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GBCC 2025

Global Breast Cancer Conference 2025

April 17 (Thu.) - 19 (Sat.) | Grand Walkerhill Seoul

Abstract Book

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한국유방암학회
Korean Breast Cancer Society

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Program at a Glance

April 17 Thu.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
08:45-09:00	**Opening Ceremony**				
09:00-10:15	**Symposium 1** Optimal Approach of Loco-Regional Management for "The" Patient	**Panel Discussion 1** Optimal Neoadjuvant Strategy for ER+ Breast Cancer	**Symposium 2** Current Status, Challenges, and Future Directions of Breast Cancer Screening in Asia	Special Session **OASIS Project** (Joint Session of KBCSG-JCOG-BCT)	**Oral Presentation 1**
10:15-10:30	**Break**				
10:30-11:45	**Symposium 3** Advancing Care in Breast Cancer for Young Women: Biology, Treatment, and Beyond	**Panel Discussion 2** Margin Assessment After Breast Conserving Surgery	**Education Session 1** Navigating the New Paradigm in Breast Pathology	Special Session **Policy on Breast Cancer**	**Oral Presentation 2**
11:45-12:00	**Break**				
12:00-12:45	**Plenary Lecture 1** Improved Understanding, Care and Outcomes for Young Breast Cancer Patients	Plenary Lecture 1			
12:45-13:00	**Break**				
	[1F, Amber] Meet the Master (Ann Partridge) 12:45-13:05				
13:00-13:45	**Satellite Symposium 1** Breakthroughs in Treatment of HER2 Expressing Metastatic Breast Cancer	**Satellite Symposium 2** First CDK4/6 Inhibitor for HR+/HER2- EBC: Abemaciclib- Increasing the Chance for Cure	Satellite Symposium 1	Satellite Symposium 2	
13:45-14:00	**Break**				
14:00-14:45	**Plenary Lecture 2** Advances in Tailoring Radiation Therapy for Breast Cancer	Plenary Lecture 2			
14:45-15:00	**Break**				
	[1F, Amber] Meet the Master (Reshma Jagsi) 14:45-15:05				
15:00-16:15		**Panel Discussion 3** Molecular Tumor Board: NGS-Guided Decision Making	**Symposium 4** Navigating Hormone Receptor-Positive Metastatic Breast Cancer: Innovations and Challenges	**ABCN Business Meeting** (Invited Only)	**Oral Presentation 3**
16:15-16:30		**Break**			
16:30-17:45		**Symposium 5** Liquid Biopsy in Breast Cancer	**Education Session 2** Innovative Approaches in Precision Medicine	**Symposium 6** Neurotization in Breast Reconstruction: Enhancing Outcome and Patient Quality of Life	**Oral Presentation 4**
17:45-18:00			**KBCS General Assembly** (17:45-18:00)		
18:00-20:00	**Welcome Dinner**				

April 18 Fri.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
08:00-08:45	**Satellite Symposium 3** Transforming HR+/HER2- Breast Cancer Care with Ribociclib: A Clinical Perspective				
08:45-09:00	**Break**				
09:00-10:15	**GBCC's Outstanding Oral Presentation 1**	**Panel Discussion 4** Integrative Approaches in Local Control for Breast Cancer	**Symposium 7** Salvage Treatment for Locoregional Recurrence	**Nursing Session 1** Comprehensive Patient Care for ABC Patients Treated with Radiotherapy KOR	**GBCC-TBCS Joint Session** Breast Cancer Research in Two Technology Powerhouses: Korea and Taiwan
10:15-10:30	**Break**				
10:30-11:45	**GBCC's Outstanding Oral Presentation 2**	**Panel Discussion 5** Collaborative Strategies for Brain Metastases in Breast Cancer	**Education Session 3** Optimal Surgical Treatment for Early to Advanced BC	**Nursing Session 2** Motherhood in Breast Cancer Survivor: Challenges and Opportunities KOR	**GBCC-JBCS Joint Session** JAPAN-KOREA Breast Cancer Research International Dialogue for Global Excellence (J-K BRIDGE)
11:45-12:00	**Break**				
12:00-12:45	**Plenary Lecture 3** Management of the Axilla in Patients Treated with Neoadjuvant Chemotherapy	Plenary Lecture 3			
12:45-13:00	**Break**				
	[1F, Amber] Meet the Master (Judy Boughey) 12:45-13:05				
13:00-13:45	**Satellite Symposium 4** Pembrolizumab: Writing a New Chapter in eTNBC	**Satellite Symposium 5** Time is Treatment: How PHESGO is Reshaping the HER2+ Breast Cancer Care	Satellite Symposium 4	Satellite Symposium 5	
13:45-14:00	**Break**				
14:00-14:45	**Plenary Lecture 4** Tracking Triple Negative Breast Cancer Evolution and Immune Evasion: Insights from TRACERx	Plenary Lecture 4			
14:45-15:00	**Break**				
	[1F, Amber] Meet the Master (Charles Swanton) 14:45-15:05				
15:00-16:15	**Symposium 8** From Neoadjuvant to Adjuvant: Optimizing Post Neoadjuvant Systemic Therapy	**Panel Discussion 6** How Deep Impact of gBRCA1/2 Sequencing	**Education Session 4** Antibody-Drug Conjugates in Clinical Practice: Bridging Innovation and Real-World Application	**Junior Doctors Forum** (15:00-15:50)	**GBCC-SSO Joint Session** Treatment Strategies for Low-Risk Ductal Carcinoma in Situ
15:50-16:15				**Break**	
16:15-16:30				**Break**	**Break**
16:30-17:45	**Symposium 9** From Genomics to Biomarker	Special Session **Clinical Controversy Session: Omission of SLNB in Early Breast Cancer**	**Education Session 5** Breast Reconstruction and RT	**Junior Doctors Debate** (16:05-17:45)	**GBCC-CACA Joint Session** New Developments in Systemic Management for High-Risk Early-Stage Hormone-Receptor-Positive, HER2-Negative Breast Cancer
17:45-19:00		**Break**			
19:00-21:00		**Presidential Dinner** (Invited Only) Théâtre des Lumières			

April 19 Sat.

Time	Room 1 (Vista 1+2)	Room 2 (Grand 1)	Room 3 (Walker 1)	Room 4 (Walker 2)	Room 5 (Art Hