. The axillary relapse rate was 1.0% in patients with nodal pCR and 10.8% in those with nodal non-pCR during follow-up. In patients achieving nodal pCR after neoadjuvant treatment, SLNB alone did not increase recurrence risk compared with ALND ($p = 0.140$), regardless of treatment group.

Conclusions: Sentinel lymph node biopsy is feasible and reliable in TNBC patients receiving neoadjuvant chemo-immunotherapy, and nodal recurrence remains low in patients achieving nodal pCR without ALND in the immunotherapy era.


Chemotherapy
N=170
36.5% cN0, 50.6%cN1, 7.6% cN2, 5.3%cN3
Immunotherapy
N=70
35.7% cN0, 52.9%cN1, 5.7% cN2, 5.7%cN3
All convert to ycN0 after neoadjuvant therapy
Receive SLN/TAD
Direct ALND
N=125
N=67
Mapping failure
8 patients in chemotherapy group
N=53
N=3
58.5%ypN0, 17.0%ypN1, 17.0% ypN2, 7.5%ypN3
33.3%ypN0, 66.7%ypN1,
SLN/TAD -
SLN/TAD +
N=103
N=61
N=14
N=6
3 patients in immunotherapy group had SLNi+, without further ALND but adequate RT, no local recurrence
Further ALND
SLN/TAD alone
Further ALND sampling
N=50
N=42
N=53
N=19
N=14
N=3
5.7% with additional LN
0.0%with additional LN
42.8% with additional LN
100.0%with additional LN

The Rate of Axillary Lymph Node Metastasis of Ductal Carcinoma in Situ with Microinvasion in University Hospital

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Background: Ductal carcinoma in situ with microinvasion (DCIS-MI) represents an intermediate entity between pure DCIS and invasive carcinoma, accounting for approximately 5-10% of DCIS cases. Although DCIS-MI demonstrates favorable biological behavior, the true incidence of axillary lymph node metastasis and the necessity of routine sentinel lymph node biopsy (SLNB) remain controversial. Current guidelines often recommend axillary staging similar to invasive disease, potentially leading to overtreatment.

Methods: To determine the incidence of axillary lymph node metastasis in DCIS-MI and to evaluate clinicopathologic factors associated with nodal involvement. A retrospective observational study was conducted at King Chulalongkorn Memorial Hospital. Patients with pathologically confirmed DCIS-MI diagnosed between January 2017 and December 2024 were included. Clinical characteristics, imaging finding, pathologic features, axillary surgical procedures, adjuvant treatments, and complications were reviewed. Associations between clinicopathologic variables and nodal metastasis were analysed using chi-square or Fisher's exact test.

Result: A total of 109 patients with DCIS-MI were identified. Among them, 100 patients underwent axillary staging and were included in analysis, Only one patient (1%; 95%CI 0.0-0.05) had axillary lymph node metastasis. The median age was 57 years, and the median tumour size was 2.05 cm. SLNB was performed in 75 patients, while 25 patients underwent axillary lymph node dissection. No axillary-related complications were observed. The single node-positive case occurred in a 47-year-old patient with a 2.5 cm, unifocal, high grade, Luminal B/HER2-positive tumor and abnormal preoperative axillary ultrasound findings. No clinicopathological variable demonstrated a statistically significant association with nodal metastasis. After a mean follow-up of 27.2 months, no ipsilateral or contralateral recurrence was detected.

Conclusions: Axillary lymph node metastasis in DCIS-MI is rare. Selective omission of SLNB may be considered in carefully selected patients, particularly those without suspicious axillary imaging or high-risk tumor features. Larger prospective studies with longer follow-up are needed to refine risk stratification and optimize axillary management in this low-risk population.

Repeat Sentinel Lymph Node Biopsy in Early-Stage pN0 Breast Cancer with Ipsilateral Local Recurrence after Mastectomy: A Single-Center Experience from Vietnam

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Background: Ipsilateral local recurrence (ILR) occurs in approximately 5-10% of breast cancer patients within 10 years of initial treatment. Accurate axillary restaging is essential for disease staging and subsequent treatment planning. Although completion axillary lymph node dissection (ALND) has been traditionally used, its morbidities, including lymphedema, may impair quality of life. Repeat sentinel lymph node biopsy (rSLNB) is a less invasive alternative. This study evaluates the feasibility and clinical impact of rSLNB in pN0 breast cancer patients with ILR after mastectomy in a Vietnamese clinical setting.

Methods: A retrospective case series was conducted at Ho Chi Minh City Oncology Hospital (October 2024-September 2025). Eligible patients were women with prior mastectomy for early-stage pN0(sn) breast cancer presenting with ipsilateral local recurrence without distant metastasis. Lymphatic mapping used subcutaneous technetium-99m HSA and/or methylene blue around the recurrence or surgical scar. Outcomes included rSLNB identification rate, sentinel lymph node (SLN) characteristics, nodal positivity, completion ALND, and factors associated with rSLNB success.

Result: Thirteen women with a median age of 41 years were included. The rSLNB identification rate was 84.6% (11/13), with a median of 3 SLNs retrieved (range 1-7). Preoperative lymphoscintigraphy identified axillary SLNs in 66.7% of cases, while methylene blue (used in 46.2%) aided identification when scintigraphy failed. Three patients (23.1%) were SLN-positive (median focus 2 mm); all underwent completion ALND, which revealed no additional metastases. One mapping failure also resulted in a negative ALND. No surgical complications were reported.

Conclusions: Repeat sentinel lymph node biopsy is a feasible and safe approach for axillary restaging in selected pN0 breast cancer patients with ipsilateral local recurrence after mastectomy and may help guide subsequent treatment decisions.

Acellular Dermal Matrix for Volume Replacement in Oncoplastic Breast-Conserving Surgery: Feasibility and Mid-Term Outcomes

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Background: Breast-conserving surgery (BCS) is the standard of care for early-stage breast cancer; however, achieving satisfactory aesthetic outcomes remains challenging in cases requiring large-volume excision, unfavorable tumor location, or in patients with small breast volume. Conventional volume replacement techniques using local flaps or lipofilling are limited by donor-site morbidity, technical complexity, and unpredictable volume retention. Acellular dermal matrix (ADM) may provide a biologically compatible and structurally stable alternative for partial breast volume replacement following BCS.

Methods: We retrospectively analyzed patients undergoing wide local excision followed by partial breast reconstruction using ADM for volume replacement (Native®, Decomed Srl, Italy). Indications included an unfavorable excision-to-breast volume ratio, and/or challenging tumor location. Surgical outcomes, postoperative complications, need for secondary procedures, and oncologic safety were evaluated. Imaging follow-up included mammography, ultrasound, and magnetic resonance imaging (MRI) as indicated. One patient with shorter follow-up was included for safety analysis. Follow-up ranged from 3 to 48 months (median 24 months).

Result: Seven patients were included. All procedures were completed successfully, and all patients were discharged within 24 hours. Final histopathology confirmed tumor excision with clear margins in all cases. One patient developed a postoperative seroma requiring percutaneous drainage, with no further intervention. Six patients received adjuvant radiotherapy with no complications reported. No secondary corrective procedures were required. During follow-up, no recurrences were observed. Postoperative imaging demonstrated preserved breast contour and reliable surveillance, without imaging artifacts related to ADM. On MRI, contrast enhancement at the ADM site showed a typical benign Type I kinetic curve, allowing differentiation from recurrence.

Conclusions: ADM-assisted volume replacement represents a safe, reproducible, and predictable oncoplastic option for selected patients undergoing BCS. The technique provides durable aesthetic outcomes, tolerates adjuvant radiotherapy, and allows reliable postoperative imaging surveillance while avoiding donor-site morbidity. These encouraging results support further prospective studies to better define patient selection criteria and long-term outcomes.

Evaluation of Chest Wall Perforator Flaps for Partial Breast Reconstruction: A Single Surgeon's Experience with Patient Demographics, Cosmetic Stability, and the Procedural Learning Curve

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Background: The advancement of oncoplastic breast surgery (OBS) has facilitated the preservation of the breast in cases where tumor-to-breast volume ratios would otherwise necessitate mastectomy. Chest wall perforator flaps (CWPFs), including LICAP, LTAP, and AICAP, have emerged as vital volume replacement techniques. This study evaluates a single surgeon's experience with these flaps, focusing on clinical outcomes, the management of patients presenting with significant volume loss after external excision biopsies, and the evolution of surgical proficiency over time.

Methods: A retrospective analysis was conducted on 40 consecutive patients undergoing partial breast reconstruction using CWPFs performed by a single surgeon from March 2021 to Jan 2026. Data collected from hospital electronic records included age, geographical residence, disease laterality, tumor characteristics (USG size, histology, IHC, grade), neoadjuvant status, surgical duration, flap type, and complications. Aesthetic outcomes were quantified using a validated cosmesis score (1-10) evaluated post-operatively and following adjuvant radiotherapy. The learning curve was assessed by comparing chronological cases (Early vs. Late) regarding operative efficiency and outcomes.

Result: The mean patient age was 43.39 +/-11.26 years. LICAP was the primary flap (57.5%). The mean pathological tumor size was 31.78 +/- 13.42 mm. Surgical duration significantly decreased from an initial 3.5-4 hours to 2-2.5 hours in the later series. Post-operative cosmesis scores averaged 8.52 +/-1.04, showing high stability after radiotherapy (8.24 +/- 1.17). Patients presenting post-excision biopsy (10%) demonstrated effective volume restoration despite initial deformities. Complication rates decreased as the surgeon progressed through the series.

Conclusions: CWPFs provide a safe, muscle-sparing, and effective solution for partial breast reconstruction, particularly for correcting volume loss and scars from prior surgeries. The learning curve is characterized by significant gains in operative efficiency and aesthetic refinement.

Age (Mean±SD)	43.39±11.2 6
Living area	
Rural	18 (42.1%)
Urban	22 (57.89%)
Clinicopathological part	
Laterality	
Right	19 (47.5%)
Left	21 (52.5%)
Duration of Presentation of disease (in month)	
<2 months	9 (22.5%)
2-6 months	18(45%)
>6 months	13 (32.5%)
Quadrant of Breast	
UOQ	21 (52.5%)
UIQ	2 (5%)
LOQ	6 (15%)
LIQ	3 (7.5%)
>1 Quad	5 (12.5%)
USG lump size on presentation (in mm) (Mean±SD)	33.5±14.37
Treatment -NACT	
Yes	9 (22.5%)
No	21 (52.5%)
Not Applicable	9 (22.5%)
IHC	
HR+, HER2–	20 (50%)
TNBC	5(12.5%)
TPBC	5 (12.5%)
HER2+	8 (20%)
NA	10 (25%)
Diagnosis	
Invasive Breast Carcinomas	30 (75%)
Phyllodes Tumors	9 (22.5%)
Small cell carcinoma	1 (2.5%)
Post OP Local Complications	
No	35 (87.5%)
Pain	2 (5%)
Pain+Edema	1 (2.5%)
Partial fat necrosis	1 (2.5%)
Seroma, fat necrosis	1 (2.5%)

Flap type	
AICAP	1 (2.5%)
LICAP	
LICAP (Propellar)	23 (10.8%)
LTAP	3 (7.5%)
LTAP (Propellar)	9 (22.50%)
MICAP	1 (2.5%)
	3 (7.5%)
pT (in mm) (Mean±SD)	31.78±13.42
Post Op Cosmesis Score	8.52±1.04
Length of stay (Days)	2.71±0.51
Post RT Cosmesis Score	8.24±1.17
Post excision biopsy	
Yes	4 (10%)
No	36 (90%)

Minimally Invasive Endoscopic Nipple-Sparing Mastectomy with Latissimus Dorsi Flap Reconstruction: Early Low-Cost Experience from a LMIC

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Background: Endoscopic nipple-sparing mastectomy (E-NSM) has emerged as a less-invasive alternative to open mastectomy and robotic NSM, offering improved cosmetic outcomes while avoiding the high procedural and infrastructure costs associated with robotic systems and implant-based reconstruction. In low- and middle-income countries (LMICs), where affordability is a major barrier, combining E-NSM with autologous latissimus dorsi (LD) flap reconstruction may represent a practical, oncologically safe, and cosmetically favourable alternative. Evidence from LMICs remains sparse.

Methods: A retrospective review was conducted of two consecutive patients (two breasts) who underwent E-NSM with immediate autologous LD flap reconstruction between January 2025 and October 2025 at a government-funded breast surgery unit. Patient demographics, breast cancer biology, operative details, incision length, reconstruction technique, intra- and postoperative complications, pathological outcomes, and early follow-up were analysed. Feasibility and perioperative safety were the primary endpoints; margin status, early oncologic outcomes, donor-site morbidity, and cosmetic satisfaction were secondary endpoints.

Result: Both patients successfully underwent E-NSM with LD flap reconstruction through a single 45 cm axillary incision without conversion to open surgery. Mean operative time was 240 minutes (range, 220-260). No intraoperative complications occurred. The LD flap was harvested endoscopically in one case and via mini-open approach in the other. Postoperative recovery was uneventful: there were no cases of nipple-areolar complex necrosis, flap loss, or major wound complications. One patient developed a minor axillary seroma managed with a single aspiration. Final pathology confirmed complete excision with negative margins in both cases.

Conclusions: Our early two-patient experience suggests that E-NSM combined with LD flap reconstruction is feasible, safe, and cosmetically effective, particularly suited for LMIC settings where robotic systems and implants are financially prohibitive.

Versatility of Chest Wall Perforator Flaps for Oncoplastic Breast Surgery

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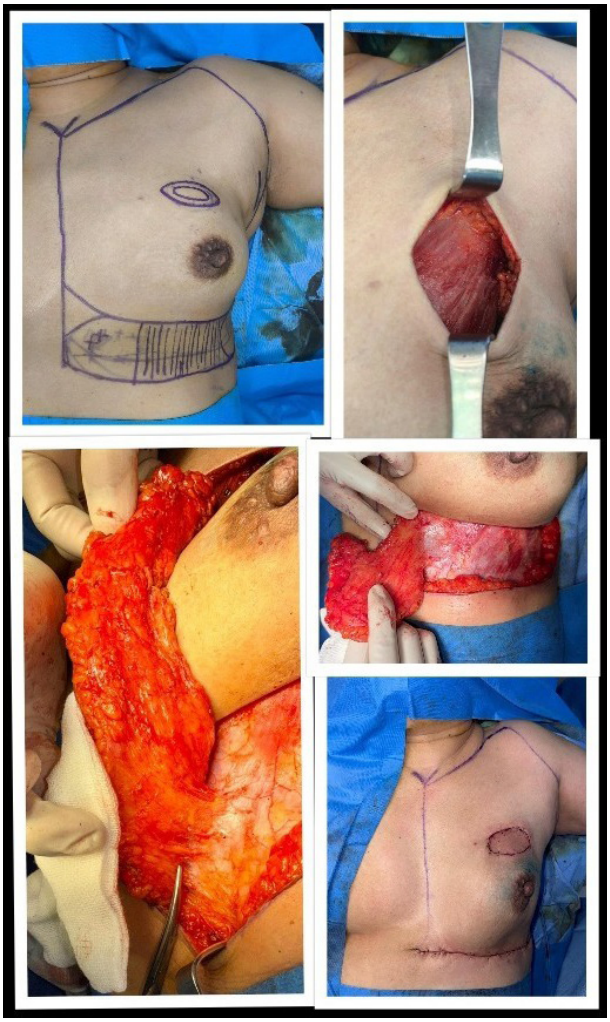
Background: Oncoplastic breast-conserving surgery (BCS) has been the prominent choice for breast cancer lately, regarding the tumor size and location. Chest wall perforator flaps (CWPF) is one of the oncoplastic technique that is still not being used regularly, especially in limited resource hospital.

Methods: This is a case series report of utilization of several kinds of CWPF for different tumor size and location in breast conserving surgery in Cipto Mangunkusumo National Hospital, Indonesia. The perforators used in this study included medial intercostal artery perforator (MICAP), anterior intercostal artery perforators (AICAP), lateral intercostal artery perforators (LICAP), and lateral thoracic artery perforators (LTAP).

Result: All patients underwent BCS and sentinel lymph node biopsy (SLNB)/axillary lymph node dissection (ALND), followed by CWPF to reconstruct the breast volume. Among all patients, 1 is located in the inner-upper quadrant, 1 in the lower-inner quadrant, 1 in lower-outer quadrant, and 4 in the upper-outer quadrant. All frozen section results for tumor margin were negative. All flaps survived and there were no signs of recurrence.

Conclusions: CWPF is a safe and effective oncoplastic technique for the treatment of breast cancer. It provides shorter surgery time and length of hospital stay, minimal complications, good oncological outcomes and cosmetics. CWPF also gives the patients and doctors more opportunity to omit mastectomy especially in resource-limited facilities.



Poster Presentation

Prospective Study on the MRI-based Integration Rate of Acellular Dermal Matrix and Complications after Breast-conserving Surgery

Eunju Shin[1,4], Soo Jung Hong[2], Hye Joung Eom[3], Tae-Kyung Yoo[4], Jisun Kim[4], Il Yong Jhung[4], Beom Seok Ko[4], Hee Jeong Kim[4], Jong Won Lee[4], Byung Ho Son[4], Sae Byul Lee[4]

[1]Kyung Hee Univ. Hospital at Gangdong, Department of Surgery, Korea, [2]ASAN U Surgery Clinic, Department of Surgery, Korea, [3]ASAN Medical Center, Department of Radiology, Korea, [4]ASAN Medical Center, Department of Surgery, Korea

Background: Breast-conserving surgery (BCS) has become the preferred approach for breast cancer; however, managing volume defects remains challenging. Paste-type acellular dermal matrix (ADM) offers a promising solution for volume replacement, but prospective data on radiologic integrity, safety, and patient-reported satisfaction are limited.

Methods: In this single-center prospective study, 188 consecutive candidates for BCS between 2023 and 2024 were enrolled, and 148 patients who underwent BCS with intraoperative paste-type ADM application and had at least 1 year of follow-up were analyzed. Breast magnetic resonance imaging (MRI) was performed at 1 year postoperatively in 141 patients to assess ADM integrity using a 6 grade scale (G0-G5). Clinicopathologic factors, operative details, and adverse events were prospectively recorded, and their association with MRI grading was evaluated. Postoperative breast satisfaction was assessed using the BREASTQ "Satisfaction with Breasts" module.

Result: The mean age was 50 years, and most tumors were hormone receptor-positive early-stage cancers. MRI grading at 1 year demonstrated 84 patients (59.6%) classified as G0-1 and 57 (40.4%) as G2-5. Higher MRI grades (G2-5) were significantly associated with larger preoperative tumor size on MRI, longer operative time, and higher nodal stage, whereas age, receptor status, and specimen weight were not significantly different between groups. Postoperative complications were rare, occurring in 2.0%, and were not associated with MRI grading. BREASTQ scores showed that most patients reported being a little or very satisfied with breast appearance in and out of clothing and with the fit of a bra, with mean item scores around 3 on a 4point Likert scale.

Conclusions: In this prospective cohort of BCS with paste-type ADM, MRI demonstrated acceptable ADM integrity in most patients, with no meaningful impact on complication rates. Paste type ADM use was associated with high postoperative satisfaction with breast appearance and garment fit, supporting its safety and cosmetic utility as an oncoplastic adjunct in BCS.

Usefulness of Acellular Dermal Matrix (ADM) Assisted Oncoplastic Breast Reconstruction Following Breast Conserving Surgery

Seok Gi Kim, Yong June Chang, Hyun Geun Cho, Jeong Yeop Ryu, Joon Seok Lee, Mansoo Suh, Kang Young Choi, Ho Yun Chung, Jung Dug Yang

Kyungpook National Univ. Hospital, Department of Plastic Surgery, Korea

Background: After breast-conserving surgery (BCS), localized defects can be challenging to reconstruct with volume displacement techniques alone. Acellular dermal matrix (ADM) has been proposed as an oncoplastic material to supplement volume and reduce contour deformity. This study evaluated the safety and clinical usefulness of ADM assisted oncoplastic breast reconstruction following BCS.

Methods: Between October 2020 and September 2023, 43 patients who underwent partial mastectomy followed by volume displacement with ADM assistance were retrospectively analyzed. The number of ADM sheets (1-2), insertion techniques (sheet/stacked/rolling), and placement planes (below the skin flap/below glandular tissue/within the defect) were tailored to defect characteristics (Figure 1). Patients were assessed preoperatively and at 1, 3, 6, and 12 months postoperatively. Breast shape and symmetry were evaluated clinically, and postoperative complications were recorded. The position, volume maintenance, and structural integrity of the ADM were radiologically evaluated using computed tomography (CT) or magnetic resonance imaging (MRI).

Result: The mean age of the patients was 49.3 years, and the median follow-up period was 32 months. ADM insertion techniques included sheet (n = 32), stacked (n = 2), and rolling (n = 9). Placement planes were below the skin flap (n = 21), below glandular tissue (n = 13), and within the defect (n = 9), with a mean ADM size of 31.2 cm^2. Within 1 year, complications occurred in five patients (11.6%). A total of eight complications were observed, including seroma, hematoma, wound-related complications, and red breast syndrome, with multiple events occurring in a single patient. No major complications, such as flap loss or fat necrosis, were observed.

Conclusions: ADM-assisted breast reconstruction after BCS can provide effective volume supplementation and help maintain breast contour with a relatively simple technique. This approach demonstrated low complication rates and stable outcomes, even in patients receiving postoperative radiotherapy.

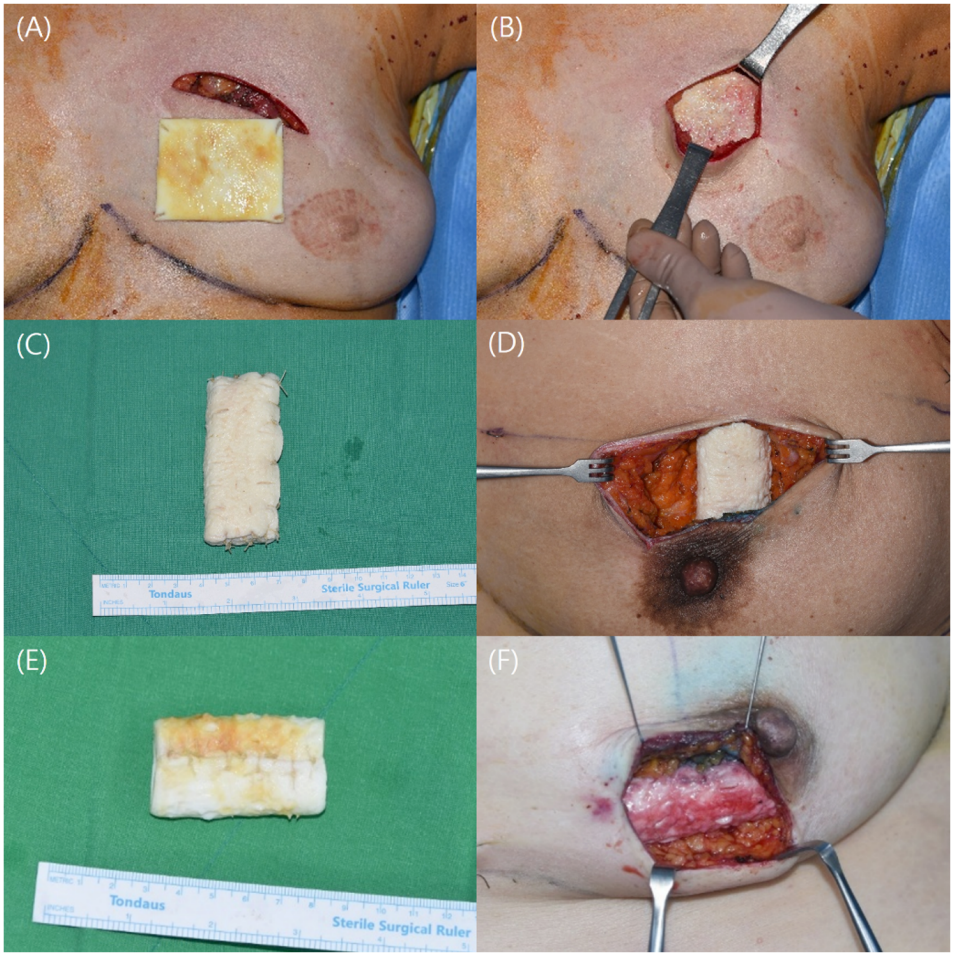


Figure 1. (A), (B) Intraoperative images. ADM (Acellular Dermal Matrix) (Megaderm 5x6cm, 3-5mm) insertion using sheet method below the skin flap. The ADM was fixed to the surrounding glandular tissue within the defect using 2-0 vicryl with interrupted sutures. (C), (D) ADM (Megaderm 6x12cm, 3-5mm) insertion using stacked method within the defect. ADM was overlapped and sutured with 2-0 Vicryl using interrupted sutures to form a stacked shape, and inserted into the defect, then fixed to the surrounding glandular tissue with interrupted sutures. (E), (F) ADM (Megaderm 5x6cm, 3-5mm) insertion using rolling method within the defect. After gathering both margins of a single ADM and suturing them with 2-0 Vicryl using interrupted sutures to form a tube shape, it was inserted into the defect and fixed to the surrounding glandular tissue with interrupted sutures.

Radiologic Safety and Volume Preservation of a 3D-Printed Bioresorbable Spacer in Breast-Conserving Surgery: A Retrospective Analysis of 53 Patients

Wooyeol Baek[1], Seho Park[2], Jee Hyun Ahn[2], Min Jung Kim[3], Kyung Jun Heo[1], Eun Jin Park[4]

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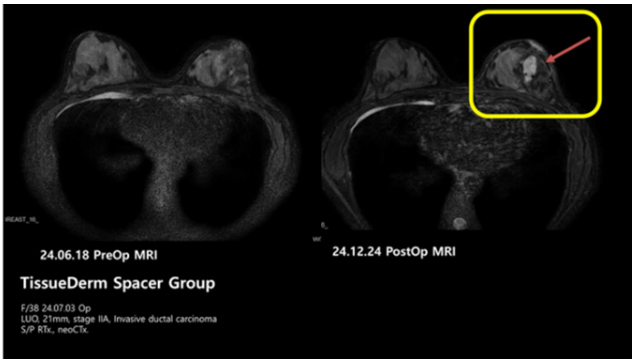
Background: Breast-conserving surgery (BCS) is an established oncologic treatment for early-stage breast cancer;however, postoperative volume deficiency and contour deformity remain common concerns. Existing reconstructive options, including local flaps, fat grafting, and acellular dermal matrix (ADM), may increase surgical complexity or interfere with postoperative imaging surveillance. TissueDerm is a novel three-dimensional (3D)printed bioresorbable polycaprolactone spacer designed to preserve lumpectomy cavity volume while allowing host tissue integration. This study aimed to evaluate the clinical safety and radiologic surveillance compatibility of the TissueDerm BCS spacer.

Methods: A retrospective review was conducted of 53 consecutive female patients who underwent BCS with TissueDerm spacer implantation between July 2024 and May 2025. Postoperative complications, adjuvant treatment timelines, and oncologic outcomes were assessed. Radiologic evaluation was performed using routine postoperative breast imaging at approximately 6 months, including MRI, CT, mammography, and ultrasonography. MRI findings were independently reviewed by two breast radiologists with emphasis on Breast Imaging Reporting and Data System categorization and the presence of spacer-related artifacts or abnormal findings.

Result: No major postoperative complications, including infection, seroma, hematoma, or foreign body reaction, were observed. All patients completed planned adjuvant therapies without delay. On MRI, the spacer-implanted region demonstrated a non-enhancing, homogeneous signal without solid components and remained stable on serial imaging at 6 months and 1 year. As shown in Figure 1, the control group (left) exhibits contour collapse with aesthetic deformity during postoperative healing after tumor excision, whereas the TissueDerm BCS spacer group (right) demonstrates preserved breast contour through effective space maintenance and autologous tissue regeneration. CT imaging showed attenuation values similar to or slightly lower than water density. Ultrasonography revealed a compressible and mobile structure that flattened under probe pressure. Mammographic evaluation demonstrated low radiographic density comparable to surrounding adipose tissue. All imaging studies were diagnostic-quality, and no spacer-related findings interfered with oncologic surveillance.

Conclusions: The TissueDerm BCS spacer demonstrated excellent clinical safety and radiologic transparency following breast-conserving surgery. These findings suggest that 3D-printed bioresorbable spacers represent a promising, imaging-friendly option for volume preservation in breast-conserving surgery.

Pre-op MRI 20.12.22
Post-op MRI 23.03.09
Without TissueDerm spacer
F/57 Rt. PM 2021-02-01 Op, RUL, 11mm, IDC, RTx+


24.06.18 PreOp MRI
24.12.24 PostOp MRI
TissueDerm Spacer Group
F/38 24.07.03 Op
LUO, 21mm, stage IIA, Invasive ductal carcinoma
S/P RTx., neoCTx.

Oncoplastic Outcomes and Patient-Reported Satisfaction Following Breast Conserving and Reconstructive Surgery: A 3-Year Experience at Intermed Hospital

Khurelbaatar Sainbaatar

Intermed Hospital, Department of Surgery, Mongolia

Background: The primary objective of modern breast cancer surgery is to achieve oncological safety while maintaining aesthetic integrity. This study evaluates the surgical outcomes and patient-reported satisfaction of individuals undergoing breast-conserving and reconstructive procedures at Intermed Hospital.

Methods: A retrospective study was conducted on 55 patients diagnosed with breast cancer stage I-IIB treated at the Department of Thoracic Surgery, Intermed Hospital, between January 2020 and November 2023. Variables analyzed included molecular subtypes, genetic predisposition (BRCA1/2), surgical technique, and postoperative psychosocial outcomes.

Result: The cohort consisted of 55 women age range 29-47 years and BMI 25. Molecular distribution was Luminal A 27 (49.1%), Luminal B 20 (36.4%), Triple-Negative 8 (14.5%), Genetic Status 6 patients (10.9%) were BRCA1/2 mutation carriers. Neoadjuvant chemotherapy was utilized in 39 cases (70.9%). Surgical interventions included Nipple-Skin Sparing Mastectomy (NSSM) with immediate implant 30 cases, Oncoplastic Breast Conserving Surgery 5 cases, Radical Mastectomy with delayed/immediate reconstruction 12 cases (4 with implant), Other complex reconstructions 3 cases. At the mean follow-up period, there were no documented cases of local recurrence or distant metastasis. Patient satisfaction analysis revealed significant post-surgical improvements in Enhanced social confidence and emotional health, high rates of body acceptance and overall attractiveness.

Conclusions: The integration of oncoplastic techniques and the involvement of plastic surgeons in therapeutic mammaplasty are highly effective at mitigating quality-of-life deficits. These approaches not only preserve physical appearance but significantly enhance psychological well-being from baseline. Where oncologically appropriate, these techniques should be established as the standard of care to optimize the holistic recovery of breast cancer patients.

Safety and Outcomes of Staged Implant Reconstruction after MRM and Radiotherapy

Mergen Dugarsuren

National Cancer Center of Mongolia, Department of Surgery, Mongolia

Background: Modified radical mastectomy (MRM) followed by radiotherapy is a mainstay in the management of locally advanced breast cancer but complicates subsequent breast reconstruction, particularly with implants, due to increased risks of complications in irradiated tissues.

Methods: Five female patients (ages 42-59) underwent MRM for stage II-III breast cancer at the National Cancer Center, Mongolia, with adjuvant radiotherapy completed between 2017 and 2018. All remained disease-free. Between 2024 and 2025, delayed breast reconstruction was performed at Intermed Hospital, Mongolia, using a two-step technique: initial tissue expander placement, followed by permanent implant insertion after an expander period of 4-6 months. Clinical data were reviewed for surgical technique, perioperative complications, aesthetic outcomes, and patient-reported satisfaction.

Result: All patients experienced a 6-8 year interval between radiotherapy and reconstruction, optimizing tissue recovery. The two-step technique, with expanders in place for 4-6 months, allowed for gradual tissue accommodation and reduced tension on irradiated skin. Mild capsular contracture occurred in two patients and minor wound dehiscence in one, with no cases of implant loss or major infection. Use of acellular dermal matrices and careful expansion protocols were key to minimizing complications. Early results showed satisfactory aesthetic outcomes and high patient satisfaction. At last follow-up, no metastasis or local recurrence was observed

Conclusions: Delayed, two-step implant-based reconstruction after MRM and radiotherapy, with a 4-6 month expander phase, is safe and effective when combined with meticulous surgical planning and modern reconstructive techniques. The staged approach is particularly advantageous in irradiated fields by promoting tissue adaptation and reducing complications. The absence of recurrence or metastasis in this cohort further supports the safety of this reconstructive pathway. Individualized counseling and multidisciplinary management remain essential for optimal patient outcomes.

Comparison of Immediate and Delayed Autologous Breast Reconstruction Methods: A Retrospective Cohort Study

Ilona Duadze, Azizzhon Zikiryakhodzhaev

National Medical Research Radiological Centre of the Ministry of Health of the Russian Federation, Department of Surgery, Russian Federation

Background: The pedicled transverse rectus abdominis musculocutaneous (TRAM) and free deep inferior epigastric perforator (DIEP) flap are two methods used for breast reconstruction after mastectomy. However, there are still controversies regarding the timing and particularities of these reconstructions. A retrospective study was conducted to assess the impact of complex treatment during autologous breast reconstruction using anterior abdominal wall flaps in patients with breast cancer.

Methods: The study included 116 patients with stage 0-IIIC breast cancer with immediate or delayed autologous breast reconstruction. Group I underwent breast reconstruction using a DIEP flap and Group II underwent breast reconstruction using a TRAM flap.

Result: The frequency of weakness of the anterior abdominal wall in the TRAM-flap group was significantly higher ($p < 0.001$). Total flap necrosis occurred more frequently in the immediate DIEP flap ($p = 0.025$). Liponecrosis of the flap was more often observed in the group of immediate TRAM-flap ($p = 0.004$). Complications in patients with obesity was significantly higher ($p = 0.002$). The duration of delayed autologous breast reconstruction does not correlate with the incidence of complications in patients who received radiation therapy and chemotherapy before surgery ($p = 0.84$, $p = 0.131$ respectively). During radiation therapy after autologous breast reconstruction, flap liponecrosis occurred significantly more often ($p = 0.021$), and the incidence of flap liponecrosis was significantly higher in the group of immediate operations than in delayed ones ($p = 0.004$). According to the results of the Breast-Q questionnaire, the indicators of psychosocial, sexual well-being, satisfaction with the reconstructed breast were significantly higher in the group of DIEP flaps ($p = 0.002$, $p = 0.004$, $p = 0.046$ respectively). Also, in the DIEP-flap group, physical well-being ($p < 0.05$) and postoperative satisfaction with the abdomen ($p = 0.003$) were higher.

Conclusions: The results of the clinical study demonstrate that autologous reconstruction is the "gold standard" in breast reconstructive plastic surgery. This method requires careful planning of the operation and selection of candidates for autologous reconstruction. This operation is necessary for a psycho-emotional, functional and aesthetic rehabilitation of the patient after mastectomy.

Intra-operative Doppler Mapping to Guide Secondary Pedicle Design in Therapeutic Mammoplasty

Serene Si Ning Goh[1,2], Lucy Aitchison[2], Dalal Alaradi[2], Georgios Exarchos[2], Leah Marley[2], Samantha Chen[2], Leyla Swafe[2], Frederick Hartley[2], Peter Barry[2]

[1]National Univ. of Singapore, Department of Surgery, Singapore, [2]The Royal Marsden NHS Foundation Trust, Department of Surgery, United Kingdom

Background: Therapeutic mammoplasty (TM) requires reliable arterial inflow to both the nipple-areolar complex(NAC) and any secondary pedicle(SP) used for defect reconstruction, yet breast vascular anatomy is highly variable and not routinely assessed. This study evaluates intra-operative Doppler mapping as a physiology-guided strategy to map breast perfusion and optimise pedicle selection and shaping.

Methods: Consecutive patients undergoing TM, with or without contralateral symmetrisation (Jan 2022-2026), underwent intra-operative handheld Doppler mapping of blood supply to the NAC and any tissue mobilised as an SP. Subsequent validation cohort underwent Doppler mapping of the medial, central, and lateral zones of SPs

Result: Sixty-four patients (114 breasts) were included. Median age was 58 years (IQR 51-63) and median BMI was 29.1 kg/m² (IQR 23.9-32.1). Doppler-detectable arterial inflow to the NAC and/or SP was identified in 100% of breasts. In the subset of TM cases requiring true volume replacement (22/64, 34%), median therapeutic specimen weight was 185 g (IQR 99-379 g), Doppler-positive SP inflow was identified in all patients (100%). In the validation cohort of 10 patients (19 breasts), doppler mapping altered SP shaping in 8 of 10 therapeutic cases (80%) and enabled targeted augmentation in one symmetrisation case. All SPs were inferior-pedicle based, most commonly supplied by central septal perforators (80%) and medial perforators (70%), with lateral inflow present in only 30%, demonstrating consistent dominance of the inferior septal system. No cases of NAC necrosis or SP fat necrosis occurred during follow-up. When collapsed into three usefulness categories, consultants rated Doppler-guided pedicle mapping as maximum in 68%, medium in 26%, and minimum in 6% of cases, whereas fellows/trainees rated it as maximum in 82%, medium in 18%, with no minimum ratings, indicating greater perceived clinical utility among less-experienced surgeons.

Conclusions: Routine intra-operative Doppler mapping reliably identifies blood supply to both NAC and secondary mammoplasty pedicles and frequently refines operative strategy.

Poster Presentation

Comparing Surgical Outcomes of Robotic versus Conventional Mastectomy

Tze Yi Low, Wei Qi Leong

National Univ. Hospital, Department of Surgery, Singapore

Background: Robotic mastectomy has gained significant popularity in the recent years, with studies demonstrating superior aesthetic outcomes and patient satisfaction compared to conventional mastectomy, with fewer complication rates, and comparable oncological safety. We sought to compare the postoperative outcomes of robotic (RM) versus conventional mastectomy (CM) in our centre, since the inception of the robotic breast surgery program in 2023.

Methods: Records of patients who underwent RM and CM in the National University Hospital between December 2023 to August 2025 were retrospectively reviewed. Propensity score matching was utilised to match the clinicopathologic variables of 30 RM and 30 CM patients. All robotic procedures were performed with the Da Vinci Xi system with a standardised technique. Comparative analyses were performed on perioperative outcomes and postoperative complications.

Result: Operative time was comparable in both groups. The total complication rate was lower in the RM group compared to the CM group, though this difference was not statistically significant (6.7% vs. 20%, $p = 0.129$). Nipple necrosis was seen in 4 CM patients, but none of patients in the RM arm had nipple necrosis (13.3% vs. 0%, $p = 0.038$). These patients had grade 2-3 nipple necrosis necessitating repeated procedures for wound debridement or negative pressure wound therapy. 2 RM patients in total experienced postoperative complications; 1 patient had skin necrosis and implant loss requiring implant removal and flap coverage; 1 patient experienced intraoperative blood loss of 2 litres from a chest wall perforator vessel, requiring intraoperative blood transfusions, but recovered uneventfully after. Increasing RM experience led to lower surgical complication rates.

Conclusions: Based on our centre's experience, RM results in significantly lower nipple necrosis rates. Our results are in keeping with studies from other centres which demonstrate comparable to fewer complication rates with RM. Further follow up of these patients is necessary to establish long-term oncological safety and cost-effectiveness.

Adoption of Endoscopic Nipple-Sparing Mastectomy with immediate reconstruction: Feasibility, Technique, and Early Outcomes

Wei Wen Ang[1], Aloysius Ming Ngan Tan[1], Rachel Yanlin Chen[1], Jun Su[1], Sheena Say Hoon Phua[1], Victoria Sze Hui Goh[2], Geraldine Hwee Ping Lee[2], Allison Mei Fern Quah[2], Ern Yu Tan[1]

[1]Tan Tock Seng Hospital (Singapore), Department of Surgery, Singapore, [2]Tan Tock Seng Hospital (Singapore), Department of Plastic Surgery, Singapore

Background: Endoscopic nipple-sparing mastectomy (eNSM) has emerged as a minimally invasive alternative to conventional open nipple-sparing mastectomy, addressing ergonomic challenges and limitations in surgical visualisation. This study evaluates the feasibility and early outcomes following the adoption of eNSM at a Singapore tertiary centre.

Methods: Between November 2024 and December 2025, 15 breast cancer patients underwent eNSM with immediate reconstruction. Reconstruction methods included pedicled transverse rectus abdominis myocutaneous, latissimus dorsi, implant-based, and deep inferior epigastric perforator flaps. Eligibility criteria comprised absence of clinical or radiological nipple involvement, no skin invasion, and breast size cup C or smaller. Outcomes assessed included operative time, estimated blood loss, length of hospital stay, postoperative complications, nipple-areolar complex (NAC) ischemia or skin ischemia, and patient satisfaction. Patients were followed for up to 12 months postoperatively.

Result: Fifteen patients underwent eNSM with immediate reconstruction. Median age was 52 years (interquartile range [IQR] 44-62) and median body mass index was 25.4 kg/m² (IQR 24.1-26.8). Median incision length was 5.0 cm (IQR 5.0-5.0). Median operative time was 182.5 minutes (IQR 170-205) for mastectomy and 500 minutes (IQR 434-575) for reconstruction. Median estimated blood loss was 100 mL (IQR 50-200). Median specimen weight was 430 g (IQR 230-496), with a median invasive tumour size of 16.5 mm (IQR 7-25). Median length of hospital stay was 5.5 days (IQR 4-6). Two patients developed superficial NAC scabbing managed conservatively. One patient experienced periareolar skin necrosis requiring debridement and skin grafting.

Conclusions: Endoscopic nipple-sparing mastectomy is a safe and effective option for appropriately selected breast cancer patients, with operative duration and blood loss comparable to open nipple-sparing mastectomy. The technique is easily adoptable, has a low rate of early complications and no observed oncological compromise in the short term, and offers improved visualisation of the medial skin flap with favourable aesthetic outcomes.

A Single-centre Experience with Local Perforator Flap Reconstruction after Breast Conserving Surgery: A Review of Indication and Outcomes

Xue En Chuang, Clement Chia

Khoo Teck Puat Hospital, Department of Surgery, Singapore

Background: Breast-conserving surgery strives to balance oncology with aesthetics, to render the patient cancer-free while preserving an appearance that many have come to signify womanhood. Local perforator flap reconstruction has been one of the ways to preserve the breast mound and enhance the shape of the breast to mirror a natural one.

Methods: A retrospective review of our centre's perforator flap reconstruction indications and outcomes in patients who have undergone a wide local excision and breast reconstruction with a LICAP (lateral intercostal artery perforator) or AICAP (anterior intercostal artery perforator) flap following breast-conserving surgery. Tumour location, flap selection, surgical outcomes and complications were analysed in this review.

Result: Over the last 2 years, in a single centre, there were 10 cases of perforator flap reconstructions following breast conserving surgery. 8 were LICAP flap reconstructions with lesions in the lateral portion of the breast, and 2 were AICAP flap reconstructions with lesions in the inferior and lower inner quadrant. Operative and post-operative recovery were uneventful with good surgical outcomes, none required further resection of margins. A simultaneous SLNB or AC was able to be performed through the same incision with no significant impact on the final cosmesis in the cases of LICAP reconstructions. A separate axillary incision was required in the cases of MICAP reconstructions, but the incisions healed well and the scars were well concealed in the axilla.

Conclusions: LICAP and AICAP flaps are safe and reliable local reconstruction options following breast conservation surgery. It is a suitable technique for reconstructions after resection of up to 50% of breast volume before considering muscle-based flaps, which have increased morbidity. Appropriate flap selection based on tumour location allows for effective volume replacement with good oncological outcomes, low complication rates and good aesthetic outcomes, make local perforator flap reconstruction a good option.

Outcomes of Chest Wall Perforator Flaps: A 10-year District General Hospital Experience

Qin Yi Lee, Laura Smith, Alexander Leeper, Jerome Pereira, Sarah Downey, Sue Down

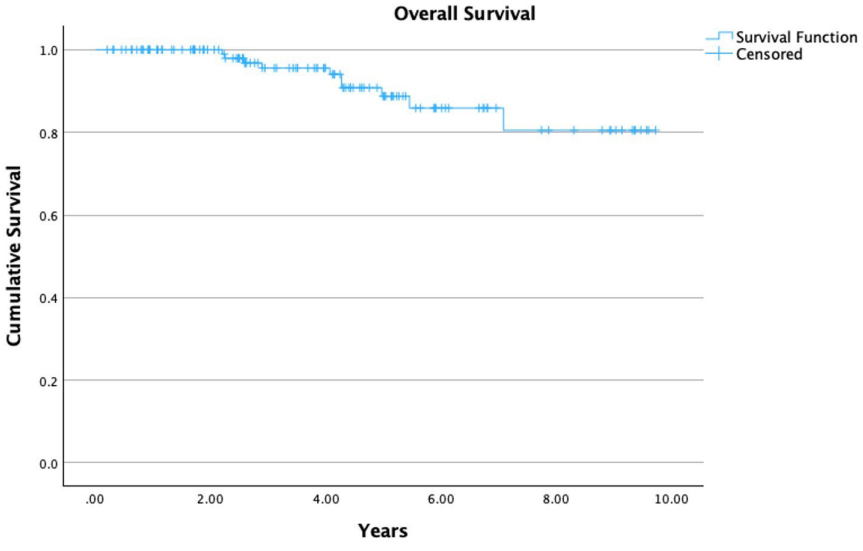
James Paget Univ. Hospital, Department of Breast Surgery, United Kingdom

Background: Emerging evidence suggests a survival advantage supporting breast-conserving surgery (BCS) for early breast cancer versus mastectomy. Oncoplastic procedures with chest wall perforator flaps (CWPF) for volume replacement in patients with a larger tumour-to-breast volume ratio has gained popularity owing to improved cosmetic outcomes with a hidden scar. Lateral Intercostal Artery Perforator (LICAP) for upper outer quadrant tumours and the Anterior or Medial Intercostal Artery Perforator (AICAP/MICAP) for inferior pole tumours are most commonly utilized.

Methods: We retrospectively review the outcomes of CWPFs in our unit over the last 10 years.

Result: 131 patients with a median age of 65.6 years old and median BMI 28 underwent BCS with a CWPF. 66.4% presented with a lump and 33.6% were screen-detected. Majority were IDC (74.8%) with 12.2% ILC, 9.2% DCIS, 2.3% mixed tumors and 1.5% benign. There were 51.1% LICAP, 42.7% AICAP/MICAP flap, 3.8% modified internal flap and 2.3% dual flaps. Median operative time was 110 minutes. 16.8% patients required further margin re-excisions. Overall complication rate was 1.24% (8 haematomas, 4 infections and 2 distortions). All flaps survived. There were 5.3% recurrences (5 distant, 2 locoregional) with a 10-year overall survival of 80%. Comparing LICAP and AICAP/MICAP, operative time for LICAP was longer (119 minutes vs 97 minutes). LICAP specimens were larger (weight 64g vs 31.5 g, dimensions 65×64×32 mm vs 52×48×25 mm) with bigger tumours (25 mm vs 19 mm). Anecdotally, some patients complain of breast heaviness and swelling suggestive of breast lymphedema which impacts their day-to-day activities, though there are no objective data available.

Conclusions: CWPF is a safe and versatile technique with low complication rates and sound oncological outcomes. Early detection and management of breast lymphedema is a potential area for further research to determine its true impact on the quality of life of breast cancer survivors with CWPFs.



Poster Presentation

Investigation on the Imaging of the Upper Limb Lymphatic Drainage Systems at Different Injection Sites

Bei Zhang[1], Qingwei Wu[2], Guoshuai Ma[2], Xiaorong Sun[2], Yongsheng Wang[1], Binbin Cong[1]

[1]Shandong Cancer Hospital & Institute, Department of Surgery, China, [2]Shandong Cancer Hospital & Institute, Department of Radiology, China

Background: High-resolution mapping of upper-extremity lymphatics clarifies the anatomical interplay between arm drainage nodes and axillary basins that receive breast lymph flow. We therefore compared the imaging phenotypes of the limb lymphatic system when a radiotracer is deposited at two distinct cutaneous sites.

Methods: Women with early-stage breast cancer were randomly allocated to receive 2 mCi 99mTc-labeled dextran (DX). Group A received a single intradermal injection in the medial bicipital groove; Group B received divided intradermal doses in the interdigital web spaces of the dorsal hand. SPECT/CT planar and tomographic images were acquired to delineate upper-limb lymphatic drainage patterns, and datasets were analyzed statistically.

Result: Between August and September 2025, 12 women were enrolled (Group A, n = 5; Group B, n = 7). No upper-extremity lymph nodes or collecting vessels were visualised in Group A. In Group B, nodal visualization reached 85.7% and vessel visualization 42.9% (nodal $p = 0.015$ vs. A; vessel $p = 0.205$). Visualised nodes lay consistently between the second and third ribs; three subjects showed complete arm-lymphatic mapping in Group B.

Conclusions: Divided intradermal tracer injection on the dorsum of the hand reliably opacifies the upper-limb lymphatic system, furnishing a practical tool to delineate normal drainage patterns and node topography and to guide strategies that minimise breast-cancer-related arm lymphoedema.

Palliative Radiotherapy for Inoperable or Metastatic Breast Cancer with Locoregional Oligoprogression on Stable Systemic Therapy

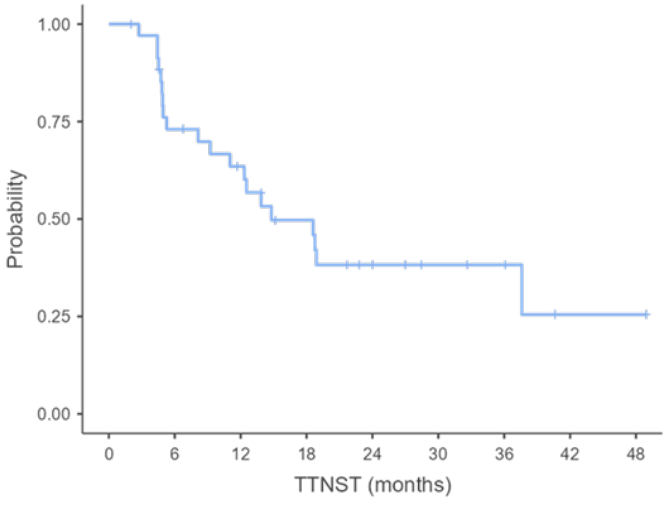
Hiu Ching Wong, Brian Chan, Jean Ngan Sum Cheng, Winnie Wing Yan Tin, Ting Ying Ng, Frank Chi Sing Wong

Tuen Mun Hospital, Department of Clinical Oncology, Hong Kong

Background: Metastatic breast cancer with oligoprogression at locoregional sites receiving radiotherapy (RT) to oligoprogressive site may delay the change to next line systemic anti-cancer therapy (SACT) and provide symptom palliation. However, evidence remains controversial. While most data focuses on ablative SBRT, outcomes of using other palliative RT techniques with ultrahypofractionated or hypofractionated dose-fractionation are understudied. Yet, clinically it is proven effective. This retrospective analysis evaluates palliative RT in oligoprogressive local breast disease.

Methods: Patients with inoperable or metastatic breast cancer with oligoprogression (≤ 5 sites), one of which was local or regional disease progression and kept on same SACT, who received palliative RT to the breast at Tuen Mun Hospital (2020-2024) were included. Treatment consisted of RT to the breast for ≥ 5 fractions, either ultrahypofractionated (UHRT) 26Gy in 5 fractions or hypofractionated (HRT) for at least 39Gy in 13 fractions with or without tumour boost to BED ≥ 70Gy ($\alpha/\beta = 3.5$). The primary endpoint was time to next systemic therapy (TTNST). Response rate and toxicities were secondary endpoints.

Result: 35 patients were included. 8 patients received UHRT, while 27 patients received HRT. Median BED 83.6Gy (range 64.6-117). 23 had hormonal receptor positive, HER2 negative disease; 11 were HER2 positive; 1 was triple negative. 54.2% had visceral metastases, 28.6% had bone-only metastases. Median time on current SACT was 12.1 months (range 3.03-108.0), received median of 1 line of SACT (range 1-3), with median of 1 site of oligoprogression (range 1-4), 69% had local only progression. Median TTNST was 14.8 months (95% CI 11 months - NR). Response rate at 12 weeks was 62.9%. Clinical Benefit Rate at 12 weeks was 85.7%. Median local PFS was 14.9 months (95% CI 11.7-NR). ≥ G3 Acute radiation dermatitis was 14.3%. Retreatment rate was 20%.



Conclusions: Palliative radiotherapy for breast cancer with locoregional oligoprogression is safe and may delay the change in SACT.

Poster Presentation

Impact of Postoperative Radiation Therapy on Local Control in Older Patients After Breast-Conserving Surgery: A Propensity Score-Matched Analysis of a Large Clinical Dataset

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Background: Postoperative radiation therapy (RT) following breast-conserving surgery is standard care; however, RT omission in low-risk elderly patients remains controversial. Large-scale real-world evidence regarding long-term RT efficacy across broad age spectrums in routine practice remains limited.

Methods: This retrospective, multi-institutional cohort study included patients who underwent breast-conserving surgery for stage 0-III breast cancer between January 2014 and December 2018 at 25 Japanese institutions. Clinical and pathological data were collected through medical record review. Primary outcomes included local recurrence, disease-free survival, and overall survival. Propensity score matching (PSM) using 1:1 nearest-neighbor matching (caliper width 0.2) was performed to minimize selection bias between RT and non-RT groups. The propensity score model incorporated age, tumor size, clinical stage, molecular subtype, hormone receptor status, HER2 status, nuclear grade, Ki-67 expression, surgical margins, and receipt of systemic therapies. Survival outcomes were analyzed using Kaplan-Meier methods and Cox proportional hazards models.

Result: Among 8,900 patients identified, 7,712 received RT, 1,140 did not receive RT, and RT status was unknown in 48 patients. After PSM based on comprehensive baseline characteristics, 1,047 well-balanced matched pairs were successfully created with excellent covariate balance. Validation of estimated treatment effects after propensity score adjustment across different age groups is currently ongoing. Additionally, subgroup analyses stratified by breast cancer molecular subtype are being conducted specifically in patients aged 75 years and older to further clarify the clinical benefit of RT in this elderly population.

Conclusions: This large-scale study will elucidate real-world clinical practice patterns of post-lumpectomy RT in Japan and reaffirm the clinical significance of RT in elderly patients. The findings will provide valuable evidence to support appropriate patient selection for RT and facilitate individualized treatment decision-making in breast-conserving therapy, particularly for elderly populations where the role of RT remains controversial.

Axillary Nodal Dose Exposure During Whole-Breast Radiotherapy in Patients Undergoing Sentinel Lymph Node Biopsy Omission: Long-Term Axillary Control and Oncologic Outcomes

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Background: Sentinel lymph node biopsy (SLNBx) omission is supported by randomized trials in selected patients with clinically node-negative, early-stage breast cancer treated with postoperative WBRT; however, the extent of incidental axillary irradiation and its contribution to axillary control remain unclear.

Methods: This single-institutional retrospective study included patients with image-defined cN0 invasive breast cancer who underwent breast-conserving surgery without SLNBx and received WBRT at Samsung Medical Center between 2016 and 2020. All tumors were pTmic-T1 without lymphovascular invasion. Hormone receptor-positive disease accounted for 78.9% of cases. WBRT was delivered using conventional fractionation (50 Gy in 25 fractions) in 63.2% or hypofractionation (42.4 Gy in 16 fractions) in 36.8%. Axillary levels I-III were contoured and radiation dose was quantified using V90 and V95, defined as the relative nodal volume receiving ≥90% or ≥95% of the prescribed breast dose. Axillary control and oncologic outcomes were assessed.

Result: Thirty-eight patients were included, with a median age of 49 years. The median Breast CTV V90 was 98.1%. Axillary nodal (ALN) dose varied across axillary levels. Median V90 was 20.6% (interquartile range [IQR], 10.1-32.1%) for level I, 12.4% (IQR, 0.9-23.5%) for level II, and 0.0% (IQR, 0.0-0.0%) for level III. Median V95 values were 0.2% for level I and 0.0% for levels II and III. More than 80% had <40% of ALN volume receiving ≥90% of the prescribed breast dose. With a median follow-up of 69 months, no axillary recurrence was observed. Five- and ten-year axillary recurrence-free survival and overall survival were both 100%, and breast cancer recurrence-free survival was 97.2%.

Conclusions: Despite limited axillary dose exposure during WBRT after SLNBx omission, long-term axillary control was excellent. These findings suggest that extensive axillary dose coverage may not be required and support further evaluation of radiotherapy de-escalation strategies.

Development of an Interpretable Machine Learning Model for Predicting Breast Cancer-Related Lymphedema

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Background: Breast cancer-related lymphedema (BCRL) is a debilitating complication that significantly impacts survivors' quality of life. This study aims to develop a robust prediction model for BCRL development within two years post-treatment using an interpretable machine learning approach.

Methods: We analyzed retrospective data from 5,549 breast cancer patients treated at our institution. Among them, 494 patients (8.9%) developed lymphedema within two years. The dataset was randomly split into a training set (80%) and a test set (20%). To address class imbalance, the Synthetic Minority Over-sampling Technique (SMOTE) was applied. Performance of multiple algorithms was evaluated using the Area Under the Receiver Operating Characteristic Curve (AUC). SHapley Additive exPlanations (SHAP) were utilized to visualize feature importance, and Odds Ratios (OR) were calculated to quantify clinical risks.

Result: The XGBoost model achieved the highest performance with an AUC of 0.7927, followed by Logistic Regression (AUC = 0.7882), Random Forest (AUC = 0.7441), and LightGBM (AUC = 0.7227). SHAP analysis primarily identified the number of dissected lymph nodes, Taxane use, Regional Nodal Irradiation (RNI), BMI, and Neoadjuvant Chemotherapy as the most critical factors influencing the model's predictions. Multivariable logistic regression further quantified the risk associated with these key features: Taxane-based chemotherapy (OR 2.38) and RNI (OR 1.33) were associated with significantly increased odds of lymphedema. Furthermore, risk increased by approximately 7% for each additional dissected lymph node (OR 1.07) and each unit increase in BMI (OR 1.07), while Neoadjuvant Chemotherapy showed an OR of 0.90.

Conclusions: This study demonstrates that machine learning models can effectively stratify BCRL risk. The integration of SHAP analysis and statistical modeling highlights that aggressive locoregional treatments, specifically extensive node dissection and RNI, along with Taxane chemotherapy and high BMI, are the primary drivers of lymphedema. These findings support the use of this interpretable model to identify high-risk patients who warrant intensified surveillance.

Long-Term Clinical Outcomes of Proton Beam Re-irradiation for Locoregionally Recurrent Breast Cancer: A Single-Center Experience

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Background: Re-irradiation for locoregionally recurrent breast cancer is limited by cumulative dose constraints and toxicity concerns. Proton beam therapy (PBT) may allow re-irradiation with acceptable safety; however, long-term outcome data remain limited.

Methods: We retrospectively analyzed breast cancer patients treated with PBT between 2016 and 2023 at a single proton therapy center. Among 106 patients (121 courses), those treated with palliative intent or irradiation to distant sites were excluded. Thirty-one patients undergoing curative-intent proton re-irradiation to locoregional sites were included. Toxicities were graded using the Common Terminology Criteria for Adverse Events version 5. Radiation doses were converted to equivalent doses in 2 Gy fractions (EQD2) using an α/β ratio of 3.

Result: The median age at re-irradiation was 53 years (interquartile range [IQR], 46-58), and salvage definitive treatment accounted for 77.4% (n = 24). The median interval from prior radiotherapy to PBT was 67.5 months (IQR, 42.8-98.5). Hypofractionated regimens were used in 83.9% (n = 26), with a median PBT dose of 64.4 Gy (EQD2) and a median cumulative dose of 118.7 Gy. With a median follow-up of 32.9 months (IQR, 23.7-70.0), 5-year breast cancer-specific survival (BCSS), locoregional recurrence-free survival (LRRFS), and distant metastasis-free survival (DMFS) were 73.9%, 66.6%, and 63.3%, respectively. Treatment-related toxicity was predominantly mild, with grade 1 in 24 patients (77.4%), grade 2 in 4 (12.9%), and grade 3 dermatitis in 1 (3.2%); no grade 4 toxicity or treatment-related death occurred. On exploratory analysis, patients with repeated recurrences had significantly worse BCSS than those with a first recurrence (hazard ratio, 5.92; 95% confidence interval, 1.12-31.3; $p = 0.037$).

Conclusions: Proton beam re-irradiation for locoregionally recurrent breast cancer achieved acceptable outcomes with limited severe toxicity. Repeated recurrence was associated with inferior BCSS, highlighting recurrence burden as an important prognostic factor when considering re-irradiation strategies.

Risk of Radiation Pneumonitis Following Concurrent Administration of Radiotherapy and Capecitabine in HER2-negative Breast Cancer

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Background: Pneumonitis induced by radiotherapy (RT), systemic therapy, or their combination is an important complication of chemoradiation for breast cancer (BC) treatment. This study aimed to assess the effects of concurrent RT and capecitabine chemotherapy on the incidence of radiation pneumonitis (RP) in patients with human epidermal growth factor receptor 2 (HER2)-negative BC with residual disease after neoadjuvant chemotherapy (NACT).

Methods: This retrospective study evaluated 19 patients with HER2-negative BC who underwent adriamycin/taxane-based NACT following surgical resection between 2023 and 2024 and received concurrent capecitabine/RT. We evaluated the incidence of RP in these patients, and, additionally, calculated progression free survival (PFS) and overall survival (OS) rates.

Result: The median follow-up period was 19.6 months after BC diagnosis. The incidence of any-grade acute RP was 42.1% within a median of 3.5 months post-RT; all patients were asymptomatic (grade 1). The incidence of any-grade late RP was 63.2% within a median of 8.6 months; 57.9% were asymptomatic (grade 1), and 5.3% were symptomatic (grade 2). Grade ≥ 3 RP did not occur, regardless of the interval from RT completion. More, 15.8% experienced capecitabine-related toxicity; 5.3% had asymptomatic neutropenia (grade 1); 5.3%, asymptomatic hand-foot syndrome (HFS, grade 1); and 5.3%, symptomatic HFS (grade 2). The 2-year PFS and OS rates were 80% and 100%, respectively.

Conclusions: RP is mainly asymptomatic in adjuvant RT with capecitabine for chemotherapy-resistant HER2-negative BC. This approach appears to be safe given the low incidence of symptomatic RP and the low toxicity of capecitabine.

Quantitative Assessment of CBCT Image Quality Metrics and Their Translation to Clinical ART Workflow Performance in Breast Cancer Patients

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Background: Adaptive radiotherapy (ART) relies on cone-beam CT (CBCT) imaging for daily treatment adaptation. However, inherent physical limitations of CBCT can compromise contour delineation and dose calculation accuracy. The relationship between quantitative CBCT image quality metrics and clinical ART workflow performance remains insufficiently characterized. This study aimed to investigate the clinical impact of CBCT image quality on ART workflow accuracy in breast cancer patients by comparing contour agreement and dose calculation accuracy between Halcyon and TrueBeam systems, and by establishing quantitative links between image quality metrics and clinical performance.

Methods: Forty breast cancer patients treated with VMAT were retrospectively analyzed and equally divided between Halcyon (n = 20) and TrueBeam (n = 20). Phantom-based image quality assessment was performed using a Catphan 504 phantom, evaluating HU uniformity, contrast-to-noise ratio (CNR), signal-to-noise ratio (SNR), and modulation transfer function (MTF). Planning CT and first-fraction CBCT images were aligned using deformable image registration. AI-based auto-segmentation was applied to six anatomical structures and evaluated using the Dice Similarity Coefficient (DSC) and geometric metrics. VMAT plans were recalculated on CBCT images using system-specific HU-to-electron density calibration curves, followed by dose-volume histogram analysis and 3D gamma evaluation.

Result: Halcyon demonstrated superior CBCT image quality, with higher CNR and improved HU uniformity compared to TrueBeam, despite comparable spatial resolution. Accordingly, Halcyon achieved more accurate and consistent contour agreement. Dosimetric evaluation demonstrated system-dependent differences across dosimetric metrics: TrueBeam showed smaller discrepancies in target coverage metrics, but systematically overestimated internal dose metrics. Under stringent 1%/2 mm gamma criteria, Halcyon demonstrated higher passing rates and lower inter-patient variability, indicating more reliable dose calculation in ART workflows.

Conclusions: Quantitative CBCT image quality metrics, particularly CNR and HU uniformity, directly influenced both contour accuracy and dosimetric concordance in breast ART workflows. These findings provide quantitative evidence linking CBCT image quality to clinical ART performance.

Low Regional Recurrence Regardless of Nodal Irradiation in cN1-2a ypN0 Patients After Dual HER2 Blockade for HER2-Positive Breast Cancer: A Multicenter Study (KROG 24-02)

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Background: The NSABP B-51 trial demonstrated that regional nodal irradiation (RNI) did not reduce breast cancer recurrence risk in patients who achieved ypN0 after preoperative systemic therapy (PST). Real-world validation in the contemporary dual HER2 blockade era is needed to inform clinical practice.

Methods: A retrospective multicenter analysis across 10 institutions of patients with cN1-2a HER2-positive breast cancer treated with PST including dual HER2 blockade (trastuzumab and pertuzumab) and postoperative radiotherapy was conducted. Recurrence-free survival (RFS) and breast cancer-specific survival (BCSS) were calculated. Subgroup analyses for RFS were performed according to ypN status and RNI use. Patterns of first recurrence were also analyzed.

Result: Of 459 eligible patients, 370 (80.6%) achieved ypN0 after PST. Patients who received RNI had higher clinical stages in both the overall cohort and ypN0 subgroup ($p < 0.05$). Only 5 ypN+ patients omitted RNI. At a median follow-up of 58.9 months (interquartile range, 52.8-69.6 months), 5-year RFS and BCSS in the overall cohort were 92.3% and 99.5%, respectively. RNI status did not affect RFS in either the overall cohort (5-year RFS: No RNI 90.6% vs. RNI 92.7%, log-rank $p = 0.505$) or the ypN0 subgroup (91.3% vs. 94.8%, $p = 0.330$). Patterns of first recurrence were similar between groups. Regional recurrence as a component of first recurrence occurred in only 1.5% of all patients and 0.8% of ypN0 patients.

Conclusions: This multicenter study provides real-world validation of NSABP B-51 findings in the dual HER2 blockade era, demonstrating exceptionally low regional recurrence rates and excellent RFS in ypN0 patients regardless of RNI. These data support RNI omission as a safe approach for HER2-positive patients achieving ypN0 after PST with dual HER2 blockade.

Delivering Cardiac-Sparing Breast Cancer Radiotherapy Using Deep Inspiration Breath Hold in a Low- and Middle-Income Country: A Dosimetric Analysis

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Background: Radiotherapy for left-sided breast cancer carries a risk of radiation-induced cardiac toxicity. Deep Inspiration Breath Hold (DIBH) is an effective technique to reduce cardiac dose but its implementation in low- and middle-income country (LMIC) settings is not widely reported. This study evaluates the feasibility and dosimetric outcomes of a DIBH program in an LMIC

Methods: A retrospective dosimetric analysis was conducted on 27 consecutive left-sided breast cancer patients treated with adjuvant radiotherapy using DIBH. All Patients received a total dose of 40 Gy to the whole breast/chest wall delivered in 15 fractions. Four patients received an additional tumor bed boost in the form of a simultaneous Integrated Boost (SIB) to a total dose of 48 Gy in 15 fractions. Treatment planning utilized 3D conformal radiotherapy (3DCRT) or volumetric modulated arc therapy (VMAT). Primary endpoints were mean heart dose (MHD) and the volume of heart receiving 25 Gy (V25%)

Result: All 27 patients successfully completed treatment with DIBH. Excellent cardiac sparing was achieved. The mean heart dose was 3.41 Gy (range: 1.1-4.65 Gy). The mean heart V25% was 9.52%. Lung dose parameters also remained within acceptable constraints, with a mean ipsilateral lung V20% of 12.07 Gy (range: 6-15.6 Gy). The median overall treatment time was 20 days, demonstrating efficient service delivery

Conclusions: The implementation of a DIBH protocol for left breast radiotherapy in an LMIC setting is both feasible and effective. The achieved dosimetric results - with a low mean heart dose of 3.41 Gy and a mean V25% of 9.52% - are comparable to standards in high-income settings and demonstrate significant potential for reducing long-term cardiac risk. This supports the broader adoption of DIBH in resource-limited environments to improve patient outcomes

Real-world Outcomes of Hypofractionated Adjuvant Radiotherapy Postmastectomy and Axillary Dissection in Early-stage Breast Cancer

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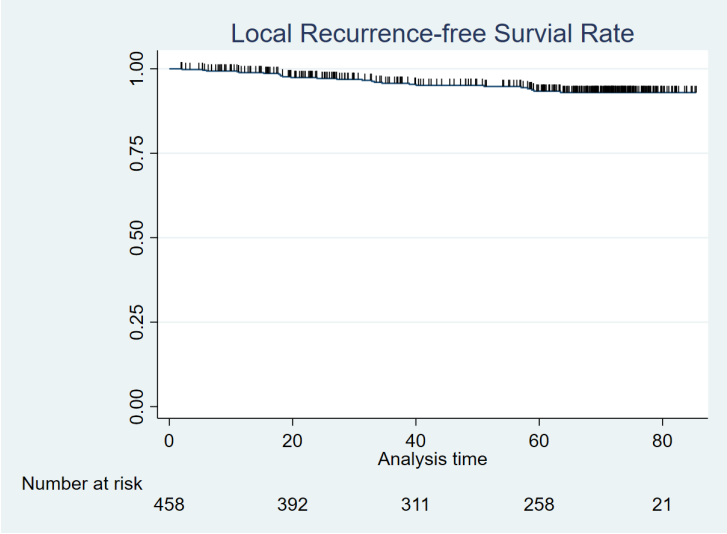
Background: In breast cancer, adjuvant radiotherapy following mastectomy and axillary lymph node dissection plays an essential role in reducing locoregional recurrence and improving overall survival, particularly in patients with high-risk features. There was limited data on the efficacy of hypofractionated adjuvant radiotherapy in developing countries. This study aimed to evaluate the outcomes of hypofractionated adjuvant radiotherapy in patients with early-stage breast cancer after mastectomy and axillary dissection.

Methods: This was a retrospective descriptive case series including 458 patients with stage IIIA breast cancer who underwent mastectomy and axillary dissection, followed by adjuvant radiotherapy using either 42–45 Gy (3 Gy per fraction) or 42.56 Gy (2.66 Gy per fraction) from June 2018 to June 2019. The study objectives were to assess locoregional recurrence rate, distant metastasis rate, locoregional recurrence-free survival (LRFS), overall survival (OS), and factors associated with survival outcomes.

Result: The median follow-up time was 64.3 months. The rates of locoregional recurrence and distant metastasis were 5.5% and 12.5%, respectively. The 6-year LRFS and OS were 93% and 95.5%, respectively. There was no statistically significant difference between the two fractionation regimens (3 Gy vs. 2.66 Gy per fraction). Patients with stage IIIA disease had a 2.4-fold higher risk of locoregional recurrence and a 3.9-fold higher risk of death compared with those in stage III. Involvement of more than three lymph nodes was also associated with an increased risk of recurrence (HR = 2.7) and mortality (HR = 4.2). The HER2 subtype was identified as an independent prognostic factor for overall survival (HR = 10.3).

Conclusions: Hypofractionated adjuvant radiotherapy after mastectomy and axillary dissection in early-stage breast cancer resulted in a low rate of locoregional recurrence. This approach can be implemented safely as standard practice, reducing treatment waiting times for patients.



Poster Presentation

Biodegradable and Redox-responsive Nanoparticle Platform with TROP2 Antibody Linkage for Lactate Dehydrogenase Inhibitor to Reduce Chemo-resistance in Triple Negative Breast Cancer

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Background: Chemo-resistance remains a leading cause of treatment failure and death in triple-negative breast cancer (TNBC). It is partially induced by aberrant level of lysine lactylation(Kla), a novel type of post-translational modification. Trop2 is a transmembrane glycoprotein overexpressing in TNBC and targeting lactylation is the promising therapeutic strategy as well as chemotherapy can trigger redox reaction, therefore, we constructed a biodegradable and redox-responsive nanoparticle (NP) platform linking Trop2 antibody for lactate dehydrogenase(LDHA) inhibitor Oxamate targeting Rac1 Kla, which could enhance chemo-resistance of TNBC.

Methods: We employed liquid chromatographymass spectrometry (LC-MS/MS) to present the landscape of protein Kla and revealed the critical regulatory effect of Rac1 Kla in TNBC. Further, a biodergradable and redox-responsive NP platform was constructed. It consists of a solid poly (disulfide amide)(PDSA)/cationic lipid core and a lipid-poly (ethylene glycol)(lipid-PEG) shell for LDHA inhibitor Oxamate targeting lactylation of Rac1 and with Trop2 antibody linkage in TNBC cells. The NP platform is highly responsive to the concentrated glutathione (GSH) in the cytoplasm induced by chemotherapy and further trigger intracellular LDHA inhibitor release.

Result: Rac1 lactylation was enriched in chemo-resistant TNBC and increased NRF2 nuclear translocation via KEAP1-NRF2 axis, thereby suppressing ferroptosis and enhancing chemo-resistance. The TROP2-targeted, GSH-responsive NP platform achieved tumor accumulation, triggered intracellular release, inhibited Rac1 lactylation in tumors, and synergized with chemotherapy to suppress tumor growth with minimal systemic toxicity.

Conclusions: Rac1 lysine lactylation is a pivotal post-translational modification linking metabolic reprogramming to ferroptosis resistance via a KEAP1-NRF2 axis in chemo-resistant TNBC. Targeting Rac1 lactylation with a TROP2-targeted and GSH-responsive nanoparticle represents a promising translational strategy to overcome chemo-resistance in TNBC.

Bromelain Attenuates Doxorubicin-Induced Cardiac Injury in a Wistar Rat Model

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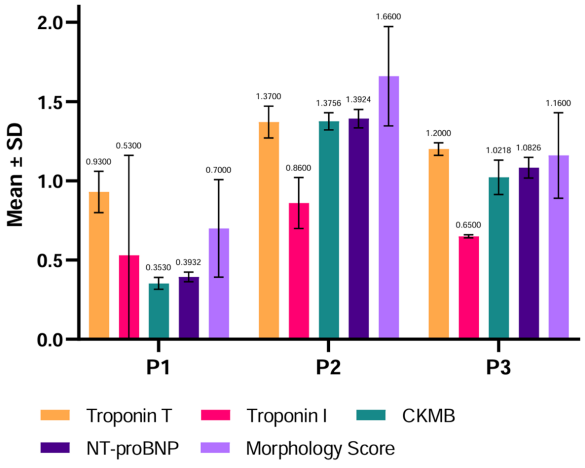
Background: Anthracycline chemotherapy remains a cornerstone of breast cancer treatment but is limited by dose-dependent cardiotoxicity, which may lead to irreversible myocardial injury and long-term cardiovascular morbidity. Strategies to mitigate anthracycline-induced cardiotoxicity remain limited. Bromelain, a proteolytic enzyme derived from Ananas comosus, exhibits antioxidant and anti-inflammatory properties that may confer cardioprotection. This study evaluated the effect of bromelain on biochemical and histopathological markers of doxorubicin-induced cardiac injury in an experimental rat model.

Methods: A posttest-only controlled experimental study was performed in Wistar (Rattus norvegicus) rats with single-blind randomization. Animals were assigned to control, doxorubicin-only (DOX; cumulative dose 15 mg/kg intraperitoneally over 14 days), or DOX plus bromelain (40 mg/kg body weight administered enterally 30 minutes before each DOX dose). On day 15, serum Troponin-T, Troponin-I, CKMB, and NT-proBNP, biomarkers commonly used for early detection and risk stratification of anthracycline-related cardiac injury, were quantified by immunoassay. Myocardial injury was further assessed histopathologically through evaluation of cytoplasmic vacuolization and myofibrillar loss.

Result: Compared with controls, DOX significantly increased Troponin-T (0.93 ± 0.13 to 1.37 ± 0.10 ng/mL), Troponin-I (0.53 ± 0.63 to 0.86 ± 0.16 ng/mL), CKMB (0.35 ± 0.03 to 1.37 ± 0.05 ng/mL), and NT-proBNP (0.39 ± 0.03 to 1.39 ± 0.05 ng/mL), accompanied by marked myocardial structural damage. Bromelain co-administration significantly attenuated biomarker elevations, including reductions in Troponin-T (1.20 ± 0.04 ng/mL), CKMB (1.02 ± 0.10 ng/mL), and NT-proBNP (1.08 ± 0.06 ng/mL), and reduced histopathological injury scores compared with DOX alone ($p < 0.001$ for all).



Conclusions: Bromelain significantly reduced validated circulating biomarkers and histopathological indicators of anthracycline-induced cardiac injury. Given the established clinical relevance of troponins and NT-proBNP in cardio-oncology, these findings support bromelain as a potential adjunctive cardioprotective strategy and justify further mechanistic and translational investigation.

Poster Presentation

Successful Response to Tegafur in a Case of Aggressive Choriocarcinomatous Breast Carcinoma Progressing on CDK4/6 Inhibition: A Case Report

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Background: Invasive breast carcinoma with choriocarcinomatous patterns is a rare, high-grade variant often associated with poor prognosis and resistance to standard therapies. We report a case where a patient progressed through multiple lines of therapy before achieving a clinical response with oral fluoropyrimidines.

Methods: Case Presentation: A 71-year-old female was diagnosed with Grade 3 Invasive Ductal Carcinoma (ER/PgR weakly positive, HER2-negative, Ki67 30-40%). Primary Treatment: The patient completed 4 courses of Neoadjuvant Chemotherapy, followed by a modified radical mastectomy (April 2024). Pathology confirmed invasive ductal carcinoma with choriocarcinomatous features and 100% nodal positivity (31/31 nodes, ypT4bN3a). An additional 4 courses of Adjuvant Chemotherapy were completed. First-Line Metastatic Therapy: In April 2025, following the discovery of multi-focal chest wall and muscular metastases, the patient was started on Ribociclib (CDK4/6 inhibitor) and Fulvestrant (Hormone Therapy). Progression and Clinical Switch: Despite targeted cell-cycle and hormone blockade, the disease showed documented progression. Clinical signs included enlarging subcutaneous masses in the pectoralis and deltoid muscles, skin ulceration, and worsening grade 3 lymphedema (lymphstasis).

Result: Response to Salvage Therapy: Due to progression, treatment was transitioned to Tegafur on November 2025. Following the initiation of Tegafur, the patient demonstrated a significant clinical response: 1. Tumor Reduction: Visible and palpable chest wall masses decreased in size. 2. Lymphstasis Improvement: A measurable reduction in lymphedema and "softening" of the previously wooden-hard subcutaneous edema. 3. Wound Stabilization: Improved management of the ulcerated skin site.

Conclusions: This case highlights that while the choriocarcinomatous subtype of breast cancer may be resistant to both standard anthracycline/taxane regimens and modern CDK4/6 inhibitors, it may retain sensitivity to fluoropyrimidines like Tegafur. This observation suggests a role for oral chemotherapy in the salvage setting for rare, aggressive histologic variants.

A Multicenter, Retrospective Study on the Real-World Efficacy and Safety of Oral Combination Metronomic Chemotherapy in Patients with Metastatic Breast Cancer

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Background: Metronomic chemotherapy, characterized by continuous administration of low-dose oral agents, exerts antiangiogenic effects with favorable tolerability. Fully oral regimens combining vinorelbine, cyclophosphamide, and capecitabine (VEX) have shown promising efficacy in metastatic breast cancer (MBC), particularly in HR+/HER2- disease. However, real-world data across molecular subtypes remains limited.

Methods: This multicenter retrospective study enrolled MBC patients treated with oral combination metronomic chemotherapy (comprising at least two of vinorelbine, cyclophosphamide, and capecitabine) across four Taiwanese institutions between 2020 and 2025. The primary endpoint was duration of treatment (DOT). Secondary endpoints included overall survival (OS), objective response rate (ORR), disease control rate (DCR), and safety.

Result: A total of 88 patients were included (median age, 60 years). HR+/HER2- disease accounted for 72.7% of the cohort, followed by TNBC (21.6%) and HER2+ (5.7%). Visceral metastases were present in 70.5% of cases. The overall median DOT was 8.5 months (95% CI, 5.5-10.1), and the median OS was 35.5 months (95% CI, 27.8-NR). By subtype, the median DOT was 9.9 months for HR+/HER2-, 4.6 months for TNBC, and 6.4 months for HER2+ ($p = 0.067$). Among the subgroup of patients receiving VEX as first-line chemotherapy following prior CDK4/6 inhibitor therapy (n = 41), the median DOT and OS reached 10.3 and 38.9 months, respectively. Among 79 evaluable patients, the ORR was 35.4% and the DCR was 78.5%. Grade ≥ 3 adverse events occurred in 19.3% of patients, with anemia and neutropenia being the most frequent.

Conclusions: In this real-world cohort, metronomic VEX demonstrated meaningful clinical activity and acceptable safety in MBC. Prolonged treatment duration and survival were observed particularly in HR+/HER2- disease, including post-CDK4/6 inhibitor settings, supporting VEX as a viable oral option in selected patients.

Poster Presentation

Association of Pegylated Liposomal Doxorubicin with Improved Overall Survival in Early-Stage Breast Cancer: A Population-Based Study

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Background: Anthracycline-based chemotherapy remains a cornerstone of adjuvant treatment for early-stage breast cancer but is limited by cumulative cardiotoxicity. Pegylated liposomal doxorubicin (PLD) was developed to reduce cardiac exposure while maintaining antitumor efficacy. However, comparative real-world survival data between PLD and conventional anthracyclines in Taiwanese patients remain limited.

Methods: This nationwide, population-based retrospective cohort study used Taiwan's National Health Insurance Research Database. Women aged ≥20 years with stage I-III, HER2-negative breast cancer who underwent mastectomy and received adjuvant anthracycline-based chemotherapy between 2006 and 2018 were included. Patients receiving PLD-based sequential chemotherapy were compared with those receiving epirubicin-based regimens. Propensity score matching (1:1) was applied to balance baseline characteristics. The primary endpoint was overall survival (OS), while secondary endpoints included disease-free survival (DFS) and cardiotoxicity. Survival outcomes were analyzed using Kaplan-Meier methods and multivariable Cox proportional hazards models.

Result: After matching, 1,050 patients were analyzed (525 per group), with a median follow-up of approximately six years. PLD-based therapy was associated with significantly improved overall survival compared with epirubicin-based therapy (adjusted hazard ratio [aHR] 0.754; 95% CI 0.632-0.899; $P < 0.001$). This survival benefit remained consistent across predefined subgroup analyses and sensitivity analyses at 3-year and 5-year follow-up intervals. A dose-response relationship was observed, with greater OS benefit at higher cumulative PLD exposure. No statistically significant differences were observed between groups in disease-free survival or clinically diagnosed cardiotoxicity.

Conclusions: In this nationwide cohort study, adjuvant PLD-based chemotherapy was associated with superior overall survival compared with epirubicin without increased cardiotoxicity. PLD may represent a reasonable anthracycline alternative for selected patients with early-stage breast cancer, particularly those with a higher comorbidity burden. Prospective studies are warranted to confirm these findings.

Clinical Impact of Germline BRCA1/2 Mutations on Outcomes of First-line Endocrine Therapy in HR-positive/HER2-negative Metastatic Breast Cancer

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Background: Germline BRCA1/2 pathogenic variants define a biologically distinct subset of breast cancer. While endocrine therapy (ET) combined with CDK4/6 inhibitors is the standard first-line treatment for HR-positive/HER2-negative metastatic breast cancer, the clinical benefit of this strategy in patients with hereditary breast and ovarian cancer (HBOC) remains insufficiently characterized. We evaluated the impact of germline BRCA1/2 variants on the effectiveness of first-line ET in real-world clinical practice.

Methods: We retrospectively analyzed 464 consecutive patients with unresectable locally advanced or metastatic HR-positive/HER2-negative breast cancer treated at our institution between December 2017 and December 2025. Germline BRCA1/2 testing was performed based on clinical indications. Clinical outcomes of patients harboring pathogenic BRCA1/2 variants were compared with those of non-carriers. Progression-free survival (PFS) was assessed using standard survival analyses.

Result: Pathogenic germline variants were identified in 23 patients (BRCA1, n = 3; BRCA2, n = 20). Twenty BRCA variant carriers received ET as first-line therapy. Median PFS in BRCA variant carriers was significantly shorter than in non-carriers (13.5 vs 20 months; $p = 0.024$). This difference persisted among patients treated with ET plus CDK4/6 inhibitors (14 vs 21 months; $p = 0.036$). Although limited by the small number of BRCA variant carriers and the retrospective study design, the consistent reduction in PFS across treatment subgroups suggests a clinically meaningful association between germline BRCA status and reduced endocrine sensitivity.

Conclusions: Patients with germline BRCA1/2 mutations demonstrated significantly inferior outcomes with first-line endocrine-based therapy, even when combined with CDK4/6 inhibitors. Despite inherent limitations related to sample size and potential selection bias, these findings challenge the universal application of standard endocrine-based strategies in HBOC-associated metastatic breast cancer and support consideration of alternative treatment sequencing, including earlier integration of PARP inhibitors, from the first-line setting.

Clinical Impact of Extended Endocrine Therapy in Premenopausal Women Aged 40 Years or Younger with T1N0 Breast Cancer: A Multicenter Retrospective Study

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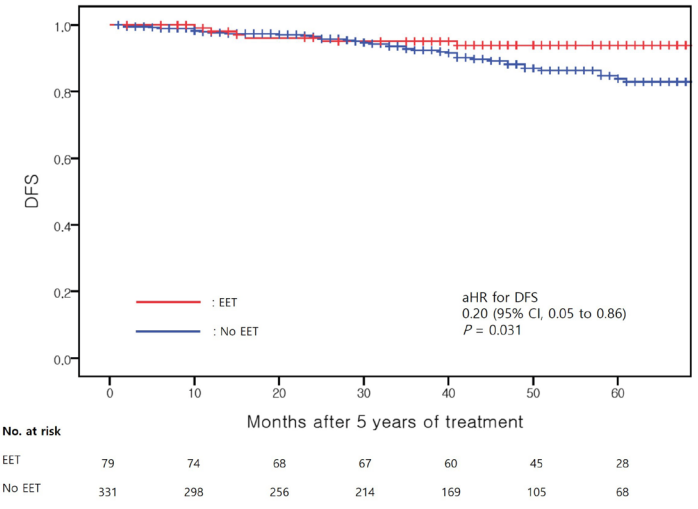
Background: In patients with clinical low-risk, early-stage (T1N0) breast cancer (BC), the necessity of extended endocrine therapy (EET) remains controversial. While 5 years of adjuvant endocrine therapy (ET) is the standard, very young premenopausal women may still face a persistent risk of late recurrence. This study aimed to evaluate the clinical benefit of EET beyond 5 years in premenopausal women aged 40 years or younger with T1N0 BC who maintained premenopausal status after the initial 5-year treatment.

Methods: We analyzed a multicenter retrospective dataset of young patients with BC. Eligible patients were those aged 40 years or younger, diagnosed with hormone receptor-positive T1N0 disease between 2007 and 2016. Inclusion criteria required patients to remain in a premenopausal state with no evidence of recurrence after completing the standard initial 5-years of ET. The primary outcome was disease-free survival (DFS) starting from 5 years after the initial diagnosis.

Result: A total of 419 patients were included in the analysis, of whom 79 received EET with a median duration of 101 months (IQR 94-104). There were no significant differences between the EET and No-EET groups regarding age and tumor characteristics, including histologic type, grade, HER2 status, and Ki-67 expression. However, the EET group had a significantly higher rate of prior adjuvant chemotherapy compared to the No-EET group (44.3% vs. 19.4%, $P < 0.001$). At 10 years after diagnosis, the DFS rate was significantly higher in the EET group than in the No-EET group (95% vs. 84%; adjusted hazard ratio [aHR], 0.20; 95% CI, 0.05~0.86; $P = 0.031$).

Conclusions: These findings suggest that even for patients with pathologically low-risk early-stage disease, EET beyond 5 years can be considered for those aged 40 years or younger who maintain premenopausal status, to further reduce the risk of late recurrence.



Poster Presentation

Evaluating Hormonal Therapy in Breast Cancer Patients Who Choose To Forgo Curative Surgery

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Background: Singapore's rapidly aging population, with citizens aged 65 or more projected to reach 24% by 2030, mirrors global demographic trends. This shift has led to an increasing number of breast cancer patients who decline surgery or are medically unfit due to frailty and co-morbidities. Palliative hormonal therapy offers a less invasive alternative, yet evidence on its long-term efficacy remains limited.

Methods: We conducted an observational cohort study using data from the Singapore Joint Breast Cancer Registry (JBCC) (1990 to 2025). Female patients aged 21 years or more who refused surgery and received hormonal therapy without chemotherapy or targeted therapy were included. Primary outcome was overall survival; secondary outcome was breast cancer-specific mortality.

Result: Of 1450 patients identified, 383 met inclusion criteria: 73 with stage I to II disease, 40 with stage III, and 270 with stage IV. Among early-stage cases, 89% were aged 60 years or more. Median overall survival for stage I to II patients was 71.3 months, with a minority of deaths attributable to breast cancer. Global evidence supports these findings: studies indicate comparable breast cancer-specific survival between primary endocrine therapy and surgery in frail elderly patients, with most deaths due to non-cancer causes.

Conclusions: Palliative hormonal therapy is a viable alternative for elderly breast cancer patients with significant co-morbidities or reduced life expectancy who are unsuitable for surgery. Further research is needed to clarify long-term outcomes, quality of life, and durability of response to guide evidence-based, patient-centered care.

Effectiveness of Primary Endocrine Therapy in Elderly Women with ER-Positive Breast Cancer

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Background: Primary endocrine therapy (PET) is used in medically unfit patients with ER-positive breast cancer, but outcome data remain limited.

Methods: Women with ER-positive breast cancer treated with PET between 1 November 2024 and 31 October 2025 were retrospectively analysed for treatment response, disease control, endocrine switching, and need for surgery.

Result: Fifty-eight ER-positive patients were treated with PET, median age was 87.5 years (IQR 82.3-91.8). Median baseline tumour size 21 mm (IQR 12-30 mm). Most tumours were invasive ductal carcinoma (79.3%) papillary carcinoma (10.3%) and invasive lobular carcinoma (8.6%); 94.8% were progesterone-receptor positive and 8.6% HER2 positive. Grade 2 disease was observed in 66.0%, while grade 1 and grade 3 tumours accounted for 20.8% and 13.2%, respectively. Two patients (3.4%) had biopsy-proven axillary nodal involvement at baseline, both of whom demonstrated complete nodal resolution on follow-up ultrasound. Median follow-up was 535 days (IQR 310-1099). Based on RECIST criteria, majority demonstrated disease control (93.1%) where partial response was observed in 37 patients (63.8%), stable disease in 14 (24.1%), complete response in 3 (5.2%) and progressive disease (PD) in 4 (6.9%). Among patients with PD, tumour size increased from a median of 14.0 mm (IQR 11.0-18.0 mm) to 29.5 mm (IQR 18.8-43.5 mm). Three had Luminal A disease and one Luminal B disease. Two underwent endocrine switching and two proceeded to surgery. Eight patients (13.8%) required a change in ET; letrozole was the most common initial agent (75.0%), with switches to exemestane (50.0%), anastrozole (25.0%), and tamoxifen (12.5%). Indications for switching were disease progression (50.0%) and treatment-related side effects (50.0%) including joint pain, hand swelling, fatigue, and mood disturbance. Only 50% achieved clinical response after switching (median 112 days).

Conclusions: These findings support primary endocrine therapy as a safe, effective, and pragmatic management strategy for frail or elderly patients unsuitable for surgery.

Prognosis and Hepatic Function Outcomes in Breast Cancer Patients with Hepatitis B Virus Infection Under Cyclin-Dependent Kinase 4/6 Inhibitor Therapy

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Background: Hepatitis B is common in East Asia, with ~10% HBsAg carriers and ~40% Anti-HBc positivity. CDK4/6 inhibitors are standard for ER+ metastatic breast cancer. Neutropenia is the most frequent adverse effect, though its relevance compared with chemotherapy remains uncertain. Hepatitis B virus is a major concern when patients are immunosuppressed. In addition, abnormal liver enzyme tests are also common adverse effects during CDK4/6i therapy, causing uncertainty in HBV patients. This study aims to evaluate the prognosis and liver function outcomes in breast cancer patients with HBV who are treated with CDK4/6i.

Methods: We conducted a retrospective review of electronic medical records for patients with metastatic breast cancer who received Palbociclib or Ribociclib at our institution between January 2020 and June 2024. Data collection includes initial diagnosis as metastasis status date, survival status, blood test information, drug and duration, and other medical record for suspicious of HBV flare up.

Result: This study included 227 patients, with 96 receiving Palbociclib and 131 Ribociclib. Anemia (77% vs 57%) and thrombocytopenia (44% vs 28%) were more frequent with Palbociclib, but overall survival was similar ($p = 0.888$). Among these patients, 25 were HBsAg-positive and 85 were Anti-HBc-positive. No significant differences in overall survival were observed according to HBsAg status, Anti-HBc status, or type of CDK4/6i received. In patients with at least one episode of abnormal liver enzyme tests, further analysis revealed no association between drug type and HBV status, though the Ribociclib group showed a non significant trend toward higher incidence.

Conclusions: Our study demonstrates that HBV infection does not affect the prognosis of breast cancer patients treated with CDK4/6i. Importantly, regardless of which CDK4/6i was used, neither HBV status nor the occurrence of liver function abnormalities showed any association with clinical outcomes. These findings indicate that CDK4/6i can be safely administered to breast cancer patients who are HBV carriers.

Poster Presentation

HBV status	EVENT	Palbociclib	Ribociclib	P-value
HBsAg	Total	7	18	
Positive	ALT increased	1(14.29%)	9(50.00%)	0.1794
	AST increased	1(14.29%)	7(38.89%)	0.3623
	ALT or AST increased	1(14.29%)	11(61.11%)	0.0730
	Any ALT or AST >5UNL	1(14.29%)	2(11.11%)	1.0000
HBsAg	Total	71	89	
Negative	ALT increased	23(32.39%)	36(40.45%)	0.2941
	AST increased	19(26.76%)	24(26.97%)	0.9767
	ALT or AST increased	27(38.03%)	39(43.82%)	0.4597
	Any ALT or AST >5UNL	0	6(6.74%)	0.0342
HBsAg	Total	18	23	
No record	ALT increased	5(27.78%)	5(21.74%)	0.6550
	AST increased	6(33.33%)	6(26.09%)	0.6128
	ALT or AST increased	7(38.89%)	7(30.43%)	0.5710
	Any ALT or AST >5UNL	0	1(4.35%)	1.0000
Anti-HBc	Total	35	50	
Positive	ALT increased	11(31.43)	21(42.00%)	0.3222
	AST increased	10(28.57%)	17(34.00%)	0.5968
	ALT or AST increased	13(37.14%)	25(50.00%)	0.2407
	Any ALT or AST >5UNL	2(5.71%)	6(12.00%)	0.4613
Anti-HBc	N	34	43	
Negative	ALT increased	8(23.53%)	21(48.84%)	0.0229
	AST increased	9(26.47%)	12(27.91%)	0.8882
	ALT or AST increased	10(29.41%)	21(48.84%)	0.0844
	Any ALT or AST >5UNL	0	2(4.65%)	0.5003
Anti-HBc	N	27	37	
No record	ALT increased	10(37.03%)	8(21.62%)	0.1755
	AST increased	7(25.93%)	8(21.62%)	0.6881
	ALT or AST increased	12(44.44%)	11(29.73%)	0.2257
	Any ALT or AST >5UNL	0	1(2.70%)	1.0000

Real World Data of Abemaciclib for ER+HER2- eBC: A Single Center Study

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Background: Adjuvant endocrine therapy (ET) remains the backbone of treatment for HR+/HER2 eBC. The monarchE trial established the clinical benefit of adding Abemaciclib to ET in patients with high-risk disease. However, real-world data evaluating treatment effectiveness, tolerability, and recurrence patterns outside randomized trials remain limited.

Methods: We conducted a single-center cohort study at Taichung Veterans General Hospital (TCVGH). A total of 244 patients with high-risk HR+/HER2 eBC were included, comprising 122 patients treated with adjuvant Abemaciclib plus ET and 122 matched patients treated with ET alone. Invasive disease-free survival (iDFS), recurrence events, and death events were evaluated. Clinical outcomes were analyzed within a maximum follow-up of 5.25 years for the Abemaciclib cohort, while longer follow-up was available in the comparator group.

Result: During follow-up, invasive disease recurrence occurred in 3 of 122 patients (2.5%) in the Abemaciclib cohort compared with 16 of 122 patients (13.1%) in the non-Abemaciclib cohort ($p = 0.002$). Distant metastasis accounted for the majority of recurrence events in both groups (68.4% overall). No local recurrence or death events were observed in the Abemaciclib cohort, whereas local recurrence occurred in 6 patients and one death was observed in the non-Abemaciclib cohort. Despite a shorter mean follow-up in the Abemaciclib group (2.0 vs. 3.8 years, $p < 0.001$), fewer recurrence events were observed.

Conclusions: In this single-center real-world cohort of patients with high-risk HR+/HER2 eBC, adjuvant Abemaciclib was associated with a lower invasive recurrence rate (2.5% vs. 13.1%), absence of local recurrence, and no observed death events during the available follow-up, despite a shorter mean observation period compared with matched controls. These real-world outcomes are consistent with the monarchE trial, which demonstrated early and sustained reductions in invasive disease recurrence and distant metastatic events with the addition of Abemaciclib to ET in high-risk HR+/HER2 eBC.

Low Dose of CDK4/6 Inhibitors and Endocrine Therapy in Metastatic Breast Cancer Impact on the Efficacy and Safety: Insights from a Low-Middle-Income Country

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Background: Cyclin-dependent kinase 4/6 inhibitors (CDK4/6i) are widely used to treat HR+/HER2- metastatic breast cancer (MBC). This study aimed to assess the real-world efficacy and tolerability of CDK 4/6i in the Egyptian population.

Methods: Prospective observational study for HR+/HER2- MBC treated in the clinical oncology department of Ain Shams University hospitals, Egypt, between July 2022 and March 2025.

Result: Ninety three patients were included (mean age, 53.8 years; range, 29-85). Median follow up time was 24.2 months (range 12-36 months). Forty five patients (48.3%) started on Ribociclib, 14 (15%) on Abemaciclib, and 34 (36.7%) on Palbociclib, with 15 patients switched from Ribociclib and Abemaciclib to Palbociclib due to logistic causes. Median PFS was 19 months (6-27 months) and 13 months for first- and second-line therapy, respectively. Patients' characteristics and treatment delay or dose reduction did not significantly impact PFS. The rate of dose reductions was 41.6%. Age was significantly correlated with a higher incidence of hematological ($p = 0.03$) and nephrological toxicity ($p = 0.02$). Furthermore, medical comorbidities were associated with a significantly higher frequency of grade 3-4 hematological events ($p = 0.02$)

Conclusions: Our findings demonstrate that CDK 4/6 inhibitors are well-tolerated within a diverse patient population. Additionally, this prospective evaluation supports the efficacy of lower-dose levels of CDK4/6i, which did not negatively impact PFS.

Real-World Safety of Trastuzumab Deruxtecan With a Case of Hepatitis B Virus Reactivation and Contextual Benchmarking Using Ado-Trastuzumab Emtansine

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Background: Trastuzumab deruxtecan (T-DXd) has become an important antibody-drug conjugate (ADC) for HER2-positive metastatic breast cancer. ILD/pneumonitis is a well-recognized serious toxicity and requires active surveillance. Liver enzyme abnormalities may also occur during treatment and should be monitored. HBV screening is routine before systemic therapy; however, HBV reactivation during T-DXd treatment has been rarely described. We assessed real-world safety outcomes with T-DXd and summarized a historical ado-trastuzumab emtansine (T-DM1) cohort for context.

Methods: We retrospectively reviewed metastatic/recurrent breast cancer treatment episodes at Dankook University Hospital (Cheonan, South Korea): T-DXd (Apr 2024–Feb 2026) and T-DM1 (Mar 2018–Feb 2026). Adverse events (AEs) were graded per CTCAE v5.0, and response per RECIST 1.1. HBV reactivation was defined as newly detectable or rising HBV DNA with hepatitis flare requiring antiviral therapy. The primary endpoint was safety; secondary endpoints were ORR and CBR.

Result: Thirty episodes were analyzed (T-DXd n = 17; T-DM1 n = 13). Median age was 58 and 56 years, respectively; median therapy line was 3 and 2, respectively; median cycles were 14 and 7, respectively. Baseline HBV markers were common (HBsAg+: 1/17 vs 3/13; anti-HBc+: 12/17 vs 7/13). One grade 3 HBV reactivation occurred with T-DXd (1/17, 5.9%) in an HBsAg-positive patient with high baseline HBV DNA; it developed at cycle 3 and resolved after treatment interruption and entecavir. No HBV reactivation occurred with T-DM1 (0/13). With T-DXd, ILD/pneumonitis occurred in 6/17 (35.3%), including grade ≥ 3 in 4/17; hepatotoxicity occurred in 3/17. In the T-DM1 cohort, thrombocytopenia occurred in 4/13, and ILD/pneumonitis was not observed. ORR/CBR were 10/17 (58.8%)/13/17 (76.5%) for T-DXd and 8/13 (61.5%)/9/13 (69.2%) for T-DM1.

Conclusions: In routine care, T-DXd was associated with a substantial ILD/pneumonitis burden and a rare HBV reactivation event. Risk-adapted HBV screening/monitoring, timely antiviral therapy when indicated, and proactive respiratory surveillance should be considered during ADC treatment.

MonarchE: Evaluation of Prognostic and Predictive Value of Ki-67 Index Pre and Post Neoadjuvant Chemotherapy (NAC) and Changes Following NAC

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Background: Two years of adjuvant abemaciclib+endocrine therapy (ET) improved IDFS over ET alone in HR+, HER2-, node-positive, high-risk disease. In patients who received NAC, abemaciclib+ET showed sustained IDFS improvement (HR:0.65; 95%CI:0.54-0.73; 4-year IDFS rates: 81% abemaciclib+ET vs 72% ET). In the intent-to-treat population, while high baseline Ki-67 was associated with worse prognosis, benefit was observed with abemaciclib regardless of Ki-67 index. We evaluate the prognostic and predictive value of baseline (pre-) and post-NAC Ki-67 index and of the changes in Ki-67 following NAC.

Methods: Ki-67 was determined centrally. In patients receiving NAC, Ki-67 index pre- or post-NAC was assessed in subgroups by Ki-67 index (high ≥ 20%; low < 20%) and by changes of Ki-67 index following NAC.

Result: Overall, 2057/5637 (36.5%) patients received NAC. Ki-67 index pre-NAC was available for 1359 pts (high, n = 879; low, n = 480) and of these, 579 patients had Ki-67 index post-NAC (high, n = 118; low, n = 461). 4-year IDFS rates indicate patients with high Ki-67 pre- and post-NAC have higher risk of recurrence (pre-NAC: HR = 0.63 [95%CI = 0.49-0.82] in high Ki-67 and HR = 0.59 [95%CI = 0.40-0.89] in low Ki-67; post-NAC: HR = 0.53 [95%CI = 0.31-0.90] in high Ki-67 and HR = 0.45 [95%CI = 0.28-0.72] in low Ki-67; Ki-67 pre- to

post-NAC: Ki-67 remained high HR = 0.63 [95%CI = 0.36-1.10], Ki-67 remained low HR = 0.71 [95%CI = 0.33-1.50], and changed from high to low HR = 0.35 [95%CI = 0.19-0.64]). Among patients with both pre- and post-NAC Ki-67 results available, NAC reduced the Ki-67 index to low in approximately 75% of high Ki-67 tumors. Patients whose tumors retained a high Ki-67 index following NAC had the highest risk of recurrence. Treatment benefit of abemaciclib+ET vs ET alone was consistent across subgroups regardless of Ki-67 index or changes in Ki-67.

Conclusions: Ki-67 index pre- or post-NAC and changes in Ki-67 following NAC were prognostic of patients outcomes, but not predictive of abemaciclib treatment benefit in monarchE as benefit with abemaciclib+ET was observed across all groups.

Effectiveness of Palbociclib in HR+ HER2- Metastatic Breast Cancer: A Real-world Data Study in Peruvian PatientsS

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Background: Treatment with cyclin-dependent kinases inhibitors (CDKi) plus endocrine therapy (ET) as a first-line treatment is recommended for improving progression-free and overall survival (OS) in hormone receptor-positive, HER2 negative (HR+/HER2-) advanced or metastasic breast cancer (ABC/MBC) patients. In this study, we determined the survival rates and prognostic factors of Peruvian patients with ABC or MBC that were treated with palbociclib plus ET as a first line in real-world clinical settings.

Methods: We conducted a retrospective study which included 43 patients with HR-positive, HER2-negative advanced or metastatic breast cancer who were treated with palbociclib plus endocrine therapy between January 2019 and December 2021. The primary end point was Progressionfree survival (PFS). Secondary end points were Overall survival (OS) and adverse events (AEs).

Result: A total of 43 patients were enrolled. Median age was 62 years, 81% (n = 35) of patients were postmenopausal, and 49% (n = 21) of patients presented a stage IV disease. Among endocrine therapy, fulvestrant was used in combination with Palbociclib in 39,5% (n = 17) of cases. The median PFS was 10.12 months and the median OS was 32.06 months. Multivariate analysis showed that only lymph node metastasis was associated with PFS outcome in both univariate and multivariate analyses. The most common adverse events were neutropenia, asthenia, anemia, leucopenia and pain.

Conclusions: In this real-world assessment of clinical outcomes in Peruvian patients with HR+/HER- ABC/MBC, treatment with palbociclib in combination with ET as a first line showed favorable effectiveness in terms of progression free survival and overall survival.

Real-World Experience of Ribociclib-Associated Liver Injury in Hormone Receptor-positive/HER2-negative Metastatic Breast Cancer

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Background: Cyclin-dependent kinase 4/6 (CDK4/6) inhibitors plus endocrine therapy (ET) constitute the standard of care for patients with hormone receptor-positive/HER2-negative metastatic breast cancer (HR+/HER2- MBC). Among these agents, ribociclib has demonstrated significant improvements in overall survival (OS). However, its clinical utility is frequently limited by hepatotoxicity, known as ribociclib-associated liver injury (RALI). In the MONALEESA-2, -3, and -7 trials, grade 3 or 4 alanine aminotransferase (ALT) elevations were observed in 9.3%, 8.5%, and 5.0% of patients receiving ribociclib, respectively. This concern has gained increasing relevance with the recent expansion of ribociclib use into the adjuvant setting for early-stage breast cancer. We aim to evaluate the incidence of RALI in real-world practice in Taiwan.

Methods: Patients with HR+/HER2- MBC receiving ribociclib plus ET at the National Taiwan University Hospital or the National Taiwan University Cancer Center from January 2020 to December 2023 were included. Individual-level data were retrospectively collected, including demographic characteristics, clinical variables, treatment details, and outcome measures. We thank the Fifth Core Lab, Department of Medical Research, NTUH, for technical support.

Result: A total of 270 patients with HR+/HER2- MBC were included in the analysis. The median age was 60 years (range, 24-90 years), and 53 patients were younger than 50 years. Grade ≥3 aspartate aminotransferase (AST) and/or ALT elevations occurred in 33 patients (12.2%). No grade 5 AST/ALT elevations were observed, and all cases resolved following discontinuation of ribociclib. Median time to onset of transaminase elevation was 42 days after ribociclib initiation (range, 9-808 days), with a median time to resolution of 15 days (range, 3-62 days). Notably, 82% of grade ≥3 transaminase elevation events occurred within the first 6 months of ribociclib treatment.

Conclusions: Although CDK4/6 inhibitors are generally well-tolerated, RALI remains a significant issue in the real-world setting. Current prescribing guidelines provide timely monitoring and management of transaminase elevations.

Real-World Outcomes of Ribociclib in HR+/HER2 Metastatic Breast Cancer: A Single-Center Retrospective Study from Southern Taiwan

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Background: Ribociclib, a CDK4/6 inhibitor, is a standard first-line therapy for HR-positive/HER2-negative metastatic breast cancer (mBC). However, real-world evidence (RWE) from Asian populations remains limited. This study aimed to evaluate treatment outcomes of ribociclib in a real-world Southern Taiwanese cohort.

Methods: We conducted a retrospective analysis using electronic medical records and cancer registry data from Kaohsiung Chang Gung Memorial Hospital (KCGMH) between July 1, 2019, and December 31, 2023. Eligible patients were female, aged > 20 years, with estrogen receptor positive (> 10%) metastatic breast cancer, who had received ribociclib for more than one month. Patients with triple-negative or HER2-positive disease were excluded. The primary endpoint was time to treatment failure (TTF), defined as the interval from initiation to discontinuation of ribociclib for any cause (progression, toxicity, death, or Taiwan NHI reimbursement limit).

Result: A total of 197 patients were included. The median TTF (mTTF) was 18.5 months (95% CI: 10.816.7), and the median overall survival (mOS) was 46.4 months (95% CI: 44.969.4). Subgroup analyses revealed consistent TTF outcomes across menopausal status, metastatic sites, and endocrine sensitivity. Patients over 75 years and those receiving ribociclib as first-line therapy demonstrated favorable outcomes.

Conclusions: This real-world analysis confirms the clinical benefit of ribociclib in Taiwanese patients with HR+/HER2 mBC, supporting its use across diverse subgroups. These findings contribute valuable data to the global RWE landscape and may inform future treatment strategies and reimbursement policies in East Asian populations.

Analysis of Asian Patients (PTS) with HR+/HER2- Early Breast Cancer (EBC) Treated with Ribociclib (RIB) + Nonsteroidal Aromatase Inhibitor (NSAI): 5-year Outcomes from NATALEE

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Background: NATALEE showed significant invasive disease-free survival (iDFS) benefit with RIB + NSAI vs NSAI alone in pts with HR+/HER2-EBC, including Asian pts. We present an updated 5-y landmark analysis of efficacy, quality of life (QoL), and safety with RIB + NSAI in Asian and non-Asian pts in NATALEE (data cutoff: May 28, 2025).

Methods: NATALEE included pts with stage II/III disease (AJCC 8th ed), with additional high-risk criteria for pts with stage IIA N0 G2 disease. Pts were randomized 1:1 to RIB + NSAI vs NSAI. Pts with Asian/non-Asian race were analyzed regardless of geographic location.

Result: While most baseline characteristics were balanced between arms for both groups, Asian (n = 675) and non-Asian (n = 4161) pts differed in age (median, 48.0 vs 53.0 y), premenopausal status (60.9% vs 41.1%), N2/3 disease (31.0% vs 17.0%), and prior chemotherapy (96.1% vs 86.3%). A consistent iDFS, distant disease-free survival, recurrence-free survival, and distant recurrence-free survival benefit was observed with RIB + NSAI vs NSAI in both Asian and non-Asian pts (Table). In both groups, median time to deterioration in EORTC QLQ-C30 physical functioning (Asian: HR, 1.03; non-Asian: HR, 0.98) and global health status (Asian: HR, 1.04; non-Asian: HR, 1.05) was similar in the RIB and NSAI arms. Safety outcomes in Asian pts were consistent with the intent-to-treat population. Asian pts on RIB had higher rates of dose interruptions and dose reductions due to adverse events (AEs), with lower RIB discontinuations due to AEs vs non-Asian pts.

Conclusions: Consistent with prior analyses, this NATALEE subgroup analysis shows a clinically meaningful efficacy benefit of adding RIB to NSAI with manageable safety and maintained QoL in Asian pts with stage II/III HR+/HER2-EBC. Previously presented at ESMO Asia Congress 2025, Final Publication Number: LBA1, Yen-Shen Lu et al. Reused with permission.

	Asian		Non-Asian	
	RIB + NSAI n = 341	NSAI Alone n = 334	RIB + NSAI n = 2070	NSAI Alone n = 2091
iDFS				
5-y rate, %	85.9	82.6	85.8	80.9
HR (95% CI)	0.65 (0.42-0.99)		0.71 (0.61-0.84)	
DDFS				
5-y rate, %	86.2	84.2	87.2	82.5
HR (95% CI)	0.69 (0.44-1.07)		0.70 (0.59-0.83)	
RFS				
5-y rate, %	87.5	86.0	88.1	82.9
HR (95% CI)	0.71 (0.44-1.13)		0.67 (0.56-0.80)	
DRFS				
5-y rate, %	87.7	87.3	89.0	84.0
HR (95% CI)	0.74 (0.46-1.21)		0.67 (0.56-0.80)	

HR, hazard ratio; DDFS, distant disease-free survival; DRFS, distant recurrence-free survival; iDFS, invasive disease-free survival; RFS, recurrence-free survival.

Impact of Neoadjuvant Chemotherapy (NACT) Response on Clinical Outcomes with Ribociclib (RIB) in HR+/HER2- EBC: A Subgroup Analysis from the Phase 3 NATALEE Trial

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Background: Trials establishing efficacy benefit of chemotherapy (CT) in HR+/HER2-EBC pre-date the use of CDK4/6 inhibitors (CDK4/6i). Given the iDFS benefit with RIB+NSAI vs NSAI alone seen in NATALEE, we evaluated the impact of NACT response on clinical outcomes.

Methods: We evaluated patients (pts) who had received NACT in NATALEE (n = 2180) and outcomes based on NACT response. A composite scoring system was used to categorize pts as NACT responders or non-responders based on change in tumor size, nodal status, and Ki-67 from baseline to surgery (Table). Pts with composite scores totaling ≥ 1 were considered responders. iDFS was analyzed using a multivariate Cox model.

Result: The responder vs non-responder group had larger tumors (T4, 18.3% vs 13.4%; T3, 32.0% vs 28.1%; T2, 44.4% vs 42.0%; T1, 4.6% vs 11.6%), greater nodal status (N3, 14.5% vs 6.0%; N2, 21.5% vs 14.0%; N1, 50.3% vs 58.7%; N0, 10.4% vs 15.3%), and a greater proportion of premenopausal pts (56.0% vs 47.3%). For pts treated with RIB + NSAI (n = 1085), iDFS benefit was similar in responders and non-responders (4-year iDFS, 86.5% vs 82.4%; HR, 0.972; 95% CI, 0.688-1.372). However, for pts treated with NSAI alone (n = 1095), iDFS benefit was greater among responders (4-year iDFS, 85.7% vs 74.8%; HR, 0.62; 95% CI, 0.445-0.864). No impact with grade or histology was found for responders vs non-responders in either arm when adjusted for responder status and other covariates.

Conclusions: NACT non-responders had worse iDFS with NSAI alone, but there was no difference in iDFS between responders and non-responders with RIB+NSAI. Given the overall improved iDFS associated with RIB+NSAI, these data suggest that CDK4/6i warrants further investigation as a CT de-escalation strategy in

HR+/HER2-EBC. Previously presented at ESMO Congress 2025, Final Publication Number: 366P, Nicholas McAndrew et al. Reused with permission.

Table. Responder Criteria and Scores

Scoring parameters							
Parameter		**Improvement (1)**		**Worsening (-1)**		**No change (0)**	
Tumor size (T)		Decreased (e.g., T2 to T1)		Increased (e.g., T0 to T1)		Either surgery or diagnosis is Tx or missing	
Nodal status (N)		Decreased (e.g., N1 to N0)		Increased (e.g., N1 to N2)		Either surgery or diagnosis is Nx or missing	
Ki67		Changed from >20% at diagnosis to ≤20% at surgery		Changed from ≤20% at diagnosis to >20% at surgery		Same Ki67 (categorical) at diagnosis and surgery or if either is missing	
Responder vs non-responder, %							
Score	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
RIB + NSAI	0.1	1.8	15.6	34.7	28.2	17.1	2.6
NSAI alone	0	2.6	14.3	35.8	26.2	18.9	2.4

Imlunestrant + abemaciclib vs fulvestrant + abemaciclib in ER+, HER2- advanced breast cancer (ABC): An indirect treatment comparison (ITC) of three phase 3 trials

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Background: The EMBER-3 (E3) trial demonstrated a progression-free survival (PFS) benefit for imlunestrant (imlu)+abemaciclib (abema) vs imlu alone in patients with ER+, HER2- ABC and disease progression on prior aromatase inhibitor therapy alone or with a cyclin dependent kinase 4/6 inhibitor (CDK4/6i). The MONARCH 2 (M2) and postMONARCH (pM) trials demonstrated the superiority of fulvestrant (fulv)+abema vs fulv in CDK4/6i-naive and pretreated patients, respectively. The efficacy of imlunestrant+abemaciclib vs fulvestrant+abemaciclib has not been directly evaluated. In the absence of head-to-head trial data, ITC was leveraged to evaluate treatment efficacy between trials. This study aims to compare efficacy of imlunestrant+abemaciclib vs fulvestrant+abemaciclib through an ITC of the EMBER-3, MONARCH 2, and postMONARCH trials.

Methods: To compare investigator-assessed PFS between imlunestrant+abemaciclib and fulvestrant+abemaciclib, three ITC methods (Bucher method, matching-adjusted indirect comparison [MAIC], and propensity score matching [PSM]), were employed using individual patient-level data from EMBER-3, MONARCH 2, and postMONARCH. Bucher is a standard ITC method with no population adjustment, while PSM and MAIC are population-adjusted methods. Ten prognostic and predictive factors were selected as baseline covariates. MAIC adjusted the pooled MONARCH 2/postMONARCH population to match the EMBER-3 population.

Result: Baseline characteristics were generally balanced in the adjusted population by MAIC and PSM. Although not powered for formal hypothesis testing, PFS favored imlunestrant+abemaciclib vs fulvestrant+abemaciclib across all three ITC methods including Bucher [EMBER-3: effective sample size (ESS) = 426, pooled MONARCH 2/postMONARCH: ESS = 1037 (HR:0.77; 95% CI:0.58, 1.04)], MAIC [EMBER-3: ESS = 426, pooled MOMARCH 2/postMONARCH: ESS = 473 (HR:0.77; 95% CI:0.55, 1.06)] and PSM [EMBER-3: ESS = 343, pooled MONARCH 2/postMONARCH: ESS = 343 (HR:0.83; 95% CI:0.56, 1.22)].

Conclusions: In this exploratory ITC analysis, the all-oral targeted therapy imlunestrant+abemaciclib showed a consistent numerical PFS benefit compared with fulvestrant+abemaciclib in patients with ER+, HER2- ABC previously treated with endocrine therapy (ET) ± CDK4/6i.

Poster Presentation

Real-world Outcomes of Ribociclib Plus Endocrine Therapy with Clinically Aggressive HR+/HER2- Metastatic Breast Cancer: Insights from Vietnam

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Background: Ribociclib in combination with endocrine therapy (ET) has demonstrated significant survival benefits in patients with hormone receptorpositive (HR+), human epidermal growth factor receptor 2negative (HER2) metastatic breast cancer (MBC). However, real-world evidence from Southeast Asia, particularly in patients with clinically aggressive diseasecharacterized by visceral involvement or rapid progressionremains limited. This study provides real-world data from Vietnam, focusing on this high-risk subgroup.

Methods: This single-center, observational study included HR+/HER2 MBC patients treated with ribociclib plus ET at Hanoi Oncology Hospital (Mar 2022-Jun 2025). Eligible patients had visceral metastases and/or clinically aggressive features, defined as symptomatic visceral disease or rapidly progressive non-visceral disease, with ECOG ≤ 2 and adequate organ function. Primary endpoints were overall response rate (ORR), progression-free survival (PFS), and adverse events (AEs).

Result: Thirty-six patients (median age 58.8, range 3084) were treated with ribociclib plus ET, predominantly as first-line therapy (69.4%). Most had visceral metastases, with 30.6% presenting symptomatic disease. Ribociclib was combined with aromatase inhibitors (72%) or fulvestrant (28%). The ORR was 38.2%, which was significantly higher in first-line use ($p = 0.04$). The clinical benefit rate reached 91.1%. Median PFS was 15 months (95% CI: 9.520.4), with 12- and 24-month PFS rates of 47.2% and 11.1%, respectively. Dose reductions occurred in 33% of patients, primarily due to neutropenia (66.7%) or elevation of liver enzymes (19.4%). Hepatic toxicity was not significantly associated with liver metastases, suggesting ribociclib's safety across subgroups ($p > 0.05$).

Conclusions: In real-world Vietnamese patients with clinically aggressive HR+/HER2 MBC, ribociclib plus ET achieved durable disease control with acceptable safety, offering a chemotherapy-sparing option for those with limited tolerance or resources. These findings align with global evidence, reinforcing ribociclib's value in high-risk disease and its potential to shape treatment paradigms across resource-constrained oncology settings in Southeast Asia.

Real World Evidence for Early Stage TNBC on Neoadjuvant Chemotherapy and Pembrolizumab: Single Centre Experience in Hong Kong

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Background: The KN522 trial demonstrated that the use of neoadjuvant pembrolizumab and chemotherapy resulted in meaningful pathologic complete response (pCR), event free, and overall survival. There is limited literature on the real world efficacy and safety in an East Asian population. This is a single centre retrospective analysis of 30 patients with triple negative breast cancer (TNBC) in Hong Kong.

Methods: Patients who received pembrolizumab-chemotherapy between February 2022 and June 2025 were included. pCR rates, along with treatment related and immune related adverse events were analysed.

Result: 30 patients were identified in the study period. Mean age at diagnosis was 58. 24 (80%) patients had cT2 disease, while 6 (20%) had cN3 disease. 24 (80%) patients were post-menopausal. pCR was achieved in 13 patients (43.3%). ≧ Grade 3 treatment related adverse reactions were seen in 13 (43.3%) patients, with 5 (16.7%) patients having ≧ Grade 3 immune related adverse events. Pembrolizumab suspension occurred in 6 (20%) patients. 19 (63.3%) patients required dose reductions, however this did not result in statistically significant lower pCR rates (36.8% vs 54.5% $p = 0.454$). Overall ≧ Grade 3 treatment related adverse reactions were associated with nominally lower pCR rates although not statistically significant (30.8% vs 52.9% $p = 0.283$).

Conclusions: Our result from this single centre experience showed good pCR rate aligning with other real world data in other countries, with acceptable safety profile. Long term data and population wide studies are warranted in the future.

Rare Cascade of Severe Immune-Related Adverse Events Necessitating Treatment Discontinuation in Triple-Negative Breast Cancer

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Background: Immune checkpoint inhibitors (ICIs) demonstrate efficacy as neoadjuvant therapy for triple-negative breast cancer (TNBC), but vigilant monitoring for severe immune-related adverse events (irAEs) is essential. Endocrine dysfunctions like hypothyroidism and adrenal insufficiency are common and manageable with hormone replacement. However, we report an unprecedented case of multiple severe irAEs, not previously documented even in post-marketing surveillance, requiring a treatment strategy change.

Methods: We reviewed irAE incidence and clinical courses in TNBC patients treated with perioperative or recurrent/unresectable pembrolizumab or atezolizumab at our institution.

Result: Pembrolizumab was administered in 7 cases, atezolizumab in 2. Observed irAEs included hypothyroidism, adrenal insufficiency, colitis, skin disorders, renal impairment, interstitial pneumonia, acute pancreatitis, diabetic ketoacidosis (DKA), and fulminant type 1 diabetes. Case Report: A 65-year-old woman presented with a left breast mass, diagnosed as left TNBC (cT2N1M0, Stage IIB). Imaging suggested liver metastasis, but biopsy confirmed hepatocellular carcinoma (HCC). Neoadjuvant chemotherapy with pembrolizumab + paclitaxel + carboplatin was initiated. After the second cycle, irAE-induced acute pancreatitis developed, prompting temporary interruption. During pancreatitis management, consciousness disturbance due to DKA led to a diagnosis of fulminant type 1 diabetes, resulting in chemotherapy discontinuation and proceeding to surgery. Left mastectomy and sentinel lymph node biopsy resulted in pathological complete response (pCR; Grade 3, no residual tumor, node-negative). HCC was treated with radiofrequency ablation (RFA), showing no residual lesion on post-treatment CT. Postoperative adjuvant therapy included EC ×4 cycles and weekly paclitaxel ×2 (remaining preoperative doses), without restarting pembrolizumab. She remains recurrence-free under follow-up. Pancreatitis fully resolved, lifting dietary restrictions, but lifelong insulin is required for type 1 diabetes. One year post-Keytruda discontinuation, renal impairment emerged, managed conservatively.

Conclusions: ICI-combined neoadjuvant therapy for TNBC offers high efficacy, but severe irAEs necessitate consideration of individualized strategies.

Targeting Aryl Hydrocarbon Receptor to Enhance Anti-PD-L1 Therapy in Triple-Negative Breast Cancer

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Background: Triple-negative breast cancer (TNBC) shows higher tumor immunogenicity than other subtypes, and immune checkpoint inhibitors (ICIs) targeting the PD-1/PD-L1 axis have been applied in treatment. However, responses to immune checkpoint blockade (ICB) remain limited by intrinsic and acquired resistance, highlighting the need for predictive biomarkers and combination strategies. The aryl hydrocarbon receptor (AHR) regulates immune responses and PD-L1 expression, promoting an immunosuppressive tumor microenvironment (TME). This study investigated whether AHR contributes to PD-L1-mediated resistance and whether its inhibition enhances therapeutic efficacy.

Methods: PD-L1-overexpressing (PD-L1 OE) and control (Ctl) 4T1 cells were generated. The AHR antagonist CH-223191 and anti-PD-L1 antibody were applied in vitro and in vivo. Flow cytometry, western blotting, cell proliferation assays, quantitative RT-PCR, immunohistochemistry (IHC), and co-culture assays were performed. An orthotopic syngeneic mouse model was established by injecting 4T1 Ctl or PD-L1 OE cells into the mammary fat pad. Mice were treated with CH-223191 (5 mg/kg, i.p., four times weekly) and anti-PD-L1 antibody (150 μg, i.p., twice weekly), alone or in combination.

Result: PD-L1 OE tumors showed reduced responsiveness to anti-PD-L1 therapy compared with control in vivo, confirming intrinsic resistance to ICB. AHR expression was elevated at RNA and protein levels in PD-L1 OE tumors after anti-PD-L1 treatment. Combination therapy with CH-223191 and anti-PD-L1 antibody tended to suppress tumor growth and increase CD8+ T-cell infiltration compared with monotherapy. In vitro, CH-223191 reduced 4T1 cell viability in a dose-dependent manner, suggesting a tumor-intrinsic role of AHR signaling. Combination treatment tended to reduce M2-like macrophage polarization relative to anti-PD-L1 monotherapy, indicating attenuation of an immunosuppressive TME.

Conclusions: AHR activation contributes to PD-L1-driven anti-PD-L1 resistance, and AHR inhibition enhanced responsiveness in vivo. These findings suggest that targeting AHR may represent a promising combination strategy to improve anti-PD-L1 immunotherapy.

Poster Presentation

99TcRadiolabeled HA/TPGS Based Umbelliferone Loaded Nanoperticles for breast cancer Synergistic Theragnostic

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Background: Radiolabeling is indeed a crucial aspect of nuclear medicine development. Umbelliferone (7-hydroxy coumarin) is a natural phytoconstituent and exhibited the anticancer effects. In this investigation, a self-assembled pH-sensitive umbelliferone loaded nanoparticle of 99mTc radiolabeled hyaluronan cholesteryl hemisuccinate conjugates (HA-CHEMS) and D-a-tocopheryl polyethylene glycol succinate (TPGS) was prepared for breast cancer synergistic theranostics and scrutinized against the 7,12-dimethylbenz(a)anthracene (DMBA) induced breast cancer in female rats.

Methods: The synthesized amphiphilic HA-CHEMS conjugates and TPGS self-assembled into umbelliferone loaded nanoparticles (HA-CHEMS-UF-TPGS-NPs) in an aqueous environment and estimation the radiochemical purity, lipophilicity study, labelling efficiency, stability, complexation, biodistribution and blood clearance. Female wistar rats were used for the breast cancer and intraperitoneal administration of DMBA (80 mg/kg) was used for the induction of breast cancer. Incidence, burden, tumor volume, antioxidant parameters, pro-inflammatory cytokines, inflammatory parameters and histological study was performed.

Result: HA-CHEMS-UF-TPGS-NPs showed the high umbelliferone loading, distribution, uniform particle size and excellent stability in vitro. The radiolabeling efficiency was observed more than 97% using the ITLC chromatography. The lipophilicity value of 99mTc labelled umbelliferone was observed 3.56%. the in vitro labelling efficacy of umbelliferone was observed 91.3% in the serum and 93.1% in the physiological saline. DMBA induced rats exhibited the increase incidence of tumor burden and volume and umbelliferone treatment remarkably suppressed the tumor burden and volume. Umbelliferone altered the level of antioxidant parameters such as MDA (23.4%), SOD (54.3%), CAT (36.4%), GSH (37.5%) and GPx (52.5%). Umbelliferone treatment also suppressed the cytokines viz., TNF-α (65.5%), IL-1β (54.3%), IL-6 (71.4%); inflammatory parameters like such as COX-2 (43.4%), PGE2 (51.3%), VEGF (42.1%), NF-κB (32.5%), respectively.

Conclusions: The result showed that HA-CHEMS-UF-TPGS NPs with stable 99mTc labelling and high umbelliferone loading capacity hold great potential for breast cancer synergistic theragnostic.

Poster Presentation

Use of Statin and Breast Cancer Patient Prognosis: A Meta-Analysis of 26 Studies

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Background: Association of the use of statin and breast cancer (BC) prognosis has actively been researched since more than a decade ago. Conclusion based on previous studies yielded mixed results and inconclusive findings. This meta-analysis therefore is to report recent findings regarding the association of statin use and the prognosis of BC patients

Methods: We search the literatures using PubMed, PMC, ScienceDirect and Google Scholars. Keywords used are statin and BC. We used the Newcastle-Ottawa Scale, funnel plot to assess publication bias and Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) to assess the quality of this review. Pooled analysis of univariate and multivariate cox regression hazard ratio (HR) of overall survival (OS), event-free survival (EFS), BC-specific survival (BCSS) and BC-specific mortality (BCSM). Pooled analysis were done using the generic inverse variance method.

Result: We included 26 studies encompassing 550,476 BC patients. All studies were of high quality, minimal publication bias and GRADE shows this review to be moderate. Univariate (HR = 1.13; 95% CI, 0.83-1.55; $P = 0.43$) and multivariate (HR = 0.97; 95% CI, 0.92-1.02; $P = 0.22$) OS as well as univariate (HR = 0.92; 95% CI, 0.87-0.97; $P = 0.002$) and multivariate (HR = 0.84; 95% CI, 0.64-1.09; $P = 0.19$) EFS did not showed a significant correlation in pooled analysis. For univariate (HR = 0.89; 95% CI, 0.83-0.95; $P < 0.001$) and multivariate (HR = 0.84; 95% CI, 0.8-0.89; $P < 0.001$) analysis of BCSS, showed that statin use can improve BCSS. In univariate (HR = 0.89; 95% CI, 0.82-0.96; $P = 0.003$) and multivariate (HR = 0.74; 95% CI, 0.62-0.89; $P = 0.001$) analysis of BSCM, the use of statin can reduce BCSM.

Conclusions: This review showed the use of statin is associated with improving BCSS and reducing BCSM. Subgroup analysis and more randomized clinical trial needs to be done.

Poster Presentation

Discovery of a Novel Nucleolar stress-inducing p53 Activator with Antitumor Activity in Breast Cancer

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Background: Although activation of the p53 pathway is an attractive therapeutic strategy in breast cancer, current approaches such as MDM2 inhibition often cause dose-limiting toxicities due to p53 activation in normal tissues. The nucleolar stress response is a recently identified mechanism that preferentially activates the p53 pathway in cancer cells without inducing significant DNA damage. Targeting this pathway may therefore enable the development of safer p53-activating therapies. In this study, we aimed to discover and characterize a novel nucleolar stress-inducing compound with therapeutic potential for breast cancer.

Methods: A nucleolar stress-specific reporter system was used to screen a large compound library, leading to the identification of a seed compound. This compound was chemically optimized to generate a lead candidate suitable for in vivo use. Antitumor activity was evaluated in breast cancer cell lines using cell proliferation assays, while tumor selectivity, pharmacokinetics, and molecular markers associated with drug sensitivity were also assessed.

Result: The optimized compound activated the p53 pathway through the nucleolar stress response and significantly inhibited breast cancer cell growth without inducing marked DNA damage. Notably, the half-maximal inhibitory concentration was more than 100-fold higher in normal blood cells than in breast cancer cells, demonstrating strong tumor selectivity. Compared with clinically evaluated MDM2 inhibitors and doxorubicin, the compound exhibited markedly reduced hematological toxicity. Furthermore, oncopanel assay analyses revealed high antitumor efficacy not only in breast cancer but also across a broad range of solid tumors. A molecular marker associated with treatment sensitivity was identified, supporting the potential for patient stratification.

Conclusions: This study reports the discovery of a novel nucleolar stress-inducing p53 activator with potent and selective antitumor activity in breast cancer. The compound represents a promising new candidate for the development of safer p53-targeted therapies and may contribute to improved treatment strategies for breast cancer.

Comparison of ER, PR, HER2, and Ki67 Expression in Diagnostic Core Biopsies and Corresponding Residual Tumors after Neoadjuvant Chemotherapy in Breast Cancer Patients of the ABCSG Trial 34

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Background: We examined the expression of ER, PR, HER2, and Ki67 by immunohistochemistry (IHC) in residual tumors after neoadjuvant chemotherapy (NaCT) and compared the results with the baseline biopsy in order to determine potential changes in biomarker status.

Methods: We included 168 patients of the randomized neoadjuvant Austrian Breast and Colorectal Cancer Study Group (ABCSG) trial 34 who were treated with NaCT. IHC was performed on routinely processed tissue section in paired samples (diagnostic core biopsies and residual invasive breast cancer post-NaCT) in a central reference laboratory. The primary objective of this sub-study was to determine the changes in biomarker expression from core biopsies to residual tumors after NaCT, and to evaluate a possible association of these changes to time to distant recurrence (DR).

Result: 10/168 (6%) ER-positive samples became negative, and 2/168 (1%) ER-negative samples became positive. PR expression changed to negative in 30/167 (18%) cases and to positive in 8/167 (5%) cases. Only 3/154 (2%) HER2-negative samples became positive (IHC 3+). Ki67 expression changed from high ($>20\%$) to low ($\leq 20\%$) in 69/166 (42%) cases and from low to high in 3/166 (2%) samples. Time to DR from surgery could be evaluated in 141 patients. HER2 was excluded from the survival analyses. The change in continuous PR expression from baseline to post-NACT (HR 1.11, 95% CI 1.01-1.21, $p=0.03$) and change in continuous Ki67 expression (HR 1.30, 95% CI 1.14-1.47, $p<0.0001$) were significantly associated with time to DR, whereas change in continuous ER expression (HR 0.93, 95% CI 0.78-1.12, $p=0.45$) was not.

Conclusions: An increase in PR and Ki67 expression from diagnostic core biopsies to residual tumor samples post-NaCT was associated with shorter time to DR. Evaluation of PR and Ki67 status in residual tumor samples post-NaCT might be considered to guide a risk-stratified adjuvant treatment.

Poster Presentation

Immune and Stress-Response Markers as Predictors of Anthracycline Neoadjuvant Chemotherapy Outcomes in Locally Advanced Breast Cancer

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Background: Response to anthracycline-based neoadjuvant chemotherapy (NAC) in locally advanced breast cancer varies widely across molecular subtypes. Identifying reliable biological markers that predict treatment response is essential to optimize therapeutic strategies. Immune-related and stress-response markers, such as granzyme B, heat shock protein 27 (Hsp27), and tumor-associated macrophages (TAMs), have been proposed as potential predictors, yet their combined role across breast cancer subtypes remains unclear.

Methods: This cross-sectional study evaluated breast cancer patients with locally advanced disease who received anthracycline-based NAC. Immunohistochemical analysis was performed on pretreatment biopsy samples to assess the expression of granzyme B, Hsp27, and TAMs. Chemotherapy response was determined based on clinical and pathological assessment. Marker expression was analyzed in relation to treatment response and molecular subtypes.

Result: Of the 60 patients analyzed, 31 (51.7%) responded to anthracycline-based neoadjuvant chemotherapy, while 29 (48.3%) did not. Granzyme B overexpression was found in 31 patients (51.7%) and was significantly more common in responders than in non-responders ($p = 0.044$). TAM overexpression was observed in 40 patients (66.7%), with the highest expression seen in the HER2-enriched subtype; however, TAM expression was not significantly associated with chemotherapy response ($p = 0.872$). Hsp27 overexpression occurred in 31 patients (51.7%) and showed no significant relationship with treatment response ($p = 0.310$).

Conclusions: Granzyme B expression appears to be a promising predictor of response to anthracycline-based neoadjuvant chemotherapy in locally advanced breast cancer, whereas Hsp27 and TAMs show limited predictive value. These findings support the role of immune-mediated mechanisms in chemotherapy response and highlight the importance of subtype-specific biomarker evaluation.

Cluster-based Predictors for Malnutrition and Cachexia Across Cancer Patients Receiving Chemotherapy

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Background: Cancer is the leading cause of death in Indonesia, responsible for 18.6% of all deaths related to catabolic diseases. Although chemotherapy remains the major strategy in cancer treatment, it increases the risk of malnutrition and cachexia. However, evidence identifying hierarchical groupings of malnutrition risk factors beyond chemotherapy remains limited, despite their importance for improving nutritional risk stratification. This study aims to identify the proximity of malnutrition-related factors among cancer patients, thereby generating hierarchical clusters of cancer patients at risk of malnutrition and cachexia.

Methods: A cross-sectional study was conducted among 148 cancer patients undergoing chemotherapy. Malnutrition status, body composition, and anthropometric indicators were assessed using Patient Generated-Subjective Global Assessment (PG-SGA), Bioimpedance Analysis (BIA), and standardized measurements, while dietary intake was collected using semi-quantitative food frequency questionnaire (SQ-FFQ). Data were standardized using z-score and analyzed using k-means clustering. Associations between clusters and clinical characteristics were examined using chi-square tests ($p < 0.05$), and multinomial logistic regression was applied to identify predictors of malnutrition and cachexia risks.

Result: Three distinct clusters were identified: (High-fat-high-intake (HFHI), Lean muscular (LM), and Low intake-low body composition (LILB)). The LM cluster represented patients with preserved energy-protein capacities despite inadequate dietary intake. The LILB cluster reflected the classic malnutrition profile with a high risk of cachexia. The HFHI cluster corresponded to a "skinny fat" phenotype. All clusters were associated with sex, smoking status, and cancer type ($p < 0.05$). Sex was a significant predictor of the HIHF cluster (OR = 6.3, $p < 0.001$), while cancer type predicted both the HIHF (OR = 7.3, $p < 0.001$) and LM clusters (OR = 4.3, $p < 0.001$).

Conclusions: Clustering approach revealed heterogenous nutritional and body composition profiles among cancer patients receiving chemotherapy. It may facilitate early identification of malnutrition and cachexia risk and support more personalized nutritional interventions.

Advanced Stage: The Dominant Independent Predictor of Mortality in Breast Cancer in FAST-Scoring to Predict Mortality A Ten-Year Observational Study

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Background: While many factors influence prognosis, the dominant, independent long-term impact of advanced disease stage needs definitive evaluation. This study is urgently needed to establish the precise prognostic significance of advanced-stage disease on overall survival over a ten-year period, providing essential data to inform better prognostication and resource allocation.

Methods: A retrospective observational cohort study was conducted using medical records of breast cancer patients treated at a tertiary referral hospital in Indonesia between 2014 and 2023. Patients were classified according to stage at diagnosis into early, locally advanced, and advanced-stage disease. Demographic characteristics, histopathological features, and clinical outcomes were analyzed. Logistic regression performed to determine which variable play as a predictor in mortality of breast cancer. A scoring model was constructed to predict mortality and ROC curve to analyze the accuracy

Result: In total of 946 patients included. Of the variables consideredincluding age, histopathology, and metastatic statusonly clinical stage remained a significant predictor in the final model. Advanced stage was associated with a significantly higher risk, with a 7.6-fold increased chance of death (AOR 7.648; 95% CI 4.815-12.148; $p < 0.001$). Farah-Arya-Sinta-Tania (FAST) Score were constructed and the cut off 3.14 showed sensitivity of 76% and specificity 59% with AUC 73% revealed a good scoring to predict mortality.

Conclusions: Advanced stages carry a significantly higher risk, and scoring system require improvement for better future scoring system.

Poster Presentation

High Ductal Carcinoma In Situ Component and HER3 Overexpression Predict Poor Recurrence-Free Survival in HER2-Positive Breast Cancer

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Background: HER2-positive breast cancer is typically associated with a poor prognosis. Although the ductal carcinoma in situ (DCIS) component is a known risk factor for recurrence, its prognostic interaction with HER3 and tumor-infiltrating lymphocytes (TILs) remains unclear. Therefore, this study aimed to investigate the prognostic significance of the DCIS component in relation to HER3 expression and TILs.

Methods: We retrospectively analyzed 413 patients who underwent surgical resection for HER2-positive breast cancer. The extent of the DCIS component, HER3 expression, and TILs were primarily evaluated in relation to recurrence-free survival (RFS). In addition, various other clinicopathological factors, including ER, PR, p53, Ki-67, tumor size, histologic grade, and histologic type, were assessed.

Result: Of 413 patients, 32 (7.7%) were classified into the High-DCIS/HER3-overexpression group. This group was significantly associated with favorable clinicopathological features, including smaller tumor size ($p < 0.001$), lower pT ($p = 0.045$), and lower stage ($p = 0.004$), compared to the others. However, the RFS rate for the High-DCIS/HER3-overexpression group (5-year survival, 88.5%) was significantly lower ($p = 0.003$) than for the other remaining group (97.7%). Notably, the Low-DCIS/High-TILs subgroup demonstrated a trend toward the most favorable prognosis, with a 5-year RFS rate of 100% ($p = 0.088$). Moreover, High-DCIS/HER3 overexpression was identified as a significant independent prognostic factor in both univariate ($p = 0.002$) and multivariate ($p = 0.005$) Cox analyses.

Conclusions: High-DCIS/HER3-overexpression phenotype is an independent poor prognostic factor in HER2-positive breast cancer, despite presenting with favorable clinicopathological features. The observation that the Low-DCIS/High-TILs subgroup tends to have the best outcomes suggests that the biological mechanisms driving poor outcomes differ according to DCIS burden. These findings highlight the necessity of stratifying HER2-positive breast cancer patients based on DCIS burden and HER3 status to optimize therapeutic strategies.

Upper Outer Quadrant Tumor Location as an Independent Favorable Prognostic Factor in N1 Breast Cancer

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Background: While tumor location influences lymphatic drainage patterns, its prognostic value in node-positive disease is unknown. We evaluated whether upper outer quadrant (UOQ) tumor location is associated with distinct survival outcomes in patients with N1 breast cancer.

Methods: We conducted a retrospective cohort study of 1,914 breast cancer patients with N1 disease treated at Seoul National University Hospital between January 2000 and December 2020. N1 disease was defined as biopsy-confirmed clinical N1 in neoadjuvant chemotherapy recipients or pathologic N1 in upfront surgery patients. Tumor location was determined by preoperative imaging (ultrasonography and MRI). Distant metastasis-free survival (DMFS) and overall survival (OS) were analyzed using Kaplan-Meier and Cox proportional hazards models.

Result: Among enrolled patients, 938 (49.0%) had UOQ tumors and 976 (51.0%) had non-UOQ tumors. While UOQ patients were older (median 49.0 vs 47.0, p-value 0.004) and received breast-conserving surgery and radiotherapy more frequently (58.6% vs 44.8%, p-value < 0.001), tumor stage, molecular subtype, histologic grade, and systemic treatment were comparable between groups. In this node-positive cohort, UOQ location was associated with significantly superior 5-year DMFS (86.3% vs 75.3%, $p < 0.001$) and OS (93.4% vs 87.9%, $p < 0.001$). On multivariate analysis, UOQ location remained a significant independent favorable prognostic factor, reducing the risk of distant metastasis by 50% (HR 0.50, 95% CI 0.42–0.60, $p < 0.001$) and death by 47% (HR 0.53, 95% CI 0.42–0.60, $p < 0.001$) after adjusting for tumor stage, molecular subtype, histologic grade.

Conclusions: Among patients with node-positive breast cancer, UOQ tumor location confers a substantial survival advantage independent of conventional prognostic factors. This finding suggests that nodal positivity has a less adverse prognostic impact when the primary tumor is located in the UOQ, potentially reflecting distinct patterns of lymphatic spread. Tumor location might be incorporated into risk stratification for N1 breast cancer patients.

Preoperative Risk Stratification in Biopsy-Proven Node-Positive Breast Cancer: Implications for Axillary De-escalation

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Background: Recent trials demonstrate safety of omitting axillary dissection in sentinel lymph node-positive patients, but those with preoperative biopsy-proven metastases remain underrepresented. We characterized nodal burden and identified preoperative predictors in this population to inform future de-escalation strategies.

Methods: We analyzed 1,671 consecutive cT1-3 patients with biopsy-proven axillary metastases undergoing upfront axillary lymph node dissection (ALND) (2008-2023). All had preoperative axillary ultrasound (AUS). Multivariable regression identified predictors of extensive disease (≥ 3 positive nodes).

Result: Overall, 662 patients (39.6%) had limited disease (1-2 positive nodes). Independent predictors of ≥ 3 positive nodes included: cT2-3 (OR 1.34-1.58, $p \leq 0.01$), AUS nodal burden (2 nodes: OR 2.03; ≥ 3 nodes: OR 2.10; both $p < 0.001$), and invasive lobular histology (OR 1.83, $p = 0.038$). Triple-negative phenotype was associated with a lower risk of extensive disease (OR 0.64, $p = 0.021$). Among patients with single abnormal node on AUS, 52.2% had limited disease, compared to 33.4% in those with ≥ 3 abnormal nodes ($p < 0.001$).

Conclusions: Biopsy-proven node-positive patients demonstrate substantial heterogeneity in axillary burden, with 40% having limited disease. Clinical T stage, histology, and ultrasound findings enable preoperative stratification into distinct risk groups. These findings challenge the current "one-size-fits-all" approach to ALND in this population and provide a strong rationale for precision-based strategies requiring prospective evaluation.

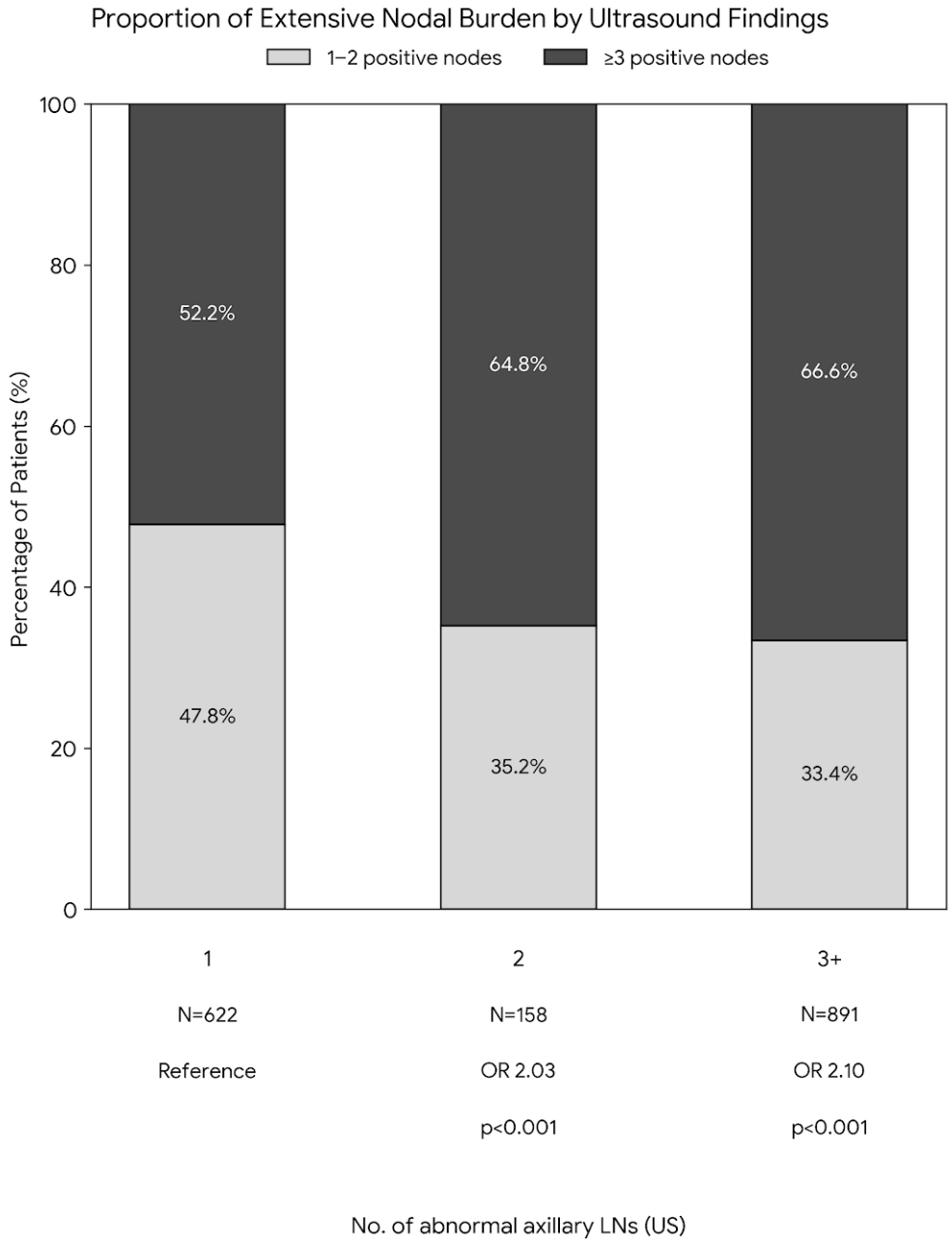

Figure 1. Proportion of Extensive Nodal Burden by Preoperative Ultrasound Findings.

The stacked bar chart shows the distribution of axillary nodal burden (1–2 vs. ≥3 positive lymph nodes) stratified by the number of suspicious nodes on preoperative ultrasound. Percentages are displayed within the bars. Odds ratios (OR) and p-values were derived from multivariable logistic regression analysis adjusted for clinical T stage, histology, receptor status, tumor grade, and axillary palpability (reference: 1 suspicious node). Abbreviations: US, ultrasound; LN, lymph node; OR, odds ratio.

Choice-Based Comparison of Multigene Assays in Hormone ReceptorPositive, HER2-Negative Breast Cancer: A Single-Center Real-World Study

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Background: Multigene assay (MGA)s are widely used to guide adjuvant treatment decisions in hormone receptor (HR)-positive, human epidermal growth factor receptor 2 (HER2)-negative early breast cancer. This study compared genomic risk stratification across three MGAs in a single-center cohort.

Methods: We retrospectively analyzed patients with HR-positive, HER2-negative stage III breast cancer who underwent surgery followed by MGA testing between October 2016 and July 2025. Patients with bilateral or recurrent breast cancer, those without sentinel lymph node biopsy, or those with failed MGA results were excluded. The MGAs included Oncotype DX (ODX), OncoFREE (OF), and GenesWell BCT (GW). Genomic high risk was defined as a recurrence score ≥ 26 for ODX, ≥ 20 for OF, and ≥ 4 for GW.

Result: A total of 503 patients were included. The mean age was 52.4 ± 9.3 years, and the mean tumor size was 17.4 ± 7.6 mm; 229 patients (45.5%) were premenopausal. MGA testing was performed in 295, 92, and 126 patients in the ODX, OF, and GW groups, respectively. Because clinicopathologic characteristics differed among the MGA groups, analyses were restricted to patients classified as clinically low risk according to the MINDACT criteria. The numbers of clinically low-risk patients were 144 (48.8%), 62 (67.4%), and 68 (53.9%) in the ODX, OF, and GW groups, respectively. Within this clinically low-risk subgroup, the proportions of patients classified as genomic high risk were 13.9%, 29.0%, and 25.0% in the ODX, OF, and GW groups, respectively, with significantly higher rates in the OF and GW groups compared with the ODX group ($p = 0.023$). In subgroup analyses by menopausal status, no significant differences were observed among postmenopausal patients, whereas a significant difference was noted among premenopausal patients ($p = 0.029$).

Conclusions: Among clinically low-risk HR-positive, HER2-negative breast cancer patients, genomic risk classification varied substantially according to the multigene assay used. These differences should be considered when interpreting MGA results and making adjuvant treatment decisions, particularly in premenopausal patients.

P-p70S6K Expression as a Prognostic Factor in Early Recurrence in Contrast to Late Recurrence in Breast Cancer.: Analysis of 4,602 Patients

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Background: While p-p70s6k overexpression is established as a predictor of poor prognosis and therapy resistance, its differential impact on early versus late recurrence remains to be elucidated. This study investigated whether the prognostic impact of p-p70s6k expression on breast cancer recurrence varies depending on the postoperative follow-up period.

Methods: We retrospectively analyzed 4,602 patients who underwent surgery for breast cancer at Korea Cancer Center Hospital between 2010 and 2021. p-p70s6k expression was evaluated using immunohistochemistry. We assessed the correlation between p-p70s6k status and oncologic outcomes, including overall survival (OS) and recurrence. A time-dependent analysis was performed to distinguish the risk impact on early recurrence (< 5 years) versus late recurrence (≥ 5 years).

Result: In the overall cohort, high p-p70s6k expression was significantly associated with an increased risk of recurrence (HR = 1.226 [1.027, 1.462], $p = 0.024$) and reduced overall survival (HR = 1.795 [1.282, 2.515], $p = 0.001$). This association was particularly pronounced in the hormone receptor positive subtype. Notably, while p-p70s6k expression served as a prognostic factor for early recurrence within 5 years post-surgery (HR = 1.287 [1.057, 1.567], $p = 0.012$), no significant correlation was observed for late recurrence occurring after 5 years ($p = 0.988$).

Conclusions: Our findings suggest that p-p70S6K may have a prognostic role prognostic biomarker for breast cancer, especially in HR-positive subtypes. However, its prognostic value appears to be largely confined to early recurrence, indicating limited utility for predicting late recurrence. These results underscore the potential need for intensive surveillance in patients with high p-p70s6k expression during the first 5 years after surgery

Association between BRCA Mutation and p-p70S6K Expression in Breast Cancer: A Retrospective Single-center Cohort Study

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Background: Germline BRCA1/2 mutations are known to induce DNA repair defects, potentially triggering compensatory PI3K/AKT/mTOR pathway activation. We investigated the clinicopathological correlation between BRCA mutations and the expression of p-p70S6K, a downstream mTOR effector, and explored their combined prognostic impact.

Methods: We retrospectively analyzed 681 high-risk breast cancer patients who underwent BRCA testing at Korea Cancer Center Hospital between 2011 and 2021. Patients were stratified into four groups based on mutation status and p-p70S6K expression: G1 (WT/Low, n = 363), G2 (WT/High, n = 242), G3 (Mut/Low, n = 50), and G4 (Mut/High, n = 26). Clinicopathological features were compared, and Disease-Free Survival (DFS) and Overall Survival (OS) were assessed using multivariate Cox proportional hazards model.

Result: The G4 group (Mut/High) showed a tendency toward more aggressive features compared to other groups, including younger age ($p = 0.033$), higher histologic grade ($p < 0.001$), and a higher prevalence of Triple-Negative Breast Cancer ($p < 0.001$). In the multivariate analysis, neither BRCA mutation nor p-p70S6K expression alone retained prognostic significance. However, an interaction was observed between the two factors. Patients with both BRCA mutation and high p-p70S6K levels demonstrated inferior DFS, with a Hazard Ratio of 2.205 (95% CI 1.173-4.147; $p = 0.014$).

Conclusions: Our findings suggest that high p-p70S6K expression may be associated with poor clinical outcomes specifically in patients with BRCA mutations, implying a possible synergistic effect between the two factors. Further research is needed to validate these results and to determine if targeting the mTOR pathway could be a potential therapeutic strategy for this high-risk group.

Impact of Clinicopathologic Factors and Inflammatory Hematologic Markers on Pathologic Complete Response After Neoadjuvant Chemotherapy in Breast Cancer

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Background: Neoadjuvant chemotherapy (NACT) is widely used in breast cancer, and pathologic complete response (pCR) is an important surrogate marker for survival. Identifying reliable predictors of pCR from both patient factors and tumor characteristics may help refine risk stratification and guide individualized treatment strategies. This study aimed to evaluate whether body mass index (BMI), serial hematologic markers, and clinicopathologic tumor features are associated with pCR in breast cancer patients treated with NACT at Wonju Severance Christian Hostpital.

Methods: We retrospectively reviewed 254 breast cancer patients who received NACT between 2020 and 2024 at our institution. Among them, 152 patients achieved pCR and 102 had residual disease after surgery. Patient related variables included BMI before and after NACT and complete blood counts obtained at three time points (before NACT, after the first cycle, and before surgery), focusing on hemoglobin, white blood cell count, platelet count, neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), and lymphocyte-to-monocyte ratio (LMR). Tumor characteristics comprised histologic grade, clinical T and N stage, and molecular subtype. pCR was defined as the absence of residual invasive carcinoma in both the breast and axillary lymph nodes. Univariable binary logistic regression was first performed for each factor, followed by multivariable logistic regression including clinically relevant and statistically significant variables from the univariable analysis.

Result: The overall pCR rate was 59.8%. In multivariable analysis, higher histologic grade and molecular subtype remained independently associated with increased odds of achieving pCR, whereas posttreatment hemoglobin, clinical T stage, and clinical N stage were not significantly associated with pCR after adjustment for other covariates.

Conclusions: In our center cohort of breast cancer patients treated with NACT, tumor related factors-particularly histologic grade and molecular subtype-were the main determinants of pCR, while post-treatment hemoglobin and anatomic stage showed no independent predictive value.

High Ductal Carcinoma In Situ Component and HER3 Overexpression Predict Poor Response to Trastuzumab in HER2-Positive Breast Cancer

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Background: While trastuzumab has improved outcomes in HER2-positive breast cancer, variable responses remain a clinical challenge. Factors such as ductal carcinoma in situ (DCIS) component, tumor-infiltrating lymphocytes (TILs), and the HER3 expression have been proposed as predictors of trastuzumab response, but their clinical significance remains controversial. Therefore, this study aimed to evaluate the predictive value of these factors in patients treated with trastuzumab.

Methods: We retrospectively analyzed 413 patients with HER2-positive breast cancer who underwent surgical resection and received at least 8 cycles of trastuzumab. The extent of the DCIS component, HER3 expression, and TILs were primarily evaluated in relation to recurrence-free survival (RFS). In addition, various other clinicopathological factors, including ER, PR, p53, Ki-67, tumor size, histologic grade, and histologic type, were also assessed.

Result: Of 413 patients, 32 (7.7%) were classified into the High-DCIS/HER3-overexpression group. This group was associated with favorable clinicopathological features, including smaller tumor size ($p < 0.001$) and lower stage ($p = 0.007$). However, the RFS rate for the High-DCIS/HER3-overexpression group (5-year survival, 88.5%) was significantly lower ($p = 0.003$) compared to the others (97.7%). Notably, the Low-DCIS/High-TILs subgroup demonstrated a trend toward the most favorable prognosis (5-year RFS: 100%, $p = 0.088$). Moreover, High-DCIS/HER3 overexpression was identified as a significant independent prognostic factor in both univariate ($p < 0.001$) and multivariate ($p = 0.006$) Cox analyses.

Conclusions: High-DCIS/HER3-overexpression serves as an independent predictive factor for poor response to trastuzumab in HER2-positive breast cancer, despite presenting with favorable clinicopathological features. Conversely, the superior outcomes in the Low-DCIS/High-TILs subgroup suggest that susceptibility to trastuzumab differs according to DCIS burden. These findings highlight the necessity of stratifying patients based on these markers to optimize therapeutic strategies and overcome trastuzumab resistance.

Integrative Clustering of Breast Cancer Has Different Prognostification Value at Diagnosis and after Neoadjuvant Chemotherapy

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Background: In neoadjuvant setting, pathologic complete response (pCR) has been the most powerful prognostic marker to determine long term survival outcome but sometimes BC patients who achieved pCR experience BC recurrence. Integrative cluster (IntClust), based on copy number aberrations and transcriptomic data, is known as one of the powerful prognostic utility. In this study, we evaluated the prognostic value of IntClust in BC treated with neoadjuvant chemotherapy.

Methods: Using sequencing data from neoadjuvant chemotherapy (NAC) cohort, we performed genomic analyses including IntClust subtyping, gene and pathway analyses and cell typing to evaluate prognostic value of tumor genomic characteristics.

Result: In BC at diagnosis, 100 BCs were included in genomic analysis. IntClust subtype was associated to BC subtype, intrinsic subtype and menopausal status at diagnosis. In survival outcome, IntClust subtype predicted pCR ($p = 0.095$), event free survival (EFS) ($p < 0.001$) and overall survival (OS) ($p < 0.001$) after completion of treatment. In cox analysis, IC ER+ high-risk group was independently associated to poor EFS (HR: 5.6) and OS (HR: 8.4) outcomes. In GSEA analysis, IC ER+high risk group had estrogen response early pathway up regulation and interferon gamma pathway down regulation. In 79 residual diseases (RDs) after NAC, IntClust subtype still had its prognostic value for EFS ($p = 0.005$) and OS ($p = 0.01$). Interestingly, IC5 (HER2) and 10 (TN) subtypes at BC diagnosis were expected to have high pCR rate and good prognosis but those of RDs were to short EFS and OS duration. In GSVA/DEG analysis, G2M checkpoint pathway was activated in IC10 and ERBB2/GRB7 were highly expressed in IC5 compared to other IC types. In cell type annotation, lumB and cycling cancer (CC) cells were abundant in RDs. IC10 mostly consisted of CC cells, which associated to poor EFS and OS. In spatial data, CC cells were interacted to neighbor cells with SPP1-ITGB3 and PDGFB-PDGFRB interaction.

Conclusions: IntClust had prognostification value for EFS and OS in NAC cohort.

Poster Presentation

Optimized Simple Clinical Rules for Identifying Low-Risk Oncotype DX Recurrence Scores in HR+/HER2- Early Breast Cancer: Prioritizing Safety through Automated Ki-67 Quantification

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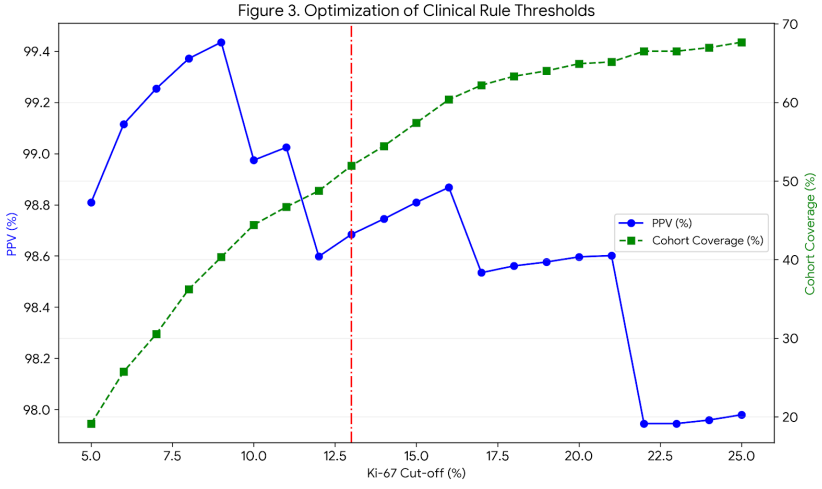
Background: The 21-gene Oncotype DX Recurrence Score (RS) is a standard prognostic assay for HR+/HER2- early breast cancer but remains inaccessible in many resource-limited settings. This study aimed to develop a high-confidence integrated nomogram and simplified clinical decision rules to predict a low-risk (RS ≤ 25), prioritizing diagnostic safety (Positive Predictive Value [PPV]) and immediate clinical utility.

Methods: We retrospectively analyzed 439 patients with HR+/HER2- breast cancer who underwent Oncotype DX testing. To ensure reproducibility, Ki-67 proliferation index was quantified using an automated digital pathology algorithm. We developed a predictive nomogram integrating clinicopathologic and MRI features. Furthermore, an iterative grid search optimization was performed to derive a simplified binary rule that maximizes PPV while maintaining adequate cohort coverage.

Result: The integrated nomogram achieved excellent discrimination with an AUC of 0.935. Through statistical optimization, we established the "Optimized Simple Clinical Rule" defined as PR Allred score ≥ 6, Ki-67 ≤ 13%, and Histologic Grade ≤ 2. This rule successfully identified 52.0% (228/439) of the cohort as low-risk with a PPV of 98.7%, offering a robust safety margin for chemotherapy omission. Conversely, the combination of PR score 0 and Ki-67 ≥ 10% served as a definitive "Red Flag," predicting a high-risk RS (> 25) with 100% specificity.

Conclusions: The proposed Optimized Simple Clinical Rule serves as a highly accurate and zero-cost screening tool for identifying candidates for chemotherapy omission. This framework emphasizes clinical safety over numerical score estimation, offering a pragmatic alternative for chemotherapy decision-making when genomic testing is unavailable.

Figure 3. Optimization of Clinical Rule Thresholds



Predicting Pathologic Complete Response in Breast Cancer Using Shear Wave Elastography

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Background: Neoadjuvant chemotherapy (NAC) can induce a pathologic complete response (pCR) - the absence of invasive tumor on surgical pathology - in a substantial subset of breast cancer patients, with reported pCR rates around 30-40% depending on tumor subtype. Shear wave elastography (SWE) is an ultrasound-based technique that quantifies tissue stiffness. The aim of this study is whether intratumoral stiffness heterogeneity, quantified by the ratio of maximum to minimum elasticity (Emax/Emin) on pretreatment SWE, can predict pCR in breast cancer patients receiving NAC.

Methods: This retrospective study was conducted on breast cancer patients who treated with NAC. All patients underwent SWE imaging of the breast tumor before starting the first NAC cycle. Quantitative SWE parameters - including mean elasticity (Emean), minimum elasticity (Emin), maximum elasticity (Emax) in kilopascals, and elasticity standard deviation (SD) - were recorded for each tumor. Elastography measurements were obtained by placing region-of-interest areas over the tumor on ultrasound to capture stiffness values; the heterogeneity ratio was calculated as Emax/Emin for each lesion.

Result: We analyzed 122 breast cancer patients (132 tumors; 8 excluded for loss to follow-up or imaging errors, final n = 124 lesions) treated with NAC between July 2022 and July 2023. Univariate analysis identified higher Emax/Emin, higher Ki-67 index, and negative ER/PR status as factors positively associated with pCR (all $p < 0.05$). The absolute stiffness values alone showed smaller or no significant differences. Clinical stage (cT, cN) and patient age showed no significant association with pCR in our cohort.

Conclusions: Pretreatment shear wave elastography, particularly the Emax/Emin stiffness ratio, appears to be a promising noninvasive indicator of which breast cancers will achieve pCR to NAC. Our findings support that shear wave elastography can aid in predicting pCR in breast cancer patients undergoing NAC, potentially improving personalized treatment planning and outcomes.

Triple Negative Breast Cancer is Independently Associated with Lower Femoral Neck T Score at the Time of Bone Metastasis

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Background: The study aimed to determine whether bone mineral density and skeletal vulnerability differ according to molecular subtype in patients with breast cancer and established bone metastasis, despite routine use of bone-modifying agents.

Methods: This single-center retrospective cohort study included patients with breast cancer and confirmed bone metastasis treated between 2002 and 2023. Molecular subtypes were classified as luminal A, luminal B, HER2-enriched, or triple-negative breast cancer (TNBC). Femoral neck and lumbar spine T-scores measured at the time of bone metastasis were evaluated as skeletal outcomes. Serum 25-hydroxyvitamin D and pyridinoline levels were assessed as markers of bone metabolism. Multivariable linear regression analyses were performed to identify factors independently associated with femoral neck T-scores.

Result: A total of 184 patients were included. The interval from initial diagnosis to bone metastasis differed by molecular subtype, with the longest latency observed in luminal subtypes and the shortest in TNBC. Compared with other subtypes, TNBC was associated with lower femoral neck T-scores and serum 25-hydroxyvitamin D levels, higher pyridinoline levels, and the highest prevalence of osteoporosis, vitamin D deficiency, and a composite high-risk skeletal phenotype. In contrast, lumbar spine T-scores did not differ across subtypes. In multivariable analyses adjusting for age, body mass index, and treatment exposure, TNBC remained independently associated with lower femoral neck T-scores.

Conclusions: Bone mineral density differs by molecular subtype in patients with breast cancer and bone metastasis. TNBC is associated with pronounced skeletal vulnerability beyond the effects of endocrine therapy, highlighting the need for subtype-specific bone health strategies in advanced breast cancer.

The Significant Determinants of Clinicopathologic Factors Related to the Multigene Predictors in Hormone Receptor-positive, HER2-negative Breast Cancer

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Background: While adjuvant treatment decisions in hormone receptor-positive, HER2-negative breast cancer have historically relied on clinicopathological factors, multigene test (MGT) has emerged as a critical determinant for adjuvant chemotherapy. However, the high cost and limited accessibility restrict widespread MGT use. This study aims to identify clinicopathological factors correlating with MGT results to establish a practical treatment algorithm for setting with limited MGT access.

Methods: A retrospective analysis was conducted on 3,403 patients who underwent surgery for hormone receptor-positive, HER2-negative breast cancer at Severance Hospital between January 2015 and December 2020. Clinicopathological variables including demographics, tumor characteristics, Ki-67 index, hormone receptor levels, and MGT results (Oncotype DX, MammaPrint, and Endopredict) were collected. Logistic regression analyses evaluated associations between clinicopathological factors, MGT scores, and adjuvant chemotherapy administration.

Result: Chemotherapy rates were comparable between patients without and with MGT, with no statistically significant difference (27.0% vs. 26.9%, $p = 0.964$). Among premenopausal patients, chemotherapy was administered to 20.0% (1/5) without MGT and 27.6% (148/537) with MGT ($p = 0.706$). Multivariate analysis revealed MGT risk score as the strongest predictor of treatment decisions ($p < 0.001$). Other independent factors included lymph node involvement, high histologic grade, Ki67 ≥ 14%, T-stage, age ≤ 50 years, and PR positivity (all $p < 0.001$). Notably, age, histologic type, T, N-stage, Ki67 index, and histological grade all emerged as significant determinants in adjuvant chemotherapy decisions (all $p < 0.001$). Lobular/other histologic types showed a protective effect ($p < 0.001$).

Conclusions: Lymph node metastasis and high histologic grade emerged as practical surrogates for MGT in predicting treatment benefit. Strong correlations between clinicopathological factors and MGT results provide a framework for adjuvant chemotherapy decisions in resource-limited settings. These findings may enable more universal and cost-effective personalized treatment for patients with hormone receptor-positive, HER2-negative breast cancer.

Prognostic Impact of Disease-free Interval on Overall Survival in Metastatic Breast Cancer: A Retrospective Cohort Study

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Background: Disease-free interval (DFI) and metastatic patterns are recognized prognostic factors in metastatic breast cancer (MBC). We investigated the prognostic impact of DFI, tumor subtype, and metastatic organ category on overall survival (OS) in patients with recurrent MBC.

Methods: We retrospectively reviewed female patients diagnosed with metastatic breast cancer at Ewha Womans University Mokdong Hospital between January 2000 and December 2022. Overall survival (OS) was defined as the time from metastatic diagnosis to death or last follow-up and expressed in months. Survival outcomes were analyzed using the Kaplan-Meier method and compared using the log-rank test. Multivariable Cox proportional hazards regression was performed adjusting for age at metastatic diagnosis, intrinsic subtype, and metastatic organ involvement, classified as bone-only, visceral (liver or lung), or brain metastasis.

Result: A total of 657 patients with metastatic breast cancer were included in the analysis. Patients were stratified into four groups according to disease-free interval (DFI): de novo metastatic disease (n = 134), recurrent disease with DFI < 24 months (n = 197), DFI 24 - < 60months (n = 196), and DFI ≥ 60 months (n = 130). KaplanMeier survival analysis revealed a significant difference in overall survival among the four groups (log-rank $p = 0.0007$). Patients with early relapse (DFI < 24 months) exhibited the poorest survival, whereas those with late relapse (DFI ≥ 60 months) demonstrated the most favorable survival outcomes. In multivariable Cox proportional hazards analysis, DFI remained an independent prognostic factor for overall survival. Subtype-specific analyses showed heterogeneity in the prognostic impact of early relapse, with the strongest adverse effect observed in triple-negative breast cancer. OS differed significantly by metastatic organ category ($p < 0.001$), with bone-only metastasis showing the most favorable prognosis.

Conclusions: Disease-free interval is an independent prognostic factor for overall survival in metastatic breast cancer. Early relapse within 24 months identifies a high-risk population, particularly among aggressive subtypes.

Prognostic Impact of HER2-Zero versus HER2-Low Status in Young Women with Breast Cancer

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Background: Recent evidence suggests that HER2-low breast cancer represents a biologically distinct entity, challenging the traditional dichotomous classification of HER2-positive and HER2-negative disease. With the emergence of antibody-drug conjugates demonstrating clinical benefit in HER2-low tumors, further characterization of this subgroup is warranted. This study compared clinicopathologic characteristics and survival outcomes between HER2-zero and HER2-low breast cancer in young women.

Methods: We retrospectively reviewed data from 1,746 patients diagnosed with primary breast cancer before the age of 50 at Eunpyeong St. Mary's Hospital between 2005 and 2015. After excluding patients with HER2-positive disease, metastatic disease at diagnosis, or incomplete data, 876 patients were included: 647 with HER2-zero tumors and 229 with HER2-low tumors. Clinicopathologic features, recurrence-free survival (RFS), and overall survival (OS) were compared. Subgroup analyses were performed according to hormone receptor (HR) status.

Result: There were no significant differences between the two groups in tumor size, T stage, N stage, histologic grade, or lymphovascular invasion. HER2-zero tumors were more frequently HR-negative ($p = 0.001$). Patients with HER2-zero breast cancer were more likely to undergo breast-conserving surgery and receive adjuvant chemotherapy and radiotherapy, whereas endocrine therapy was more frequently administered in the HER2-low group. In the overall cohort, HER2-zero breast cancer demonstrated significantly better RFS than HER2-low breast cancer ($p = 0.009$), while OS did not differ significantly ($p = 0.131$). Multivariate analysis identified HER2-low expression and high histologic grade as independent predictors of worse RFS. In HR-positive breast cancer, HER2-zero tumors were associated with significantly better RFS and OS compared with HER2-low tumors ($p = 0.001$ and $p = 0.007$, respectively). HER2-low expression remained an independent predictor of worse RFS on multivariate analysis.

Conclusions: In breast cancer patients younger than 50 years, HER2-low expression is associated with inferior recurrence-free survival compared with HER2-zero disease. This prognostic difference is particularly pronounced in hormone receptorpositive breast cancer.

Spatial Transcriptomic Signatures of Chemo-resistant Residual Tumor Bed in Triple-negative Breast Cancer and Their Association with Recurrence

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Background: Pathologic complete response (pCR) after neoadjuvant chemotherapy (NAC) predicts favorable outcomes in triple-negative breast cancer (TNBC), yet some patients still experience recurrence, whereas others with residual disease (RD) remain disease-free. This study used spatial transcriptomics to explore the molecular features in the post-NAC tumor bed and their association with recurrence.

Methods: Spatial transcriptomic profiling was performed on post-NAC TNBC resection specimens using the GeoMx DSP platform. Tumor beds were segmented into tumor (CK+CD45-), stroma (CK-CD45-), and immune (CD45+) compartments. Cases were classified by treatment response (pCR vs RD) and further stratified by recurrence within 3 years. Genes associated with recurrence were identified and validated in three external TNBC cohorts.

Result: In RD tumors, recurrent cases displayed distinct gene-expression profiles in both tumor and stromal compartments. In tumor compartment of RD-recurrent cases, LPL, FARP1, and NECTIN4 were upregulated. LPL and FARP1 were associated with improved distant relapse-free survival (DRFS) in an NAC-treated cohort (GSE25066), but showed reversed prognosis (LPL) or insignificant (FARP1) disease-free survival (DFS) in treatment-nave (TCGA-BRCA and SCANB) cohorts. NECTIN4 showed consistent shorter DFS in all treatment-nave cohorts. FABP4 and GAL were recurrence-related upregulated genes in stromal compartment. FAPB4 was associated with better DRFS in an NAC-treated cohort but insignificant in treatment nave cohorts. GAS was consistently significantly associated with shorter DRFS and DFS in GSE25066 and SCANB cohorts, respectively. In tumor bed of pCR cases, stroma and immune compartments had differentially upregulated genes, but significant clinical impact of recurrence-related genes was not found owing to sparse cellularity.

Conclusions: This study demonstrates that chemoresistant residual tumors in TNBC maintain epithelial differentiation and metabolic plasticity, while adjacent stroma acquires lipid-handling and immune-modulatory features and promote recurrence. These findings suggest that recurrence-associated genes, such as LPL, FARP1, FABP4, and GAL may serve as biomarker for post-NAC risk stratification and therapeutic targets.

Neoadjuvant Chemotherapy Response Metrics Are Subtype-Dependent Surrogates for Prognosis in Breast Cancer

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Background: In patients receiving neoadjuvant chemotherapy (NAC), treatment response is commonly used as a surrogate for prognosis. However, the prognostic relevance of response metrics may differ by breast cancer subtype. We evaluated which NAC response measures best reflect systemic recurrence risk across subtypes.

Methods: We retrospectively analyzed patients with stage I-III breast cancer treated with NAC at Korea University Anam Hospital between 2000 and 2022. Patients were classified into four subtypes according to hormone receptor (HR) and HER2 status. Systemic recurrence was assessed as both a binary outcome and a time-to-event endpoint (distant metastasis-free survival, DMFS). Three NAC response metrics were evaluated: clinical response by imaging according to Response Evaluation Criteria in Solid Tumors version 1.1, pathological complete response (pCR), and nodal pathological response (ypN0, analyzed among baseline clinical node-positive patients only). Discriminatory performance was quantified using area under the receiver operating characteristic curve (AUC) and concordance index (C-index).

Result: A total of 841 patients were included, of whom 678 had baseline node-positive disease. In the HR+/HER2- subtype (n = 330; systemic recurrence rate 14%), none of the response metrics demonstrated meaningful prognostic discrimination (AUC 0.52-0.57; C-index 0.53-0.55). In contrast, in HR-/HER2+ tumors (n = 137; recurrence rate 15%), clinical response and pCR showed strong predictive performance (AUC up to 0.79; C-index up to 0.76). Triple-negative breast cancer (TNBC; n = 188; recurrence rate 18%) demonstrated moderate discrimination across metrics (AUC 0.66-0.67). The HR+/HER2+ subtype (n = 184; systemic recurrence rate 9%) showed discrimination by clinical response and pCR (AUCs 0.62 and 0.60; C-indices 0.62 and 0.59), aligning more closely with HR- subtypes than with HR+ disease.

Conclusions: The prognostic utility of NAC response metrics varies substantially by subtype. Surrogate endpoints for NAC response should therefore be selected in a subtype-specific manner rather than uniformly applied across all patients.

Exploratory Meta-regression of Tumor Biology and Metastatic Pattern in Locoregional Treatment Outcomes for De Novo Metastatic Breast Cancer

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Background: Existing literature on locoregional treatment (LRT) in de novo metastatic breast cancer (dnMBC) has not demonstrated a consistent survival benefit, suggesting heterogeneity in treatment effect. We conducted an exploratory meta-regression to assess whether clinicopathologic characteristics are associated with differences in survival following LRT.

Methods: PubMed, Cochrane Library, Scopus, and Web of Science were searched for randomized trials published from January 2010 to January 2026 comparing LRT plus systemic therapy to systemic therapy alone. Random-effects meta-regression using restricted maximum likelihood estimation was performed. Study-level proportions of hormone receptor-positive disease (HR), HER2-positive disease, triple-negative breast cancer (TNBC), menopausal status, and bone-only metastasis were analyzed.

Result: Five trials comprising 1,368 patients were included. Overall survival (OS) was not significantly improved with LRT (HR 0.87, 95% CI 0.68-1.13; $p = 0.21$). HR-positive disease was significantly associated with survival outcomes (HR 0.83 per 10% increase, 95% CI 0.73-0.94; $p = 0.004$). A study-level association was also observed for TNBC (HR 0.47 per 10% increase, 95% CI 0.24-0.91; $p = 0.026$). Bone-only dnMBC showed a favorable pattern with LRT (HR 0.93 per 10% increase, 95% CI 0.86-1.01; $p = 0.087$). HER2 status and menopausal status were not associated with differences in OS.

Conclusions: Although LRT did not provide a universal survival benefit in dnMBC, differences in trial outcomes may be driven by tumor biology and metastatic pattern. HR-positive disease showed a consistent association with survival outcomes, while HER2-positivity and menopausal status did not influence benefit. Bone-only dnMBC showed a favorable pattern of outcomes. Despite its aggressive nature, biological heterogeneity within TNBC suggests patient subsets with durable treatment response may warrant further investigation. Further studies are needed to better define biologically distinct subgroups in whom LRT may be clinically relevant.

Prognostic Value of Ki-67 and Progesterone Receptor for Adjuvant Chemotherapy De-escalation in Early Luminal-type Breast Cancer

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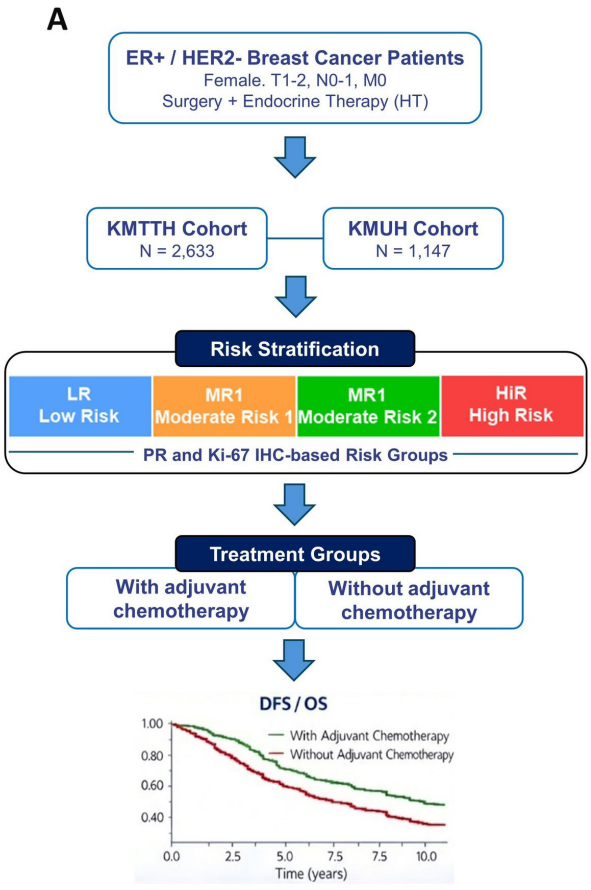
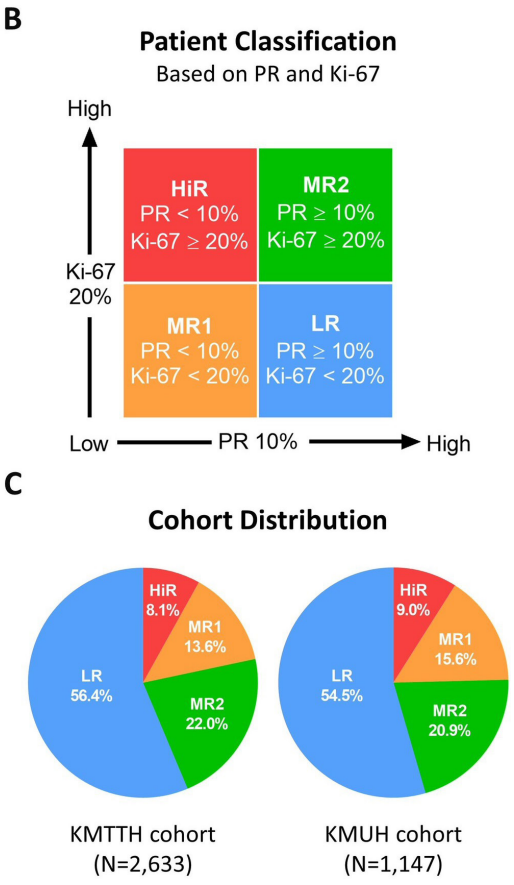
Background: Identifying hormone receptor-positive (HR+)/HER2-negative early breast cancer patients who benefit from adjuvant chemotherapy (CT) remains challenging due to uncertain biomarker thresholds. This study aimed to develop and validate a refined immunohistochemistry (IHC) based risk stratification model (PR10/Ki20) and a quantitative risk score (RS) to guide CT decision-making.

Methods: This retrospective study analyzed a discovery cohort (KMTTH, n = 2,633) and an external validation cohort (KMUH, n = 1,147). Using prespecified cutoffs, patients were categorized into four groups: low risk (LR; PR ≥ 10% and Ki-67 < 20%), moderate risk 1 (MR1; PR < 10% and Ki-67 < 20%), moderate risk 2 (MR2; PR ≥ 10% and Ki-67 ≥ 20%), and high risk (HiR; PR < 10% and Ki-67 ≥ 20%). A quantitative RS was derived incorporating PR10/Ki20 categories, age, pathological T stage, and lymphovascular invasion.

Result: The PR10/Ki20 model demonstrated consistent prognostic performance. HiR patients showed significantly poorer disease-free survival (DFS) and overall survival (OS), whereas the LR group exhibited favorable outcomes. In the validation cohort, adjuvant CT was associated with improved DFS in the HiR group (adjusted hazard ratio [aHR] 0.075; 95% confidence interval (CI) 0.006-0.919; $P = 0.0428$), whereas no significant benefit was observed in the LR group. The RS successfully separated patients into high- and low-RS groups with significantly different DFS across both cohorts (KMTTH: $P = 0.005$; KMUH: $P = 0.004$).

Conclusions: The PR10/Ki20 framework identifies a high-risk subgroup benefiting from CT, while delineating a large low-risk group without demonstrable CT benefit. This accessible IHC-based approach supports CT de-escalation in LR patients and treatment intensification in HiR patients, offering a practical tool for risk-adapted decision-making.


A
ER+ / HER2- Breast Cancer Patients
Female. T1-2, N0-1, M0
Surgery + Endocrine Therapy (HT)
KMTTH Cohort
N = 2,633
KMUH Cohort
N = 1,147
Risk Stratification
LR
Low Risk
MR1
Moderate Risk 1
MR1
Moderate Risk 2
HiR
High Risk
PR and Ki-67 IHC-based Risk Groups
Treatment Groups
With adjuvant chemotherapy
Without adjuvant chemotherapy
DFS / OS
With Adjuvant Chemotherapy
Without Adjuvant Chemotherapy
1.00
0.80
0.60
0.40
0.0
2.5
5.0
7.5
7.5
10.0
Time (years)


B
Patient Classification
Based on PR and Ki-67
High
Ki-67
20%
HiR
PR < 10%
Ki-67 ≥ 20%
MR2
PR ≥ 10%
Ki-67 ≥ 20%
MR1
PR < 10%
Ki-67 < 20%
LR
PR ≥ 10%
Ki-67 < 20%
Low
PR 10%
High
C
Cohort Distribution
HiR
8.1%
MR1
13.6%
LR
56.4%
MR2
22.0%
KMTTH cohort
(N=2,633)
HiR
9.0%
MR1
15.6%
LR
54.5%
MR2
20.9%
KMUH cohort
(N=1,147)

Engineered α9 nAChR Targeting Antibodies Block Nicotine-Driven Triple-Negative Breast Cancer Progression and Exhibit Favorable Safety in Cynomolgus Monkeys

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Background: Cigarette smoking and nicotine exposure promote breast cancer progression and poor outcomes by aberrantly activating nicotinic acetylcholine receptors (nAChRs), with α9-nAChR serving as a key oncogenic driver, especially in triple-negative breast cancer (TNBC). However, effective therapeutic strategies that directly target α9-nAChR remain limited.

Methods: In this study, we engineered an antigen comprising the extracellular loops of α9-nAChR (α9CLP) and used mouse immunization followed by phage display to isolate an α9CLP-specific single-chain variable fragment (scFv) antibody, mCLPS1.

Result: The dominant clone mCLPS1 showed specific binding to α9-nAChR and was further engineered into an Fc-fusion antibody (mCLPS1-Fc) and an anti-mPEG bispecific antibody (mCLPS1/anti-mPEG BsAb) to improve its affinity and therapeutic potential. The mCLPS1/anti-mPEG BsAb significantly enhanced the therapeutic efficacy of mPEGylated liposomal doxorubicin (Lipo-Dox) in targeting α9-nAChR-positive breast cancer. In TNBC patient-derived xenograft (PDX) models, mCLPS1-Fc markedly inhibited tumor growth, mitigated nicotine-induced tumor acceleration, and enhanced docetaxel's antitumor efficacy. Comprehensive safety assessments of mCLPS1/anti-mPEG BsAb and mCLPS1-Fc antibody administration in non-human primates (Cynomolgus monkeys, Macaca fascicularis) revealed no neuromuscular toxicity, myasthenia gravis-like symptoms, hematologic abnormalities, or irreversible organ damage, indicating a favorable safety profile.

Conclusions: In summary, this study identifies α9-nAChR as a key molecular target in nicotine-induced tumor progression and highlights α9-nAChR-specific antibodies as promising targeted therapeutic candidates for TNBC, particularly in patients with a history of nicotine exposure. Keyword: Triple-negative breast cancer, α9-nicotinic acetylcholine receptor, scFv-Fc fusion antibody, patient-derived xenograft, non-human primate safety evaluation.

Tumor Characteristics and Survival Rate of HER2-low Breast Cancer Patients: A Retrospective Cohort Study Conducted at Maha Chakri Sirindhorn Medical Center (MSMC)

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Background: Breast cancer (BC) is one of the most common malignancies among women worldwide, including in Thailand. Human epidermal growth factor receptor 2 (HER2) status is a key biomarker guiding prognosis and treatment decisions. Recently, tumors with low HER2 expression (HER2-low) have been proposed as a biologically distinct subgroup; however, their clinical and prognostic significance remains unclear, particularly in Asian populations. This study aimed to characterize HER2-low breast cancer within a Thai tertiary-care setting and to compare its clinicopathological features and disease-free survival (DFS) with those of HER2-negative and HER2-positive breast cancer. A retrospective cohort study was conducted using electronic medical records from Maha Chakri Sirindhorn Medical Center (MSMC), Nakhon Nayok, Thailand, over an eight-year period (2018-2025). Patients with confirmed HER2 status and available follow-up data were included.

Methods: A total of 235 patients were analyzed, of whom 34.9% were HER2-positive, 51.9% were HER2-negative, and 13.2% were classified as HER2-low. Baseline clinicopathological characteristics and treatment modalities were compared across HER2 groups. Disease-free survival was estimated using the Kaplan-Meier method and compared using log-rank and Wilcoxon tests.

Result: HER2-low tumors demonstrated clinicopathological features that overlapped substantially with HER2-negative disease, particularly with respect to hormone receptor expression. Kaplan-Meier analysis showed no statistically significant differences in DFS among HER2-positive, HER2-negative, and HER2-low groups.

Conclusions: This study provides the first real-world characterization of HER2-low breast cancer in a Thai tertiary hospital setting. While HER2-low tumors exhibit distinct biological features, they did not demonstrate significantly different DFS compared with established HER2 categories. Larger studies with longer follow-up are warranted to further define the prognostic and therapeutic implications of HER2-low breast cancer.

Prognostic Value of the CPS+EG Score in HR+/HER2- Breast Cancer Treated With Neoadjuvant Chemotherapy

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Background: Pathologic complete response (pCR) after neoadjuvant chemotherapy (NAC) is a well-established prognostic marker in HER2-positive and triple-negative breast cancer. However, its utility in the HR+/HER2- subtype remains uncertain. The CPS+EG score-integrating clinical stage (CS), post-treatment pathologic stage (PS), estrogen receptor (E) status, and tumor grade (G)-may enhance prognostic discrimination beyond CS, PS, or pCR alone. We aimed to assess the prognostic performance of the CPS+EG score in Vietnamese patients with HR+/HER2- breast cancer treated with NAC.

Methods: We conducted a retrospective cohort study of 109 stage II-III HR+/HER2- breast cancer patients who received NAC followed by surgery between January 1 and December 31, 2023. Disease-free survival (DFS) and overall survival (OS) were estimated using Kaplan-Meier method and compared across CPS+EG strata. Discrimination was evaluated using Harrell's C-index, with paired bootstrap resampling to compare CPS+EG against CS and PS.

Result: With a median follow-up of 39 months, higher CPS+EG scores are significantly associated with poorer outcomes. Three-year DFS rates for scores 0-5 are 100%, 92.3%, 87.1%, 65.1%, 25.6%, and 25.0%, respectively (log-rank $p < 0.001$). A similar pattern is observed for OS: patients with scores 0-2 have 100% survival, while those with scores 3, 4, and 5 decline to 85.8%, 54.1%, and 50.0%, respectively (log-rank $p < 0.001$). In discrimination analyses, CPS+EG achieves significantly higher C-index values than CS and PS for both DFS (0.780 vs. 0.631 and 0.667) and OS (0.826 vs. 0.659 and 0.645).

Conclusions: The CPS+EG score provides superior prognostic stratification compared with traditional clinical and pathological staging, offering a reliable tool for survival prediction in HR+/HER2- breast cancer patients treated with NAC.

Impact of Frailty, Endocrine Therapy Adherence, and Radiotherapy in Elderly Patients With Low-Risk HR+ Breast Cancer: A KBCSG 35 Multicenter Cohort Study

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Background: In elderly patients with low-risk hormone receptor-positive (HR+), HER2-negative breast cancer, adjuvant treatment de-escalation is increasingly considered. However, the benefit of specific modalities may vary based on patient vulnerability and endocrine therapy (ET) adherence. We evaluated long-term outcomes focusing on how frailty, age, and ET adherence modify the effect of radiotherapy (RT).

Methods: We retrospectively analyzed 1,177 women aged ≥70 years with pT1-2N0 HR+/HER2-negative breast cancer across 17 Korean hospitals (2008-2018). Geriatric high risk was defined as age ≥80 years and/or severe frailty. TumorScore (0-1 vs. ≥2) was determined by tumor size, lymphovascular invasion, and histologic grade. ET adherence was dichotomized as sustained (adherent: ≥48 months or ≥80% of follow-up) versus unsustained. Primary endpoints were invasive breast cancer recurrence (iBCR) and locoregional recurrence (LRR), with death as a competing risk.

Result: Among 1,177 patients (median follow-up 71 months), 53 invasive recurrences (4.5%) and 155 deaths (13.2%) occurred. Breast cancer-specific death accounted for only 1.1%, while most deaths were unrelated to breast cancer. At 10 years, the cumulative incidence of iBCR was 6.2% and LRR was 3.6%. Unsustained ET (sHR 6.45) and high TumorScore (sHR 3.35) were the strongest predictors of iBCR ($p < 0.001$). While RT omission did not increase iBCR, RT significantly lowered LRR in breast-conserving surgery patients (sHR 0.35; $p = 0.027$). In geriatric high-risk patients with low TumorScore, RT reduced 10-year LRR from 11.6% to 2.3% ($p = 0.029$).

Conclusions: In elderly HR+ breast cancer, outcomes were generally favorable, with mortality primarily driven by non-breast cancer causes. RT significantly contributed to locoregional control, showing greater benefit in patients with high geriatric vulnerability or unsustained ET. Adjuvant de-escalation should be optimized by integrating frailty, age, and ET adherence alongside tumor characteristics.

The Experiences, Perceptions, and Care Needs of Patients with Cancer Therapy Induced Menopause: A Phenomenological Qualitative Study

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Background: Between 63% and 83% of menstruating patients experience cancer therapy induced menopause (CTIM) following oncological treatment. Despite its high prevalence, CTIM remains underexplored from the patient perspective. This study aimed to identify the perceptions, experiences, and care needs of patients living with CTIM.

Methods: A phenomenological qualitative design was used to explore the lived experiences of patients with CTIM. Purposive sampling was applied, and semi-structured interviews were conducted in three hospitals. Data were analyzed using thematic analysis to identify key themes.

Result: Eighteen semi-structured interviews were conducted until data saturation was achieved. CTIM was experienced as an unexpected and highly impactful side effect of cancer treatment. Experiences varied according to age. Perceptions of infertility were influenced by whether participants had an active desire for children prior to their cancer diagnosis. In addition to physical symptoms, CITM affected self-image, mental well-being, and relationships with partners. Participants reported a lack of information and guidance and felt insufficiently supported, particularly regarding referrals to specialized care.

Conclusions: Cancer therapy induced menopause has a profound impact on women's lives and their intimate relationships. Significant gaps remain in current care provision, including inadequate information, limited follow-up, and insufficient referral pathways. These findings highlight the need for proactive monitoring of CITM during oncological follow-up, improved knowledge among healthcare providers, and more targeted referral to specialized services.

Partners' Experiences and Needs in Supporting Women with Cancer Therapy Induced Menopause

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Background: Advances in cancer treatment and rising incidence rates have led to a growing population of cancer survivors. Cancer therapy induced menopause (CTIM) is a significant late effect of oncological treatment, causing physical and psychological symptoms that also affect patients' partners. Despite this impact, little research has focused on partners' experiences. This study aimed to explore the specific experiences and care needs of partners of women with CTIM to better tailor care and support.

Methods: A qualitative study with a phenomenological design was conducted. Nine semi-structured individual interviews were carried out with partners of women experiencing CTIM. Interviews were transcribed verbatim and analyzed using thematic analysis. Researcher triangulation was applied to enhance analytical rigor.

Result: Partners did not perceive menopause as a distinct condition but rather as part of the broader spectrum of late effects following cancer treatment. They reported feelings of loneliness and insufficient recognition of their own needs, which negatively affected their emotional well-being. Sexuality and intimacy within the relationship were influenced by both physical and emotional changes. Open communication emerged as a key factor in managing relational tensions. Additionally, shifts in traditional gender roles were observed, with partners assuming new responsibilities within the family.

Conclusions: This study underscores the importance of effective communication and tailored support to address the specific needs of partners of women with CTIM. The findings highlight the need for healthcare services to better recognize and integrate partners' perspectives in survivorship care.

Cancer Therapy Induced Menopause: Healthcare Providers' Perceptions and Care Needs

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Background: Cancer remains one of the leading causes of death worldwide. Rising incidence rates combined with improved survival have resulted in an increasing number of women experiencing cancer therapy induced menopause (CTIM), a condition associated with significant physical and psychosocial complications. Despite these challenges, standardized care protocols for this population are lacking. This study aimed to explore healthcare providers' perceptions and needs regarding the care of women with CTIM.

Methods: A qualitative exploratory study was conducted using both focus group discussions and individual interviews. Dutch-speaking healthcare providers involved in oncological treatments with potential menopausal effects were recruited nationwide using a multicentric approach. Purposive and convenience sampling methods were applied. Data were analyzed thematically.

Result: Nineteen healthcare providers from two university hospitals, six general hospitals, and one primary care setting participated in the study. Participants reported that CTIM often comes as an unexpected outcome for patients. Two main themes emerged from the data: (1) suboptimal follow-up and counselling, and (2) insufficiently informed patients. These themes highlighted gaps in continuity of care, information provision, and overall management of CTIM.

Conclusions: Healthcare providers perceive current care for women with cancer therapy induced menopause as suboptimal. The unexpected nature of CTIM for patients is attributed to inadequate follow-up, fragmented care organization, and insufficient patient education. Optimizing care requires improved continuity, better coordination, broader professional knowledge, proactive counselling, increased use of non-pharmacological interventions, and reduced treatment-related costs.

A Cross Sectional Study on Shoulder Mobility after Breast Surgery

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Background: Surgery remains essential for curative treatment for breast cancer. However, it can result in chronic shoulder morbidity, adversely affecting long-term quality of life. Existing epidemiological and functional data predominantly reflected Western populations, creating a gap in understanding the recovery trajectory of Asian survivors. This study investigated medium-to-long-term shoulder sequelae in our local cohort.

Methods: A cross-sectional study was conducted in our survivorship clinic in patients with prior breast cancer surgery (≥ 6 months post-operation). Objective assessments included primarily bilateral goniometric evaluation of shoulder active range of motion and dynamometric strength testing. Secondary measure encompassed a structured survey on rehabilitation preferences. Data were analysed using SPSS.

Result: In total 88 patients were included. A statistically significant reduction in range of motion (abduction: active (operated side 166.6 +/- 18.4' vs non-operated side 170.8 +/- 14.4', $p < 0.05$) and passive (operated side 171.9 +/- 17.0 vs non-operated side 175.3 +/- 12.7', $p < 0.05$) and strength (abduction: operated side 41.3 +/- 12.7 N vs non-operated side 42.2 +/- 13.7, $p < 0.05$) was demonstrated upper limb assessment. Furthermore, comparing different rehabilitation program, outpatient exercise program showed the highest preference (7.0/10), followed by home based exercise with prior instruction (6.7/10), online consultation (5.4/10), app-based exercise program (5.1/10) and wearable-based exercise program (4.4/10).

Conclusions: This study demonstrated shoulder dysfunction in Hong Kong breast cancer survivors despite long after the index treatment. The findings provide essential data for developing evidence-based, rehabilitation protocols to mitigate functional decline and improve survivorship care in this population.

Single Center Retrospective Study on Risk Factors for Lymphoedema after Breast Cancer Treatment

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Background: This study aimed to examine the incidence and risk factors of lymphoedema in patients with breast cancer after treatment in Pok Oi Hospital in Hong Kong.

Methods: A descriptive, retrospective study looking into patients with unilateral breast cancer receiving upfront surgery from January 2018 to October 2021 in Pok Oi Hospital. Lymphoedema was defined by L-Dex measurement. Demographics, L-Dex measurement, surgical methods and adjuvant treatments were analysed with descriptive statistics, chi-square tests and independent t sample tests. Significant risk factors were further analysed using multivariate Cox regression to adjust for potential confounding factors. Patients were followed up for an average of 4 years. Patients with an L-Dex score increase of >6.5 from baseline were considered consistent with lymphoedema.

Result: Out of 388 patients analysed, 24 patients developed lymphoedema. Significant risk factors identified were age, BMI, mastectomy, axillary lymph node dissection, number of total lymph nodes removed, number of positive lymph nodes, axillary radiation and chemotherapy. Using multivariate Cox regression analyses, higher BMI was significantly associated with more breast cancer-related lymphoedema.

Conclusions: In this study, we identified risk factors contributing to lymphoedema following breast cancer treatment, including age, obesity, mastectomy, axillary lymph node dissection, the number of total lymph nodes removed, the number of positive nodes, axillary radiation, and chemotherapy. This helps to identify breast cancer survivors who are at risk of developing lymphoedema.

Impact of an AI-Driven Chatbot on Breast Cancer Awareness, Anxiety Reduction, and Timely Specialist Consultation in a Resource Constrained Setting: A Prospective Evaluation of "ASHA"

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Background: Early detection and timely evaluation of breast lumps are crucial for improving breast cancer outcomes. However, lack of awareness, fear, and limited access to specialists often delay healthcare-seeking behavior. The AI-driven chatbot ASHA was developed to provide evidence-based breast health information, guide patients in self-assessment, facilitate risk stratification, and encourage timely medical consultations.

Methods: This study assessed the impact of ASHA (https://chatgpt.com/g/g-67b1f66e1d5c81919658f488411435e6-aashaa-bot) on patients presenting with breast lumps. A prospective analysis was conducted, comparing patient-reported outcomes, including knowledge improvement, anxiety levels, and healthcare-seeking behavior, before and after chatbot interaction. Key performance indicators included user engagement, diagnostic accuracy in risk stratification, and the chatbot's ability to reduce consultation delays.

Result: Preliminary findings based on 30 patients suggest that chatbot users exhibited significantly improved awareness of benign vs. malignant breast lump characteristics. A notable reduction in anxiety scores and an increase in timely specialist consultations were observed among chatbot-assisted patients. The AI tool demonstrated high accuracy in risk stratification based on validated guidelines, aiding in appropriate triaging.

Conclusions: The ASHA chatbot serves as an effective digital health intervention, bridging gaps in breast cancer awareness and early diagnosis. Its implementation could enhance patient engagement, alleviate anxiety, and expedite appropriate medical attention, particularly in resource-limited settings. Further research is needed to optimize its integration with clinical workflows and assess long-term outcomes.

Real-World Survival of HER2-Positive and Triple-Negative Breast Cancer at a Tertiary Referral Center in Indonesia

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Background: HER2-positive and triple-negative breast cancers represent biologically aggressive subtypes with distinct therapeutic challenges. While survival outcomes from high-income countries are well documented, real-world data from Southeast Asia remain limited. This study aimed to evaluate long-term survival outcomes of HER2-positive and triple-negative breast cancer treated at a tertiary referral center in Indonesia.

Methods: We conducted a retrospective cohort study of breast cancer patients treated at Arifin Achmad General Hospital, Pekanbaru, Indonesia, between 2014 and 2023. Hormone receptor negative tumors were classified by immunohistochemistry into HER2-positive (ER/PR/HER2+) and triple-negative breast cancer (ER/PR/HER2). Overall survival (OS), progression-free survival (PFS), and disease-free survival (DFS) were estimated using the KaplanMeier method.

Result: Among 1,796 patients, 40.3% had hormone receptor negative breast cancer, including HER2-positive tumours (26.3%) and triple-negative disease (14.0%). The mean age at diagnosis was 47.2 years, and the majority of patients presented with locally advanced disease. Survival outcomes differed markedly between molecular subtypes. HER2-positive breast cancer demonstrated more favourable long-term survival, whereas triple-negative breast cancer consistently showed poorer outcomes. The 5-year OS rate was lowest in the triple-negative subgroup (73.6%), accompanied by inferior PFS and DFS across follow-up periods. Advanced stage at diagnosis and presence of distant metastasis were strongly associated with adverse survival outcomes.

Conclusions: HER2-positive and triple-negative breast cancers exhibit distinct real-world survival patterns in this tertiary care setting. Triple-negative breast cancer remains associated with the poorest prognosis, underscoring the need for earlier diagnosis and optimized access to effective systemic therapies. Molecular subtypebased stratification remains essential for prognostic assessment and treatment planning.

Survival Patterns of Hormone ReceptorPositive Breast Cancer According to Luminal Subtypes: A Decade of Real-World Evidence from Indonesia

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Background: Hormone receptorpositive breast cancer constitutes the largest proportion of breast cancer cases worldwide and demonstrates heterogeneous clinical behavior across luminal subtypes. Despite its prevalence, survival data from Southeast Asian populations remain scarce. This study aimed to evaluate long-term survival outcomes of hormone receptorpositive breast cancer based on luminal molecular subtypes.

Methods: A receptor-positive cohort study was conducted among hormone receptorpositive breast cancer patients treated at Arifin Achmad General Hospital, Pekanbaru, Indonesia, between 2014 and 2023. Molecular classification using immunohistochemistry categorized tumors into Luminal A, Luminal B HER2-negative, and Luminal B HER2-positive subtypes. Overall survival (OS), progression-free survival (PFS), and disease-free survival (DFS) were analyzed using the KaplanMeier method.

Result: Of 1,796 breast cancer patients, 59.7% were hormone receptorpositive, comprising Luminal A (17.8%), Luminal B HER2-negative (16.6%), and Luminal B HER2-positive (25.3%). The mean patient age was 47.2 years, with more than half presenting at a locally advanced stage. Survival outcomes for hormone receptorpositive disease were favorable, with overall survival rates of 97.7% at 1 year, 89.4% at 2 years, and 79.7% at 5 years. Among luminal subtypes, Luminal B HER2-negative demonstrated the highest 5-year OS (84.1%), while Luminal A consistently showed strong disease-free and progression-free survival throughout follow-up. Earlier stage at diagnosis was associated with superior long-term outcomes across all luminal subtypes.

Conclusions: Hormone receptorpositive breast cancer exhibits favorable long-term survival, with distinct prognostic differences among luminal subtypes. Luminal stratification remains essential for risk assessment and supports individualized endocrine-based treatment strategies, particularly in resource-limited settings.

Effectiveness of Scalp-Cooling System for the Prevention of Chemotherapy-induced Hair Loss among 42 Metastatic Breast Cancer Patients Treated with Eribulin

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Background: Scalp cooling techniques have been applied to prevent or at least reduce chemotherapy-induced alopecia (CIA) since the 1970s. I had the opportunity to exploit the computer-controlled chilled helmet-like silicone cap system (Cellguard) and to apply it to more than 940 breast cancer patients in my breast clinic. Recently the effectiveness of scalp-cooling system has been announced in cases of adjuvant chemotherapy. This report may be a few with results about the efficacy of this device for the prevention of CIA for metastatic breast cancer patients treated with Eribulin.

Methods: 55 patients treated with Eribulin for metastatic breast cancer in our clinic were recruited and evaluated for CIA with or without scalp cooling. Four months after commencing chemotherapy including Eribulin, their CIA were classified by Dean's grade scale and NCI-CTS grade scale. 42 patients were treated using Cellguard and 13 patients without. Mean age of using Cellguard and without are 52.4 (range 45-67) years and 60.8 (range 44-77) years old, respectively.

Result: None of the 42 patients using Cellguard treated with regimens including Eribulin ever used a wig. Hair loss in these patients ranged from G-0 to G-1 by NCI-CTC scale and G-0 to G-3 by Dean's scale. Discomfort such as headache, being chilled, and scalp pain were also assessed but scalp cooling was very well tolerated. In our development, we elaborated the use of inner cap made by non-woven fabric which should be considered significantly comfortable with respect to other types of caps.

Conclusions: In our experience, scalp hypothermia is one approach that can be used to prevent hair loss for metastatic breast cancer patients treated with Eribulin in spite of previously undergoing other chemotherapy. Not only does Cellguard system promote quality of life of patients as a safe tool for hair loss prevention in cancer treatment, but it may contribute to better treatment as well.

Digital Decision Aid for Genetic Counseling in Breast Cancer: A Prospective Pilot Study

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Background: Germline testing has become crucial to breast cancer management, as pathogenic variants inform prognosis, targeted therapy, and risk-reducing strategies. However, patients often lack sufficient understanding of testing options and implications, potentially compromising informed decision-making. This study evaluated whether digital decision aid enhances decision confidence and emotional well-being during the genetic testing process.

Methods: This prospective pilot study enrolled 30 female breast cancer patients undergoing germline testing. A digital decision aid (Hereditary Cancer Navigator) was provided before genetic counseling and result disclosure. Patient-reported outcomes were assessed at three timepoints, evaluating decisional conflict (Decision Conflict Scale), quality of life (EQ-5D-5L), autonomous decision-making capacity (General Causality Orientations Scale), and usability of a digital decision aid (Post-study system usability questionnaire). Paired and exploratory subgroup analyses were performed.

Result: At baseline, 72.4% reported no prior knowledge of genetic testing. Following result disclosure, high decision confidence nearly doubled (39% to 67%) and positive ratings of information delivery increased substantially (46% to 78%). However, anxiety showed heterogeneous patterns. Overall EQ-5D anxiety scores increased modestly from 1.48 to 1.62 ($p = 0.478$), and 26.9% of participants showed individual worsening. In exploratory subgroup analysis, patients aged over 45 years experienced increased anxiety (+0.31) while younger patients showed improvement (-0.11). Patients with children-maintained guilt scores regarding hereditary transmission (4.47 to 4.53), whereas those without children showed improvement (5.00 to 3.80).

Conclusions: The digital decision aid enhanced knowledge and confidence during germline testing. However, exploratory findings suggest that patients aged over 45 years and those with children may experience persistent emotional burden despite improved understanding. These hypothesis-generating observations warrant validation in larger studies and suggest potential benefit of age- and family-tailored psychosocial support.

Beyond Overall Survival: Cancer-Specific Survival Reveals Equivalent Prognosis in Elderly Breast Cancer Patients (≥70 Years)

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Background: Elderly breast cancer patients experience reduced overall survival (OS) due to competing mortality from comorbidities. Breast cancer-specific survival (BCSS) analysis is essential to distinguish cancer-related outcomes from non-cancer mortality, enabling personalized treatment strategies. We aimed to compare OS and BCSS between elderly(≥ 70 years) and middle-aged (50-69 years) breast cancer patients, and to determine the impact of comorbidities on mortality outcomes.

Methods: We analyzed 88,730 breast cancer patients from National Health Insurance Service claims data (2010-2018), stratified by age: 50-69 years (n = 73,958) and ≥ 70 years (n = 14,772). Comorbidity burden was quantified using the Charlson Comorbidity Index (CCI): median CCI 2.0 (IQR 1.0-3.0) in elderly versus 1.0 (IQR 0.0-2.0) in younger patients ($p < 0.001$). Notably, 36.2% of elderly patients harbored severe comorbidity (CCI ≥ 3) compared to 16.6% of younger cohorts, while 38.0% of younger patients had no comorbidities (CCI = 0) versus 18.0% of elderly ($p < 0.001$). OS and BCSS were estimated using Kaplan-Meier analysis and Cox proportional hazards regression.

Result: At 5 years, OS was 91.8% (50-69 years) versus 75.3% (≥ 70 years, $p < 0.0001$), representing a 16.5% absolute difference. Three-year OS demonstrated 94.8% versus 83.5%, respectively. Critically, BCSS exhibited no significant disparity between age groups, indicating that OS differences are attributable entirely to competing non-cancer mortality. Breast cancer accounted for 68.7% of deaths in younger patients versus only 46.8% in elderly patients. Conversely, non-cancer deaths (pneumonia, cardiovascular disease, Alzheimer's disease, senility) constituted 3.1% in younger versus 18.0% in elderly patients. Dementia (adjusted HR 1.63, 95% CI 1.52-1.75) and chronic renal failure (HR 1.96, 95% CI 1.71-2.23) demonstrated the strongest associations with elderly OS mortality.

Conclusions: BCSS analysis demonstrates that elderly patients have favorable breast cancer-specific prognosis comparable to younger cohorts. The pronounced OS disparity reflects competing comorbidity-driven non-cancer mortality. BCSS-based prognostic assessment should guide clinical decision-making in elderly patients, mitigating inappropriate treatment de-escalation predicated on potentially misleading OS estimates.

Unmet Needs of Breast Cancer Patients Living Alone: A Qualitative Study

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Background: Breast cancer is increasingly experienced as a long-term condition requiring ongoing self-management. For women living alone, the absence of a co-residing caregiver may fundamentally reshape the cancer care experience; however, little qualitative research has examined breast cancer specific unmet needs within single-person households across the cancer care continuum.

Methods: This qualitative study draws on in-depth interviews conducted between January and May 2025 with single-person household cancer patients in South Korea. From an original sample of 88 participants, narratives of 28 breast cancer patients were extracted and subjected to focused thematic pattern analysis. Analysis explored breast cancerspecific experiences across diagnosis, treatment, and post-treatment survivorship.

Result: Analysis revealed distinct unmet needs shaped by the interaction between breast cancerspecific treatment trajectories and living alone. Key themes included: (1) the cumulative burden of long-term hormone and adjuvant therapies managed without daily support; (2) isolated decision-making regarding fertility, treatment options, and future life planning; (3) embodied changes related to surgery, alopecia, and radiotherapy that intensified social withdrawal; (4) information overload without a trusted co-interpreter; and (5) misalignment between breast cancer care pathways and healthcare systems implicitly designed around caregiver presence.

Conclusions: Breast cancer patients living alone experience qualitatively distinct challenges that extend beyond general cancer-related difficulties. Findings underscore the need for breast cancer care models that explicitly account for single-person household contexts, particularly during long-term treatment and survivorship phases.

Factors Associated with Quality of Life Among Patients with Breast Cancer

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Background: Breast cancer is the most common cancer in women worldwide. Breast cancer may be negatively associated with quality of life (QOL) of patients with breast cancer. In this study, we examined the QOL and its associated factors among patients with breast cancer.

Methods: A cross-sectional study was conducted with a sample of 319 breast cancer patients hospitalized after surgery at Pusan National University Yangsan Hospital, in Gyeongsangnam-do, South Korea. Data were collected from September 2021 to October 2024 using structured questionnaires including symptoms, anxiety, depression, self-efficacy, resilience, social support, coping and QOL.

Result: The mean age of the participants was 51.85 ± 9.56 years. QOL scores were 93.47 ± 16.24. The factors associated with QOL of breast cancer patients were symptoms ($\beta = -0.43$, $p < .001$), self-efficacy ($\beta = 0.18$, $p < .001$), resilience ($\beta = 0.23$, $p < .001$) and social support ($\beta = 0.19$, $p < .001$) which explained 59.2% of the variation ($F = 66.93$, $p < .001$).

Conclusions: Our findings indicated that lower symptoms, higher self-efficacy, resilience and social support were associated with QOL of breast cancer patients. Clinical interventions should focus on management of symptoms, and it would also help to strengthen self-efficacy, resilience and social support. This study could be used as scientific evidence to improve the QOL of breast cancer patients after surgery.

Serial Quality of Life Assessment in Breast Cancer Patients Undergoing Radiotherapy

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Background: To evaluate the longitudinal trajectory of quality of life (QOL) in breast cancer patients receiving radiotherapy (RT).

Methods: This prospective cohort study included 774 breast cancer patients who received radiotherapy. QOL was assessed using the EORTC QLQ-C30 and QLQ-BR23 at baseline (pre-RT), and at 6, 12, 24, and 36 months post-RT. Changes from baseline were analyzed using linear mixed effects models.

Result: The median age was 49.0 years, and the majority underwent breast-conserving surgery (83.5%). At 6 months post-RT, the most pronounced deterioration was observed in arm symptoms (18.7 to 37.1; $p < 0.001$). Significant declines were also observed in body image (84.0 to 66.2; $p < 0.001$), sexual enjoyment (27.8 to 10.9; $p < 0.001$), and social functioning (92.5 to 77.4; $p < 0.001$). At 36 months, although most domains showed recovery several impairments persisted. Breast symptoms remained the most affected (+16.9 from baseline, $p < 0.001$), followed by continued deficits in sexual enjoyment (17.8 to 13.7, $p < 0.001$), and body image (84.0 to 75.2, $p < 0.001$). Patients receiving regional nodal irradiation (RNI) reported worse body image, arm symptoms (at 12 months), and breast symptoms compared to the non-RNI group (all $p < 0.001$).

Conclusions: Breast cancer patients experience significant QOL deterioration at 6 months post-RT, particularly in arm symptoms and body image. While most domains improved by 36 months, symptoms such as breast symptoms persisted. Patients receiving RNI tended to show worse QOL scores in body image, arm symptoms, and breast symptoms compared to those without RNI. These findings underscore the need for supportive care during the early post-treatment period, with particular attention to patients undergoing RNI.

Factors Associated with Fatigue in Breast Cancer Survivors: Secondary Analysis of a Prospective Cohort Study (BIG-S)

Won Kyung Cho[1], Tae Hoon Lee[1], Haeyoung Kim[1], Won Park[1], Woong Ki Park[2], Jai Min Ryu[2], Se Kyung Lee[2], Byung Joo Chae[2], Jonghan Yu[2], Jeong Eon Lee[2], Seok Won Kim[2], Seok Jin Nam[2]

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Background: Cancer-related fatigue (CRF) is one of the most common symptoms experienced by breast cancer survivors, significantly impacting quality of life. This study aimed to identify factors associated with fatigue in breast cancer survivors using repeated measurements over time.

Methods: We conducted a secondary analysis of a prospective cohort study (BIG-S) including 2,749 breast cancer patients from a single tertiary cancer center. Fatigue was assessed using the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) fatigue subscale at baseline, 6, 12, 24, and 36 months post-diagnosis. Univariate and multivariate analyses using linear mixed-effects models were performed to analyze longitudinal fatigue scores, adjusting for demographics, comorbidities, lifestyle factors, and treatment variables.

Result: Mean fatigue scores were 31.1, 41.7, 36.2, 33.7, and 30.4 at baseline, 6, 12, 24, and 36 months, respectively, with peak severity at 6 months post-diagnosis. In multivariate analysis, factors associated with higher fatigue included younger age ($\beta = -0.30$, $p < 0.001$), presence of comorbidities ($\beta = 3.82$, $p < 0.001$), radiotherapy ($\beta = 3.23$, $p = 0.007$), underweight ($\beta = 3.11$, $p = 0.003$), total mastectomy ($\beta = 2.99$, $p = 0.008$), smoking history ($\beta = 3.00$, $p < 0.001$), and past alcohol consumption ($\beta = 2.88$, $p < 0.001$). Physical activity was associated with lower fatigue (active vs inactive: $\beta = -3.80$, $p < 0.001$).

Conclusions: CRF in breast cancer patients peaks at 6 months post-diagnosis and improved over time. Younger age, comorbidities, and smoking/alcohol consumption history were associated with higher fatigue, while physical activity was associated with lower fatigue scores. Prospective interventional trials evaluating integrated management strategies including physical activity programs for high-risk patients might be needed to reduce fatigue.

Complementary and Alternative Medicine in Breast Cancer: A Cross-Sectional Survey of Korean Physicians' Perspectives and Clinical Experience

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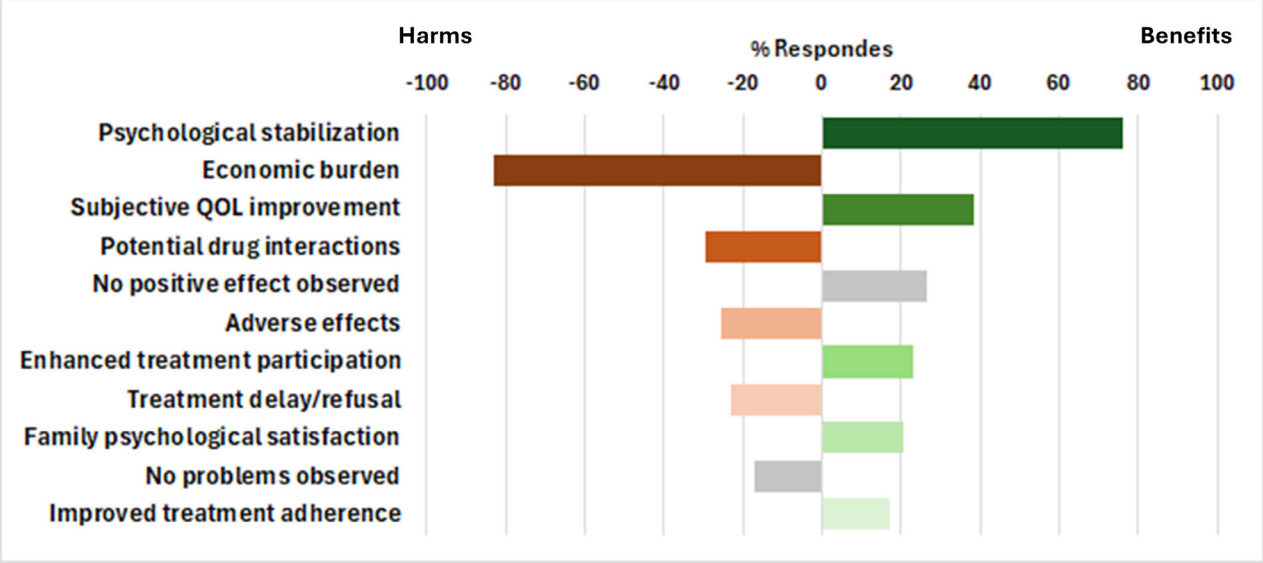
Background: Complementary and alternative medicine (CAM) use is prevalent among breast cancer patients, yet physician perspectives on managing CAM-using patients remain understudied. This study aimed to characterize how breast cancer specialists encounter and respond to CAM use in clinical practice.

Methods: A cross-sectional survey was conducted among Korean Breast Cancer Society members from September through October 2025. An electronic 23-item questionnaire assessed respondent demographics, personal CAM practice patterns, frequency of encounters with patients receiving CAM at other facilities, types of modalities observed, perceived benefits and harms, and attitudes toward CAM integration with standard treatment.

Result: Among 84 respondents analyzed, most were breast surgeons (88.1%) from university hospitals (59.5%) with over 10 years of experience (72.6%). While 32.1% of physicians personally provided CAM therapies, 65.9% encountered patients receiving CAM at other facilities weekly or more frequently. The most commonly observed modalities were hyperthermia (83.1%), mistletoe therapy (80.7%), and high-dose intravenous vitamin C (77.1%). Physicians identified psychological stabilization as the most frequent positive effect (75.9%), but economic burden as the primary concern (82.9%). Regarding evidence sufficiency, 74.1% of CAM-providing physicians acknowledged that evidence was insufficient but partially credible. Among all respondents, 38.6% supported concurrent use of evidence-based CAM with standard treatment, while 30.1% did not recommend CAM due to insufficient evidence. Notably, 79.5% endorsed the need for clinical practice guidelines.

Conclusions: This expert physician survey revealed substantial gaps between high patient demand for CAM and low physician provision, coupled with frequent clinical encounters requiring guidance. Economic burden represents the predominant concern. The strong endorsement for clinical practice guidelines indicates the need for evidence-based resources tailored to real-world clinical practice.


Harms
% Respondes
Benefits
-100
-80
-60
-40
-20
0
20
40
60
80
100
Psychological stabilization
Economic burden
Subjective QOL improvement
Potential drug interactions
No positive effect observed
Adverse effects
Enhanced treatment participation
Treatment delay/refusal
Family psychological satisfaction
No problems observed
Improved treatment adherence

Exploring Women's Perspective on Sexual Health of Post Mastectomy vs. Post Lumpectomy of Breast Cancer Patients in a Tertiary Hospital in the Philippines

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Background: Breast cancer is a leading cause of cancer-related mortality among women worldwide and in the Philippines. While advances in treatment have improved survival, survivorship issues, particularly sexual health, remain underrecognized, especially in low- and middle-income countries. Cultural stigma, limited sexual health resources, and inadequate survivorship care contribute to persistent sexual dysfunction among breast cancer survivors. This study aimed to assess and compare sexual health outcomes among post-mastectomy and post-lumpectomy breast cancer patients at Makati Medical Center.

Methods: A cross-sectional study was conducted among 109 Filipina breast cancer patients aged 19 years and older treated at the Department of Surgery, Makati Medical Center. Participants completed the Female Sexual Function Index (FSFI) questionnaire and a checklist assessing additional survivorship concerns. Descriptive statistics were used to summarize patient characteristics and outcomes. Independent t-tests were performed to compare sexual function scores and survivorship concerns between mastectomy and lumpectomy groups. Statistical analysis was carried out using SPSS version 23.

Result: The mean age of participants was 45 years, with most patients diagnosed at Stage II breast cancer (45.9%). Mastectomy was performed in 71 patients (65.1%), while 38 patients (34.9%) underwent lumpectomy. Female sexual dysfunction based on FSFI scores was identified in 65.1% of patients. Common survivorship concerns included early menopause (31.2%) and treatment-related issues (20.2%). There was no statistically significant difference in post-surgical sexual function between mastectomy and lumpectomy groups ($p = 0.294$), nor in other survivorship concerns ($p > 0.05$).

Conclusions: Sexual health issues are substantial among breast cancer survivors regardless of surgical technique. The high prevalence of dysfunction highlights the need for healthcare providers to integrate sexual health into comprehensive survivorship care. Addressing these concerns through counseling, reproductive health services, and culturally sensitive education is essential to overcoming the stigma and infrastructure gaps that currently hinder patient quality of life.

Significant Difference between Post-Mastectomy and Post-Lumpectomy Patients and Female Sexual Function among Patients, Department of Surgery, Makati Medical Center, January to March 2025

	Lumpectomy	Mastectomy	Total	p
Female Sexual Function Index				.294
Indicative of Sexual Activity	16(42.1)	22(31)	38(34.9)	
Not Sexually Active – No Desire	22(57.9)	49(69)	71(65.1)	

Poster Presentation

Management of Hot Flushes in Women Receiving Endocrine Therapy for Breast Cancer: An Updated Systematic Review and Meta-Analysis

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Background: Endocrine therapy is fundamental in reducing recurrence and mortality in hormone receptor-positive breast cancer. Hot flashes, the most common vasomotor symptom (VMS) among women receiving endocrine therapy, can significantly impact quality of life, and importantly, compromise adherence to endocrine therapy, a known predictor of survival. We aim to evaluate the effectiveness of both pharmacological and non-pharmacological management strategies, including emerging alternatives and complementary interventions.

Methods: A systematic literature review was conducted in PubMed, Embase, and Cochrane Central Register of Controlled Trials (CENTRAL). A literature search was performed in PubMed, Embase, and Cochrane Library. Randomised controlled trials (RCTs) published 2015 onwards evaluating women of any age with a history of breast cancer undergoing endocrine therapy receiving non-hormonal treatment for management of vasomotor symptoms were included. The methodological quality of each RCT was evaluated using Cochrane's risk-of-bias (RoB 2) tool, while non-randomised trials were assessed using ROBINS-I.

Result: 12 RCTs evaluating non-hormonal interventions for VMS in women receiving endocrine therapy for breast cancer were included, encompassing a total of 1923 participants. Interventions consisted of pharmacological agents (including SSRIs/SNRIs, gabapentin, clonidine, and emerging therapies such as elinzanetant and Q-122) and non-pharmacological modalities (including acupuncture, cognitive behavioural therapy, cool pad pillow topper, yoga, and meditation). Our findings suggest a reduction in VMS across both domains, quantified by VMS frequency and severity, improvements in sleep, quality of life, and occurrence of adverse events.

Conclusions: Non-hormonal therapies in the management of VMS have progressed greatly in the last decade, necessitating a review of the current standard of care. Preliminary assessment indicates that several interventions, particularly novel pharmacological agents, promisingly offer clinically meaningful symptom relief. Given the substantial impact of VMS on both quality of life and treatment adherence, this review aims to better inform clinical decision-making and survivorship care.

Complementary and Alternative Medicine for Supportive Care in Breast Cancer Survivors: An Umbrella Review

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Background: Breast cancer survivors commonly experience persistent symptoms including psychological distress, sleep disturbance, fatigue, pain, and vasomotor symptoms that impair quality of life. Complementary and alternative medicine (CAM) is frequently incorporated into survivorship care, yet clinical guidance is challenged by heterogeneity and variable quality across existing systematic reviews. We conducted an overview of systematic reviews to synthesise the effectiveness and safety of CAM interventions for supportive care in breast cancer survivors.

Methods: Following a prospectively registered protocol in PROSPERO (CRD420251185022), an overview of systematic reviews published between 2015 and 2025 was performed. Six databases (PubMed, EMBASE, Scopus, Cochrane Library, PsycINFO, and CINAHL) were searched for systematic reviews and meta-analyses evaluating CAM interventions in adult breast cancer survivors. Data extraction was conducted independently by two reviewers. Outcomes were grouped into quality of life, psychological outcomes, sleep, pain, vasomotor symptoms, and functional outcomes. Findings were synthesized narratively using direction-of-effect and consistency across reviews, with safety and reported contraindications summarised descriptively.

Result: 22 systematic reviews were included. Mind-body intervention was the most frequently evaluated CAM modality (7/22, 31.8%), followed by acupuncture (5/22, 22.7%). Thirteen reviews (59.1%) included meta-analyses. Overall methodological quality was predominantly low to moderate. Consistent benefit was most frequently reported for psychological outcomes (5/22, 22.7%) and quality of life (3/22, 13.6%), particularly for mind-body interventions and acupuncture. Evidence for pain, vasomotor symptoms, cognitive, and functional outcomes was mixed and less consistent. Adverse events reported in 7 reviews (31.8%) were mild and transient, with no serious harms reported.

Conclusions: Current evidence suggests that CAM interventions, particularly mind-body approaches and acupuncture, may provide supportive benefits for psychological well-being and quality of life in breast cancer survivors. The predominance of low to moderate methodological quality reviews highlight the need for survivorship-specific trials to strengthen the evidence base for integrative survivorship care.

Benefit of Primary Tumour Resection in De Novo Metastatic Breast Cancer: A Multicentre Retrospective Cohort Study

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Background: Traditionally, treatment for de novo metastatic breast cancer has been palliative, with surgery reserved mainly for symptom relief. Advances in systemic therapies have prolonged survival and renewed interest in whether locoregional treatment may offer additional benefit. However, current evidence remains inconclusive, with ongoing trials and variability in patient selection and treatment strategies limiting definitive conclusions. This retrospective study evaluates the impact of primary tumour surgery on survival outcomes in patients with de novo metastatic breast cancer and identify subgroups that may benefit most from surgical intervention.

Methods: We analysed 861 patients diagnosed with metastatic breast cancer between 2005 and 2017. Inclusion criteria were patients ≥21 years with de novo metastatic disease. Exclusion criteria included loss to follow-up, incomplete records, prior breast cancer, bilateral breast cancers, or development of new nonbreast primaries or contralateral breast cancers. Survival outcomes were estimated using Kaplan-Meier methods, with logrank tests for comparisons.

Result: 396 underwent surgery and 465 did not. Median overall survival (OS) was significantly longer in the surgery group (55.2 vs 27.5 months; $p < 0.0001$), supported by higher 5 year OS rates (48% vs 23%). Median time to progression (TTP) did not differ significantly (65.6 vs 73.1 months; $p = 0.423$). Within the surgical cohort, patients who received neoadjuvant therapy had improved OS (62.7 vs 49.1 months; $p = 0.029$), with a nonsignificant trend toward shorter TTP (49.0 vs 94.9 months; $p = 0.072$). Subtype analysis showed the best outcomes in ER+/PR+ patients (OS 73.4 months; TTP 89.6 months), followed by HER2+ and TNBC. Global logrank tests were significant for OS ($p = 0.00012$) and TTP ($p = 0.0059$).

Conclusions: Primary tumour surgery was associated with improved overall survival in de novo metastatic breast cancer, particularly in ER+/PR+ patients. These findings suggest a potential role for surgery in selected patients within a multidisciplinary treatment approach.

Beyond Survival: Adapting Metacognitive Therapy to Reduce Fear of Cancer Recurrence in Taiwanese Breast Cancer Survivors

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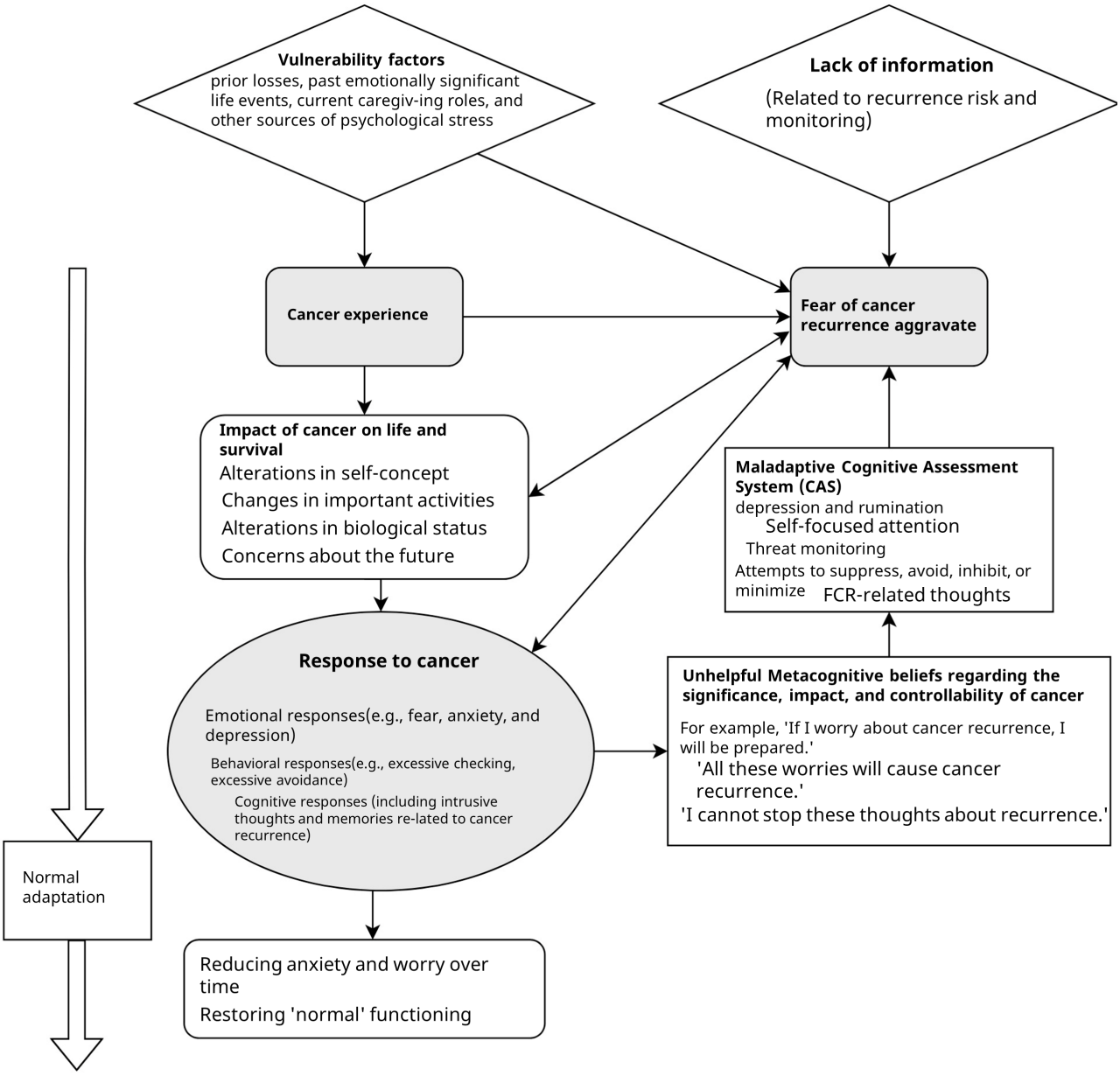
Background: Breast cancer survival rates have improved substantially, resulting in a growing population of long-term survivors requiring ongoing monitoring and survivorship care. Despite favorable prognosis, many survivors experience persistent fear of cancer recurrence (FCR), which can significantly impair psychological well-being, daily functioning, and healthcare utilization. Metacognitive-based interventions, including the ConquerFear program developed in Australia and later adapted in Hong Kong, have shown effectiveness in reducing FCR. However, culturally tailored, evidence-based interventions for Taiwanese breast cancer survivors remain limited. This study aimed to culturally adapt the ConquerFear intervention for Taiwan and evaluate its feasibility.

Methods: This study consists of two phases. In Phase I, the Hong Kong Chinese version of ConquerFear was culturally adapted through a multidisciplinary Delphi consensus process and pilot testing to ensure cultural relevance and treatment fidelity. Phase II is an ongoing parallel two-arm randomized controlled trial enrolling cancer survivors aged ≥18 years who completed primary treatment and demonstrated clinically significant FCR. Participants are randomized to receive either the adapted ConquerFear intervention or relaxation training, each delivered in six weekly sessions. Outcomes include FCR severity, metacognitive beliefs, cognitive-attentional syndrome, anxiety, depression, quality of life, post-traumatic growth, and coping styles, assessed at baseline and follow-up intervals.

Result: The cultural adaptation and manual development phases have been completed. Expert consensus indicated high content validity, cultural appropriateness, and clinical feasibility of the Taiwan-adapted manual. Pilot testing demonstrated strong patient acceptability, high engagement, and favorable feedback regarding intervention relevance and clarity. Large-scale randomized evaluation is currently underway.

Conclusions: The adapted ConquerFear intervention demonstrates promising feasibility for addressing FCR among Taiwanese breast cancer survivors. The program may provide an important psychosocial component of long-term survivorship care, pending confirmation of effectiveness in ongoing trials.



Poster Presentation

NADA Ear Acupuncture Improves Postoperative Pain, Anxiety, and Upper Limb Stiffness in Breast Cancer Patients: A Retrospective Case Series

Chin-Hu Tsai[1], Kuen-Jang Tsai[2], Chao-Ming Hung[2], Hui-Ming Lee[2], Kuan-Tso Chen[3], Yuan-Her Lin[3], Chin-Chuan Tsai[4]

[1]E-Da Hospital, Department of Surgery, Taiwan, [2]E-Da Cancer Hospital, Department of Surgery, Taiwan, [3]E-Da Cancer Hospital, Department of Chinese Medicine, Taiwan, [4]E-Da DaChang Hospital, Department of Chinese Medicine, Taiwan

Background: Postoperative quality-of-life (QoL) remain a clinical issue in breast cancer surgery. Acupuncture is a postoperative adjunctive therapy. National Acupuncture Detoxification Association(NADA) protocol is an auricular acupuncture method originally for substance abuse. This study aimed to evaluate clinical impact of NADA protocol on postoperative symptoms and QoL in breast cancer patients.

Methods: We reviewed patients treated with NADA protocol after breast cancer surgery in our hospital during 2021/8~2022/9. NADA consisted of five auricular points and continued for 4 days. We used visual analogue scale (VAS) and Wilcoxon signed-rank test for pain, anxiety and upper limb stiffness evaluation. Pain was assessed daily for rapid postoperative trajectory and immediate treatment response (pre-treatment, post 20 minutes, day 2 to day 4). Anxiety and upper limb stiffness were evaluated at pre-treatment and day 4 to reflect cumulative effects. Patient's satisfaction and QoL impact were assessed with Was-It-Worth-It (WIWI) questionnaire at completion.

Result: 19 patients completed first day treatment and declining to 14, 12, and 11 patients on days 2, 3, and 4. One patient quit after day 1 and didn't answer anxiety and upper limb muscle stiffness scores. Significant reductions in pain scores were observed between pre-treatment and 20 minutes post-treatment($p < 0.001$) and day 3 to day 4($p = 0.0169$). Anxiety and upper limb muscle stiffness scores showed significant improvement in day 1 and day 4 ($p = 0.0176$ and $p = 0.0478$). On the WIWI questionnaire, 94.1% of patients reported the treatment was worthwhile and would recommend it, and 88% reported improved QoL.

Conclusions: NADA protocol was feasible and demonstrated a significant immediate analgesic effect within 20 minutes of treatment and reduction in pain toward the end of course. Improvements in anxiety and upper limb stiffness over four days support its role as an adjunctive therapy for breast cancer surgery with high satisfaction. Controlled studies are warranted to confirm clinical benefit.

Comparison	Timepoint 1 (n/median+/-SD)	Timepoint 2 (n/median+/-SD)	P value
Anxiety pretreatment vs D4	18/2.5 ± 2.07	11/1 ± 0.62	**0.0176**
Upper limb stiffness Pretreatment vs D4	18/2 ± 2.33	11/1 ± 1.51	**0.0478**
Pain pretreatment vs post 20min	19/4 ± 2.52	19/3 ± 2.06	**0.001**
Pain post 20min vs D2	19/3 ± 2.06	14/3 ± 1.62	0.0792
Pain D2 vs D3	14/3 ± 1.62	12/2.75 ± 1.70	0.334
Pain D3 vs D4	12/2.75 ± 1.70	11/1 ± 1.66	**0.0169**

Patient Satisfaction (WIWI): 94.1% reported treatment was worthwhile / would recommend, 88% reported improved QoL

The Immune Modulation Effects and Survival Benefit in Astragalus polysaccharides (PG2)-treated Breast Cancer Patients with Fatigue

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[1]Tri-Service General Hospital, Department of Medical Oncology, Taiwan, [2]Tri-Service General Hospital, Department of Surgery, Taiwan

Background: Astragalus polysaccharide (APS, PG2), a botanical drug derived from Astragalus membranaceus, has been widely used in advanced breast cancer patients with cancer-related fatigue. It has been shown to modulate the immune system and reduce inflammation. A previous clinical study demonstrated its impact on CRF and inflammatory biomarkers in the context of breast cancer treatment. The impact and underlying mechanisms of APS on immune modulation in the breast cancer microenvironment remain to be elucidated.

Methods: This study aimed to retrospectively evaluate the absolute lymphocyte count and neutrophil-lymphocyte-ratio (NLR) in APS-treated patients with clinical cancer treatment efficacy. Also, we analyzed the proliferation/invasion in breast cancer cells and macrophages following APS treatment as the mechanistic exploration. APS's effects on T cells and macrophages were assessed using flow cytometry, Western blot analysis, quantitative PCR, cytokine membrane arrays, wound healing, and Matrigel invasion arrays. The effect of APS on the interaction between anti-PD1 and MC38/MDA-MB-231 cancer cells was investigated.

Result: PG2 exhibits significant therapeutic efficacy in relieving CRF among advanced breast cancer patients. It was observed that APS led to decreased NLR in breast cancer with positive survival correlation in metastatic breast cancer patients. APS activated both CD4+ and CD8+ T cells in cancer-harbored mice compared to healthy mice. Furthermore, APS potentiated anti-PD1 treatment in MC38-implanted tumor with promoting CD4+ T cells, CD8+ T cells, M1 macrophage polarization, and decreased regulatory T cell.

Conclusions: In addition to APS's cancer-fatigue relieving efficacy, APS might result in a immunological priming effect to the tumor microenvironment. These findings indicate a potential role of integration APS into existing cancer treatment regimens, primarily through its ability to immune modulation.

Breast Radiotherapy and Risk of Hematologic Malignancies: a Target Trial Emulation Using Real-world Data

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[1]Tri-Service General Hospital, Department of Medical Oncology, Taiwan, [2]Tri-Service General Hospital, Department of Pharmacy Practice, Taiwan

Background: Breast-conserving surgery with adjuvant radiotherapy is the standard treatment for early-stage breast cancer, but randomised trials evaluating long-term hematologic malignancy risk are infeasible. We emulated a target trial to estimate the causal effect of breast radiotherapy on hematologic malignancy risk.

Methods: Using the TriNetX Global Collaborative Network, we identified women with breast cancer who underwent breast conserving surgery with radiotherapy (BCS+RT) or modified radical mastectomy without radiotherapy (MRM). We performed 1:1 propensity score matching and assessed hematologic malignancies from 365 days after surgery. We calculated hazard ratios (HRs) with 95% confidence intervals (CIs) and E-values to assess robustness to unmeasured confounding.

Result: Among 31,788 matched pairs, BCS+RT was associated with increased risk of hematologic malignancies (HR 1.57; 95% CI 1.37–1.81), with the highest risks for leukaemia (HR 2.34; 95% CI 1.78–3.08) and non-Hodgkin lymphoma (HR 1.94; 95% CI 1.55–2.44). Higher radiotherapy doses showed increased hazard ratios. Negative control outcomes (kidney stones, appendicitis) showed null associations. Effect modification was observed for diabetes (Pinteraction = 0.038) and neoadjuvant chemotherapy (Pinteraction = 0.012).

Conclusions: Breast radiotherapy is associated with increased risk of hematologic malignancies, particularly leukaemia and non-Hodgkin lymphoma. These findings support incorporating long-term hematologic surveillance into survivorship care and shared decision- making for breast cancer treatment.

Poster Presentation

Personal and Familial Factors Associated with Genetic Testing Decisions in HBOC and Lynch Syndrome Families

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Background: Cascade genetic testing of individuals at high-risk for hereditary breast-ovarian cancer (HBOC) and Lynch syndrome (LS) enables individualized risk-management programs, including surveillance and/or risk-reduction surgeries. Despite the benefits, some at-risk individuals choose to avoid genetic testing. This study explored personal and familial factors associated with genetic testing decisions among individuals in HBOC and LS families.

Methods: The Israel Cascade (iCascade) is part of an international nurse led study in collaboration with Switzerland and Korea. The iCascade is an open-ended, family-based study, conducted among carriers of pathogenic/likely pathogenic variants, associated with HBOC or LS, and their biological relatives. Descriptive statistics using t-tests or One-way ANOVA, and mixed linear regression model were performed, considering individual and family level data.

Result: The iCascade sample consisted of 428 individuals: 249 (58%) from HBOC families and 179 (42%) from LS families. Of these, 372 (87%) participants underwent genetic testing, while 56 participants (13%) did not. Univariate analyses at the individual level showed that untested participants were younger, without partner relationships and smokers. Their objective and perceived genetic knowledge scores were lower than those who underwent genetic testing. They also perceived lower healthcare support and demonstrated less problem-focused coping and more avoidance-focused coping. However, the mixed linear regression model, performed at the family level, revealed that perceived genetic knowledge was the only significant predictor. Personal cancer risk assessment was the main motivation for genetic testing, while family planning considerations were less common. Common reasons for avoiding genetic testing included lack of referral/knowledge about testing locations, and personal reasons (lack of time, interest, or preference not to know). Concern about results being used against them was twice as common in HBOC vs LS families.

Conclusions: Findings highlight the need for improved genetic education and accessible counseling supporting autonomous decision-making, with attention to syndrome-specific concerns.

Positive Motivation for Family Disclosure and Associated Factors among Women with Hereditary Breast Cancer: The K-CASCADE study

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[1]Yonsei Univ. College of Nursing, Department of College of Nursing and Brain Korea 21 Four Project, Korea, [2]Yonsei Univ. College of Nursing, Department of College of Nursing, Korea, [3]Univ. of Basel, Department of Clinical Research, Switzerland, [4]Yonsei Univ. College of Nursing, Department of Mo-im Kim Nursing Research Institute, Korea

Background: Family disclosure involves communicating information on pathogenic genetic variants, including cancer risk and preventive implications, to blood relatives. This process occurs within a family context and is influenced by sociodemographic, cognitive, psychological, and relational factors. This study examined positive motivation for family disclosure and its associated factors among women with hereditary breast cancer.

Methods: Data for women with hereditary breast cancer (BRCA1/2, PALB2, ATM, CHEK2) enrolled between 2021-2025 (N = 197), from the K-CASCADE multicenter cohort study (https://kcascade.kr/) were analyzed. Blood relatives, men, and cases with ≥ 30% missing data were excluded. Positive motivation for family disclosure was assessed at the first follow-up, while independent variables were obtained at baseline. Missing data were addressed using multiple imputation. Associations were examined using correlation, multiple linear, and quantile regression analyses.

Result: Among participants, 33 (16.8%) had not disclosed. The positive motivation score was slightly higher than midpoint (52.65 ± 14.36) and higher among women with lower education and prior disclosure experience ($p < .05$). Among subdomains (1-7 scale), understanding of genetic information was highest (5.85 ± 1.29), while need for family support was lowest (2.62 ± 1.56). Positive motivation was weakly correlated with cancer coping self-efficacy (r = 0.22, $p = .002$) and shared decision-making (r = 0.15, $p = .032$). Quantile regression showed that prior disclosure experience and greater participation in shared decision-making were associated with higher motivation across all quantiles ($p < .05$). At the 0.25 quantile, lower decisional regret for genetic testing (β = 1.04, $p = .014$) and greater recurrence concerns (β = 1.65, $p < .001$) were significant, whereas time since diagnosis > 5 years was significant only at the 0.75 quantile (β = -1.65, $p = .046$).

Conclusions: Findings underscore the pivotal role of prior family disclosure and shared decision-making, supporting the use of motivation-sensitive interventions. Emotionally focused strategies strengthening family cohesion may benefit individuals with lower motivation (0.25 quantile), whereas sustained monitoring and re-education may help prevent motivational decline among long-term survivors (0.75 quantile).

Poster Presentation

Table 4. Factors Associated with Positive Motivation for Family Disclosure by Quantile regression

(N=197)

Variables	OLS			QR 0.25			QR 0.50			QR 0.75		
	β	SE	*p*	β	SE	*p*	β	SE	*p*	β	SE	*p*
Age												
<40yr	(ref)											
≥40yr	1.51	2.33	.517	0.78	0.73	.300	2.20	0.52	.005	1.13	0.93	.239
Disclosure to family												
No	(ref)											
Disclosure to some family members (excluding spouse)	7.14	3.08	.023	9.03	0.93	<.001	8.67	1.36	<.001	7.00	2.11	.004
Time since breast cancer diagnosis												
≤5yr	(ref)											
>5yr	-0.81	2.19	.711	-0.03	0.83	.973	0.99	0.60	.115	-1.65	0.78	.046
Shared decision-making	0.72	0.91	.429	0.79	0.18	<.001	2.03	0.21	<.001	1.75	0.28	<.001
Family cohesion	1.06	0.95	.267	1.28	0.33	<.001	0.70	0.17	<.001	0.33	0.35	.355
Concerns about recurrence	0.64	0.86	.456	1.65	0.31	<.001	-0.34	0.26	.205	-0.34	0.60	.574
Hereditary cancer Knowledge	-0.16	0.30	.587	-0.27	0.18	.151	-0.36	0.09	<.001	-0.14	0.04	.003
Self-efficacy dealing with cancer	2.53	1.13	.026	1.59	0.39	<.001	2.42	0.33	<.001	4.56	0.30	<.001
Decisional regret related to genetic testing	0.50	1.04	.634	1.04	0.38	.014	-0.56	0.45	.227	0.29	0.54	.604

R^2: 0.1177, adjusted R^2: 0.0752, GVIF^ < 1.5

Poster Presentation

Identification of Latent Classes Based on Pre-Specified Symptom Cluster in Posttreatment Cancer Survivors

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Background: Although cancer-related symptoms frequently occur in clusters, survivorship care remains largely symptom-specific, limiting oncology nurses' ability to comprehensively assess and manage co-occurring symptoms. Therefore, this study aimed to identify latent classes based on a pre-specified symptom cluster (pain, fatigue, depression, and sleep disturbance) among posttreatment cancer survivors, examine factors associated with class membership, and compare health-related quality of life (HRQOL) across classes.

Methods: This secondary cross-sectional analysis used online survey data from five cancer survivor communities in South Korea. The sample included 1019 posttreatment survivors of breast, colorectal, lung, stomach, or thyroid cancer. Symptoms were assessed using the survivorship concerns checklist from the National Comprehensive Cancer Network Guidelines for Cancer Survivorship, and HRQOL was measured using the Korean version of the EORTC QLQ-C30. Latent class analysis was conducted to identify symptom cluster classes.

Result: Three latent classes were identified: a high symptom burden class (34.3%), a pain-sleep disturbance class (19.8%), and a low symptom burden class (45.9%). Older age, lower income, stomach cancer diagnosis, and multimodal treatment were associated with higher likelihood of membership in the high and pain-sleep disturbance classes, whereas adherence to a healthy diet was associated with lower likelihood. HRQOL differed significantly across classes, with the high symptom burden class showing the poorest outcomes.

Conclusions: Distinct latent classes based on a pre-specified symptom cluster reveal substantial heterogeneity in symptom burden and HRQOL among posttreatment cancer survivors. These findings support risk-stratified, symptom cluster-based survivorship care to improve HRQOL.

Early Detection of Drug-Induced Interstitial Lung Disease Through a Nurse-Integrated Multidisciplinary Monitoring Program in Breast Cancer Patients

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Background: Drug-induced interstitial lung disease (ILD) is a well-recognized and potentially serious adverse effect of modern breast cancer therapies, particularly antibodydrug conjugates such as trastuzumab deruxtecan (Enhertu). Once ILD develops, systemic corticosteroid treatment is often required and cancer therapy may be interrupted, compromising treatment continuity. Early detection before symptom onset is therefore critical. This study describes a nurse-integrated, multidisciplinary monitoring strategy designed to facilitate early identification and management of ILD in breast cancer patients.

Methods: We conducted a retrospective analysis of 40 breast cancer patients receiving trastuzumab deruxtecan at a tertiary medical center. Prior to treatment initiation, all patients were referred to pulmonology for baseline high-resolution computed tomography (HRCT) and pulmonary function testing. Scheduled pulmonology follow-up was arranged every three months, with chest radiography and pulmonary function reassessment at six months and repeat HRCT annually. In parallel, oncology nurses performed structured monitoring during routine oncology visits, including resting and post-exertional pulse oximetry after a standardized three-minute walking test. Multidisciplinary collaboration between breast surgeons, pulmonologists, and oncology nurses was maintained throughout treatment.

Result: Among the 40 patients monitored, 13 developed grade 1-2 ILD during treatment. Notably, four patients were asymptomatic at the time of detection, and ILD was identified through structured monitoring and imaging surveillance rather than symptom presentation. Early initiation of corticosteroid therapy and timely multidisciplinary intervention were implemented. Under combined monitoring and collaborative management, treatment interruption due to ILD was minimized, and no cases progressed to severe respiratory failure.

Conclusions: A nurse-integrated, pulmonology-collaborative monitoring model enables early detection of drug-induced ILD, including asymptomatic cases, in breast cancer patients receiving targeted therapy. Proactive surveillance and multidisciplinary coordination support timely intervention, enhance patient safety, and help preserve treatment continuity. This model highlights the pivotal role of oncology nurses in advanced cancer therapy monitoring.

Effectiveness of a Blended Learning Program for Antineoplastic Drug Safety Management among Newly Graduated Nurses: A Quasi-Experimental Study

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Background: Newly graduated nurses assigned to chemotherapy-handling wards require specialized competencies in antineoplastic drug safety management. This study aimed to evaluate the effectiveness of a blended learning program for antineoplastic drug safety management targeting newly graduated nurses.

Methods: A single-group pre-post repeated-measures quasi-experimental design was employed using the Kirkpatrick evaluation model. Participants were 33 newly graduated nurses assigned to wards handling antineoplastic drugs. Data were collected from March 2024 to October 2025. Outcome variables included knowledge, learning transfer motivation, and implementation of antineoplastic drug safety management, measured at pre-intervention, immediately post-intervention, 4 weeks, and 10 weeks post-intervention. Generalized estimating equations were used for analysis. Focus group interviews were conducted with 10 participants.

Result: Learning satisfaction (4.95 ± 0.20) and engagement (4.62 ± 0.44) were high. Knowledge scores significantly increased from pre-intervention (0.77 ± 0.20) to immediately post-intervention (0.93 ± 0.08) and were maintained at 4 weeks (0.93 ± 0.09) and 10 weeks (0.93 ± 0.08) (Wald $\chi^2 = 29.54$, $p < .001$). Learning transfer motivation showed no significant change until 4 weeks post-intervention but decreased significantly at 10 weeks (6.47 ± 0.82, $p = .015$). Implementation scores were maintained from 4 weeks (4.55 ± 0.30) through 10 weeks post-intervention (4.45 ± 0.62) (Wald $\chi^2 = 0.79$, $p = .375$). Qualitative analysis revealed three themes: increased sensitivity, enhanced response capacity, and increased self-efficacy in antineoplastic drug safety management.

Conclusions: The blended learning program effectively improved knowledge among newly graduated nurses, with effects sustained up to 10 weeks post-intervention. The gradual decline in learning transfer motivation suggests the need for ongoing reinforcement education. This program can be applied to orientation and continuing education initiatives in healthcare institutions.

Poster Presentation

Safety and Treatment Patterns of Ribociclib Plus Endocrine Therapy in Chinese Patients with HR+/HER2– Early Breast Cancer: A Multicenter Prospective Real-World Study

Chao Ni[1], Zixuan Wang[1], Pengfei Qiu[2], Jun Zhou[3], Bojian Xie[4], Yangjun Cai[4], Xidong Gu[5], Wenwu Wang[6], Jinhua Ding[7], Jun Zhou[8], Zhijun Dai[9], Chaoyang Xu[10], Jun Shen[11], Minjun Dong[11], Xiaoyan Jin[12], Zhangsheng Xiao[13]

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Background: The NATALEE trial confirmed Ribociclib plus endocrine therapy for HR+/HER2– early breast cancer, but Asian patients comprised < 15% of its cohort and real-world tolerability data for this population are limited. This study evaluated the safety and treatment patterns of this regimen in Chinese patients.

Methods: This multicenter, prospective study (NCT06587789) was conducted on patients with HR+ HER2- stage II or III early breast cancer who received ribociclib at 400-mg starting dose plus physician-selected endocrine therapy. We extracted objective clinical examination results from electronic medical records, and obtained subjective adverse reactions through follow-ups. Moreover, instances of dose adjustments, delayed medication and discontinuation were also recorded.

Result: Between August 2023 and October 2025, a total of 274 patients from 13 tertiary Grade A hospitals were enrolled, with an average age of 52 years old. Among them, 57.9% were in stage II and 42.1% were in stage III. As of January 1st, 2026, all-grade adverse events (AEs) were observed in 248 patients (90.4%). The most common adverse events were neutropenia (84.7%; grade 3/4:29.9%), fatigue (46.7%), and rash (29.6%). 11.3% of patients have permanently discontinued the use of ribociclib due to AEs. Additionally, 22.3% and 18.6% of patients experienced dose reduction and treatment interruption respectively.

Conclusions: Ribociclib plus endocrine therapy had favorable clinical tolerability. AE-related permanent discontinuation (11.3%) and treatment interruption (18.6%) were far lower than in the NATALEE trial, reflecting better adherence in routine practice. All-grade neutropenia was higher, mainly mild grade 1–2 events, with grade 3/4 rates notably lower than in NATALEE. These findings confirm enhanced real-world tolerability of Ribociclib in Chinese patients and solid evidence for its wider use in high-risk early HR+/HER2– breast cancer.

Upfront Surgery versus Neoadjuvant Systemic Therapy in T4b Fungating/Ulcerated Breast Cancer: Real-World Comparative Effectiveness on Quality of Life and Survival in a High-Burden LMIC Population

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Background: T4b fungating/ulcerated breast cancers cause profound physical, psychological, and social morbidity. Although neoadjuvant systemic therapy (NAST) is commonly advocated, available evidence suggests no clear long-term survival superiority over surgery-first strategies. In high-burden LMIC settings, where patients often present with infection, anemia, malnutrition, and limited access to supportive care, the impact of treatment strategy on quality of life (QoL) may be as critical as oncologic outcomes.

Methods: This prospective observational study compares upfront surgery-first versus NAST-first strategies in women with non-metastatic T4b fungating/ulcerated breast cancer. Quality of life was assessed using the EORTC QLQ-C30 and QLQ-BR23 at baseline and 6 weeks, with a ≥10-point change considered clinically meaningful. Mixed-effects models and survival analyses were planned, with adjustment for baseline performance status, anemia, nutritional status, tumor burden, and receptor subtype.

Result: Baseline QoL scores and disease characteristics were comparable between groups. At 6 weeks, the surgery-first group demonstrated a significantly greater improvement in global QoL scores compared to the NAST-first group (mean change +18.4 vs +6.2 points), exceeding the threshold for clinical relevance. Rapid symptom control was observed with upfront surgery, with earlier cessation of bleeding, reduction in malodor, and decreased wound care burden. Patients in the NAST-first group experienced slower symptom relief and higher rates of treatment interruptions due to infection, anemia, or wound-related complications. Early oncologic outcomes showed no significant difference in short-term PFS between groups, although follow-up remains immature for definitive survival comparisons.

Conclusions: Interim analysis suggests that in T4b fungating/ulcerated breast cancer, upfront surgery provides faster and clinically meaningful improvement in quality of life and symptom control. In high-burden LMIC populations, where advanced disease and supportive care limitations are common, a surgery-first strategy may represent a patient-centered, dignity-preserving, and pragmatically effective approach.

MASCC International Healthcare Professional Survey of Current Practices of Managing Breast Cancer-Related Lymphoedema and Lymphoedema-Related Cellulitis

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Background: Despite new evidence supporting the need for surveillance, early diagnosis, and intervention in the management of Breast cancer-related arm lymphoedema (BCRAL) and BCRAL-associated cellulitis, multiple barriers hinder clinical translation in real-world settings. Challenges include variability in awareness, diagnostic criteria for BCRAL, and limitations to access such as insurance coverage disparities. These barriers vary across institutions and countries, often influenced by economic factors. This study aims to characterize global practices in BCRAL surveillance, diagnosis, treatment, and cellulitis management to identify key barriers, facilitators, and unmet needs in early BCRAL and cellulitis care.

Methods: We are distributing an online survey to regulated healthcare professionals involved in BCRAL care, with an anticipated response of 100-200 participants worldwide. The questionnaire collects data on demographics, current clinical practices relating to BCRAL surveillance, diagnosis, treatment, and cellulitis management. Data collection will close on April 30, 2026. Ethical approval was obtained from the Hyogo Cancer Center Human Research Ethics Committee, Japan (project number: R24-004). This survey was developed by a multidisciplinary International Committee on BCRAL. The authors declare no conflicts of interest associated with this study. The survey link is as follows; https://forms.gle/uuUP8uaWZ6MRNRAJ9

Result: By the February 1st, 2026, 113 participants from 19 countries answered this survey. We are waiting more voices from various countries. The final analysis is expected to reveal variations in diagnostic methods and interventions for BCRAL and BCRAL-associated cellulitis. Common and unique barriers to providing comprehensive BCRAL care will be reported. Insights may inform the development of standardized care pathways to improve global patient outcomes.

Conclusions: The findings from this study will contribute to an understanding of the barriers and facilitators for implementing early BCRAL detection, comprehensive management of BCRAL, and strategies for reducing BCRAL-associated cellulitis in the care of breast cancer survivors. All BCRAL healthcare practitioners are welcome to participate in this survey.

Randomized Study Comparing Artificial Intelligence-Supported ePRO Monitoring vs Routine Follow-up During Sacituzumab Govitecan Treatment in Patients with Advanced Breast Cancer (PRO-VIDE)

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Background: Electronic patient-reported outcome (ePRO) monitoring may identify symptom worsening and treatment-related toxicities earlier than routine follow-up, but alert handling can increase staff workload. PRO-VIDE evaluates a patient-facing artificial intelligence (AI)-supported ePRO strategy during sacituzumab govitecan (SG) therapy for metastatic triple-negative breast cancer (mTNBC) patients, combining automated contact guidance and chatbot-based psychological support.

Methods: PRO-VIDE is a multicenter, randomized, parallel group trial at 29 hospitals in Japan. Eligible participants are women aged ≥ 18 years with mTNBC, previously treated with ≥ 1 chemotherapy for advanced/metastatic disease, ECOG performance status 0-2, and able to complete ePRO reporting. All participants receive SG. Randomization is 1:1 by minimization (ECOG 0 vs 1-2; age ≤ 59 vs ≥ 60; chemotherapy line ≤ 3rd vs ≥ 4th). In the AI-ePRO arm, participants report daily temperature and general condition (5-point facial scale). A prespecified rule-based algorithm flags possible worsening, triggers selected PRO-CTCAE items, and advises patients to contact the hospital's triage line. A study-specific chatbot based on ChatGPT (not the public consumer service) collects free-text symptoms and concerns; the system generates clinician-facing summaries integrating PRO-CTCAE and free-text entries to support the medical interview at visits. In the control arm, participants receive usual care without the AI-ePRO system. The primary endpoint is change from baseline to Week 12 in EORTC QLQ-C30 Global Health Status/QoL. Key secondary endpoints include other QLQ-C30 domains, fatigue (EORTC QLQ-FA12), adherence, SG treatment duration, unplanned outpatient visits, and

patient satisfaction.

Result: The sample size was determined using a mixed-effects model for repeated measures (MMRM). Group comparison at Week 12 will use a Wald test to assess the between-group difference in MMRM estimates. Assumptions included a 12-point difference between groups, SD of 24, time-point correlation of 0.5, two-sided alpha of 10%, and 80% power.

Conclusions: Target accrual is 110 patients (55/arm), starting in January 2026. As of January 25, 2026, 4 patients have been enrolled.

Radiotherapy Dose Adaptation Based on Tumor Biology in cN3 Breast Cancer: Interim Results of the RADAPT-N3 Study Incorporating ctDNA Analysis

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Background: In clinically node-positive (cN3) breast cancer, undissected internal mammary (IMN) or supraclavicular nodes (SCN) may harbor residual tumor after neoadjuvant chemotherapy (NAC). The optimal radiotherapy (RT) dose for these regions remains undefined. The RADAPT-N3 study (NCT05896865) investigates response-adapted simultaneous integrated boost (SIB) to IMN or SCN based on imaging-defined residual disease.

Methods: This non-randomized, single-arm phase II study enrolled cN3 patients treated with NAC, surgery, and postoperative RT. RT included SIB to undissected IMN or SCN: 3.5 Gy × 16 fractions for imaging-defined residual disease and 3.35 Gy × 16 fractions for imaging complete response. Pre-RT blood samples were analyzed using a tumor-agnostic sequencing panel (IMBDx AlphaLiquid100®, 118 genes) to detect pathogenic circulating tumor DNA (ctDNA).

Result: As of September 2025, 61 patients were enrolled, with ctDNA analyzed in 47 (77.0%). Subtypes included Luminal (50.8%), HER2-positive (26.2%), and Triple-negative (TNBC, 23.0%). At a median follow-up of 24 months, 2-year recurrence-free and overall survival rates were 90.5% and 98.2%, respectively. Pathogenic ctDNA variants were detected in 55.3% of patients (median VAF 0.08%). Notably, pathogenic alterations were present in 80.0% (4/5) of patients who developed recurrence. In multivariable analysis, a Maximum Somatic Allele Frequency (MSAF) ≥ 2.0% was strongly associated with recurrence risk (HR 17.00, $p = 0.061$), alongside TNBC subtype (HR 18.15, $p = 0.019$).

Conclusions: RADAPT-N3 demonstrates the feasibility of response-adapted SIB for undissected IMN or SCN in cN3 breast cancer. Interim findings suggest that postoperative pathogenic ctDNA, particularly MSAF levels, may serve as a critical biomarker for stratifying early recurrence risk.

Poster Presentation

GERD Symptoms Do Not Worsen During Neoadjuvant Chemotherapy but Increase After Radiotherapy in Breast Cancer Patients

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Background: Although gastroesophageal reflux disease (GERD) symptoms are common during breast cancer treatment, the timing and treatment phases associated with their onset remain unclear. This ongoing prospective study aimed to evaluate longitudinal changes in GERD symptoms using the GERD-Q questionnaire.

Methods: This prospective observational study was initiated in October 2024. Patients with breast cancer receiving neoadjuvant or adjuvant chemotherapy were enrolled. During chemotherapy, patients were randomly assigned to one of three gastric medications: esomeprazole (proton pump inhibitor), tegoprazan (potassium-competitive acid blocker), or rebamipide (gastric mucosal protective agent). GERD symptoms were assessed using the GERD-Q questionnaire at predefined time points: before chemotherapy (V1), during and after chemotherapy (V2-V3), after surgery (V4), and after completion of radiotherapy (V6). As enrollment of adjuvant chemotherapy patients is ongoing, current analyses primarily focused on patients treated with neoadjuvant chemotherapy.

Result: GERD-Q scores did not change significantly during the chemotherapy phase (V1-V3) among patients with available assessments (n = 38), and no differences were observed according to chemotherapy regimen, including TCHP and PCAC plus pembrolizumab. No significant change in GERD-Q scores was observed immediately after surgery (V3-V4), regardless of surgical approach. In contrast, among patients who completed radiotherapy and had post-treatment assessments (n = 24), GERD-Q scores were significantly higher after radiotherapy compared with baseline (mean change +1.17; Wilcoxon signed-rank test, $p = 0.032$). While the median change was zero, a subset of patients demonstrated clinically meaningful worsening, contributing to the overall increase. No significant difference in GERD-Q change was observed between breast-conserving surgery and total mastectomy.

Conclusions: GERD symptoms did not worsen during neoadjuvant chemotherapy or the immediate postoperative period but increased after completion of radiotherapy. These findings suggest that GERD symptom aggravation in breast cancer patients may predominantly occur during the later phases of treatment rather than during chemotherapy itself.

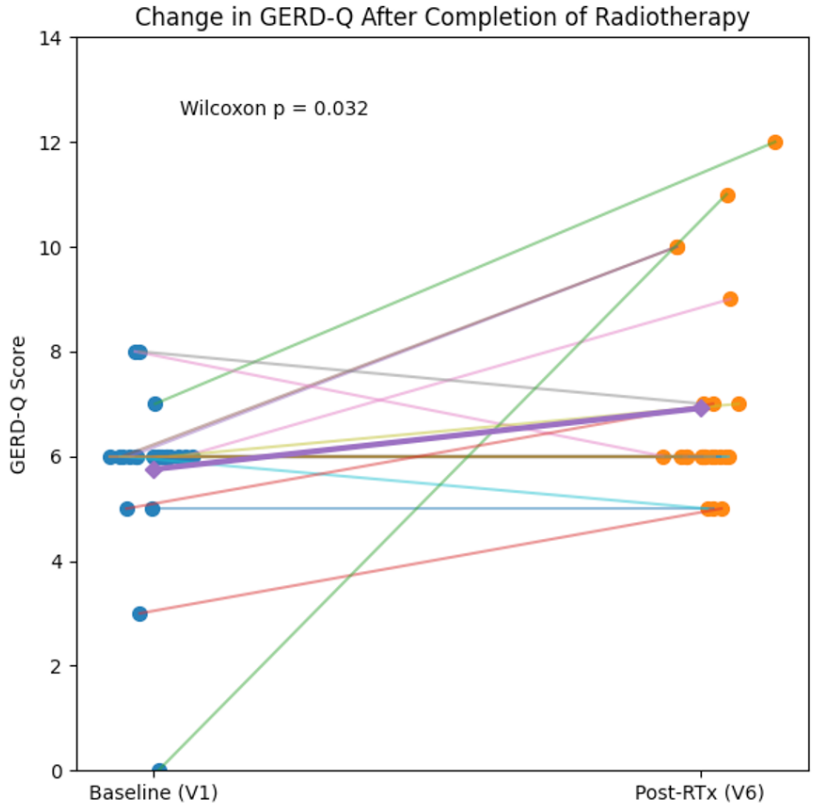

Figure 1. Individual changes in GERD-Q scores from baseline to post-radiotherapy. GERD-Q scores remained stable in most patients but worsened in a subset after radiotherapy (p = 0.032).

A Randomized Controlled Trial of LLM-Assisted Chemotherapy Side Effect Management in Breast and Colon Cancer Patients: ALLIANCE Trial

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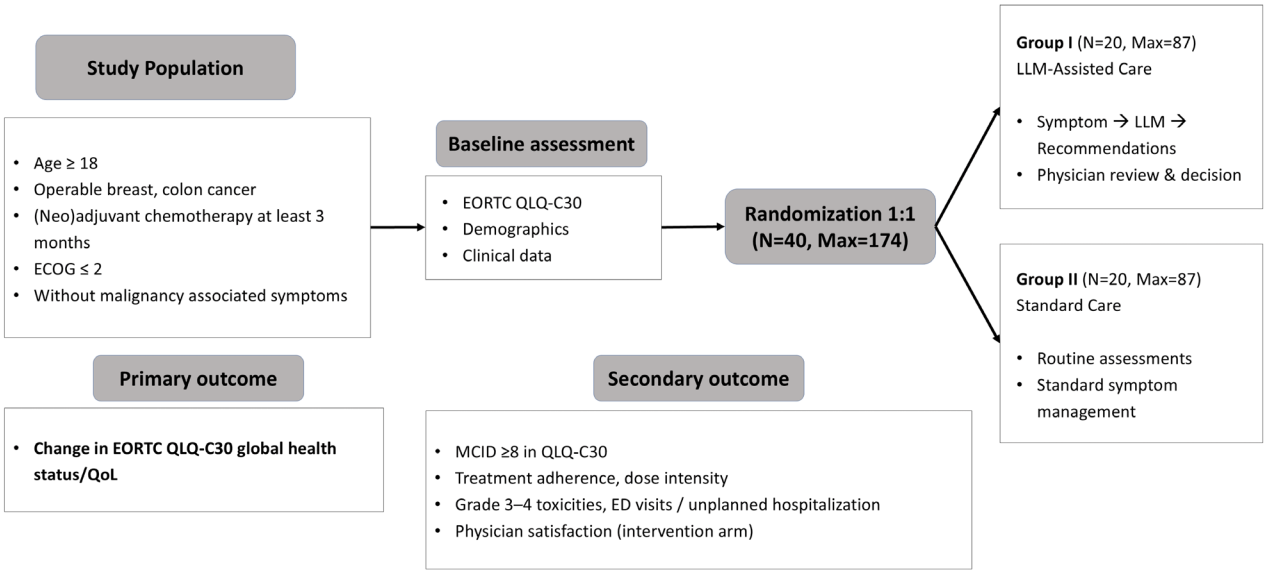
Background: Chemotherapy-related side effects substantially impair health-related quality of life (HRQOL) and contribute to dose reductions and treatment delays. Although digital symptom monitoring has demonstrated clinical benefit, most existing systems rely on predefined algorithms with limited flexibility. Large language models (LLMs) offer context-aware, natural language-based support, but randomized evidence for their use in oncology symptom management remains scarce.

Methods: This is a prospective, open-label, two-stage adaptive randomized controlled trial conducted at a tertiary academic center. Adult patients with breast or colon cancer scheduled to receive systemic chemotherapy are randomized 1:1 to standard care with or without physician-supervised LLM-assisted symptom management. In the intervention arm, clinicians input anonymized patient symptom data into an LLM, review the generated recommendations, and make final clinical decisions. The primary endpoint is change in HRQOL measured by the EORTC QLQ-C30 global health status/quality of life scale. Secondary endpoints include treatment adherence, dose intensity, grade 3-4 toxicities, healthcare utilization, and physician satisfaction. An interim analysis after 40 patients will assess feasibility, safety, and conditional power, with a maximum planned enrollment of 174 patients.

Result: This trial is registered at ClinicalTrials.gov (NCT07198581). Patient enrollment is ongoing. Interim feasibility and safety outcomes will be evaluated according to the pre-specified adaptive design.

Conclusions: This trial will provide randomized evidence on the effectiveness and safety of physician-supervised LLM-assisted symptom management during chemotherapy and clarify the role of LLMs as clinical decision support tools in oncology care.

ALLIANCE trial: Study design



Poster Presentation

Bilateral Risk-Reducing Nipple-Sparing Mastectomy with Reconstruction Surgery in BRCA 1/2 Gene Mutation Carriers, First-Degree Relatives: A Case Report

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Background: According to Mongolia's annual disease statistics, breast cancer ranks 4th overall and 3rd among women, comprising 17.2% of all cancers by 2025. A woman who carries a deleterious mutation has a breast cancer risk of up to 85% as well as a greatly increased risk of ovarian cancer. Female BRCA1/2 germline pathogenic variant carriers have an increased lifetime risk of breast cancer and may wish to consider risk-reducing mastectomy for surgical prevention.

Methods: Between July of 2023 and November of 2024, 35-46 years old, BRCA 1/2 gene mutation carrier, 4 sisters had prophylactic bilateral nipple-areolar complex sparing mastectomy followed by immediate reconstruction using implants without any complications. The general descriptive factors were as follows: mean age was 41.75 years, mean surgery duration was 299 minutes, mean blood loss was 33.7 mL, and mean hospital stay was 5 days. All patients underwent bilateral salpingo-oophorectomy surgeries in our hospital as well. Postoperative histology test showed triple negative invasive carcinoma of no special type/ductal/ for one patient, while the other patient had estrogen positive, the same type of cancer. Both patients continued the treatment with chemotherapy and target therapy for 1 year/Olaparib/

Result: All patients' follow-up examinations are continuing without possible complications; 2 cancer patients showed no cancer occurrence until August of 2025.

Conclusions: Risk-reducing bilateral mastectomy reduces breast cancer incidence by 90% or more in patients at risk of hereditary breast cancer. Despite BRCA1/2 carriers undergoing risk-reducing surgeries, 50% of affected patients in our study were diagnosed with breast cancer. Moreover, without genetic mutation testing or cancer screening, these patients faced a higher likelihood of late-stage diagnosis. It is essential to adequately assess the appropriateness of genetic testing for each patient, provide counseling on appropriate prevention methods, and prioritize the patient's individual needs.

Metastasis of Endometrioid Carcinoma to Breast: A Case Report and Literature Review

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Background: Although breast cancer is the most common malignancy in women worldwide, extra-mammary metastasis to the breast is relatively rare. The common cause of secondary cancer of the breast is contralateral breast metastasis. Clinical presentation and radiological findings mimic primary breast cancer. Histological and a panel of immunohistochemical stains are cornerstones of diagnosis

Methods: We reported a rare case of endometrioid carcinoma metastasis to the breast. Highlighting metastasis occurs in the early stage of primary cancer with a good prognosis.

Result: A 50-year-old Thai female with a perimenopausal status presented with abnormal vaginal bleeding. She underwent a gynecologic examination, vaginal ultrasound, hysteroscopy, followed by fractional and curettage. The histological result was endometrioid carcinoma. Then total hysterectomy with bilateral oophorectomy was performed. Patient was diagnosed with stage IA endometrial carcinoma and received adjuvant vaginal brachytherapy A year after completion of endometrial cancer treatment, she developed with breast lump in her left breast. Ultrasound and mammogram showed multiple ill-defined hypoechoic masses in left breast, corresponding to the palpable lump. The patient underwent breast tissue biopsy. Histological result revealed adenocarcinoma. Immunohistochemical studies were negative for mammaglobin, GCDFP15, ER, TTF-1 and positive for vimentin, PTEN. The immunoprofile is consistent with endometrioid carcinoma. Patient received first-line palliative carboplatin/paclitaxel. After 3 years, she had developed lung metastasis, and the second-line regimen was changed to cisplatin/paclitaxel until now

Conclusions: This case demonstrates a rare metastasis of solid non-breast carcinoma. A new breast lump or other symptoms of breast in a patient with known malignancy should be investigated with a complete clinical evaluation, tissue diagnosis, and proper immunohistochemical staining to confirm the diagnosis and appropriate management

Telemedicine-Based Dietary and Behavioral Support Versus Conventional Follow-up in Pediatric Breast Cancer: A Digital Supportive Oncology Study

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SNM College and Hospital, Department of Internal Medicine, India

Background: Sleep disturbance and anxiety are common among children and adolescents undergoing treatment for breast cancer, negatively affecting emotional regulation, behavior, and family functioning. Access to supportive care is often limited by travel distance, treatment burden, and workforce constraints. Digital health platforms offer scalable solutions for delivering psychosocial and lifestyle interventions remotely. This study evaluated the feasibility, effectiveness, and implementation potential of a telemedicine-based dietary and behavioral care program compared with standard outpatient follow-up.

Methods: This comparative clinical study enrolled 380 pediatric patients with breast cancer and clinically diagnosed sleep and anxiety disorders. Participants received either telemedicine-based supportive care (n = 258) or conventional outpatient follow-up (n = 122). The digital intervention included structured dietary counseling, sleep hygiene education, and anxiety-focused behavioral strategies delivered via a secure telemedicine platform. Assessments were conducted at baseline and at 1, 3, and 6 months. Primary outcomes included sleep quality, anxiety severity, behavioral functioning, and adherence to dietary recommendations. Feasibility, caregiver acceptability, and implementation readiness were assessed using a validated questionnaire.

Result: Children in the telemedicine group demonstrated significantly higher adherence to dietary and behavioral recommendations and greater improvements in sleep regularity than those receiving outpatient care. At six months, 66.4% achieved at least a 50% reduction in sleep and anxiety symptoms, while 33.7% showed improvements exceeding 80%. Additional benefits included reduced daytime irritability, improved emotional regulation, and more structured family routines. Caregiver satisfaction with telemedicine was high (92.8%), driven by convenience, reduced travel burden, and improved continuity.

Conclusions: Telemedicine-delivered dietary and behavioral interventions are feasible, acceptable, and clinically effective for managing sleep and anxiety disorders in pediatric breast cancer patients. The scalability and low-resource requirements of digital platforms support broader implementation across pediatric oncology settings, particularly in resource-limited regions globally.

Eliminating Uncertainties in Post-Breast-Conserving Surgery Cosmesis Evaluation Using Vision-Language Artificial Intelligence

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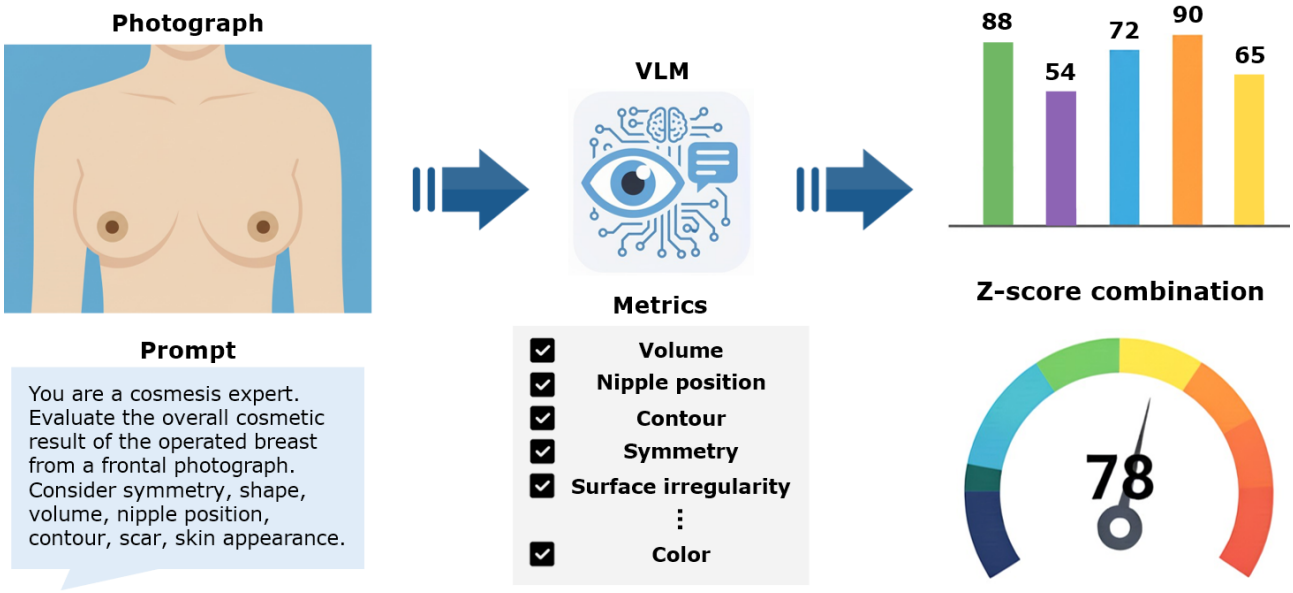
Background: Aesthetic outcomes following breast-conserving therapy are critical determinants of quality of life, yet current evaluation methods are limited by the subjectivity of existing scales and substantial inter-observer variability. This study investigated the feasibility of Large Vision-Language Models (LVLMs) as an objective, label-independent framework for breast cosmesis assessment and evaluated their potential to provide consistent evaluations free from exposure-dependent learning effects.

Methods: We analyzed 89 frontal-view breast images from the RTOG 1014 trial, with expert-consensus labels established by consensus grading from six radiation oncologists using the Global Cosmetic Score. Multiple LVLMs, including the GPT-5 family, Gemini 2.0 Flash, and Claude-4.5 Haiku, were evaluated after systematic optimization of prompt complexity, scoring scales, and few-shot strategies. A multidisciplinary expert survey involving seven clinicians was conducted on a subset of 34 randomly selected cases, and learning effects were assessed through sequential subgroup analysis.

Result: Optimal performance was achieved with multi-metric evaluation, detailed prompts, continuous scoring, and one-shot exemplars. The optimized GPT-5-based framework achieved significant correlation with expert consensus (Spearman's $\rho = 0.697$; 95% CI: 0.564-0.789) and excellent reproducibility (ICC = 0.982; 95% CI: 0.974-0.987). High concordance was observed for macroscopic features such as volume, symmetry, and contour, whereas performance was lower for subtle changes including scar appearance. While human evaluators achieved higher overall agreement with labels, they demonstrated a clear learning effect, with lower concordance in early evaluations that progressively improved with cumulative case exposure. In contrast, LVLM-based assessments remained consistent regardless of case number.

Conclusions: LVLMs offer a robust and reproducible method for objectively evaluating breast cosmesis without task-specific training. By providing consistent assessments independent of exposure-dependent learning, this approach more closely approximates real-world clinical practice where cosmesis is evaluated on a per-patient basis. Further validation studies are needed to establish LVLMs as a standardized tool for breast cosmesis evaluation in clinical settings.


Photograph
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Prompt
You are a cosmesis expert. Evaluate the overall cosmetic result of the operated breast from a frontal photograph. Consider symmetry, shape, volume, nipple position, contour, scar, skin appearance.
Metrics
Volume
Nipple position
Contour
Symmetry
Surface irregularity
Color
Z-score combination
78

A Study Protocol for Evaluating an AI-based Chatbot to Support Decision-making in Breast Cancer Surgery and Adjuvant Therapy: A Patient-centered Outcomes Study

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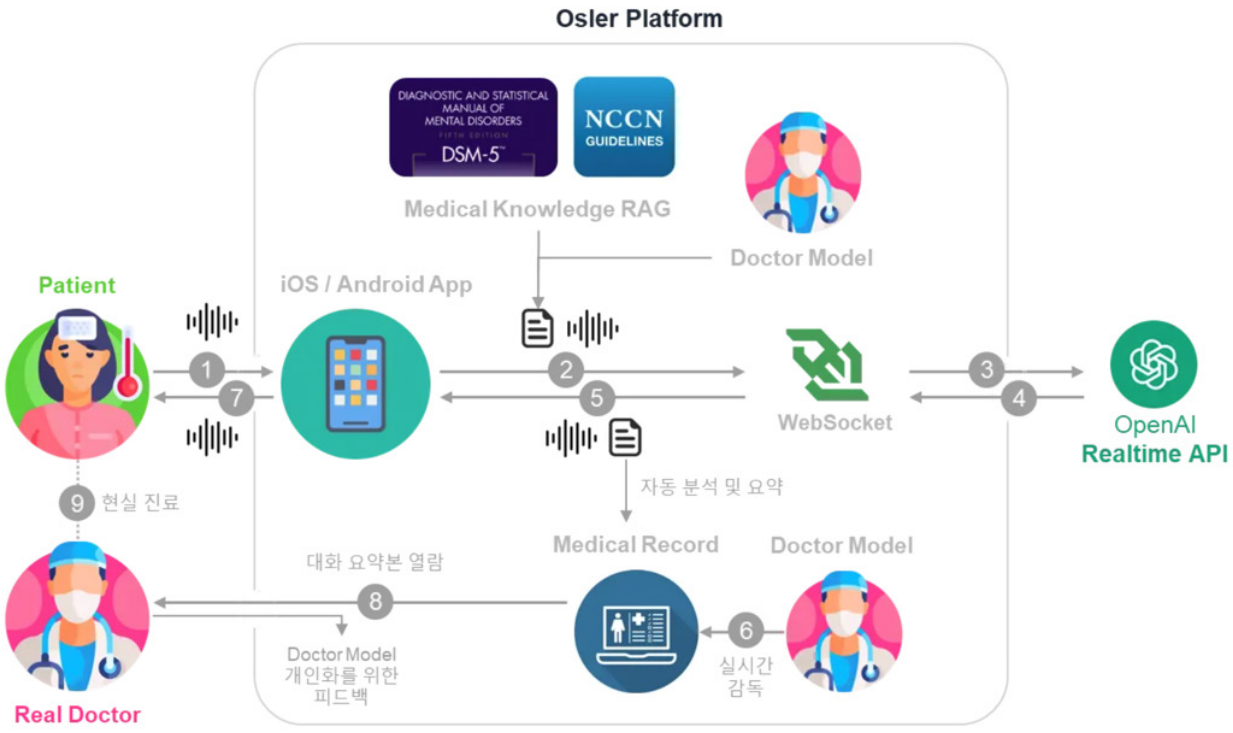
Background: In routine clinical practice, preoperative counseling for breast cancer treatment is provided by clinicians, but time constraints limit the delivery of sufficiently individualized patient education. Repetitive explanations also impose a substantial workload on healthcare providers, potentially reducing clinical efficiency. Artificial intelligence (AI) -based chatbots have emerged as promising tools to deliver standardized and personalized information, support repeated patient inquiries, and enhance patient understanding at their own pace. This study aims to evaluate the clinical applicability of an AI-based chatbot (Osler) for breast cancer surgery and adjuvant therapy and to assess its impact on patient comprehension, satisfaction, and anxiety.

Methods: This study is a prospective, single-center pilot clinical study. Eligible participants are women aged 20-80 years with newly diagnosed invasive or non-invasive breast cancer within one year, who are scheduled to undergo surgery and are able to communicate in Korean. A cloud-based, web-based AI chatbot application utilizing the OpenAI Realtime API for real-time speech processing will be used to deliver personalized preoperative surgical information on the day before surgery. The chatbot provides tailored explanations based on individual patient characteristics and surgeon-specific surgical features. After the AI-based counseling session, patients complete smartphone-based questionnaires assessing comprehension, satisfaction, and anxiety, followed by standard face-to-face counseling and informed consent by the attending clinician.

Result: Changes in patient comprehension and anxiety before and after chatbot use will be analyzed using paired t-tests. Patient satisfaction will be summarized using mean values and standard deviations based on Likert-scale responses.

Conclusions: Study findings will provide valuable insight into the role of an AI-based chatbot in supporting patient-centered preoperative education for breast cancer surgery and adjuvant therapy, while potentially improving clinical workflow efficiency and reducing repetitive counseling burden on healthcare providers.


Osler Platform
DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS
DSM-5
NCCN GUIDELINES
Medical Knowledge RAG
Doctor Model
Patient
iOS / Android App
WebSocket
OpenAI
Realtime API
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현실 진료
자동 분석 및 요약
Medical Record
Doctor Model
대화 요약본 열람
Doctor Model
개인화를 위한
피드백
실시간
감독
Real Doctor

Benign Tumors Arising from Axillary Accessory Breast at a Single Center

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Background: Accessory breast tissue is residual breast tissue that results from failure of regression during embryogenesis, common occurring in 2~6% population. It is usually located in the axilla and also can have pathologic conditions that normal breast does. Study on benign tumor arising from axillary accessory breast is still very little.

Methods: Two thousand and fifty-two patients who have been treated with accessory breast tissue from September 2017 to Oct 2025 at the Spring Day Clinic were analyzed retrospectively for tumor arising from axillary accessory breast. Patients who had cancer diagnosed through preoperative biopsy were excluded. All tumors' pathologies were reviewed. All the operations were performed by one surgeon (Dr. Hwang).

Result: Twenty-three out of 2052 patients had benign tumors confirmed by pathology (18 fibroadenomas, 3 fibrocystic disease, one tubular adenoma and one benign phyllodes tumor.) Twenty-one patients had mass like lesions in their axillary accessory breast on preoperative ultrsound examination. Two patients were diagnosed on benign tumor arising from axillary accessory breast only by pathologic confirmation. In our study, all patients enjoyed cosmetically satisfying outcomes and no patients had recurrence during the follow-up period.

Conclusions: Breast surgeon always consider that various tumor conditions can develop even in axillary accessory breast, and they must perform an ultrasound examination before accessory breast excision and perform a biopsy or removal of accessory breast if necessary.

Streamlining Management of Nipple Discharge: Lessons from ductal excisions over the last 10 years in a District General Hospital

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James Paget Univ. Hospital, Department of Surgery, United Kingdom

Background: The National Unilateral Nipple Discharge (NUND) Study revealed that 5% patients (average age 63-years) with unilateral nipple discharge had a malignancy. Association of Breast Surgery (ABS) guidance recommends observation only and consider ductal surgery for clear or blood-stained single-duct discharge as it is rarely malignant (3%). Getting it Right First Time (GIRFT) Report revealed that 13% of surgeries were for benign conditions and recommends avoiding unnecessary breast surgery.

Methods: We review the histology of all ductal excisions performed since Jan 2013 to Dec 2024 in our Breast Unit to determine if it can be avoided. Surgery performed for fistulas and infections were excluded from analysis.

Result: A total of 162 ductal excisions in 152 patients (mean age 51 years) were performed. 39.7% histology were normal. Duct Ectasia was most common pathology at 26.3% (mean age 49 years) followed by IDP at 21.6% (mean age 57.8 years), 9.3% were B3 lesions (mean age 55 years) and 3.1% malignant (mean age 67.8 years). Full clinical details (since 2016) for 98 patients were available for further analysis. 71% presented with bloody nipple discharge which was only reproducible in 23.5% patients during clinical examination. 7.14% imaging had U3 findings, the rest being U1/U2. Average waiting time from first consultation to surgery was 74 days, indicating that most were listed immediately after a first consultation.

Conclusions: Management of nipple discharge remains a dilemma of over-treatment versus an occasional missed diagnosis. Our findings correlates with previous research confirming nipple discharge having an extremely low rate of occult malignancy. Patients more than 55 years are more likely to have pathological results. A watchful waiting approach is prudent for younger patients and surgery can be considered if discharge is persistent after a period of observation.

Temporal Trends in BRCA1/2 Genetic Testing and Clinical Management Following Insurance Expansion in Japan

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Background: In Japan, BRCA1/2 genetic testing for breast cancer patients was initially introduced as a self-paid service around 2010. In June 2018, it was reimbursed as a companion diagnostic for olaparib in patients with HER2-negative advanced or recurrent breast cancer. Insurance coverage was further expanded in April 2020 for the diagnosis of hereditary breast and ovarian cancer syndrome (HBOC), and in 2022 for early-stage HER2-negative high-risk breast cancer to guide adjuvant therapy. We evaluated temporal changes in BRCA1/2 testing volume, testing indications, and clinical management following insurance expansion.

Methods: Breast cancer patients who underwent BRCA1/2 genetic testing at our institution between 2014 and January 2026 were retrospectively reviewed. According to changes in insurance coverage, patients were classified into three periods. Testing volume, indications, results, and clinical interventions for mutation-positive patients were analyzed.

Result: A total of 215 patients underwent BRCA1/2 testing; 26 were mutation-positive and 189 were negative, including one inconclusive case and six variants of uncertain significance. Testing volume increased over time: one self-paid case in 2014, 11 cases between June 2018 and March 2020 (Period I), 55 cases between April 2020 and July 2022 (Period II), and 148 cases between August 2022 and October 2025 (Period III). In Periods II and III, HBOC diagnosis was the most common indication, including patients retrospectively diagnosed after insurance expansion. In Period III, 16 patients were tested to guide adjuvant therapy, with one mutation-positive case identified. Among mutation-positive patients, olaparib was administered to six patients with recurrent disease, risk-reducing salpingo-oophorectomy was performed in seven, and contralateral risk-reducing mastectomy in two. One contralateral breast cancer was detected during contrast-enhanced MRI surveillance. Genetic counseling was provided to all mutation-positive patients.

Conclusions: Although BRCA1/2 testing increased insurance expansion in Japan, clinical interventions for mutation-positive patients remain limited. System development is needed to optimize clinical use of genetic testing results.

One Case of Invasive Micropapillary Carcinoma, which Indicates Osteoclast-like Giant Cell Tumor in Pathology

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Background: Invasive Micropapillary Carcinoma (IMPC) is a particular type of breast cancer, and it is a relatively rare disease since the onset of IMPC accounts for around 1~3% of all breast cancer. Generally, IMPC is known to show nests of invasive carcinoma between interstitials, with a shape, for instance, resembling a Mulberry-like structure in pathology.

Methods: We encountered an uncommon case of IMPC, characterized by a unique pathological finding: a breast cancer with osteoclast-like giant cell tumor, which accounts for only 0.5~1.2% of all breast cancer cases, yet we have very few reports; therefore, we report this case for its clinical implications.

Result: [case] 75-year-old female, pointed out a lump on the right breast in the CT when she had a compression fracture, and was referred to Hospital A on year X-1 February. The result of the biopsy at Hospital A showed "Tumor with giant cells" and was referred to our department in May, year X-1. We have run another biopsy in May, yet we haven't reached a definitive diagnosis. However, the lump showed enlargement over time, and we evaluated that it may be highly malignant. We conducted a total mastectomy of the right breast and a Sentinel lymph node biopsy in June of the same year.

Conclusions: The result of the pathological diagnosis after the surgery reveals a complication of breast cancer, invasive micropapillary carcinoma, and osteoclast-like giant cell tumor. Invasive cancer component of the pathological specimens was not contradicted by IMPC findings and indicated positive for hormone receptor and negative for HER2. Moreover, osteoclast-like giant cell tumor components were demonstrated positive CD68(PGM-1)(+, partial), CD68 (KP-1)(+, giant cell), CD163(+, partial), but negative H3.3 G34W. The patient currently undergoes endocrine therapy and takes 20 mg/day of Tamoxifen Citrate.

A Case Report of Inflammatory Breast Cancer in a 75-Year-Old Filipino Female

Aileen Calicaran, Eloisa Rachel Lobo, Eileen Regalado-Morales, Benedicto Carpio, Armelia Lapitan-Torres, Matthew David Parco, Amelita Tanglao-De Guzman, Faye Elinore Kison

Ospital ng Maynila Medical Center, Department of Dermatology, Philippines

Background: Inflammatory breast cancer (IBC), a rare and aggressive subtype, manifests with diffuse skin hardening resembling erysipelas and typically lacks an identifiable mass. Early detection is critical due to its fast progression and unfavorable prognosis. Effective management requires a comprehensive, multidisciplinary strategy aimed at personalized treatment and supportive care, aiming to enhance patient outcomes and quality of life.

Methods: This is a case of a 75-year-old Filipino female with a 7-month history of a slow-growing, warm, tender, erythematous plaque over the left breast. Breast ultrasound showed no distinct mass on both breasts but with minimal skin thickening on the left breast. She was initially assessed by her primary care physician with Inflammatory Breast Disease, Left; To Consider Mastitis; rule out Malignancy. She was then referred to Dermatology service for further evaluation and management. To rule out differential diagnoses and conduct further evaluation, a dermoscopy was performed, revealing a whitish-pink area with irregular dotted vessels and white, round globules. A potassium hydroxide (KOH) test was also conducted, which was negative for fungal elements. The patient subsequently underwent a punch biopsy on the left breast.

Result: Hematoxylin and Eosin (H&E) stained tissue samples from the punch biopsy showed extensive invasion of the dermis and subcutaneous tissue by strands, groups, and cords of tumor cells, with interstitial arrangement of tumor cells in between collagen bundles ("Indian filing") prominently seen. Additional immunohistochemical ER, PR, and HER2/Neu stains were negative. Based on the above findings, the diagnosis favored Inflammatory Breast Cancer. The patient was referred to Internal Medicine Oncology department with a planned Doxorubicin, Cyclophosphamide, and Paclitaxel (AC-T) chemotherapy protocol.

Conclusions: Inflammatory breast cancer has a wide array of clinical manifestations that may hinder timely diagnosis. Early detection depends on thorough history-taking, physical examination, and histopathological assessment.

Extraintestinal Salmonella Enteritidis Infection of the Breast Simulating Malignancy

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Background: Breast masses in older adults are typically approached with a high index of suspicion for malignancy. While infectious etiologies are recognized, extraintestinal Salmonella involvement of the breast remains exceedingly uncommon. Such presentations can closely mimic breast carcinoma on both clinical examination and radiologic assessment, posing significant diagnostic challenges. We describe a rare case of Salmonella enteritidis infection manifesting as a suspicious breast mass in an elderly patient, initially indistinguishable from malignancy.

Methods: An 85-year-old Chinese female with hypertension, hyperlipidemia, chronic kidney disease, and a history of stage I colon cancer status post right hemicolectomy, presented with a two-week history of right breast pain with a progressively increasing mass. Clinical examination revealed a palpable 4 cm mass without skin changes. Breast ultrasound demonstrated a heterogeneously hypoechoic, vascular lesion categorized as BI-RADS 4, raising concern for malignancy. Ultrasound-guided core needle biopsy showed chronic fibroinflammatory changes without malignancy. Chest wall MRI and CT imaging suggested an inflammatory mass with abscess formation. Purulent discharge draining from the biopsy tract was cultured and laboratory investigations were reviewed.

Result: Culture of the purulent discharge isolated Salmonella enteritidis, susceptible to ceftriaxone and co-trimoxazole. Blood cultures were negative, and no gastrointestinal symptoms or alternative infection source was identified. The patient was treated with intravenous ceftriaxone for 30 days, resulting in marked clinical improvement. Follow-up demonstrated complete resolution of breast pain, erythema, discharge, and palpable mass. Inflammatory markers normalized and repeat ultrasound showed near complete resolution of the lesion, consistent with a benign finding (BI-RADS 2).

Conclusions: Extraintestinal Salmonella enteritidis infection of the breast is a rare but important differential diagnosis for suspicious breast masses. This case highlights the importance of microbiological evaluation and consideration of infectious etiologies to avoid misdiagnosis and unnecessary aggressive surgical intervention. Early recognition and appropriate antibiotic therapy lead to excellent outcomes.

A Rare Case of Borderline Phyllodes Tumor in a Male Patient: A Case Report and Review of Literature

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[1]*Univ. of Santo Tomas Hospital, Department of Surgery, Philippines,* [2]*Univ. of Santo Tomas Hospital, Department of Pathology, Philippines*

Background: Phyllodes tumors are considered a very rare breast neoplasm, accounting for only 0.3% to 0.9% of all breast tumors. These tumors were previously thought to be a neoplasm that occurred exclusively in women and to date, there are very few documented cases of phyllodes tumors in males. This report presents a very rare case of a borderline phyllodes tumor in a young man.

Methods: A 26-year-old Filipino male presented with a progressively enlarging mass in his left breast. He initially noticed gynecomastia with associated hyperesthesia 5 months prior to consult. He later on noticed a mobile retroareolar lump which rapidly increased in size. Patient was non-obese with no comorbidities and no family history of breast cancer. On physical examination, he had a 9×9 cm circumscribed, firm, non-fixed, slightly tender mass in the central portion of his left breast with mild erythema of the skin surrounding the areola. Breast ultrasound revealed a large circumscribed hypoechoic mass with heterogenous echopattern and internal and peripheral vascularity. Ultrasound guided core needle biopsy revealed a fibroepithelial lesion with increased stromal cellularity and stromal atypia. Patient underwent a simple mastectomy.

Result: On gross examination, there was a cream white well-circumscribed, rubbery, lobulated 7×5×6 cm mass abutting the skin and nipple. Microscopic examination disclosed a fairly circumscribed fibroepithelial neoplasm showing moderate stromal cellularity, associated with cleft-like and leaf-like ductal distortion. The stromal cells displayed moderate nuclear atypia with mitotic activity of up to 5-6 MF/10 HPF. There was focal stromal overgrowth but no areas of tumor necrosis. The tumor borders were sharply circumscribed with pushing margins. All inked surgical margins were negative for tumor involvement.

Conclusions: This case highlights the rarity of phyllodes tumors in men and the importance of prompt workup and intervention to enable less invasive surgical management and optimize outcomes.

Secretory Breast Carcinoma Detected on Routine Screening: A Rare Case Managed with Breast Conserving Surgery

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Background: Secretory breast carcinoma (SBC) is a rare, low-grade invasive breast carcinoma, accounting for less than 1% of all breast cancers, and is characterized by indolent behavior, excellent prognosis, and a low incidence of axillary lymph node metastasis. Although outcomes are favorable, sentinel lymph node biopsy (SLNB) remains recommended for accurate axillary staging and to guide adjuvant management. We report a screening-detected case of SBC in an adult patient managed with breast conserving surgery (BCS) and SLNB.

Methods: A 54-year-old Filipino woman was found to have a right breast nodule on routine screening mammography. Core needle biopsy was suspicious for SBC. She subsequently underwent partial mastectomy with histologically negative margins. Final histopathologic evaluation, supported by immunohistochemistry demonstrating strong and diffuse S100 expression, focal epithelial staining for CK5/6 and estrogen receptor, and negative staining for smooth muscle myosin and p63, together with molecular testing confirming an NTRK3 fusion, established the diagnosis of SBC. Completion SLNB was then performed using a dual-tracer technique with indocyanine green fluorescence and methylene blue for lymphatic mapping.

Result: Four sentinel lymph nodes were successfully identified and excised. No intra-operative or immediate post-operative complications occurred. Final histopathology demonstrated no metastatic involvement in all sentinel lymph nodes. The patient had an uncomplicated post-operative course.

Conclusions: Secretory breast carcinoma is a rare breast malignancy that may present incidentally on routine screening in adults. BCS with SLNB is an appropriate and oncologically sound management strategy. Given its rarity and overlapping histologic features with other low-grade breast carcinomas, accurate diagnosis using immunohistochemistry and molecular confirmation is critical to avoid overtreatment. This case contributes to the limited body of literature on adult SBC and highlights the importance of tailored surgical management and judicious axillary staging in rare breast tumors.

Malignant Adenomyoepithelioma of the Breast-Case Report

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Breast & Endocrine Surgery Centre, Department of Surgery, Saudi Arabia

Background: Breast adenomyoepithelioma (AME) a rare entity of breast tumors with proliferation in epithelial or myoepithelial cells. Generally considered as a benign disease with low grade malignant potential. However, malignant transformation involving one or both cellular components can occur in some cases, which characterized by tendency of local recurrence and hematological spread.

Methods: We present a case of challenging diagnosis of malignant AME in previously repeated two negative biopsies.

Result: A 74 year old female presented with right breast lump for 6 months with radiological evidence of right breast suspicious lesion BI-RADS 4C. Core needle biopsy was performed twice and both showed benign AME lesion. Right breast excision biopsy was done due to pathological and radiological discordant and the final histopathology showed malignant AME grade 1. The decision was made for re-excision of the margin and Right breast central lumpectomy, in addition to sentinel lymph node biopsy. In regard to adjuvant treatment, the patient received 40 Gy/15 Fx radiotherapy.

Conclusions: AME is a rare breast tumor and few cases have been reported, as a result the ultimate multidisciplinary management has not been established yet. Moreover, local control of the disease is deemed as a fundamental principle in the management.

Malignant Phyllodes Tumor with Pancreatic Metastasis Mimicking Pancreatic Neuroendocrine Tumor on Imaging: A Rare Case Report

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Background: Malignant phyllodes tumor of the breast is a rare fibroepithelial neoplasm with metastatic potential, most commonly involving the lung and bone. Metastasis to the pancreas is exceedingly rare and may present a diagnostic challenge, particularly when radiologic features mimic pancreatic neuroendocrine tumor (PNET), which requires a different treatment approach.

Methods: We report a rare case of pancreatic metastasis from malignant phyllodes tumor, emphasizing the limited specificity of imaging for hypervascular pancreatic masses and the need for clinicopathologic correlation.

Result: A 61-year-old woman with underlying diabetes mellitus and no family history of breast or abdominal malignancy presented with a large right breast mass measuring 13 cm. She underwent right total mastectomy followed by adjuvant radiotherapy. One year later, surveillance contrast-enhanced CT and MRI revealed a 2-cm arterial-enhancing mass in the pancreatic body and multiple bilateral pulmonary nodules, without evidence of local chest wall recurrence. Based on its hypervascular appearance, the pancreatic lesion was initially suspected to be a pancreatic neuroendocrine tumor. Endoscopic ultrasoundguided biopsy of the pancreatic mass and CT-guided biopsy of the lung lesions both demonstrated spindle cell neoplasm morphologically identical to the primary breast tumor. Immunohistochemical studies were negative for AE1/AE3, CD117, DOG-1, S100, and desmin, supporting a diagnosis of metastatic malignant phyllodes tumor. The patient received palliative doxorubicin and ifosfamide, followed by pazopanib after pulmonary progression. Subsequent treatment with gemcitabine plus docetaxel resulted in stable disease at the most recent follow-up.

Conclusions: This case demonstrates a rare pancreatic metastasis from malignant phyllodes tumor presenting as a hypervascular pancreatic mass mimicking PNET. Awareness of this diagnostic pitfall and clinicoradiologicpathologic correlation are essential for accurate diagnosis and appropriate management.

A Cost Analysis of the Robot-assisted Nipple-Sparing Mastectomy in the Republic of Korea

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Background: Robotic surgical systems enable surgeons to perform more precise surgical movements by reducing hand tremors with highly flexible robotic instruments and better visualization with a high-resolution 3D camera. Robot-assisted nipple-sparing mastectomy (RNSM) increases the quality of life of women who undergo mastectomy with immediate breast reconstruction with a hidden scar and a low rate of nipple necrosis. This study aimed to evaluate the cost of RNSM in South Korea.

Methods: The data of 744 cases with nipple-sparing mastectomy (NSM) from eight institutions in South Korea between 2016 and 2023 were collected. The cost of NSM with immediate breast reconstruction was analyzed comparing between conventional and robotic techniques.

Result: The median age of the patients was 46 years (range 16-74). The total medical cost was 16,492.2 ± 5,941.3k KRW for the conventional nipple-sparing mastectomy(CNSM) group and 28,097.8 ± 7,504.5k KRW for the RNSM group. The reimbursed costs for the CNSM and RNSM groups were 13,523.0 ± 4,804.1k KRW and 16,677.1 ± 5,040.7k KRW, respectively, and the difference was significant ($p < 0.001$).

Conclusions: In South Korea, the use of robotic surgical systems in NSM with immediate breast reconstruction requires an additional 11,500 k KRW of medical cost. More sophisticated analyses adjusted for the postoperative complications and quality of life are necessary to evaluate the cost-effectiveness of the use of robotic surgical systems in breast surgery in the future.

Evaluating the Feasibility of an Electronic Patient-Reported Outcomes Platform Integrating Electronic Health Records and a Mobile Messaging App in Breast Cancer Radiotherapy

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Background: Integrating electronic patient-reported outcomes (ePROs) into electronic health records (EHRs) can enhance care quality, yet systematically collecting longitudinal ePRO data remains challenging in routine breast cancer practice. To address this, we implemented an automated system that distributes ePRO questionnaires via a mobile messaging application and transfers responses directly into the EHR. To evaluate patient response rates to this messaging-based ePRO system and identify factors associated with complete response (CR) among breast cancer patients receiving radiotherapy and follow-up.

Methods: We retrospectively analyzed prospectively collected BREAST-Q ePRO data from patients who received adjuvant radiotherapy between May 2023 and April 2024. At each visit, patients received an automated web link via KakaoTalk to complete the questionnaire prior to the appointment. Response rates were defined as the proportion of questionnaires completed and transferred to the EHR. CR was defined as completion of all required items. Factors associated with CR were examined using univariate and multivariate logistic regression.

Result: A total of 1,488 patients and 2,431 encounters (median, 1 per patient) were analyzed. The median age was 51 years (range, 23-83), and 65.1% were aged 40-59; comorbidities were present in 14.9%. CR rates for the first, second, and third ePRO encounters were 89.9%, 98.3%, and 97.3%, respectively. Among first-time respondents, younger patients (<60 years) demonstrated higher CR rates (90.9% vs. 87.0%, $p=0.03$). The timing of questionnaire dispatch significantly affected CR ($p<0.001$): rates were highest when sent >1 hour before the visit (93.3%) or the afternoon prior (92.7%) and lowest when sent ≥ 2 days before (76.9%) or within 1 hour (81.7%). Age and timing remained independently significant in multivariate analysis ($p<0.01$).

Conclusions: A mobile messaging-based automated ePRO system demonstrated high feasibility and adherence. Age and dispatch timing significantly influenced response rates, offering practical guidance for optimizing ePRO integration into routine oncology workflows.

Extra-mammary Metastasis to the Breast: A Great Mimicker

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Background: Breast metastases are rare, comprising 0.5-6.6% of breast tumours. Common origins include lymphomas, melanomas, ovarian and lung cancers. Patients may present symptomatically, lesions picked-up on screening mammography or incidentally in other cross-sectional imaging.

Methods: We share five patients with varying presentations whose biopsies showed extra-mammary metastases and discuss its associated diagnostic challenges.

Result: Case 1: A 72 year-old lady who underwent breast cancer treatment 15-years ago presented with an axillary lesion presumed to be a skin cyst. Breast imaging incidentally showed an ill-defined 23 mm mass in the right breast (M3, U4). Biopsies revealed metastatic clear-cell renal carcinoma. Case 2: A 61 year-old man presented with a right-retroareolar lump. Imaging showed a 19 mm hypoechoic lesion with prominent axillary nodes (M5, U5, A3). Breast cancer was suspected, but biopsies returned as a poorly-differentiated adenocarcinoma with signet-ring cells of a gastrointestinal tract origin. Case 3: CT incidentally picked up a right breast mass in an 89-years-old male. Imaging showed a highly vascular 36 mm lesion. Biopsies revealed a metastatic adenocarcinoma with neuroendocrine differentiation likely an upper GI primary. Case 4: A 64 years-old lady under treatment for metastatic bladder cancer presented with 2-months history of left breast changes suspicious for inflammatory cancer. Imaging showed skin thickening and oedema of left breast with no focal lesion and multiple axillary adenopathy. Biopsies revealed metastatic lung adenocarcinoma. Histology re-review of her previous bladder tumour biopsy was in-fact a lung primary. Case 5: A 66 years-old lady presented with a left breast lump and had a recent ultrasound pelvis showing a right malignant adnexa mass. Imaging showed a 13 mm complex cystic lesion. Biopsies revealed a high-grade serous carcinoma of ovarian origin.

Conclusions: Extramammary metastasis to the breast can spread via haematogenous or lymphatic routes. Treatment and prognosis varies and is determined by the primary cancer. This highlights the importance of clinical, radiological and histopathological correlation.

Ovarian Tissue Cryopreservation and Successful Reimplantation in a Breast Cancer Patient, a Modern Miracle

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Background: We describe our experience with a two staged laparoscopic fertility preservation technique in a breast cancer patient in our centre, the largest institution for women's health in Singapore.

Methods: Our patient is a lady initially diagnosed with triple negative right breast cancer, T2 N0 M0, at age 36 years old. She was then single and unmarried, and was referred to our centre for a discussion of fertility preservation options. The patient opted for ovarian tissue cryopreservation, and underwent a laparoscopic ovarian wedge resection, prior to breast cancer therapy, and the ovarian tissues were successfully retrieved and cryopreserved.

Result: After completing a right mastectomy and adjuvant chemoradiotherapy, the patient was in remission when she married and returned to our centre at age 42 years old. She underwent a successful laparoscopic reimplantation of the cryopreserved ovarian tissues at age 44. Post operatively, her anti mullerian hormone levels and follicular stimulating hormone levels that were initially in the menopausal range, showed a marked improvement, confirming successful restoration of ovarian function and ovarian reserve. 3 years later, she conceived naturally at age 47 but unfortunately lost the pregnancy in an early miscarriage.

Conclusions: Despite her advanced age, our patient still achieved significant results with ovarian tissue cryopreservation and reimplantation. We are hopeful that every successful case of fertility preservation encourages breast cancer patients and their physicians, to consider pursuing fertility preservation options, even when they are currently unmarried and without immediate plans for fertility.

Regional Mismatch Between Breast Cancer Burden and Treatment Capacity in Korea: Evidence of Uniform Demand but Concentrated Supply

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Background: Breast cancer incidence continues to rise across Korea. However, it is unclear whether the distribution of healthcare resources aligns with the nationwide increase in disease burden. This study aimed to compare regional patterns in breast cancer incidence, screening participation, treatment-related medical expenditures, and healthcare infrastructure to identify potential mismatches between demand and supply.

Methods: Age-standardized incidence rates (ASR) for breast cancer were extracted from KOSIS for two periods (2009-2013 vs. 2014-2018) across 16 provinces. Female breast cancer screening participation rates from 2014-2023 were obtained from national screening statistics. Breast cancer specific medical expenditures (C50) by province were also retrieved. Healthcare infrastructure indicators (the number of tertiary hospitals, total healthcare facilities, and public-sector physicians) were analyzed to assess regional distribution. Regional shares were compared between the capital region (Seoul, Gyeonggi, Incheon) and non-capital regions.

Result: All provinces showed increasing ASR, with ranging from +12.0 to +19.8 per 100,000, demonstrating a uniform nationwide rise. Screening participation also increased consistently, with mean rates rising from 58.4% to 66.6% in the capital region and from 61.6% to 64.9% in non-capital regions. Breast cancer medical expenditures increased nationwide from 573.6 billion KRW (2014) to 1.63 trillion KRW (2023), a 2.85-fold increase. The capital-region expenditure share remained stable (51.6% in 2014 vs. 51.5% in 2023), indicating similar growth patterns across all regions. In contrast, healthcare infrastructure remained disproportionately concentrated in the capital region, which contained over half of Korea's tertiary hospitals and the majority of public-sector physicians, exceeding its share of incidence and population.

Conclusions: Breast cancer burden including incidence, screening participation, and medical expenditures has increased uniformly across Korea. However, healthcare infrastructure has remained heavily concentrated in the capital region, creating a structural mismatch between nationwide demand and uneven regional supply. Strengthening regional surgical and oncologic capacity may help address emerging disparities in access to breast cancer care.

BELLA (Breast Cancer Evidence-based Learning in AI): My SASSY (Standard Aligned AI for Synthesis and Support of Your MDT decisions) MDT Assistant

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Background: Multidisciplinary tumour boards (MDTs) are the gold standard in breast cancer care. They coordinate oncological care by pooling expertise across medical disciplines to make complex treatment decisions based on imaging, pathology, genomics and patient factors. However, the increasing complexity of cases makes consistent guideline application challenging in time-limited MDT discussions. BELLA, an AI chatbot built on Claude 4, is designed to augment breast cancer MDTs by synthesising global clinical guidelines into transparent, standard-aligned adjuvant treatment recommendations with clinicians retaining final decision authority.

Methods: BELLA generated recommendations by utilising long-context prompting using domain-specific instructions for multimodal adjuvant treatments based on global breast cancer treatment guidelines (NCCN, ASCO); and processing inputs from tumour biology datasets and patient data from electronic health records (EHR). Iterative prompt refinement was done through analysis of concordance rates of BELLA-generated MDT recommendations from retrospective data of 145 patients (Mar-Sep 2025). Validation with prospective analysis of concordance rates of 82 patients (Oct-Dec 2025) was done using accuracy and Cohen's kappa (κ).

Result: BELLA achieved 92.6% overall accuracy with $\kappa = 0.87$ for adjuvant treatment recommendations, demonstrating high concordance rates with specialist-endorsed MDT decisions. Domain-specific performance: Chemotherapy 87.3%, $\kappa = 0.80$; Genomic assays 90.4%, $\kappa = 0.79$; Endocrine therapy 89.9%, $\kappa = 0.83$; Anti-HER2 therapy 99.1%, $\kappa = 0.94$; Genetic testing 96.0%, $\kappa = 0.92$; and Radiotherapy 92.6%, $\kappa = 0.84$. On average, BELLA takes 0.3 minutes per case recommendation, shorter than an average MDT case discussion (1.5 minutes).

Conclusions: BELLA demonstrates strong concordance with expert MDT decisions and acts as a structured second set of eyes. By standardising baseline recommendations, this SASSY assistant can reduce cognitive meeting loads, facilitate consensus without dictating decisions and flag out cases that fall outside standard pathways. Future institutional scalability and evolution incorporating new therapeutic developments make BELLA a powerful adjunct as a standard-aligned AI that synthesises global breast cancer guidelines to support, not replace, MDT decision-making.

Benchmarking Cloud and On-premises LLMs for Structuring Narrative Medical Reports across Higher-order Clinical Reasoning Tasks

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Background: Manual abstraction of breast cancer variables from unstructured pathology and radiology reports is a major bottleneck in clinical research. This study benchmarked cloud-based and on-premises large language models (LLMs) for structuring narrative medical reports across clinical reasoning tasks of varying complexity.

Methods: Twelve LLMs (6 cloud, 6 local) were evaluated on six tasks using 713 breast pathology reports (T stage, N stage, lymphovascular invasion [LVI]), 200 liver MRI reports, and 2,396 sliding-window sets of serial brain and chest imaging. Models were prompted with zero-shot templates to produce JSON outputs, supported by a schema-correction module. Performance was compared against a two-expert consensus gold standard and a trained human comparator.

Result: Both best-performing cloud and local models matched or exceeded human performance across most tasks. For breast-specific tasks, cloud models achieved near-ceiling accuracy: 1.000 for LVI, 0.994 for T-stage, and 0.992 for N-stage. The best local models showed comparable performance: 1.000 for LVI, 0.993 for T-stage, and 0.986 for N-stage. Performance declined for temporal reasoning tasks, with best cloud and local accuracies of 0.880 and 0.850 for chest progression, respectively, though still surpassing human accuracy (0.700). Verifier-based self-checking did not consistently improve accuracy.

Conclusions: LLMs can reliably automate the extraction of complex breast cancer variables and longitudinal progression data. While cloud models generally lead in performance, high-performing on-premises models offer a viable, privacy-preserving alternative for institutional deployment, significantly reducing the manual abstraction burden for oncology research.

Male Breast Cancer - Lessons Over 15 Years from a District General Hospital

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Background: Historically, Male breast cancer (MBC) is extremely rare and accounts for < 1% of all breast cancers and male cancer diagnoses. Its management is extrapolated from female patients due to its rarity. It typically presents later in life, with advanced-stage disease, often hormone-receptor positive, higher prevalence of genetic mutations of which two-thirds are BRCA2.

Methods: We review our cases series of male breast cancers from 2010, reflect on the emerging trends and discuss the paradigm shift on its management.

Result: 36 patients with a median age of 74.9 years (35.8–87.7 years) were diagnosed with MBC. 94.4% were symptomatic (31 lump, 3 nipple changes) and remaining picked-up incidentally via a CT-scan. At presentation, 8.33% (n = 3) were metastatic and 2.78% (n = 1) had bilateral disease. 97.3% tumours were ER-positive and 5.4% (n = 2) HER2-positive. 5.56% (n = 2) had primary endocrine treatment owing to fragility. 86.1% (n = 31) underwent surgery: 5 WLE and 27 mastectomy with 17 SLNB, 7 axillary sampling and 8 axillary clearances. 1 patient is currently undergoing NACT. Post-surgery, 12.9% (n = 4) patients had chemotherapy and 45.2% (n = 14) had radiotherapy. Tamoxifen was prescribed for all ER-positive tumours but was switched to an aromatase inhibitor in 20% (3 distant recurrences, 2 PE, 1 TIA, 1 disease progression on medical treatment) and stopped prematurely in 5.71%(n = 2) due to poor tolerance. 5-year overall survival rate is approximately 50% with a median of 6.35 years (95% CI 2.03–10.6 years). No genetic aberration has been identified in patients who had genetic testing.

Conclusions: Interestingly, though we are a small unit with 350 to 400 new breast cancers a year, we diagnosed 8 MBC (5 under age 70) within the last 18-months. MBC is a distinct entity and merits its own treatment pathway. Increased awareness and further collaborative research are required to gain clarity and optimise the management of MBC.

Attitudes of Patients Towards Medical Students in Outpatient Breast Specialist Clinics

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Background: Patient encounters are essential for the development of medical students' clinical reasoning and examination skills. However, the intimate nature of certain clinical assessments, such as breast examinations, may pose a barrier to adequate clinical exposure, particularly for male medical students. This may limit opportunities for meaningful student participation. This study examined the experiences and attitudes of patients attending breast clinics towards the involvement of medical students in their care.

Methods: Patients from the breast specialist outpatient clinic at the Singapore General Hospital and National Cancer Centre Singapore were invited to fill in a survey anonymously. Comfort level towards male/female medical students were ranked on a 5-point Linkert scale (1-very uncomfortable, 3 neutral,5 very comfortable). Patients were analysed in 2 groups, those under the care of a male vs female breast surgeon.

Result: Twenty-eight patients responded to the survey, of which 25% (n = 7) had male breast surgeons. Overall, patients were more comfortable with female medical students. Patients from the male surgeon group were more likely to be gender-neutral towards students (85.71% vs 52.38%) and were more comfortable with male students (average score 3.714 vs 3.35). Patients in the female breast surgeon group felt more strongly towards the gender of the medical student (47.62% vs 28.57%) and were less comfortable having a male student ask them questions on their breast condition (average score 2.714 vs 3.857) and to examine them (average score 2.714 vs 3.714).

Conclusions: While patients acknowledged the importance of medical student participation in learning breast conditions and examinations, they showed a preference for female students. Patients managed by male breast surgeons were more accepting of male medical students. Strategic allocation of male students to clinics led by male surgeons may improve patient acceptance and support clinical education, alongside the use of breast simulators.

Image-Guided Pre-Operative Magnetic Seed Localisation of Breast Lesions: Experience of a Singapore Hospital With the Magnetic Occult Lesion Localization Instrument (MOLLI)

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Background: Breast cancer remains the most common malignancy among women. Up to two-thirds are non-palpable at diagnosis, necessitating precise preoperative localisation to achieve negative margins and reduce locoregional recurrence. Traditional wire-guided localisation has several drawbacks including technical challenges, suboptimal cosmetic outcomes, and higher reoperation rates. Its use in the axilla is limited due to the risk of bleeding and neurovascular injury, as well as logistical constraints requiring same-day coordination between departments. Wire-free alternatives such as the Magnetic Occult Lesion Localisation Instrument (MOLLI), have emerged as promising techniques offering workflow flexibility and enhanced patient comfort. They involve implanting a small ferromagnetic marker within the target lesion, which is subsequently detected intraoperatively using a handheld magnetic probe that provides both quantitative and auditory feedback. MOLLI offers unique advantages, including the absence of radiation handling requirements and the ability to detect precise distances to the marker. This study evaluates the feasibility, accuracy, and clinical applicability of the MOLLI system within the Singapore population as an alternative localisation technique for breast lesions.

Methods: Single-centre audit was conducted at a tertiary institution involving 19 patients who underwent MOLLI localisation between 2023 and 2025. Data collected included lesion type and location, success of seed placement and seed visibility. Descriptive statistics were used to evaluate localisation accuracy and workflow outcomes. Device-related limitations and instances requiring conversion to hook-wire were also documented.

Result: All MOLLI localisations were technically successful with accurate intraoperative detection. Negative surgical margins were achieved in the majority of cases. The technique offered greater scheduling flexibility. One detector malfunction necessitated conversion to hook-wire. The main limitations include the 3.5-cm detection depth, susceptibility to magnetic interference, and cost.

Conclusions: MOLLI magnetic seed localisation is a feasible and effective alternative to wire-guided techniques in the Singapore context. It offers logistical and patient-centred advantages, supporting broader adoption for breast and axillary lesion localisation.

Paraneoplastic Neurological Syndrome and Breast Cancer: A diagnostic Challenge

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Background: Paraneoplastic Neurologic Syndrome (PNS) is a rare autoimmune condition affecting < 1% of breast cancer patients though 9.7% of PNS patients are eventually found to have breast cancer. Immune cross-reactivity between cancer cells and nervous system is believed to be causative.

Methods: We discuss an atypical presentation, management and outcome of PNS in breast cancer to raise awareness on this unusual disease.

Result: A 65 year-old healthy lady presented with a 2-week history of sudden onset of limb weakness, stiffness with paraesthesia. This rapidly evolved leaving her bedbound and dependent on full-time care. Blood tests, CSF analysis and a brain CT scan were unremarkable. A month later, she was referred to the Breast Clinic after discovering a left breast lump. Examination showed a suspicious 2 cm left breast lump with palpable axillary lymphadenopathy. Imaging confirmed a malignant lesion with pathological axillary node. Biopsy revealed G3 IDC, ER+/HER2- with metastatic node. She was started on anastrozole. PET-CT, MRI brain and spine did not show distant metastasis. PNS was suspected and although her anti-neuronal antibody panel was negative, a neurophysiology study confirmed severe peripheral neuropathy. She was started on a course of methylprednisolone and IV immunoglobulins with improvement of her neurological symptoms. Unfortunately, she also developed a lower-limb deep vein thrombosis which required anti-coagulation. She eventually had a left mastectomy with axillary-node clearance. Post-operative recovery was excellent, she tolerated her adjuvant chemotherapy and is awaiting radiotherapy. She did not require further IVIG infusions. In terms of her neurological function, her mobility improved significantly and is able to walk independently though she still has some issues with fine motor movement of her fingers.

Conclusions: Paraneoplastic Neurological Syndrome is challenging to diagnose and manage due to its heterogeneity in presentation, timing with cancer diagnosis and outcomes. It is debilitating thus early recognition, prompt treatment with multidisciplinary collaboration is essential to improve outcomes.

HER2 Gene Amplification was Assessed by Fluorescent in Situ Hybridization (FISH) for the First Time in Mongolia in Breast Cancer Cases with Equivocal HER2 Status

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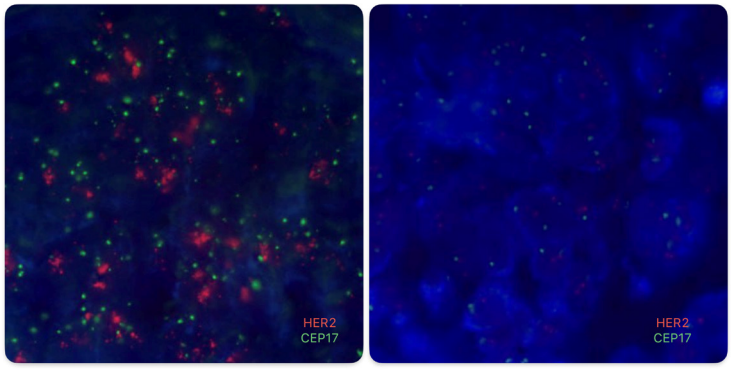
Background: Accurate assessment of human epidermal growth factor receptor 2 (HER2) status is essential for molecular subtyping and treatment decision-making in breast cancer. In cases with equivocal HER2 immunohistochemistry (IHC 2+), confirmation of HER2 gene amplification using in situ hybridization (ISH), particularly fluorescent ISH (FISH), is required. Data on the application of FISH for HER2 equivocal breast cancer in Mongolia remain limited.

Methods: This retrospective study included breast cancer cases diagnosed at the National Cancer Center with HER2 IHC equivocal (2+) results. Formalin-fixed, paraffin-embedded tissue samples of sufficient quality were analyzed using dual-color FISH probes targeting the HER2 gene and chromosome 17 centromere (CEP17). HER2/CEP17 ratios and mean HER2 copy numbers were calculated in at least 20 tumor cells per case, and specimens were classified into Groups 1-5 according to the 2018 ASCO/CAP guidelines to determine HER2 amplification status.

Result: A total of 11 specimens from 10 patients were evaluated. All cases were invasive breast carcinoma, no special type (NST). High histological grade (grade 3) was observed in 63.6% of specimens, ductal carcinoma in situ in 54.5%, and lymphovascular invasion in 72.7%. Estrogen and progesterone receptor expression was high in 90.9% of cases, while one case was triple-negative. FISH analysis classified 72.7% of specimens as Group 5, 18.2% as Group 4, and 9.1% as Group 2. HER2 gene amplification was confirmed in only one specimen (9.1%).

Conclusions: The majority of HER2 IHC 2+ breast cancer cases were molecularly HER2 non-amplified. FISH provides definitive confirmation of HER2 status and is essential to avoid unnecessary HER2-targeted therapy. This study represents the first Mongolian experience using FISH for HER2 equivocal breast cancer and provides a foundation for future large-scale studies and national guideline development.



Poster Presentation

Post-radiation Angiosarcoma of the Breast: A Multi-faceted Disease

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Background: Secondary Breast Angiosarcoma is extremely rare with an incidence of 0.3%. It originates in the endothelial cells lining blood or lymphatic vessels and can be triggered by radiotherapy or chronic lymphedema.

Methods: We highlight three cases of angiosarcoma diagnosed in our unit over the last 2-years to raise awareness on their unique presentation, challenges in diagnosis, management and outcome.

Result: Case 1: A 70 years-old lady with a previous lumpectomy, adjuvant radiotherapy, Herceptin and endocrine for a pT2N0M0 breast cancer 4 years ago presented with a subtle rash on her breast. Mammogram showed post-surgical changes, punch-biopsy revealed chronic inflammation. She returned in 2-months with extensive purplish nodules over her entire breast. Imaging showed marked skin thickening and repeat punch-biopsy confirmed angiosarcoma. PET-CT established no distant metastasis and she had a mastectomy (250 mm angiosarcoma). Unfortunately, there was rapid recurrence with distant metastasis within weeks and she eventually demised 1-year after her diagnosis. Case 2: A 86 years-old lady with a previous lumpectomy, adjuvant radiotherapy and endocrine for a pT2N0M0 breast cancer 10 years ago presented with a lump, nipple and skin changes on her breast. Imaging revealed an asymmetric density and extensive skin oedema. Histology confirmed angiosarcoma. PET-CT established no metastatic disease and she underwent a mastectomy (120 mm angiosarcoma with incidental 22 mm G1 IDC). She remains well on Tamoxifen. Case 3: A 79 years old lady with a previous lumpectomy, adjuvant radiotherapy and endocrine therapy for a multifocal pT1cN0M0 left breast cancer 4 years ago presented with a new subtle vascular rash on her breast. Mammogram showed post-surgical changes. A punch biopsy confirmed angiosarcoma. PET-CT did not show any distant metastasis and she underwent a left mastectomy (histology awaited).

Conclusions: Angiosarcoma is aggressive. It starts off insidiously but progresses rapidly and is challenging to manage. Timely recognition is key for a successful outcome.

Effect of Bariatric Surgery on the Incidence of Breast Cancer in Females with Morbid Obesity

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Background: Patients with morbid obesity, body mass index (BMI) > 40 kg/m^2 have a significantly increased risk of developing breast cancer, especially postmenopausal hormone receptor positive breast cancer. Studies show that obese women are at double the risk of normal weight women. Obesity is a driver of this risk through increased estrogens, insulin, and chronic inflammation. Currently, bariatric surgery is the most effective treatment for obesity. The protective effects of bariatric surgery on the development of breast cancer have not been fully investigated

Methods: This longitudinal observational study of patients with morbid obesity (BMI >40 kg/m^2) was carried out to review breast cancer incidence in patients undergoing bariatric surgery over a 6-year period from 2018 to 2023, with an additional 2 years of follow-up (FU) at a single center with both bariatric and breast surgery departments.

Result: A total of 3152 patients with morbid obesity and underwent bariatric surgery were included in the analysis. Of these, 2492 (79%) were women. The age of female patients ranged from 17y to 65y with mean age 41y. 475 (19%) female patients were post-menopausal. Mean preoperative weight was 108 kg and mean BMI was 44 kg/m^2. At the final FU, mean weight was 83 kg, BMI was 33 kg/m^2, total body weight loss percentage was 30% and excess weight loss percentage was 56%. FU retention rate was 82%. During the FU period only 2 (0.08%) female patients got diagnosed with breast cancer and were referred to cancer breast surgery clinic for further management. Both patients were premenopausal. None of the post-menopausal women developed cancer breast during FU period.

Conclusions: The low reported incidence in this high-risk patient population may be attributable to the protective effect of weight loss resulting from bariatric surgery. More prospective and comparative studies are needed to better understand the impact of bariatric surgery on the development of breast cancer in obese women.

When Child-Rearing Becomes a Barrier to Breast Cancer Treatment: A Case Series Involving Collaboration with Child Welfare Services

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Background: Breast cancer affects approximately one in nine women in Japan and has a peak incidence at a relatively younger age compared with other malignancies. Consequently, a substantial proportion of patients are raising preschool-aged children at the time of diagnosis. In such situations, difficulties related to child-rearing may emerge after diagnosis or during treatment and can become significant barriers to treatment initiation and continuity. Collaboration between healthcare providers and social welfare systems, particularly child welfare services, is therefore essential. However, reports describing such interdisciplinary collaboration remain limited.

Methods: We report three female patients with breast cancer aged between 30 and 50 years who were raising preschool-aged children at the time of diagnosis. Routine interviews at the initial outpatient visit revealed insufficient childcare support, financial constraints, and a lack of alternative caregivers in all cases. Medical social workers intervened early and collaborated with local government agencies and child welfare services to arrange temporary foster care or institutional support and to establish sustainable childcare support systems.

Result: These interventions successfully prevented treatment refusal or interruption and enabled the continuation of standard oncological treatments, including palliative care when indicated. Early multidisciplinary involvement alleviated psychological distress, facilitated patients' acceptance of treatment, and ensured the safety and well-being of the children throughout the treatment period.

Conclusions: For patients with breast cancer who are raising preschool-aged children, early assessment of family and social circumstances and proactive linkage to social welfare resources are crucial to maintaining treatment continuity while safeguarding child well-being. Collaboration between healthcare providers and child welfare services plays a pivotal role in delivering comprehensive care to patients with substantial childcare needs.

Marked Response to Palliative Chemoradiotherapy for Esophageal Metastasis From Breast Cancer: A Case Report

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Background: Esophageal metastasis from breast cancer is uncommon and may cause clinically significant obstruction. We report a case diagnosed after severe dysphagia and demonstrating a marked response to palliative concurrent chemoradiotherapy.

Methods: A 79-year-old woman was diagnosed with left invasive ductal carcinoma (ER-positive, PgR-positive, HER2 1+; cT2N0M0, stage IIA) and underwent mastectomy with sentinel lymph node biopsy and level II axillary dissection. Pathology confirmed invasive ductal carcinoma (25 × 34 × 35 mm) with nodal metastases to the sentinel node (1/1) and axillary nodes (level I, 15/18; level II, 1/1), consistent with pT2N3aM0 (stage IIIC). Postoperatively, she received weekly paclitaxel (12 cycles), followed by letrozole and postmastectomy radiation therapy (60 Gy in 30 fractions). Oral tegafur/uracil was continued for approximately 3 years after completion of postmastectomy radiation therapy. 5 years after the initial breast cancer diagnosis, she developed progressive dysphagia and became unable to tolerate oral intake. Contrast-enhanced CT suggested paraesophageal lymph node metastasis. Upper endoscopy revealed circumferential stenosis at 30 cm from the incisors, while mucosal biopsy was negative. Endoscopic ultrasound-guided fine-needle aspiration confirmed carcinoma consistent with metastasis from breast cancer. For severe dysphagia (dysphagia score 3), percutaneous endoscopic gastrostomy was performed for enteral nutrition, and external-beam radiotherapy (66 Gy in 33 fractions) with concurrent S-1 was administered.

Result: 2 months after completion of chemoradiotherapy, endoscopy demonstrated improvement of stenosis and inflammatory findings. 4 months after completion of chemoradiotherapy, normal oral intake was restored (dysphagia score 0), and the gastrostomy tube was removed.

Conclusions: Palliative concurrent chemoradiotherapy with S-1 achieved rapid symptomatic recovery and endoscopic improvement in esophageal metastasis from breast cancer. These findings suggest that palliative concurrent chemoradiotherapy may be considered for symptomatic esophageal metastasis causing obstruction.

Long Term Oncological Outcomes of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) Following Multidisciplinary Management at a Tertiary Referral Centre

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Background: Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) is an uncommon type of non-Hodgkin lymphoma associated with breast implant capsules. The aim of this study is to evaluate the long-term oncological outcomes of patients undergoing multidisciplinary treatment for BIA-ALCL.

Methods: All patients treated for BIA-ALCL at a tertiary referral centre were identified and clinical data was collected from a prospectively maintained database.

Result: Between 2015-2025, 26 BIA-ALCL patients [median age 48 years (IQR 44-56)] were treated at our institution. 16 cases occurred following cosmetic breast augmentation, and 10 following post-mastectomy breast reconstruction. All patients had previously received textured implants. Median time from first implant surgery to diagnosis was 11 years (IQR 7-16). All patients underwent implant removal with en-bloc total capsulectomy (bilateral in case of bilateral implants). No contralateral BIA-ALCL was diagnosed. 21 patients with stage I (IA-IC) disease required no additional treatment beyond surgical management. Two patients with Stage IIA disease were treated with additional chemotherapy (1 neoadjuvant and 1 adjuvant). Two patients with stage III disease received adjuvant chemotherapy while for one patient, radiotherapy to the axilla was also discussed but not given after balancing the uncertainty of oncological benefit and patient comorbidities. One patient with stage IV disease underwent neoadjuvant chemotherapy followed by surgery showing a complete response and subsequent consolidation therapy with autologous stem cell transplant. Seven patients underwent simultaneous reconstructive surgery with bilateral mastopexy. At a median follow-up of 46 months (IQR 27-71), there were no episodes of local or systemic relapse or death.

Conclusions: Surgical management alone is sufficient for early-stage BIA-ALCL, while systemic therapy should be reserved for patient with more advanced disease. Overall, BIA-ALCL is associated with excellent oncological outcomes.

Against The Odds: A Case of Metachronous Quadruple Primary Cancers in a Single Patient

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Background: The development of multiple primary malignancies in a single patient is uncommon and often raises concern for an underlying genetic cancer predisposition. The incidence of quadruple primary cancer remains exceedingly rare and has been reported at < 0.1% in literature.

Methods: A 70-year-old Filipina with a 1-year history of a right breast mass. Her past medical history revealed diagnoses of Adenoid Cystic Carcinoma of the Cribriform Plate, post wide excision (2015), Sacral Dermatofibrosarcoma, post wide excision (2015), and Round Cell Neoplasm of the left lung, post biopsy (2023). Ultrasound-guided CNB revealed an invasive ductal carcinoma. IHC staining ER-positive, PR-negative, and HER2neu-negative. Metastatic work-up showed no signs of distant metastasis.

Result: The patient underwent Modified Radical Mastectomy, Right, with Thoracoabdominal Fasciocutaneous Advancement Flap under regional anesthesia. Pure peripheral nerve block was done due to the contraindication for general anesthesia. Final histopathology revealed an Invasive Breast Carcinoma with Neuroendocrine Features, grade 3, measuring 6.3 cm in greatest dimension, with focal presence of lymphatic and vascular invasion. All 14 lymph nodes were negative for tumor metastasis. AJCC Stage IIB (pT3pN0M0).

Conclusions: The etiology of these cancers is not fully understood. Theories such as field cancerization, genetics, radiation, chemotherapy, exposure to carcinogens, and family history of cancer have been suggested. Field cancerization is when other organs besides the organ with cancer are exposed to the carcinogen and carry a high risk of cancer. The presence of multiple, histologically-diverse malignancies raises the possibility of an underlying hereditary predisposition. Syndromes like Li-Fraumeni, associated with germline TP53 mutations, are characterized by a broad tumor spectrum including breast cancer and sarcomas. There are no fixed treatment guidelines to be followed. If the aim is curative, radical therapy is indicated. From a clinical standpoint, this underscores the importance of vigilance and comprehensive evaluation in cancer survivors even years after treatment of prior malignancies.

Author Index

Name	Code	Page
Adiputra, Putu Anda Tusta	PO003	266
Adiputra, Putu Anda Tusta	PO023	290
Adiputra, Putu Andatusta	PO190	474
Ahn, Chang Ho	MOP3-01	224
Ahn, Eunyong	MOP2-04	218
Ahn, Ha Rim	PO287	504
Ahn, Harim	PO007	270
Ahn, Hee Kyung	SS1-01	185
Ahn, Hee Kyung	PO204	489
Ahn, Hee-Jung	POD1-01	251
Ahn, Jee Hyun	MOP3-04	228
Ahn, Jee Hyun	POD2-02	254
Ahn, Jee Hyun	POD3-01	255
Ahn, Jee Hyun	PO084	356
Ahn, Jee Hyun	PO144	424
Ahn, Jee Hyun	PO208	493
Ahn, Jee Hyun	PO269	566
Ahn, Sangjeong	SM12-02	56
Ahn, Sung Gwe	SM5-02	30
Ahn, Sung Gwe	GS1-01	141
Ahn, Sung Gwe	GS1-03	143
Ahn, Sung Gwe	MOP3-04	228
Ahn, Sung Gwe	MOP3-09	237
Ahn, Sung Gwe	MOP4-04	242
Ahn, Sung Gwe	POD2-02	254
Ahn, Sung Gwe	PO128	405
Ahn, Sung Gwe	PO211	496
Ahn, Taejin	MOP2-04	218
Aissaoui, Souria	PO014	278
Aitchison, Lucy	MOP4-03	240
Aitchison, Lucy	PO148	429
Akashi-Tanaka, Sadako	PO051	320
Akdere, Murat	PO183	466
Akriti, Nanda	MOP4-03	240
Al, Juliana	PO059	329
Al, Juliana	PO095	370
Alacacoglu, Ahmet	MOP3-07	233
Alaradi, Dalal	MOP4-03	240
Alaradi, Dalal	PO148	429
Alfie, Margarita	MOP3-08	235

Name	Code	Page
Al-Khaifi, Muna	PO249	540
Altangerel, Bold	PO099	374
Altangerel, Bold	PO254	549
Amin, Khalid	PO182	464
An, Dami	PO025	292
An, Hanxiang	CACAJS-03	165
An, Jeongshin	MOP1-06	211
An, Mijin	PO227	514
An, Yeong Yi	PO031	299
An, Yeong Yi	PO089	362
Andinata, Bob	PO049	318
Ando, Takahito	PO075	345
Ang, Wei Wen	PO150	431
Anh, Tuan Pham Huynh	PO137	415
Anwar, Sumadi Lukman	PO004	267
Anwar, Sumadi Lukman	PO050	319
Appachu, Sandhya	PO021	287
Arihiro, Koji	PO051	320
Arima, Kazunari	PO191	475
Aruga, Tomoyuki	JTJS-03	155
Atal, Mansi	PO124	400
Attia, Mohamed	MOP4-03	240
Attia, Mohamed	PO173	453
Attila Szasz, Marcell	PO020	286
Attygale, Ayoma	PO285	582
Avanti, Widya Surya	PO050	319
Avellanosa, Dale	PO061	331
Aydin, Mustafa Caner	PO104	379
B S, Srinath	MOP1-02	205
B S, Srinath	PO021	287
B S, Srinath	PO125	401
B V, Prakash	PO123	399
Bae, Choon Hee	PO243	533
Bae, Soo Youn	PO008	271
Bae, Soong June	GS1-01	141
Bae, Soong June	GS2-05	150
Bae, Soong June	CACAJS-05	168
Bae, Soong June	MOP3-02	226
Bae, Soong June	MOP3-04	228
Bae, Soong June	MOP3-09	237

Name	Code	Page
Bae, Soong June	POD2-02	254
Bae, Soong June	PO128	405
Bae, Soong June	PO211	496
Bae, Soong June	PO287	504
Bae, Sung June	MOP4-04	242
Baek, Jong Yun	PO158	439
Baek, Jongyun	PO270	567
Baek, Seung Ho	GS1-01	141
Baek, Seung Ho	MOP3-09	237
Baek, Soo Yeon	GS2-05	150
Baek, Soo Yeon	CACAJS-01	163
Baek, Wooyeol	PO144	424
Bago-Horvath, Zsuzsanna	PO192	476
Bai, Chia-Yu	PO240	530
Balija, Tara	MOP2-01	213
Banno, Hirona	PO075	345
Bardia, Aditya	MOP3-05	230
Bardia, Aditya	PO183	466
Bardia, Aditya L	MOP3-07	233
Bareham, Monique	PO249	540
Baris-Feldman, Hagit	PO014	278
Barnoy, Sivia	PO014	278
Barnoy, Sivia	PO242	532
Barroso-Sousa, Romualdo	MOP3-05	230
Barry, Peter	MOP4-03	240
Barry, Peter	PO148	429
Barry, Peter	PO173	453
Bartsch, Rupert	PO192	476
Batbaatar, Ganzorig	PO280	577
Batmunkh, Ankhzaya	PO044	313
Batmunkh, Bilguunzaya	PO099	374
Batmunkh, Bilguunzaya	PO166	447
Batmunkh, Bilguunzaya	PO254	549
Batsaikhan, Davaadash	PO099	374
Batsaikhan, Davaadash	PO254	549
Bayar, Bayart-Uils	PO280	577
Bernard, Koh Tiang Guan	PO110	386
Bernardo, Mary Joy	PO100	375
Bernik, Stephanie	MOP2-01	213
Bianchini, Giampaolo	MOP3-05	230
Bidard, Francois-Clement	PO184	468
Block, Margaret	PO178	459
Boniface, Jana de	PL1-01	2
Boniface, Jana de	ES4-01	95
Boniface, Jana de	KIC-04	132
Brandstetter, Anita	PO192	476
Bravo, Leny	PO012	276
Briones, Maria Ellaine	PO061	331
Briones, Maria Ellaine	PO264	561
Brufsky, Adam	MOP3-08	235
Brugnoletti, Fulvia	PO014	278
Buerki, Nicole	PO014	278
Buhari, Shaik Ahmad	MOP4-01	238
Bunawar, Fathar Usman	PO195	479
Bunawar, Fathar Usman	PO225	512
Buzas-Bereczki, Orsolya	PO020	286
Byun, Dahn	MOP3-02	226
Byun, Dahn	POD2-01	253
Byun, Dahn	PO009	272
Byun, Dahn	PO083	355
Byun, Dahn	PO198	482
Byun, Hwa Kyung	ES3-02	93
Byun, Hwa Kyung	PO157	438
Byun, Hwa Kyung	PO257	552
Byun, Hwa Kyung	PO275	572
Byun, Jae Ho	PO253	547
C, Srinivas	PO123	399
C, Vivian	PO059	329
Cabioglu, Neslihan	PO104	379
Cahyono, Roby	PO004	267
Cai, Haifeng	PO066	336
Cai, Yangjun	PO247	538
Calicaran, Aileen	PO263	560
Carpio, Benedicto	PO263	560
Castaneda, Carlos	PO012	276
Cescon, David	MS1-01	107
Cescon, David	MS5-01	120
Cha, Chihwan	PO090	363
Cha, Chihwan David	PS1-03	136
Cha, Chihwan David	PO005	268

Name	Code	Page
Cha, Chihwan David	PO006	269
Cha, Chihwan David	PO287	504
Cha, Chihwan-David	MOP4-08	247
Cha, Won Chul	PO270	567
Cha, Yoon Jin	PO211	496
Chae, Byung Joo	GS1-03	143
Chae, Byung Joo	MOP3-02	226
Chae, Byung Joo	MOP3-03	227
Chae, Byung Joo	POD2-01	253
Chae, Byung Joo	PO009	272
Chae, Byung Joo	PO025	292
Chae, Byung Joo	PO083	355
Chae, Byung Joo	PO129	406
Chae, Byung Joo	PO198	482
Chae, Byung Joo	PO231	518
Chae, Byung Joo	PO232	519
Chae, Byung-Joo	GS1-05	144
Chae, Heejung	MOP3-01	224
Chae, Heejung	PO227	514
Chae, Seoung Wan	MOP1-03	207
Chae, Sumin	PO287	504
Chaiprasithkul, Supicha	PO216	502
Chan, Adrian	PO249	540
Chan, Arlene	PO182	464
Chan, Brian	PO154	435
Chan, Hsiu-Hsuan	PO245	536
Chan, Kuen	PO186	470
Chan, Man Yi	PO222	509
Chan, Raymond	PO249	540
Chan, Victoria Elena	PO064	334
Chandra, Amos Immanuel	PO190	474
Chandrachamnong, Korawan	PO118	394
Chang, Dun-Hao	PO114	390
Chang, Jee Suk	MS3-03	114
Chang, Jee Suk	MOP4-06	244
Chang, Jee Suk	PO157	438
Chang, Jee Suk	PO257	552
Chang, Myung Chul	PO177	458
Chang, Won Ick	POD3-02	257
Chang, Yong June	PO143	422
Chang, Yoosoo	PO025	292
Chang, Young Woo	PO079	349
Chang, Young Woo	PO090	363
Chang, Youngwoo	PO078	348
Chang, Yun-Woo	SM3-01	19
Chao, Ta-Chung	PO037	305
Chappuis, Pierre O.	PO014	278
Charonpongsunton, Chanchai	PO216	502
Chattar, Yogesh	PO183	466
Chawla, Saloni	PO162	443
Chen, Chiu-Ying	PO108	384
Chen, Fang Ming	PO214	499
Chen, Hongwei	PO164	445
Chen, Hung Hsun	PO214	499
Chen, I-Chun	PO180	462
Chen, Jen Jee	PO047	316
Chen, Jia-Hong	PO168	449
Chen, Ji-Lin	PO036	304
Chen, Kuan-Tso	PO239	528
Chen, Li-Chia	PO240	530
Chen, Li-Ching	PO215	501
Chen, Olivette	PO235	523
Chen, Po-Huang	PO168	449
Chen, Po-Huang	PO241	531
Chen, Rachel Yanlin	PO150	431
Chen, Samantha	PO148	429
Chen, Shin-Cheh	PO135	412
Chen, Yang-Chuan	PO168	449
Chen, Yen-Jen	MOP4-09	249
Chen, Ying-Rong	PO174	454
Chen, Yu-Guang	PO240	530
Chen, Zhao Feng	PO277	574
Cheng, Chihtao	PO238	526
Cheng, Jean Ngan Sum	PO154	435
Cheng, Min-Chi	PO168	449
Cheng, Novena Lin Sing	PO069	339
Cheon, Wonjoong	PO160	441
Cheun, Jong-Ho	GS2-05	150
Cheun, Jong-Ho	MOP2-04	218
Cheun, Jong-Ho	MOP3-04	228

Name	Code	Page
Cheun, Jong-Ho	POD2-02	254
Cheun, Jong-Ho	PO128	405
Cheung, Alyson	PO068	338
Cheung, Billy	PO040	309
Cheung, Ho Hung Billy	PO221	508
Cheung, Ho-Hung	PO018	284
Chhabra, Jasleen Kaur	PO216	502
Chi, Lin Zar	PO109	385
Chi, Lin Zar	PO110	386
Chia, Clement	PO151	432
Chia, Stephen	PO183	466
Chin, Wing Yuen	PO098	373
Ching, Tan Ying	PO264	561
Cho, Eun Yoon	ES2-03	91
Cho, Hunhwi	PO080	350
Cho, Hyejin	NS1-03	178
Cho, Hyeonggeun	MOP4-07	246
Cho, Hyun Geun	PO143	422
Cho, Juhee	PO229	516
Cho, Junghoon	PO043	312
Cho, Junho	PO043	312
Cho, Won Kyung	ES4-03	97
Cho, Won Kyung	GS1-03	143
Cho, Won Kyung	PO129	406
Cho, Won Kyung	PO156	437
Cho, Won Kyung	PO158	439
Cho, Won Kyung	PO231	518
Cho, Won Kyung	PO232	519
Cho, Won Kyung	PO251	544
Cho, Won Kyung	PO270	567
Cho, Yeona	PO257	552
Choi, Byung-Ock	PO160	441
Choi, Byungseo	PO259	556
Choi, Dayeong	PO030	298
Choi, Eunjoo	PO229	516
Choi, Hee Jun	ERS-03	105
Choi, Hee Jun	PO085	357
Choi, Hee Jun	PO090	363
Choi, Hee Jun	PO287	504
Choi, Hee Jun	PO269	566
Choi, Hoon	PO233	520
Choi, Hoon	PO253	547
Choi, Hyang Suk	PO202	487
Choi, Hyeon Dong	PO041	310
Choi, Hyerin	PO025	292
Choi, Hyun Joo	PO031	299
Choi, Hyun Joo	PO089	362
Choi, Jae Young	PO258	554
Choi, Ji Soo	GS1-03	143
Choi, Ji Soo	PO054	324
Choi, Jihye	PO228	515
Choi, Jin Hwa	PO161	442
Choi, Jinhyuk	PO252	545
Choi, Jinsung	PO229	516
Choi, Jiwoo	MOP2-08	223
Choi, Jung Eun	PD2-02	64
Choi, Jung Eun	PO090	363
Choi, Jung Eun	PO199	484
Choi, Kang Young	POD4-02	260
Choi, Kang Young	PO087	359
Choi, Kang Young	PO143	422
Choi, Minkyoung	PO030	298
Choi, Minkyoung	PO188	472
Choi, Seung Hye	PO210	495
Choi, Sowon	MOP1-01	204
Choi, Stephanie	PO212	497
Choi, Su Yun	GS2-05	150
Choi, Wonseok	GS2-01	145
Choi, Yelin	MOP2-08	223
Choi, Yoon-Jung	PO227	514
Choi, Young Jin	GS2-05	150
Choi, Young Jin	PO088	361
Choi, Yunseon	PO159	440
Chong, Bee Kiang	PO045	314
Choridah, Lina	PO050	319
Chotai, Niketa	PO045	314
Chou, Hsu-Huan	PO135	412
Choudhary, Neha	PO139	417
Chow, Edward	PO249	540
Chu, Chia-Hui	PO135	412

Name	Code	Page
Chu, Pei-Yi	PO036	304
Chua, Hui Wen	PO105	381
Chua, Joyce Hazel	PO062	332
Chua, Joyce Hazel	PO103	378
Chua, Joyce Hazel	PO213	498
Chua, Joyce Hazel	PO286	583
Chua, Vannesza Hendricke	PO103	378
Chua, Vannesza Hendricke	PO213	498
Chuang, Xue En	PO151	432
Chun, Jihyun	PO196	480
Chun, Jihyun	PO203	488
Chun, Seok-Joo	POD3-02	257
Chung, Chi-Feng	PO182	464
Chung, Ho Yun	PO087	359
Chung, Ho Yun	PO143	422
Chung, Il-Yong	GS1-01	141
Chung, Il-Yong	MOP3-09	237
Chung, Il-Yong	PO082	354
Chung, Jae-Ho	SM4-01	24
Chung, Jai Hyun	PO081	352
Chung, Joo-Hyun	POD4-01	259
Chung, Min Sung	PO005	268
Chung, Wai-Shan	PO135	412
Chung, Woosung	PO020	286
Co, Jayson	PO103	378
Co, Jayson	PO213	498
Co, Mariniell	PO062	332
Co, Michael	PO040	309
Co, Michael	PO221	508
Cocos-Alcantara, Angeli Andrea	PO102	377
Cong, Binbin	PO120	396
Cong, Binbin	PO153	434
Cornes, Paul	PS1-02	135
Cortes, Javier	MOP3-05	230
Cristi-Limson, Margaret Joyce	PO234	522
Crnjevic, Tanja Badovinac	MOP3-07	233
Csanyi, Bernadett	PO020	286
Cung, Anh Tuyet Thi	PO163	444
Cung, Thi Tuyet Anh	PO217	503
Curigliano, Giuseppe	PL3-01	5
Curigliano, Giuseppe	PD4-01	69
Curigliano, Giuseppe	SS3-01	189
Dagan, Efrat	PO014	278
Dahanayake, Tilanka Kalanapriya	MOP1-05	210
Dai, Ming-Shen	PO168	449
Dai, Ming-Shen	PO240	530
Dai, Ming-Shen	PO241	531
Dai, Zhijun	PO247	538
Dank, Magdolna	PO020	286
Daphale, Pallavi	PO124	400
Darbonne, Walter C	MOP3-08	235
Das, Nilanjan	PO139	417
Dashjamts, Tuvshinjargal	PO044	313
Datta, Arunima	PO139	417
Day, Bann-Mo	MOP3-08	235
Devi, Desak Gede Agung Pramesti	PO193	477
Dharma, Ngurah Arie Kapindra	PO165	446
Di, Hai	PO059	329
Di, Hai	PO095	370
Digan, Thomas	PO016	282
Dinc, Funda	PO033	301
Dineshwary, Periasammy	PO096	371
Ding, Jinhua	MOP2-06	221
Ding, Jinhua	PO247	538
Do, In Gu	MOP1-03	207
Dong, Minjun	PO247	538
Doon, Yoke Kiet	PO097	372
Doon, Yoke Kiet	PO098	373
Down, Sue	PO152	433
Down, Sue	PO260	557
Down, Sue	PO271	568
Down, Sue	PO276	573
Down, Sue	PO281	578
Downey, Kate	PO173	453
Downey, Sarah	PO152	433
Downey, Sarah	PO260	557
Downey, Sarah	PO271	568
Downey, Sarah	PO276	573
Downey, Sarah	PO279	576
Downey, Sarah	PO281	578

Name	Code	Page
Du, Fanny Le	PO183	466
Du, Xin	MOP3-06	232
Duadze, Ilona	PO147	428
Dubsky, Peter C.	SM5-03	32
Duc, Thang Do	PO185	469
Dugarsuren, Mergen	PO146	427
Ebata, Akiko	MOP4-08	247
Egle, Daniel	PO192	476
Ekassiana, Pande Made Krisna	PO023	290
Elbahrawy, Aly	PO282	579
Elder, Kenneth	PO039	308
El-Sharkawi, Dima	PO285	582
Emi, Akiko	PO051	320
Emiroglu, Selman	PO104	379
Endo, Itaru	GS1-02	142
Endo, Itaru	PO024	291
Endo, Itaru	PO155	436
Endo, Kayoko	PO126	402
Enkhbat, Gerelmaa	PO099	374
Enkhbat, Gerelmaa	PO254	549
Enkhbat, Orgilbold	PO099	374
Enkhbat, Orgilbold	PO254	549
Enyedi, Marton	PO020	286
Eom, Hye Joung	PO142	421
Eom, Yong Hwa	PO210	495
Eom, Youngin	PO178	459
Eom, Youngin	PO184	468
Erdenetuya, Erdenetogtokh	PO099	374
Erdenetuya, Erdenetogtokh	PO254	549
Esserman, Laura	PL4-01	6
Esserman, Laura	SM5-01	28
Exarchos, Georgios	PO148	429
Farah, Benjamin Livingston	PO063	333
Faruk, Muhammad	PO073	343
Fasching, Peter A.	MOP3-05	230
Fasching, Peter A.	PO178	459
Fasching, Peter A.	PO183	466
Favret, Anne	MOP3-08	235
Feldman, Merilin	MOP3-08	235
Fernandez, Maria Munoz	PO178	459
Ferreyra, Yomali	PO012	276
Ferreyra, Yomali	PO179	461
Filipits, Martin	PO192	476
Fok, Elaine Wing Shan	PO069	339
Fong, Hui Chai	PO107	383
Forster-Anderson, Theadora	PO048	317
Franco, Sandra Ximena	MOP3-05	230
Frenel, Jean Sebastien	GS2-03	148
Fuentes, Hugo	PO012	276
Fujii, Kimihito	PO075	345
Fujii, Takahiro	PO284	581
Fujisawa, Tomomi	ES1-02	84
Fujisawa, Tomomi	MOP4-08	247
Fukui, Kayo	PO051	320
Fukui, Yukiko	PO052	322
Fukuoka, Junya	SM12-01	55
Fushimi, Atsushi	PO250	542
Gagliardi, Tanja	PO119	395
Gampenrieder, Simon P.	PO192	476
Gao, Li-Ting	PO241	531
Gao, Melissa	GS2-03	148
Gao, Melissa	PO182	464
Garg, Garvit	PO071	341
Gashi, Vesa	MOP4-03	240
Gau, Ruoh Yun	PO135	412
Gerelmaa, Enkhbat	PO032	300
Geyer, Jr, Charles E.	MOP3-07	233
Ghosh, Mithun	POD1-01	251
Gnant, Michael	PO192	476
Goda, Kyoko	PO169	450
Godden, Amy	PO173	453
Goh, Charissa	PO272	569
Goh, Rui Ying	PO111	387
Goh, Serene	PO235	523
Goh, Serene Si Ning	MS2-02	110
Goh, Serene Si Ning	MOP4-03	240
Goh, Serene Si Ning	PO131	408
Goh, Serene Si Ning	PO148	429
Goh, Serene Si Ning	PO173	453
Goh, Serene Si Ning	PO236	524

Name	Code	Page
Goh, Siak Ming	PO272	569
Goh, Victoria Sze Hui	PO150	431
Goksu, Sema Sezgin	PO178	459
Gomez, Henry	PO012	276
Gomez, Henry	PO179	461
Gomi, Naoya	PO284	581
Gomi, Tatsuya	PO284	581
Gonzalez, Valeria	GS2-03	148
Goto, Manami	PO075	345
Gradishar, William J	MOP3-08	235
Graffeo-Galbiati, Rosella	PO014	278
Grimes, Brenda R	PO178	459
Gruber, Viktoria	PO192	476
Gu, Xidong	MOP2-06	221
Gu, Xidong	PO247	538
Gui, Gerald	MOP4-03	240
Gunawan, I Putu Ari	PO003	266
Guo, Jingyi	PO164	445
Guzman, Amelita Tanglao-De	PO263	560
Guzman, Bryce Matthew Tan De	PO103	378
Guzman, Bryce Matthew Tan De	PO213	498
Gwak, Hongki	PO055	325
Ha, Booyoung	PO246	537
Hafiz, Muhammad Zaki Abdul	PO022	289
Hafiz, Muhammad Zaki Abdul	PO195	479
Hafiz, Muhammad Zaki Abdul	PO224	511
Hafiz, Muhammad Zaki Abdul	PO225	512
Hajdu, Tibor	PO279	576
Half, Elizabeth	PO014	278
Halligan, Doug	GS2-03	148
Hamal, Iva	PO162	443
Hamzah, Julie Liana	PO107	383
Hamzah, Julie Liana Bte	PO171	452
Han, Airi	SM1-03	13
Han, Airi	PO202	487
Han, Boo Kyung	PO054	324
Han, Fulei	PO001	263
Han, Jaihong	PO227	514
Han, Sang-Ah	SSOJS-03	161
Han, Sangwon	MS1-01	107
Han, Wonshik	GS1-03	143
Han, Wonshik	MOP2-04	218
Han, Wonshik	MOP4-07	246
Han, Wonshik	POD1-01	251
Han, Wonshik	PO026	294
Han, Wonshik	PO028	296
Han, Wonshik	PO029	297
Han, Wonshik	PO030	298
Han, Wonshik	PO128	405
Han, Wonshik	PO130	407
Han, Wonshik	PO188	472
Han, Wonshik	PO197	481
Han, Yireh	PO200	485
Han, Yireh	PO201	486
Hanamura, Toru	MOP4-08	247
Hanash, Samir M.	MS5-03	122
Hara, Fumikata	MOP4-08	247
Haracska, Lajos	PO020	286
Harada, Kazuharu	PO155	436
Harada-Shoji, Narumi	SM3-02	21
Harahap, Wirsma Arif	PO022	289
Harbeck, Nadia	PD3-03	68
Harbeck, Nadia	MS3-02	113
Harbeck, Nadia	SS5-01	193
Harbeck, Nadia	MOP3-07	233
Harbeck, Nadia	PO178	459
Hartley, Frederick	PO148	429
Hartman, Mikael	PS1-01	134
Hartman, Mikael	MOP4-01	238
Harun, Nusrat	GS2-03	148
Harun, Nusrat	PO182	464
Hasegawa, Makoto	PO284	581
Hasei, Joe	PO250	542
Hatachi, Toshiko	PO283	580
Hatta, Nurfareha Mohd	PO060	330
Hattori, Masami	PO187	471
Hayashi, Akitatsu	SM4-02	26
Hayashida, Tetsu	PO053	323
He, Kaishen	MOP2-03	217
Heinimann, Karl	PO014	278

Name	Code	Page
Heo, Kyung Jun	PO144	424
Herold, Magdolna	PO020	286
Herold, Zoltan	PO020	286
Herqutanto, Herqutanto	PO049	318
Hesley, Gina	MOP2-02	215
Hidayat, Farah Mardhiyah	PO224	511
Himakhun, Wanwisa	PO015	280
Hing, Jun Xian Jeffrey	PO132	409
Hino, Naoki	PO261	558
Hirata, Kimiko	PO155	436
Hirata, Miki	PO262	559
Hiroko, Tsukada	PO051	320
Hizume, Mayu	GS1-02	142
Hizume, Mayu	PO024	291
Hlauschek, Dominik	PO192	476
Ho, David Joon	SM12-03	57
Ho, Tze Gek	PO046	315
Ho, Yuan Soon	PO215	501
Hoag, Beth	PO249	540
Hoai, Nam Ho	PO137	415
Hoai, Nam Vo	PO185	469
Hofer, Colleen	PO061	331
Hogea, Cosmina	PO250	542
Hojo, Takashi	MOP4-08	247
Hong, An Tran Cao	PO137	415
Hong, Ji Eun	MOP1-06	211
Hong, Ji Hyun	POD3-02	257
Hong, Sa Deok	POD1-01	251
Hong, Soo Jj	PO209	494
Hong, Soo Jung	PO142	421
Hong, Sungryong	PO058	328
Horimoto, Yoshiya	PO155	436
Hsi, Chieh-Ning	PO035	303
Hsu, Chih-Ho	PO114	390
Hsu, Chih-Yi	MOP4-09	249
Hu, Jiajia	PO164	445
Hua, Ruimin	MOP3-06	232
Huang, Chi-Cheng	JTJS-02	154
Huang, Chi-Cheng	MOP4-09	249
Huang, Chi-Cheng	PO035	303
Huang, Chi-Cheng	PO037	305
Huang, Chih-Hao	PO174	454
Huang, Chiun-Sheng	PO182	464
Huang, Chun-Teng	PO036	304
Huang, Li-Ju	PO038	307
Huang, Min-Chuan	PO034	302
Huang, Shih-Yu	PO181	463
Huang, Tzu-Chuan	PO168	449
Huang, Weimin	MOP2-03	217
Huang, Yang Yang	PO016	282
Hui, Joyce Yee Hing	PO069	339
Hui, Shane Sim Wen	PO064	334
Hung, Chao-Ming	PO239	528
Hung, Chih-Chiang	PO175	456
Hung, Chih-Chiang	PO245	536
Hung, Ming-Chia	PO175	456
Hurk, Corina Van Den	PO249	540
Hurvitz, Sara A.	MOP3-07	233
Hwang, Bing-Fang	PO108	384
Hwang, Eunkyung	NS2-02	180
Hwang, Ji Hye	GS2-02	146
Hwang, Ki-Tae	POD1-01	251
Hwang, Seongbae	PO259	556
Hwang, Sohyun	POD1-01	251
Hwang, Woochan	MOP3-01	224
Iau, Philip	MOP4-01	238
Ido, Mirai	PO075	345
Im, Seock-Ah	MS6-03	126
Im, Seock-Ah	GS2-03	148
Im, Seock-Ah	GS2-05	150
Im, Seock-Ah	MOP3-01	224
Im, Seock-Ah	PO182	464
Inaki, Noriyuki	PO262	559
Ishiguro, Atsushi	PO250	542
Ishii, Kei	PO052	322
Ishikawa, Takashi	PD3-01	66
Ishikawa, Takashi	GS1-02	142
Ishikawa, Takashi	PO024	291
Ishikawa, Takashi	PO155	436
Itonaga, Tomohiro	PO155	436

Name	Code	Page
Ivros, Nikolaos	PO138	416
Iwamoto, Naoko	PO051	320
Iwamoto, Takayuki	PO250	542
Iwata, Hiroji	PD3-02	67
Iwata, Hiroji	MOP4-08	247
Izarzugaza, Yann	PO183	466
Jain, Rajesh	PO072	342
Jain, Rajesh	PO248	539
Jang, Jaeyeon	PO202	487
Jang, Mi Young	PO081	352
Jang, Won Il	POD3-02	257
Jang, Woosung	PO087	359
Jang, Yoonyoung	PO025	292
Jee, Juliana Jee Binti Jeffri	PO016	282
Jefford, Michael	PO249	540
Jeon, Byonghee	NS1-01	176
Jeon, Hyeeun	PO026	294
Jeon, Hyeeun	PO030	298
Jeon, Soyoung	PO008	271
Jeong, Byung-Kwan	MOP1-01	204
Jeong, Hyeong Eun	PO007	270
Jeong, Jiwon	MOP2-05	220
Jeong, Joon	GS1-01	141
Jeong, Joon	MOP3-09	237
Jeong, Joon	MOP4-04	242
Jeong, Joon	POD3-01	255
Jeong, Joon	PO014	278
Jeong, Joon	PO128	405
Jeong, Joon	PO211	496
Jeong, Yoohee	PO178	459
Jeong, Yoohee	PO184	468
Jeong, Young Ju	PO287	504
Jhaveri, Komal	PO184	468
Jhaveri, Komal L	MOP3-08	235
Jhung, Il Yong	PO142	421
Jin, Xiaoyan	PO247	538
Jo, Gae Hoon	POD1-01	251
Johnson, Jeffrey	MOP2-02	215
Johnston, Stephen Rd	PO178	459
Jones, Jennifer	PO249	540

Name	Code	Page
Jongthira-Amnuay, Patcharaphol	PO216	502
Joshi, Shalaka	PO124	400
Jung, Chan Kwon	PO196	480
Jung, Chan Kwon	PO203	488
Jung, Ho Yun	POD4-02	260
Jung, Ji-Jung	GS1-03	143
Jung, Kyung Hae	MOP3-07	233
Jung, Kyung Hae	PO182	464
Jung, Sehee	PO030	298
Jung, So-Youn	PO014	278
Jung, So-Youn	PO227	514
Jung, Sung Ui	PO252	545
Jung, Tae-Du	POD4-02	260
Jung, Youn Joo	GS2-02	146
Jung, Younjoo	PO206	491
K S, Bharat	PO125	401
Kajiyama, Akiko	PO284	581
Kalinsky, Kevin	PO184	468
Kalles, Vasileios	PO067	337
Kalles, Vasileios	PO138	416
Kalmath, Sunil	PO125	401
Kamei, Yoshiaki	PO051	320
Kanamori, Fumika	PO126	402
Kang, Bong Joo	PO054	324
Kang, Byeongju	PO006	269
Kang, Byeongju	PO057	327
Kang, Byeongju	PO077	347
Kang, Byeongju	PO087	359
Kang, Danbee	PO025	292
Kang, Eunhye	MOP3-04	228
Kang, Eunhye	MOP4-07	246
Kang, Eunhye	POD2-02	254
Kang, Eunhye	PO130	407
Kang, Eunhye	PO197	481
Kang, Eunyoung	MOP2-05	220
Kang, Hyelim	PO177	458
Kang, Hyunjung	PO031	299
Kang, Hyunjung	PO089	362
Kang, Minseo	PO043	312
Kang, Minwoong	GS2-01	145

Name	Code	Page
Kang, Miran	PO058	328
Kang, Myeong Jae	PO087	359
Kang, Sang Yull	SSOJS-02	160
Kang, Sang Yull	PO007	270
Kang, Su Hwan	GS2-05	150
Kang, Su Hwan	PO199	484
Kang, Sun Hee	GS1-05	144
Kang, Sun Hee	GS2-05	150
Kang, Sun Hee	PO287	504
Kang, Taewoo	POD1-01	251
Kang, Young Nam	PO160	441
Kang, Young-Joon	GS1-05	144
Kang, Young-Joon	PO006	269
Kang, Young-Joon	PO011	275
Kang, Young-Joon	PO090	363
Kang, Young-Joon	PO091	365
Kang, Young-Joon	PO287	504
Kang, Young-Joon	PO233	520
Kang, Young-Joon	PO253	547
Kang, Young-Joon	PO269	566
Kanojia, Anjali	MOP4-02	239
Kanou, Akiko	PO051	320
Kanyadhara, Lohita Krishna	MOP1-02	205
Kanyadhara, Lohita Krishna	PO021	287
Kanyadhara, Lohita Krishna	PO125	401
Kao, Chieh-Ni	PO113	389
Kao, Wen-Bin	PO108	384
Kashiwagi, Shinichiro	PO051	320
Kassmeyer, Blake	MOP2-02	215
Kataoka, Koshi	PO155	436
Katapodi, Maria	PO243	533
Katapodi, Maria C.	PO014	278
Kato, Makoto	PO226	513
Kawaguchi, Kosuke	MOP4-08	247
Kawahara, Kohichi	PO191	475
Kawamura, Mariko	PO155	436
Kawanishi, Kana	PO052	322
Kawashima, Hiroko	PO262	559
Kawashima, Masahiro	PO052	322
Kawata, Aya	PO284	581

Name	Code	Page
Kenessey, Istvan	PO020	286
Khambri, Daan	PO022	289
Khan, Aadil	PO285	582
Khan, Sarah	MOP3-08	235
Khan, Sawsan	PO267	564
Khanh, Ha Nguyen	PO185	469
Khoo, Kah Seng	PO097	372
Khoo, Kah Seng	PO098	373
Kida, Kumiko	MOP4-08	247
Kida, Kumiko	PO155	436
Kijtavee, Voratape	PO118	394
Kikawa, Yuichiro	MOP4-08	247
Kikawa, Yuichiro	PO126	402
Kikawa, Yuichiro	PO249	540
Kikawa, Yuichiro	PO250	542
Kim, Ah Yoon	MOP4-04	242
Kim, Dabin	PO011	275
Kim, Deok-Woo	SM4-03	27
Kim, Dongwon	MOP2-05	220
Kim, Dooreh	GS1-05	144
Kim, Dooreh	PO008	271
Kim, Dooreh	PO128	405
Kim, Dooreh	PO196	480
Kim, Dooreh	PO203	488
Kim, Ee Jin	GS1-01	141
Kim, Ee Jin	MOP3-09	237
Kim, Eui Tae	PO177	458
Kim, Eun Young	GS2-05	150
Kim, Eun Young	JTJS-04	157
Kim, Eun Young	MOP1-03	207
Kim, Eun Young	MOP3-02	226
Kim, Eun Young	PO006	269
Kim, Eun Young	PO128	405
Kim, Eun-Kyu	POD1-01	251
Kim, Eun-Kyu	PO010	274
Kim, Eun-Kyu	PO027	295
Kim, Gayoun	PO269	566
Kim, Gun Min	POD3-01	255
Kim, Haeyoung	GS1-03	143
Kim, Haeyoung	GS2-02	146

Name	Code	Page
Kim, Haeyoung	CACAJS-04	166
Kim, Haeyoung	PO129	406
Kim, Haeyoung	PO156	437
Kim, Haeyoung	PO158	439
Kim, Haeyoung	PO161	442
Kim, Haeyoung	PO287	504
Kim, Haeyoung	PO231	518
Kim, Haeyoung	PO232	519
Kim, Haeyoung	PO251	544
Kim, Haeyoung	PO270	567
Kim, Hee Jeong	GS1-01	141
Kim, Hee Jeong	GS1-03	143
Kim, Hee Jeong	GS2-05	150
Kim, Hee Jeong	JTJS-01	153
Kim, Hee Jeong	MOP3-04	228
Kim, Hee Jeong	MOP3-09	237
Kim, Hee Jeong	PO082	354
Kim, Hee Jeong	PO142	421
Kim, Hee Jeong	PO170	451
Kim, Hee Yeon	POD1-02	252
Kim, Hong Kyu	PO006	269
Kim, Hong-Kyu	MOP2-04	218
Kim, Hong-Kyu	MOP4-07	246
Kim, Hong-Kyu	PO130	407
Kim, Hong-Kyu	PO197	481
Kim, Hong-Kyu	PO287	504
Kim, Hun Jung	PO159	440
Kim, Hwang-Phill	PO251	544
Kim, Hye Jung	PO057	327
Kim, Hyejung	PO054	324
Kim, Hyobin	PO233	520
Kim, Hyobin	PO253	547
Kim, Hyun Je	MOP1-01	204
Kim, Hyun Yul	GS2-02	146
Kim, Hyun Yul	PO230	517
Kim, Hyun-Ah	GS2-05	150
Kim, Hyun-Ah	PO200	485
Kim, Hyun-Ah	PO201	486
Kim, Hyung Suk	PO273	570
Kim, Isaac	POD1-01	251

Name	Code	Page
Kim, Jae Il	GS1-05	144
Kim, Jae Il	PO287	504
Kim, Jaeil	PO057	327
Kim, Jee Hung	SS6-01	195
Kim, Jee Hung	POD3-01	255
Kim, Jee Hung	PO211	496
Kim, Jee Hyun	MOP3-01	224
Kim, Jee Hyun	PO182	464
Kim, Jee Ye	MOP4-06	244
Kim, Jee Ye	POD3-01	255
Kim, Jee Ye	PO269	566
Kim, Ji Hoon	PO253	547
Kim, Ji Hye	PO081	352
Kim, Ji Hyun	PO014	278
Kim, Ji Sun	PO227	514
Kim, Ji Ye	PO257	552
Kim, Ji Yeon	GS2-02	146
Kim, Jin Hee	PO161	442
Kim, Jin Sung	MOP4-06	244
Kim, Jisun	MS1-01	107
Kim, Jisun	GS1-01	141
Kim, Jisun	MOP3-09	237
Kim, Jisun	PO014	278
Kim, Jisun	PO082	354
Kim, Jisun	PO142	421
Kim, Ji-Yeon	PO204	489
Kim, Jiyeong	MOP1-03	207
Kim, Jiyeong	PO005	268
Kim, Jiyoung	MOP2-05	220
Kim, Jong Hyun	PO086	358
Kim, Joo Heung	PO080	350
Kim, Joo Heung	PO090	363
Kim, Ju Hee	PO026	294
Kim, Ju Hee	PO028	296
Kim, Ju Hee	PO029	297
Kim, Ju Hee	PO188	472
Kim, Juhee	PO030	298
Kim, Jung Ho	MOP3-01	224
Kim, Ki Beom	MOP3-02	226
Kim, Ki Beom	POD2-01	253

Name	Code	Page
Kim, Ki Beom	PO198	482
Kim, Ki Bum	PO009	272
Kim, Ki Jo	GS1-01	141
Kim, Ki Jo	MOP3-02	226
Kim, Ki Jo	MOP3-09	237
Kim, Ki Jo	POD2-01	253
Kim, Ki Jo	PO009	272
Kim, Ki Jo	PO083	355
Kim, Ki Jo	PO198	482
Kim, Kibeom	PO083	355
Kim, Ku Sang	PO085	357
Kim, Ku Sang	PO090	363
Kim, Kusang	PO252	545
Kim, Kyoo Hyun	POD3-01	255
Kim, Kyubo	POD3-02	257
Kim, Kyubo	PO161	442
Kim, Leslie	MOP2-01	213
Kim, Mi Young	PO087	359
Kim, Min Hwan	POD3-01	255
Kim, Min Jung	PO144	424
Kim, Moon Jin	PO253	547
Kim, Myong Kyoung	PO054	324
Kim, Nalee	MOP4-06	244
Kim, Nalee	PO270	567
Kim, Nam Hui	PO269	566
Kim, Nayeon	PO229	516
Kim, Sarah	MOP2-04	218
Kim, Seok Gi	PO143	422
Kim, Seok Won	MOP3-02	226
Kim, Seok Won	MOP3-03	227
Kim, Seok Won	POD2-01	253
Kim, Seok Won	PO009	272
Kim, Seok Won	PO025	292
Kim, Seok Won	PO083	355
Kim, Seok Won	PO129	406
Kim, Seok Won	PO198	482
Kim, Seok Won	PO204	489
Kim, Seok Won	PO231	518
Kim, Seok Won	PO232	519
Kim, Seonhui	PO233	520
Kim, Seonhui	PO253	547
Kim, Seul Gi	POD1-01	251
Kim, Seung Ki	POD1-01	251
Kim, Seung-Il	POD1-01	251
Kim, Seung-Il	POD3-01	255
Kim, Seuran	PO207	492
Kim, Soi	PO211	496
Kim, Soo Hyun	PO244	535
Kim, Soo Yeon	PO229	516
Kim, Sue	PO014	278
Kim, Sue	PO243	533
Kim, Sun	MS2-03	111
Kim, Sung Won	PO014	278
Kim, Sung-Won	MOP2-05	220
Kim, Sunhwa	PO160	441
Kim, Tae Gyu	PO161	442
Kim, Tae Hyun	GS2-05	150
Kim, Tae Hyun	POD3-02	257
Kim, Tae Hyun	PO161	442
Kim, Tae Jin	MOP1-05	210
Kim, Won Hwa	SM6-02	34
Kim, Won Hwa	PO057	327
Kim, Woo Young	PO269	566
Kim, Ye Jeong	PO287	504
Kim, Ye Ryung	PO081	352
Kim, Yeon-Joo	SM2-01	15
Kim, Yeon-Joo	PO227	514
Kim, Yong Bae	POD3-02	257
Kim, Yong Bae	PO157	438
Kim, Yong Bae	PO161	442
Kim, Yong Yeup	PO081	352
Kim, Yong Yeup	PO090	363
Kim, Yongseok	PO273	570
Kim, Zisun	PO011	275
Kimura, Takayuki	PO250	542
Kimura, Yuri	PO051	320
Kirk, Deborah	PO249	540
Kiso, Marina	PO052	322
Kison, Faye Elinore	PO263	560
Kittikongwat, Somboon	PO268	565

Name	Code	Page
Ko, Beom Seok	GS1-01	141
Ko, Beom Seok	MOP3-09	237
Ko, Beom Seok	PO082	354
Ko, Beom Seok	PO142	421
Ko, Beom Seok	PO258	554
Ko, Eun Sook	PO054	324
Ko, Eun Young	PO054	324
Ko, Hye Mi	PO041	310
Ko, Junho	PO058	328
Ko, Li-Kun	PO038	307
Ko, Li-Kun	PO167	448
Ko, Yunhee	PO243	533
Koerniawan, Heru Sutanto	PO190	474
Koh, Cher Hui	PO092	367
Koh, Cher Hui	PO093	368
Koh, Cher Hui	PO094	369
Koh, Cher Hui	PO096	371
Koh, Hyoung Won	PO027	295
Koh, Jaemoon	MOP3-01	224
Koh, Jiwon	PD4-02	70
Koh, Jiwon	MOP3-01	224
Koh, Tiang Guan Bernard	PO274	571
Koi, Yumiko	PO250	542
Kok, Marleen	PD1-01	59
Kon, Mattias Wei Ren	PO236	524
Kong, Sun-Young	PO227	514
Koo, Taeryool	PO161	442
Kook, Yoonwon	MOP4-04	242
Korean Breast Cancer Society Kbcs	POD1-01	251
Korlimarla, Aruna	MOP1-02	205
Korlimarla, Aruna	PO021	287
Kortoma, Asmaa	PO176	457
Kotani, Haruru	PO250	542
Kotronoulas, Greg	PO249	540
Kousaka, Junko	PO075	345
Kovacs, Tibor Gyorgy	MS6-01	124
Kozanoglu, Erol	PO104	379
Krumwiede, Kimberly Hoggatt	MS2-01	108
Krupa, Katherine	MOP4-03	240
Krupa, Katherine	PO173	453
Ku, Dohoe	PO078	348
Ku, Dohoe	PO079	349
Ku, Fan-Chen	PO183	466
Kuerer, Henry	SM8-02	41
Kuerer, Henry	PD6-01	77
Kulka, Janina	PO020	286
Kumar, Arun	PO123	399
Kumar, P	PO256	551
Kumar, Vikas	PO189	473
Kundu, Debanjan	PO249	540
Kuo, Wen-Ling	PO135	412
Kurnia, Ahmad	PO141	420
Kurniawati, Inge	PO190	474
Kurokawa, Yuki	PO262	559
Kurozumi, Sasagu	PO024	291
Kutomi, Goro	PO155	436
Kuwayama, Takashi	MOP4-08	247
Kwak, Geum-Hee	GS2-05	150
Kwak, Jungeun	PO254	549
Kwan, Jennifer Yin Yee	PO249	540
Kwon, Hyun Jung	MOP3-01	224
Kwon, Minjung	MOP1-03	207
Kwon, Sunyoung	POD2-02	254
Kwon, Yeonjoo	PO127	404
Kwong, Ava	PO018	284
Kwong, Ava	PO019	285
Kwong, Ava	PO040	309
Kwong, Ava	PO070	340
Kwong, Ava	PO221	508
Kyung, Dongsoo	PO251	544
Lai, Hung-Wen	ES1-01	83
Lai, Hung-Wen	ERS-01	102
Lai, Hung-Wen	PO092	367
Lai, Hung-Wen	PO093	368
Lai, Hung-Wen	PO094	369
Lai, Hung-Wen	PO096	371
Lai, Hung-Wen	PO108	384
Lai, Hung-Wen	PO134	411
Lai, Jiun-I	PO037	305
Laililnizan, Muhamad Halil Fikri	PO060	330

Name	Code	Page
Lam, Lisa H	MOP3-08	235
Lambertini, Matteo	ES5-03	100
Lambertini, Matteo	MS6-02	125
Lapitan-Torres, Armelia	PO263	560
Larson, Nicholas	MOP2-02	215
Laue, Christoph Cramer Von	PO184	468
Laurentiis, Michelino De	GS2-03	148
Law, Rebekah	MOP4-03	240
Law, Rebekah	PO173	453
Le, Phuoc Ba	PO065	335
Le, Trang Thi Thuy	PO065	335
Lee, Ahwon	PO196	480
Lee, Ahwon	PO203	488
Lee, A-Young	PO229	516
Lee, Bom-Yi	MOP2-05	220
Lee, Changhoon	MOP4-07	246
Lee, Changhoon	PO130	407
Lee, Changhoon	PO197	481
Lee, Chee Meng	PO105	381
Lee, Chi Hoon	PO009	272
Lee, Chi Hoon	PO198	482
Lee, Cho Eun	MOP3-02	226
Lee, Cho Eun	POD2-01	253
Lee, Cho Eun	PO009	272
Lee, Cho Eun	PO083	355
Lee, Cho Eun	PO198	482
Lee, Cho-How	PO241	531
Lee, Christine	MOP2-02	215
Lee, Daeun	PO211	496
Lee, Dae-Won	MOP3-01	224
Lee, Dakyung	NS1-02	177
Lee, Dong Won	MOP4-06	244
Lee, Dong Won	PO257	552
Lee, Dongheon	PO041	310
Lee, Eun-Gyeong	GS2-05	150
Lee, Eun-Gyeong	PO287	504
Lee, Eun-Gyeong	PO227	514
Lee, Eun-Shin	PO006	269
Lee, Eun-Shin	PO090	363
Lee, Eun-Shin	PO212	497
Lee, Geraldine Hwee Ping	PO150	431
Lee, Geraldine Hwee-Ping	PO046	315
Lee, Han Byoel	PO188	472
Lee, Han-Byeol	PO130	407
Lee, Han-Byoel	PD5-03	75
Lee, Han-Byoel	GS1-03	143
Lee, Han-Byoel	GS1-05	144
Lee, Han-Byoel	MOP3-04	228
Lee, Han-Byoel	MOP4-07	246
Lee, Han-Byoel	POD2-02	254
Lee, Han-Byoel	PO020	286
Lee, Han-Byoel	PO026	294
Lee, Han-Byoel	PO028	296
Lee, Han-Byoel	PO029	297
Lee, Han-Byoel	PO030	298
Lee, Han-Byoel	PO197	481
Lee, Hee Jin	MOP1-01	204
Lee, Hui-Ming	PO239	528
Lee, Hye Jin	PO243	533
Lee, Hye Sun	PO008	271
Lee, Hye Yoon	PO078	348
Lee, Hye Yoon	PO079	349
Lee, Hye Yoon	PO091	365
Lee, Hyebin	PO161	442
Lee, Hyun Jeong	MOP2-05	220
Lee, Hyunjong	ES3-01	92
Lee, In Hee	PO057	327
Lee, Insook	PO246	537
Lee, Jae Young	MOP4-06	244
Lee, Janghee	MOP3-04	228
Lee, Janghee	POD2-02	254
Lee, Janghee	PO006	269
Lee, Janghee	PO127	404
Lee, Jeeyeon	GS1-05	144
Lee, Jeeyeon	PO057	327
Lee, Jeeyeon	PO077	347
Lee, Jeeyeon	PO087	359
Lee, Jeeyeon	PO090	363
Lee, Jeeyeon	PO091	365
Lee, Jeeyeon	PO287	504

Name	Code	Page
Lee, Jeeyeon	PO269	566
Lee, Jeong Eon	SM8-03	43
Lee, Jeong Eon	GS1-03	143
Lee, Jeong Eon	MOP3-02	226
Lee, Jeong Eon	MOP3-03	227
Lee, Jeong Eon	POD2-01	253
Lee, Jeong Eon	PO009	272
Lee, Jeong Eon	PO014	278
Lee, Jeong Eon	PO025	292
Lee, Jeong Eon	PO083	355
Lee, Jeong Eon	PO129	406
Lee, Jeong Eon	PO198	482
Lee, Jeong Eon	PO204	489
Lee, Jeong Eon	PO287	504
Lee, Jeong Eon	PO231	518
Lee, Jeong Eon	PO232	519
Lee, Jeongmin	PO054	324
Lee, Jeongshim	PO159	440
Lee, Jiayi	PO272	569
Lee, Jieun	PD6-03	80
Lee, Jieun	POD3-02	257
Lee, Jieun	PO182	464
Lee, Jieun	PO196	480
Lee, Jieun	PO203	488
Lee, Jihoon	MOP3-02	226
Lee, Jihoon	POD2-01	253
Lee, Jihoon	PO083	355
Lee, Jin Ah	PO008	271
Lee, Jong Eun	GS2-05	150
Lee, Jong Ho	POD4-02	260
Lee, Jong Hoon	PD6-02	79
Lee, Jong Won	GS1-01	141
Lee, Jong Won	MOP3-09	237
Lee, Jong Won	PO082	354
Lee, Jong Won	PO142	421
Lee, Jong-In	PO202	487
Lee, Joon Seok	POD4-02	260
Lee, Joon Seok	PO087	359
Lee, Joon Seok	PO143	422
Lee, Joongkwon	PO082	354
Lee, Jun-Hee	MOP3-04	228
Lee, Jun-Hee	POD2-02	254
Lee, Jun-Hee	PO085	357
Lee, Keun Seok	MOP3-08	235
Lee, Kwan Ho	PO205	490
Lee, Kwanbum	POD1-01	251
Lee, Kyoungmin	GS2-01	145
Lee, Kyung-Hun	MOP3-01	224
Lee, Kyung-Hun	POD3-02	257
Lee, Meehyun	PO206	491
Lee, Min Hyuk	GS2-05	150
Lee, Min Jung	PO227	514
Lee, Minhyuk	PO043	312
Lee, Moo Hyun	PO090	363
Lee, Moo Hyun	PO287	504
Lee, Moohyun	PO006	269
Lee, Moon Hee	PO159	440
Lee, Namgyo	NS2-03	181
Lee, Qin Yi	PO152	433
Lee, Qin Yi	PO260	557
Lee, Qin Yi	PO271	568
Lee, Qin Yi	PO276	573
Lee, Qin Yi	PO279	576
Lee, Qin Yi	PO281	578
Lee, Sae Byul	MOP3-03	227
Lee, Sae Byul	MOP3-09	237
Lee, Sae Byul	PO006	269
Lee, Sae Byul	PO082	354
Lee, Sae Byul	PO090	363
Lee, Sae Byul	PO142	421
Lee, Samantha	PO278	575
Lee, Sangeun	PO028	296
Lee, Sangeun	PO030	298
Lee, Se Kyung	MOP3-02	226
Lee, Se Kyung	MOP3-03	227
Lee, Se Kyung	POD2-01	253
Lee, Se Kyung	PO009	272
Lee, Se Kyung	PO025	292
Lee, Se Kyung	PO083	355
Lee, Se Kyung	PO129	406

Name	Code	Page
Lee, Se Kyung	PO198	482
Lee, Se Kyung	PO231	518
Lee, Se Kyung	PO232	519
Lee, Seeyoun	PO227	514
Lee, Seonyoung	PO029	297
Lee, Seonyoung	PO030	298
Lee, Seung Ah	POD1-01	251
Lee, Seung Ah	PO009	272
Lee, Seung Ah	PO083	355
Lee, Seung Ah	PO198	482
Lee, Seungah	MOP3-02	226
Lee, Seungah	POD2-01	253
Lee, Seungjoo	PO058	328
Lee, Seungmin	PO010	274
Lee, Shing Fung	PO249	540
Lee, Shou-Fan	PO114	390
Lee, Si Yeon	PO084	356
Lee, Siyeon	PO208	493
Lee, Siyeon	PO269	566
Lee, Soo Jung	PO057	327
Lee, Soo Jung	PO199	484
Lee, Soo-Chin	PD1-02	60
Lee, Soo-In	PO043	312
Lee, Su Min	MOP3-02	226
Lee, Su Min	MOP3-03	227
Lee, Su Min	POD2-01	253
Lee, Su Min	PO009	272
Lee, Su Min	PO083	355
Lee, Su Min	PO198	482
Lee, Tae Hoon	PO129	406
Lee, Tae Hoon	PO156	437
Lee, Tae Hoon	PO158	439
Lee, Tae Hoon	PO161	442
Lee, Tae Hoon	PO287	504
Lee, Tae Hoon	PO231	518
Lee, Tae Hoon	PO232	519
Lee, Tae Hoon	PO251	544
Lee, Tae Hoon	PO270	567
Lee, Tak Yeon	PO258	554
Lee, Yejoo	PO030	298
Lee, Yien Sien	PO278	575
Lee, Yi-Yuan	PO092	367
Lee, Yi-Yuan	PO093	368
Lee, Yi-Yuan	PO094	369
Lee, Yi-Yuan	PO096	371
Lee, Yi-Yuan	PO108	384
Lee, Yi-Yuan	PO134	411
Lee, Youn Ju	GS2-05	150
Lee, Young Joo	PO008	271
Lee, Young Kyu	PO160	441
Lee, Young-Jin	MOP3-04	228
Lee, Young-Jin	POD2-02	254
Lee, Young-Jin	PO082	354
Lee, Young-Jin	PO170	451
Lee, Young-Jin	PO258	554
Lee, Yu-Hsuan	PO036	304
Lee1, Sae Byul	GS1-01	141
Leeper, Alexander	PO152	433
Leeper, Alexander	PO260	557
Leeper, Alexander	PO271	568
Leeper, Alexander	PO276	573
Leeper, Alexander	PO281	578
Lemant, Jeanne	PO014	278
Lenh, Phong Thanh	PO217	503
Leong, David	PO016	282
Leong, Lester	MOP2-03	217
Leong, Lester Chee Hao	PO063	333
Leong, Wei Qi	PO149	430
Leung, Jessica	ES2-02	89
Leung, Jessica	MS1-01	107
Li, Haiyan	PO121	397
Li, Hengyu	MOP2-06	221
Li, Huihui	MOP3-06	232
Li, Qingjian	PO164	445
Li, Yujia	PO184	468
Li, Zongyan	PO121	397
Liang, Mary Moon-Sun	PO064	334
Liang, Yongping	PO066	336
Liao, Ying-Yu	PO034	302
Lim, Beth Shi Yu	PO131	408

Name	Code	Page
Lim, Cheol-Wan	GS2-05	150
Lim, Donghyun	PO200	485
Lim, Fang Yi	PO013	277
Lim, Hae Sol	PO129	406
Lim, Hanseul	PO200	485
Lim, Hanseul	PO201	486
Lim, Ji Young	GS2-02	146
Lim, Myong Cheo	PO014	278
Lim, Seung Hwan	PO086	358
Lim, Seung-Taek	PO202	487
Lim, Woosung	GS2-05	150
Lim, Woosung	PO127	404
Lim, Xin Yan	PO237	525
Lim, Yi Ping	PO097	372
Lim, Yi Ping	PO098	373
Lim, Young Ah	PO127	404
Limpratya, Tanitti	PO255	550
Limpratya, Tanitti	PO268	565
Lin, Chang Ting	PO181	463
Lin, Chieh Ting	PO047	316
Lin, Chin-Yao	PO167	448
Lin, Hsiang-Wen	PO174	454
Lin, Joseph	PO167	448
Lin, Shih-Lung	PO094	369
Lin, Shih-Lung	PO096	371
Lin, Yuan-Her	PO239	528
Lin, Zar Chi	MOP2-07	222
Lin, Zar Chi	PO106	382
Lin, Zhiping	MOP2-03	217
Ling, Xiao Shuang	PO132	409
Lingier, Sofie	PO218	505
Linn, Yun Le	PO110	386
Liste-Hermoso, Mario	MOP3-07	233
Litchfield, Lacey	PO184	468
Liu, Chia Hua	PO047	316
Liu, Chien-Ting	PO181	463
Liu, Chun-Yu	PO036	304
Liu, Chun-Yu	PO037	305
Liu, Deli	PO178	459
Liu, Hongjin	MOP4-05	243
Liu, Qiwen	PO121	397
Liu, Tsung Yu	PO115	391
Liu, Yuqi	PO066	336
Lo, Carol Sheung Yan	PO069	339
Lo, Chiao	PO034	302
Lo, Grace Yuk Fong	PO186	470
Lo, Jing-Jou	PO167	448
Lo, Yung-Feng	PO135	412
Lobo, Eloisa Rachel	PO263	560
Loftus, Panteera	PO117	393
Loh, Engracia	MOP2-03	217
Loh, Engracia	PO063	333
Loi, Sherene	GS2-03	148
Loi, Sherene	MOP3-07	233
Lopez, Mariano	PO179	461
Low, Tze Yi	PO149	430
Lu, Yen-Shen	SM7-02	38
Lu, Yen-Shen	GS2-03	148
Lu, Yen-Shen	PO180	462
Lu, Yen-Shen	PO182	464
Lu, Zhongkang	MOP2-03	217
Lui, Su Ann	MOP4-01	238
Luk, Alvin	MOP1-04	209
Lum, Chih Yean	PO047	316
Lustberg, Maryam Beheshti	PO249	540
M S, Sulakshana	PO125	401
Ma, Ding	SM11-03	54
Ma, Guoshuai	PO120	396
Ma, Guoshuai	PO153	434
Maalouf, Hani	PO173	453
Maccallum, Caroline	PO039	308
Madhukumar, Preetha	PO171	452
Maha, Aslan	PO276	573
Maha, Aslan	PO279	576
Malhotra, Usha	MOP3-05	230
Malilay, Ray	PO062	332
Mamounas, Eleftherios (Terry)	SM1-01	11
Man, Gregory Bruce	PO039	308
Manasnayakorn, Sopark	PO136	414
Mann, Bruce	KIC-02	129

Name	Code	Page
Mardhiyah, Farah	PO195	479
Mardhiyah, Farah	PO225	512
Mario, Kiki	PO165	446
Marley, Leah	PO148	429
Marra, Antonio	SM11-01	52
Marshall, Evelyn	MOP4-03	240
Marta, Gustavo Nader	PO249	540
Martin, Miguel	MOP3-07	233
Martin, Miguel	MOP3-08	235
Martin, Miguel	PO178	459
Maskell, David	PO276	573
Masud, Abdullah Al	MOP2-02	215
Masuda, Norikazu	PO052	322
Masuda, Norikazu	PO178	459
Masuda, Rika	PO053	323
Masumoto, Norio	PO051	320
Matalkah, Ahmad	ERS-02	103
Matheson, Julia	PO039	308
Mathew, Jismy	PO125	401
Matsui, Chiaki	PO126	402
Matsuoka, Kinya	PO283	580
Maulanisa, Sinta Chaira	PO195	479
Maulanisa, Sinta Chaira	PO224	511
Maulanisa, Sinta Chaira	PO225	512
Mayer, Erica L	MOP3-08	235
Mcandrew, Nicholas	PO183	466
McKean, Andrew	PO285	582
Metzger, Otto	SM1-02	12
Metzger, Otto	SM10-01	48
Mima, Atsushi	PO261	558
Min, Eun-A	PO043	312
Min, Junwon	PO177	458
Min, Sun Young	PO006	269
Min, Sun Young	PO090	363
Min, Sun Young	PO287	504
Mine, Mari	PO187	471
Mitrousias, Apostolos	PO067	337
Mitrousias, Apostolos	PO138	416
Miyahara, Kana	PO250	542
Miyazaki, Hitoe	PO283	580
Mizumoto, Masashi	PO155	436
Mo, Fei	MOP1-04	209
Mochitomi, Yukari	PO051	320
Mohabbatizadeh, Borna	MOP2-01	213
Mohamed, Muhamad Idham	PO060	330
Mohanty, Subhashree	PO162	443
Mohri, Ryosuke	PO262	559
Moisun, Joanne	PO097	372
Mok, Chi Wei	MOP2-07	222
Mok, Chi Wei	PO106	382
Mok, Chi Wei	PO109	385
Mok, Chi Wei	PO110	386
Mok, Chi Wei	PO132	409
Mok, Chi Wei	PO274	571
Mollavelioglu, Baran	PO104	379
Monnerat, Christian	PO014	278
Montagna, Giacomo	PD5-02	74
Montoya, Luis Lopez	PO249	540
Moon, Bora	PO243	533
Moon, Byung-In	PO127	404
Moon, Hyeong-Gon	MOP4-07	246
Moon, Hyeong-Gon	PO130	407
Moon, Hyeong-Gon	PO197	481
Moon, Hyun Seung	PO258	554
Moon, Joon Suk	PO077	347
Moon, Joon Suk	PO287	504
Moon, Joonsuk	PO057	327
Moon, Serin	PO196	480
Moon, Serin	PO203	488
Moon, Woo Kyung	SM3-03	23
Moon, Yong Wha	POD1-01	251
Morante, Zaida	PO012	276
Morante, Zaida	PO179	461
Mori, Hitomi	PO187	471
Moriguchi, Yoshio	PO052	322
Morishita, Saori	PO284	581
Moscetti, Luca	MOP3-08	235
Moshier, Erin	MOP2-01	213
Mosiun, Joanne	PO098	373
Motoyama, Kentaro	PO187	471

Name	Code	Page
Mouri, Yukako	PO075	345
Moutzouri, Olga	PO067	337
Moutzouri, Olga	PO138	416
Muhammad, Muhammad	PO195	479
Muhammad, Muhammad	PO224	511
Muhammad, Muhammad	PO225	512
Mukai, Hirofumi	PO250	542
Munante, Bruno	PO179	461
Munkhnyam, Munkhzul	PO099	374
Munkhnyam, Munkhzul	PO254	549
Murakami, Akari	PO051	320
Musgrave, Elizabeth	PO271	568
Muslumanoglu, Mahmut	PO104	379
Myagmar, Odbaatar	PO099	374
Myagmar, Odbaatar	PO254	549
N N, Ashitha	MOP1-02	205
Nagai, Eishi	PO187	471
Nagata, Aya	PO051	320
Nagayama, Aiko	PO053	323
Nai, Kei Teng	PO133	410
Naik, Ravi	PO119	395
Naito, Yoichi	MOP4-08	247
Nakafusa, Yuji	PO187	471
Nakamoto, Shogo	PO250	542
Nakamura, Takashi	PO051	320
Nakanishi, Akira	PO032	300
Nakano, Shogo	PO051	320
Nakano, Shogo	PO075	345
Nam, Eun Ji	PO014	278
Nam, Sang Eun	PO086	358
Nam, Sang-Eun	GS2-05	150
Nam, Seok Jin	MOP3-02	226
Nam, Seok Jin	MOP3-03	227
Nam, Seok Jin	POD2-01	253
Nam, Seok Jin	PO009	272
Nam, Seok Jin	PO025	292
Nam, Seok Jin	PO083	355
Nam, Seok Jin	PO129	406
Nam, Seok Jin	PO198	482
Nam, Seok Jin	PO204	489
Nam, Seok Jin	PO231	518
Nam, Seok Jin	PO232	519
Nanan, Rapeephan	PO118	394
Narui, Kazutaka	GS1-02	142
Narui, Kazutaka	PO024	291
Narui, Kazutaka	PO155	436
Neciosup, Silvia	PO012	276
Neciosup, Silvia	PO179	461
Neven, Patrick	PO184	468
Newman, David	PO271	568
Ng, Cathy Po Ching	PO013	277
Ng, Cathy Po Ching	PO064	334
Ng, Cathy Po Ching	PO133	410
Ng, Celene	MOP4-01	238
Ng, Po Ching Cathy	PO112	388
Ng, Qin Xiang	PO235	523
Ng, Qin Xiang	PO236	524
Ng, Ting Ying	PO154	435
Ngatata, Takuya	PO284	581
Nguyen, An Huynh Khanh	PO065	335
Nguyen, Anh Luan	PO217	503
Nguyen, Cuong Quang	PO065	335
Nguyen, Ha My Cong	PO163	444
Nguyen, Hoang Quy	PO217	503
Nguyen, Kha Tran	PO137	415
Nguyen, Luan Anh	PO137	415
Ni, Chao	MOP2-06	221
Ni, Chao	PO247	538
Nickson, Carolyn	PO039	308
Nielsen, Dorte	PO178	459
Niikura, Naoki	MOP3-08	235
Ning, Fangling	MOP1-04	209
Nishie, Mariko	PO052	322
Nishisho, Aya	PO261	558
Nishiyama, Kenichi	PO187	471
Niu, Xiao	PO001	263
Noh, Dasom	POD2-02	254
Noh, Woo Chul	GS2-05	150
Noh, Woo Chul	PO086	358
Noma, Midori	PO051	320

Name	Code	Page
Noor, Norizal Mohd	PO060	330
Norawi, Muhammad Nor Hidayat Mohd	PO060	330
O'connell, Rachel	MOP4-03	240
O'connell, Rachel	PO119	395
O'connell, Rachel	PO173	453
O'connell, Rachel	PO285	582
O'dea, Anne	GS2-03	148
O'regan, Ruth	GS2-03	148
O'shaughnessy, Joyce	PO184	468
Odeh, Ghada	PO076	346
Odnasan, Shirnen	PO099	374
Odnasan, Shirnen	PO254	549
Offersen, Birgitte	PL5-01	7
Offersen, Birgitte	SM2-03	18
Ogiya, Akiko	MOP3-07	233
Oh, Donghyeon	PO199	484
Oh, Jeong Hun	PO010	274
Oh, Kawon	MOP3-02	226
Oh, Kawon	POD2-01	253
Oh, Kawon	PO009	272
Oh, Kawon	PO083	355
Oh, Kawon	PO198	482
Oh, Minsik	MOP1-01	204
Oh, Sang-Ha	PO041	310
Oh, Se Jeong	PO233	520
Oh, Se Jeong	PO253	547
Oh, Se-Young	MOP1-06	211
Ohta, Yusuke	PO051	320
Oka, Yuki	PO284	581
Okazaki, Mai	MOP4-08	247
Okuno, Toshitaka	PO051	320
Ong, Patricia	PO103	378
Ong, Patricia	PO213	498
Ono, Yuka	PO155	436
Oobayashi, Aiko	PO126	402
Ooi, Wei Yi	PO019	285
Ordonez, Felicidad Claudia	PS2-01	137
Oshi, Masanori	GS1-02	142
Oshi, Masanori	PO024	291
Oshi, Masanori	PO155	436
Ozaki, Kanna	PO075	345
Ozaki, Yukinori	ES5-01	98
Ozcan, Onder	PO033	301
Ozeki, Rie	PO250	542
P S, Hari	MOP1-02	205
P S, Hari	PO021	287
Paek, Se Hyun	PO090	363
Paek, Sehyun	PO085	357
Paek, Sun Ha	POD3-02	257
Pagdanganan, Maria Cecilia	PO100	375
Pagehgiri, Aslesa Wangpathi	PO003	266
Pai, Trupti	PO124	400
Pak, Shin Jeong	PO005	268
Pan, Fei	MOP3-06	232
Pandangan, Sarfia	PO266	563
Panigoro, Sonar Soni	PO022	289
Panjwani, Poonam	PO124	400
Papapanagiotou, Ioannis	PO067	337
Papapanagiotou, Ioannis	PO138	416
Pape, Eva	PO218	505
Pape, Eva	PO219	506
Pape, Eva	PO220	507
Parco, Matthew David	PO263	560
Park, Chan Sub	PO200	485
Park, Chan Sub	PO201	486
Park, Changhee	MOP3-01	224
Park, Eun Jin	PO144	424
Park, Eunhwa	GS2-05	150
Park, Hae Jin	POD4-01	259
Park, Ho Yong	PO057	327
Park, Ho Yong	PO077	347
Park, Ho Yong	PO087	359
Park, Hye Yeon	MOP3-01	224
Park, Hyeli	PO161	442
Park, Hyung Seok	GS1-03	143
Park, Hyung Seok	GS1-05	144
Park, Hyung Seok	POD1-01	251
Park, Hyung Seok	POD3-01	255
Park, Hyung Seok	PO006	269

Name	Code	Page
Park, Hyung Seok	PO014	278
Park, Hyung Seok	PO090	363
Park, Hyung Seok	PO269	566
Park, In Hae	PD1-03	61
Park, In Hae	GS2-01	145
Park, Jeong Young	PO233	520
Park, Ji Soo	PO014	278
Park, Jin Hee	POD1-02	252
Park, Jiwon	PO042	311
Park, Jongmoo	PO087	359
Park, Jung Ho	GS2-05	150
Park, Jung Ho	PO287	504
Park, Jung Won	PO258	554
Park, Jung Young	PO253	547
Park, Kyong Hwa	MS1-01	107
Park, Kyong Hwa	GS2-05	150
Park, Kyoung Sik	PO086	358
Park, Kyunghee	PO204	489
Park, Min Ho	GS2-05	150
Park, Sae Gwang	POD1-02	252
Park, Sangjoon	PO257	552
Park, Sangjoon	PO275	572
Park, Seho	GS2-05	150
Park, Seho	POD1-01	251
Park, Seho	POD3-01	255
Park, Seho	PO084	356
Park, Seho	PO144	424
Park, Seho	PO170	451
Park, Seho	PO208	493
Park, Se-Ho	MOP2-08	223
Park, Seo Jung	NS2-01	179
Park, Seong Min	POD1-01	251
Park, Seongmun	PO043	312
Park, Shin-Young	GS2-05	150
Park, Sikyeong	PO243	533
Park, So Yeon	MOP3-01	224
Park, Sun-Young	PO227	514
Park, Tae Hwan	POD4-02	260
Park, Tristen	ES1-03	85
Park, Tristen	MOP2-01	213
Park, Vivian Youngjean	MS4-03	118
Park, Won	PO129	406
Park, Won	PO156	437
Park, Won	PO158	439
Park, Won	PO231	518
Park, Won	PO232	519
Park, Won	PO251	544
Park, Woo Chan	PO008	271
Park, Woong Ki	GS2-05	150
Park, Woong Ki	MOP3-02	226
Park, Woong Ki	MOP3-03	227
Park, Woong Ki	POD2-01	253
Park, Woong Ki	PO009	272
Park, Woong Ki	PO083	355
Park, Woong Ki	PO129	406
Park, Woong Ki	PO198	482
Park, Woong Ki	PO231	518
Park, Woong Ki	PO232	519
Park, Woong-Yang	PO204	489
Park, Yeon Hee	SM11-02	53
Park, Yeon Hee	GS2-03	148
Park, Yeon Hee	JDF-02	174
Park, Yeon Hee	MOP3-05	230
Park, Yeon Hee	PO182	464
Park, Yeon Hee	PO204	489
Park, Youri	PO127	404
Part, Inho	PO211	496
Patel, Ronak	PO285	582
Patil, Asawari	PO124	400
Peng, Peijian	MOP1-04	209
Peng, Xuan	MOP3-05	230
Pereira, Jerome	PO152	433
Pereira, Jerome	PO260	557
Pereira, Jerome	PO276	573
Pereira, Jerome	PO279	576
Pereira, Jerome	PO281	578
Perez-Moreno, Pablo	MOP3-07	233
Perez-Moreno, Pablo	MOP3-08	235
Periasammy, Dinesh	PO093	368
Periasammy, Dineshwary	PO059	329

Name	Code	Page
Periasammy, Dineshwary	PO092	367
Periasammy, Dineshwary	PO094	369
Periasammy, Dineshwary	PO095	370
Pham, Tuan Anh	PS2-03	139
Phan, Stephanie	PO249	540
Phan, Thi Hong Duc	PO217	503
Phua, Sheena Say Hoon	PO150	431
Piceu, Hanna	PO219	506
Piltin, Mara	MOP2-02	215
Pinker-Domenig, Katja	SM6-03	36
Pinto, Joseph	PO179	461
Ponsuwan, Nantawan	PO015	280
Poon, Rita	PO048	317
Porcheron, Amanda	PO249	540
Port, Elisa	MOP2-01	213
Prakash, Guru	MOP4-02	239
Primardian, Yohanes Arvi	PO165	446
Priskin, Katalin	PO020	286
Puglisi, Fabio	PO183	466
Purevsukh, Tugsjargal	PO044	313
Purevsuren, Gantsetseg	PO280	577
Pushpanathan, Sabaris	PO124	400
Putra, Rachmad Meyliandry	PO073	343
Putri, Shabrina Rizky	PO074	344
Putri, Shabrina Rizky	PO141	420
Qerimi, Bardha Citaku	PO014	278
Qiang, Liu	PO178	459
Qiu, Pengfei	PO247	538
Quah, Alison Mei-Fern	PO046	315
Quah, Allison Mei Fern	PO150	431
Que, Raissa Maxine	PO062	332
Que, Raissa Maxine	PO286	583
Rabaglio, Manuela	PO014	278
Rachman, Abdul	PS2-02	138
Rafn, Bolette Skjodt	PO249	540
Rajput, Rohit	MOP4-02	239
Ramish, Asai	PO044	313
Ramos, Charmagne Loren	PO130	407
Ramshorst, Gabrielle H. Van	PO218	505
Ramshorst, Gabrielle H. Van	PO219	506
Ramshorst, Gabrielle H. Van	PO220	507
Rauf, Nurul Hidayah Abdul	PO092	367
Rauf, Nurul Hidayah Abdul	PO108	384
Rauf, Nurul Hidayah Abdul	PO134	411
Ravichandran, Madhumitha	MOP4-03	240
Rawat, Shyam	PO072	342
Rawat, Shyam	PO248	539
Razavi, Pedram	SM7-03	39
Razavi, Pedram	MS5-02	121
Reasor, Erica Stringer	GS2-03	148
Rebosa, Leona Marie Francesca	PO103	378
Rebosa, Leona Marie Francesca	PO213	498
Regalado-Morales, Eileen	PO263	560
Reimer, Toralf	SM8-01	40
Reimer, Toralf	PD5-01	73
Reimer, Toralf	KIC-03	131
Reinisch, Mattea	GS2-03	148
Remo, Viela Mae	PO234	522
Reynaert, Alanis	PO220	507
Rhu, Jinsoo	MS3-01	112
Rimawi, Mothaffar F.	MOP3-07	233
Rinnerthaler, Gabriel	PO192	476
Rio-Gonzalez, Angela	PO249	540
Rioja, Patricia	PO012	276
Rocero, Julian	PO235	523
Rodriguez, Alejandro	PO183	466
Rose, Allison	PO039	308
Rubio, Isabel T.	MS4-01	115
Rubio, Isabel T.	JDF-01	172
Rugo, Hope S	MOP3-08	235
Rugo, Hope S	PO184	468
Rugo, Hope S.	MOP3-05	230
Ruiz-Borrego, Manuel	MOP3-07	233
Rusby, Jennifer	MOP4-03	240
Ryu, Han Suk	MOP3-01	224
Ryu, Heeju	MOP1-05	210
Ryu, Jai Min	ES2-01	87
Ryu, Jai Min	GS1-01	141
Ryu, Jai Min	GS1-03	143
Ryu, Jai Min	GS2-05	150

Name	Code	Page
Ryu, Jai Min	MOP3-02	226
Ryu, Jai Min	MOP3-03	227
Ryu, Jai Min	MOP3-04	228
Ryu, Jai Min	MOP3-09	237
Ryu, Jai Min	POD2-01	253
Ryu, Jai Min	POD2-02	254
Ryu, Jai Min	PO006	269
Ryu, Jai Min	PO009	272
Ryu, Jai Min	PO014	278
Ryu, Jai Min	PO025	292
Ryu, Jai Min	PO083	355
Ryu, Jai Min	PO085	357
Ryu, Jai Min	PO090	363
Ryu, Jai Min	PO129	406
Ryu, Jai Min	PO198	482
Ryu, Jai Min	PO231	518
Ryu, Jai Min	PO232	519
Ryu, Jai Min	PO269	566
Ryu, Jai-Min	PO229	516
Ryu, Jeong Yeop	POD4-02	260
Ryu, Jeong Yeop	PO087	359
Ryu, Jeong Yeop	PO143	422
Ryu, Kum Hei	PO227	514
Ryu, Miri	PO230	517
Ryu, Seungho	PO025	292
Ryu, Seungyeon	PO030	298
S, Anuradha	PO123	399
S, Chandana Sri	PO021	287
S, Guruguhan	MOP1-02	205
Sadachi, Ryo	PO250	542
Sae-Lim, Chayanee	PO116	392
Saenz, Jose Angel Garcia	PO178	459
Sagara, Yasuaki	MOP4-08	247
Sagara, Yasuaki	PO051	320
Sagawa, Teiri	PO283	580
Sahay, Ayushi	PO124	400
Sainbaatar, Khurelbaatar	PO099	374
Sainbaatar, Khurelbaatar	PO145	426
Sainbaatar, Khurelbaatar	PO254	549
Saito, Ayumi	MOP4-08	247
Saito, Masayuki	PO075	345
Saji, Shigehira	MOP3-07	233
Sakaguchi, Satsuki	PO126	402
Sakai, Takehiko	MOP4-08	247
Sakalosh, Viktoriya	PO182	464
Salamullah, Salamullah	PO195	479
Salamullah, Salamullah	PO224	511
Salamullah, Salamullah	PO225	512
Sangai, Takafumi	PO250	542
Santi, Patricia Xavier	PO178	459
Santos, Emmeline Cua-De Los	PO234	522
Santos-Lipana, Maria Kaiserin	PO101	376
Sapunar, Francisco	PO184	468
Sarvottama, Megha	MOP1-02	205
Sasa, Soichiro	PO261	558
Sasada, Shinsuke	MOP4-08	247
Satria, Perdana	PO194	478
Sawada, Toru	PO261	558
Schem, Christian	PO183	466
Schmid, Peter	MOP3-05	230
Schmid, Peter	MOP3-07	233
Schneeweiss, Andreas	MOP3-08	235
Schneider, Jean	PO031	299
Schneider, Jean	PO089	362
Seah, Chin Mui Jaime	MOP2-07	222
Seah, Chin Mui Jaime	PO132	409
Seah, Jaime	PO274	571
See, Mee Hoong	PO097	372
See, Mee Hoong	PO098	373
See, Mee-Hoong	PO108	384
Seet, Yert Li Melissa	PO106	382
Seet, Yert Li Melissa	PO132	409
Seki, Tomoko	PO053	323
Seo, Da Eun	PO080	350
Seo, Jeongmin	MOP3-01	224
Seo, Youngjin	PO207	492
Seol, Yunji	PO160	441
Seong, Min-Ki	PO200	485
Seong, Min-Ki	PO201	486
Setiadi, Maria Angelika	PO002	264

Name	Code	Page
Setiawan, I Gede Budhi	PO003	266
Setiawan, I Gede Budhi	PO190	474
Shah, Mona D.	MOP3-07	233
Sharma, Dhananjaya	PO071	341
Sharma, Dhananjaya	PO072	342
Sharma, Dhananjaya	PO248	539
Sharma, P	PO256	551
Sharma, Priyanka	PO183	466
Sharma, Vikas	PO256	551
Shekhar, Saket	PO072	342
Shen, Jun	MOP2-06	221
Shen, Jun	PO247	538
Shen, Minjun	PO001	263
Shen, Shih-Che	PO135	412
Sherman, Kerry	PO249	540
Shet, Tanuja	PO124	400
Shetty, Keerthi	MOP1-02	205
Shibata, Nobuhiro	PO250	542
Shien, Tadahiko	MOP4-08	247
Shien, Tadahiko	PO250	542
Shih, Nai Wen	PO047	316
Shim, Ven Qing	PO097	372
Shima, Hiroaki	PO051	320
Shimizu, Hanako	PO052	322
Shimomura, Akihiko	MOP4-08	247
Shin, Dong Seung	MOP2-04	218
Shin, Dong Seung	MOP3-04	228
Shin, Dong Seung	POD2-02	254
Shin, Dong-Seung	PO130	407
Shin, Eunju	PO142	421
Shin, Hee-Chul	PO010	274
Shin, Hee-Chul	PO020	286
Shin, Hee-Chul	PO027	295
Shin, Hyuk Jai	PO269	566
Shin, Hyukjai	PO056	326
Shin, Hyunju	PO158	439
Shin, Hyun-Soo	PO043	312
Shin, Junghoon	SS4-01	191
Shin, Junghoon	PO204	489
Shin, Jungwook	MOP4-06	244
Shin, Kabsoo	ES5-02	99
Shin, Kyung Hwan	POD3-02	257
Shin, Su-Jin	PO211	496
Shiozaki, Momo	PO191	475
Showalter, Shayna	SSOJS-01	159
Shrubsall, Donna	PO271	568
Sim, Nadia Hui-Shan	PO046	315
Sim, Pei Yin Dayna	PO106	382
Sim, Shane Wen Hui	PO133	410
Sim, Wen Hui Shane	PO112	388
Sim, Yirong	PO107	383
Sim, Yirong	PO171	452
Sim, Yirong	PO237	525
Sim, Yirong	PO277	574
Simanjuntak, Arya Marganda	PO195	479
Singer, Christian F.	PO192	476
Singh, Parul	MOP4-02	239
Sinnett, Victoria	MOP4-03	240
Siregar, Nia Novianti	PO002	264
Siriviboonchaiyakul, Supanuch	PO216	502
Siu, Blythe	PO221	508
Slamon, Dennis	PO182	464
Smith, Karen L.	MOP3-05	230
Smith, Laura	PO152	433
Smith, Laura	PO260	557
Smith, Laura	PO271	568
Smith, Laura	PO276	573
Smith, Laura	PO281	578
Snuggs, Nikki	PO173	453
Sodnom, Munguntsetseg	PO280	577
Sodnomgeleg, Oyudari	PO099	374
Sodnomgeleg, Oyudari	PO254	549
Soeratman, Alif Rizky	PO002	264
Sohn, Joohyuk	POD1-01	251
Sohn, Joohyuk	POD3-01	255
Sohn, Joohyuk	PO182	464
Son, Byung Ho	GS1-01	141
Son, Byung Ho	MOP3-09	237
Son, Byung Ho	PO082	354
Son, Byung Ho	PO142	421

Name	Code	Page
Son, Gil Soo	PO079	349
Son, Gilsoo	PO078	348
Son, Nak-Hoon	PO090	363
Song, In Hye	MS1-01	107
Song, Jeong Yoon	GS1-05	144
Song, Jin-Ho	POD3-02	257
Song, Jongwon	PO208	493
Song, Ju Myung	PO253	547
Song, Kaiyu	MOP3-06	232
Song, Seung Yong	MOP4-06	244
Song, Seung Yong	PO257	552
Soong, Sung Inda	PO186	470
Srihari, Sulakshana	PO021	287
Srinivasan, Nandhini	MOP4-01	238
Stroyakovskii, Daniil	PO182	464
Su, Jun	PO092	367
Su, Jun	PO108	384
Su, Jun	PO134	411
Su, Jun	PO150	431
Sudarsa, I Wayan	PO003	266
Sudarsa, I Wayan	PO023	290
Suematsu, Mayuko	PO283	580
Suen, Dacita	PO070	340
Sugahara, Shinji	PO155	436
Sugimori, Makoto	GS1-02	142
Sugimoto, Hanano	PO261	558
Suh, Koung Jin	SM10-02	49
Suh, Koung Jin	MOP3-01	224
Suh, Mansoo	POD4-02	260
Suh, Mansoo	PO087	359
Suh, Mansoo	PO143	422
Suh, Ye Yoon	MOP3-01	224
Suh, Young-Jin	PO031	299
Suh, Young-Jin	PO089	362
Sujarittanakarn, Sasithorn	PO117	393
Sujarittanakarn, Sasithorn	PO015	280
Sukartini, Ninik	PO049	318
Suma, Chigusa	PO262	559
Sumadi, I Wayan Juli	PO023	290
Sumbayak, Jimmy Pranata	PO004	267
Sumitomo, Hiroyuki	PO261	558
Sun, David	MOP1-04	209
Sun, Xiaorong	PO120	396
Sun, Xiaorong	PO153	434
Sung, Hyun-Jung	MOP3-01	224
Sung, Sihyun	MOP2-08	223
Suongsarath, Nayada	PO216	502
Suprabawati, Desak Gede Agung	PO193	477
Suryawisesa, Ida Bagus Made	PO023	290
Suwa, Hirofumi	PO052	322
Swafe, Leyla	PO148	429
Syafitri, Annisa	PO049	318
Syamsu, Salman Ardi	PO073	343
Sze, Andria	PO221	508
Szeto, Kylie Joan Yi	PO222	509
T, Pavan Sugoor	PO123	399
Taguri, Masataka	PO155	436
Taira, Tetsuhiko	PO250	542
Taji, Tomoe	PO126	402
Takabe, Kazuaki	GS1-02	142
Takabe, Kazuaki	PO024	291
Takada, Koji	PO051	320
Takada, Masahiro	PO052	322
Takada, Masahiro	PO126	402
Takahara, Sachiko	PO052	322
Takahashi, Maiko	PO053	323
Takahashi, Mina	MOP4-08	247
Takano, Shoko	PO155	436
Takano, Toshimi	MOP3-05	230
Takano, Yuko	MOP4-08	247
Tamada, Souichirou	PO284	581
Tan, Aloysius Ming Ngan	PO150	431
Tan, Audrey Poh Poh	PO171	452
Tan, Eelin	PO046	315
Tan, Ern Yu	PO045	314
Tan, Ern Yu	PO150	431
Tan, Joan Xin Ern	PO236	524
Tan, Jubi Lyn	PO100	375
Tan, Kathleen Adryon	PO062	332
Tan, Puay Hoon	PD2-03	65

Name	Code	Page
Tan, Ryan	MOP2-03	217
Tan, Si Ying	PO063	333
Tan, Si Ying	PO171	452
Tan, Su Min Charmaine	PO236	524
Tan, Su-Ming	MOP2-07	222
Tan, Su-Ming	PO109	385
Tan, Su-Ming	PO110	386
Tan, Su-Ming	PO132	409
Tan, Su-Ming	PO274	571
Tan, Tzer Sien	PO112	388
Tan, Veronique Kiak Mien	PO171	452
Tan, Ying Ching	PO171	452
Tan, Ying Ching	PO237	525
Tan, Ying Ching	PO277	574
Tanabe, Yuko	PO250	542
Tanada, Yasuko	PO051	320
Tane, Kaori	PO249	540
Tang, Ee Ling Serene	PO112	388
Tang, Serene Ee Ling	PO064	334
Tang, Serene Ee Ling	PO111	387
Tang, Serene Ee Ling	PO133	410
Tarantino, Paolo	SM9-03	47
Tarantino, Paolo	PD4-03	72
Tarantino, Paolo	SS2-01	187
Tasis, Nikolaos	PO067	337
Tasis, Nikolaos	PO138	416
Tasoulis, Marios	MOP4-03	240
Tasoulis, Marios	PO285	582
Tasoulis, Marios Konstantinos	ES4-02	96
Tasoulis, Marios Konstantinos	PO119	395
Teerayathanakul, Narongchai	PO255	550
Tekin, Leyla	PO033	301
Terakawa, Hirofumi	PO262	559
Terata, Kaori	KIC-01	128
Tey, Sze Keong	PO019	285
Tey, Szekeong	PO018	284
Thai, Son Nguyen	PO185	469
Thakur, Subhash	PO162	443
Thasee, Patra	PO255	550
The, Phuong Tran Viet	PO137	415
Thien, Huong Pham	PO137	415
Thoviriyavej, Wilairat	PO015	280
Tin, Winnie Wing Yan	PO154	435
Tison, Nicola Raphaela	PO265	562
Tison, Nicola Raphaela	PO266	563
Toesca, Antonio	PO067	337
Toi, Masakazu	PL2-01	3
Tokunaga, Eriko	PO250	542
Tolaney, Sara M	MOP3-08	235
Tolaney, Sara M	PO184	468
Toledano, Ivan	PO178	459
Tongson, Luinio	PO061	331
Tran, Dang Ngoc Linh	PO217	503
Tran, Xuan Thi	PO163	444
Traore, Sory	PO184	468
Tredan, Olivier	MOP3-05	230
Trinidad, Celestine Marie	PO265	562
Trinidad, Celestine Marie	PO266	563
Tripriadi, Effif Syofra	PO195	479
Tripriadi, Effif Syofra	PO224	511
Tripriadi, Effif Syofra	PO225	512
Tsai, C. Jillian	SM2-02	17
Tsai, Chin-Chuan	PO239	528
Tsai, Chin-Hu	PO239	528
Tsai, Kuen-Jang	PO239	528
Tsang, Janice	SM9-02	46
Tsang, Wai Fong	PO222	509
Tsemach, Ronit	PO014	278
Tsemach, Ronit	PO242	532
Tseng, Ling-Ming	MOP4-09	249
Tseng, Ling-Ming	PO035	303
Tseng, Ling-Ming	PO036	304
Tseng, Ling-Ming	PO037	305
Tseng, Mei-Fang	PO036	304
Tsoi, Daphne Tf	PO178	459
Tsoi, Yee-Kei Violet	PO068	338
Tsoti, Sandra Maria	PO067	337
Tsoti, Sandra Maria	PO138	416
Tsugawa, Koichiro	MOP4-08	247
Tsuji, Wakako	PO052	322

Name	Code	Page
Tsurutani, Junji	SM10-03	51
Tsuyuki, Shigeru	PO052	322
Tugano, Rachelle Joanne	PO102	377
Tukenmez, Mustafa	PO104	379
Tulyeubai, Khaibar	PO254	549
Tulyeubai, Khiabar	PO099	374
Tumursukh, Nomin Erdene	PO080	350
Tungprayoonlert, Thanisorn	PO136	414
Turner, Nicholas	PL6-01	9
Turner, Nicholas	SM7-01	37
Turner, Nicholas	MS5-04	123
Uetake, Hiroyuke	PO032	300
Urban, Matthew	MOP2-02	215
Usman, Fathar	PO224	511
Utami, Tania Nugrah	PO195	479
Utami, Tania Nugrah	PO224	511
Utami, Tania Nugrah	PO225	512
Uyama, Koh	PO261	558
V V H P K, Sasimouli	PO125	401
Vachtsevanos, Nikolaos	PO271	568
Valdiviezo, Natalia	PO012	276
Valenica, Guillermo	PO012	276
Vanmali, Vaibhav	PO124	400
Vano, Amanda May Ong	PO101	376
Veeraiyyan, Durgadevi	MOP1-02	205
Veeraiyyan, Durgadevi	PO021	287
Velaiutham, Shanta	PO048	317
Vidal, Gregory A	MOP3-08	235
Vidaurre, Tatiana	PO012	276
Viet, Cuong Nguyen	PO185	469
Villarreal-Garza, Cynthia M.	MOP3-05	230
Vlachogiorgos, Apostolos	PO067	337
Vlachogiorgos, Apostolos	PO138	416
Vo, Duc Hieu	PO217	503
Vo, Hong Minh Phuoc	PO217	503
Vo, Nam Khac	PO065	335
Vongsaisuwon, Mawin	PO136	414
Vongwattanakit, Phuphat	PO136	414
Vorburger, Denise	PO119	395
Vu, Thao	PO185	469
Wallen, Matthew	PO249	540
Wang, Chun Ting	PO069	339
Wang, Hsinhui	PO134	411
Wang, Shenghua	PO001	263
Wang, Wan-Lun	PO036	304
Wang, Wenwu	PO247	538
Wang, Xiaohong	MOP2-03	217
Wang, Yongsheng	CACAJS-02	164
Wang, Yongsheng	PO120	396
Wang, Yongsheng	PO153	434
Wang, Zixuan	PO247	538
Wannasri, Thitiporn	PO255	550
Wannasri, Thitiporn	PO268	565
Wansaicheong, Gervais	PO046	315
Ward, Joseph	PO285	582
Watanabe, Junichiro	PO250	542
Watanabe, Ken-Ichi	MOP4-08	247
Wei, Ching-Ting	PO167	448
Wei, Jennifer	PO178	459
Weng, Yu-Wen	PO175	456
Werlen, Laura	PO014	278
Werutsky, Gustavo	MOP3-07	233
Wetan, Ni Gusti Ayu Agung Manik Yuniawaty	PO003	266
Wibisana, Gunawan	PO049	318
Wibisana, Gunawan	PO141	420
Wihandono, Asdi	PO165	446
Witaningrum, Riani	PO194	478
Withana, Nimali P.	MOP3-07	233
Wittayagomol, Natnicha	PO268	565
Woen, Do Youn	MOP3-02	226
Woen, Do Youn	PO009	272
Woen, Do Youn	PO083	355
Woen, Doyoun	POD2-01	253
Woen, Doyoun	PO198	482
Wolf, Julie Ryan	PO249	540
Won, Hoyoun	MOP4-07	246
Wong, Allen Wei-Jiat	PO046	315
Wong, Chow Yin	PO171	452
Wong, Cindy	PO249	540

Name	Code	Page
Wong, Frank Chi Sing	PO154	435
Wong, Henry	PO249	540
Wong, Hiu Ching	PO154	435
Wong, Pui Sze	PO222	509
Wong, Serena Yu Yan	PO122	398
Wong, Yijia	PO046	315
Woo, Joo Hyun	PO127	404
Woo, Joohyun	PO209	494
Woo, Sang Uk	PO081	352
Wotherspoon, Andrew	PO285	582
Wu, Jiong	MOP3-07	233
Wu, Qingwei	PO120	396
Wu, Qingwei	PO153	434
Wu, Shih-Chung	PO181	463
Wu, Yongxin	PO121	397
Xiao, Chunhua	CACAJS-06	169
Xiao, Zhangsheng	PO247	538
Xie, Bojian	PO247	538
Xu, Binghe	GS2-03	148
Xu, Binghe	PO182	464
Xu, Binghe	PO183	466
Xu, Chaoyang	PO247	538
Xu, Hong Yun	PO105	381
Yadav, Sanjay Kumar	PO071	341
Yadav, Sanjay Kumar	PO072	342
Yadav, Sanjay Kumar	PO140	419
Yadav, Sanjay Kumar	PO223	510
Yadav, Sanjay Kumar	PO248	539
Yamada, Akimitsu	GS1-02	142
Yamada, Akimitsu	PO024	291
Yamada, Akimitsu	PO155	436
Yamagami, Kazuhiko	PO052	322
Yamaguchi, Ayane	PO052	322
Yamaguchi, Mina	PO051	320
Yamaguchi, Rin	PO051	320
Yamakawa, Arisa	PO051	320
Yamamoto, Sena	PO250	542
Yamashiro, Hiroyasu	PO052	322
Yamauchi, Chikako	PO155	436
Yanai, Hirotsugu	PO126	402
Yang, Chia-Ning	PO038	307
Yang, Christina Shi-Hui	PO171	452
Yang, Eun-Jung	MOP2-08	223
Yang, Eun-Jung	MOP4-06	244
Yang, Eun-Jung	PO084	356
Yang, Jiun	PO243	533
Yang, Jung Dug	POD4-02	260
Yang, Jung Dug	PO087	359
Yang, Jung Dug	PO143	422
Yang, Ming-Han	PO180	462
Yang, Ping Fu	PO214	499
Yang, Shih-Hung	PO180	462
Yang, Wilson	PO039	308
Yang, Yunjung	MOP2-08	223
Yang, Yun-Jung	PO253	547
Yao, Hengji	MOP2-03	217
Yao, Yao	MOP2-06	221
Yap, Yoon-Sim	MS4-02	117
Yap, Yoon-Sim	PO178	459
Yasuki, Yukichika	PO191	475
Yazkan, Cenk	PO033	301
Ye, Chenglin	MOP3-07	233
Ye, Jingming	MOP4-05	243
Yeo, Seung Mi	GS2-02	146
Yin, Yongmei	MOP3-05	230
Yirong, Sim	PO264	561
Yoh, Kyungah	MOP2-05	220
Yokoe, Takamichi	PO053	323
Yokouchi, Yuki	PO284	581
Yonemori, Kan	SM9-01	45
Yong, Esther Yen-Qin	PO131	408
Yong, Wei Sean	PO171	452
Yong, Wei Sean	PO277	574
Yoo, Tae Kyung	GS1-01	141
Yoo, Tae Kyung	MOP3-09	237
Yoo, Tae-Kyung	PO082	354
Yoo, Tae-Kyung	PO142	421
Yoo, Tae-Kyung Robyn	PD2-01	63
Yoo, Tae-Kyung Robyn	GS1-05	144
Yoo, Yonju	PO243	533

Name	Code	Page
Yoo, Young Bum	PO086	358
Yoon, Chang Ik	PO008	271
Yoon, Chang Ik	PO128	405
Yoon, Chang Ik	PO196	480
Yoon, Chang Ik	PO203	488
Yoon, Jina	ES3-03	94
Yoon, Jung Hee	PO229	516
Yoon, Jung Hyun	SM6-01	33
Yoon, Kwang Hyun	PO287	504
Yoon, Kyung-Hwak	PO010	274
Yoon, Yena	PO010	274
Yoon, Young Chul	PO253	547
Yoshida, Masahiro	PO284	581
Yoshimura, Michio	PO155	436
You, Ji Young	PO090	363
You, Ji Young	PO269	566
Youn, Hyun Jo	GS2-05	150
Youn, Hyun Jo	POD1-01	251
Youn, Hyun Jo	PO007	270
Youn, Hyun Jo	PO170	451
Youn, Inyoung	PO054	324
Yu, Chi-Chang	PO135	412
Yu, Da Young	PO078	348
Yu, Da Young	PO079	349
Yu, Jong Han	GS2-02	146
Yu, Jong Han	PO083	355
Yu, Jong Han	PO198	482
Yu, Jonghan	GS1-03	143
Yu, Jonghan	MOP3-02	226
Yu, Jonghan	MOP3-03	227
Yu, Jonghan	POD2-01	253
Yu, Jonghan	PO009	272
Yu, Jonghan	PO025	292
Yu, Jonghan	PO129	406
Yu, Jonghan	PO287	504
Yu, Jonghan	PO231	518
Yu, Jonghan	PO232	519
Yu, Jyh-Cherng	PO240	530
Yu, Langtian	MOP1-04	209
Yu, Zhuohang	MOP2-06	221
Yuen, Ho Yan	PO222	509
Yun, Hyunjin	PO058	328
Yusuf, Zahra Al	PO278	575
Zaguirre, Karen	PO100	375
Zarate, Juan Pablo	PO183	466
Zevallos, Alejandra	PO179	461
Zhang, Baoxuan	MOP3-06	232
Zhang, Bei	PO120	396
Zhang, Bei	PO153	434
Zhang, Jiale	MOP3-06	232
Zhang, Jin	PO182	464
Zhang, Juan	PO066	336
Zhang, Qingqing	PO017	283
Zhang, Yue	PO001	263
Zheng, Fangchao	MOP3-06	232
Zhou, Dongdong	MOP3-06	232
Zhou, Jun	MOP2-06	221
Zhou, Jun	MOP2-06	221
Zhou, Jun	PO247	538
Zhou, Jun	PO247	538
Zhu, Yuxuan	MOP2-06	221
Zikiryakhodzhaev, Azizzhon	PO147	428
Zou, Tao	PO018	284
Zuerrer-Haerdi, Ursina	PO014	278

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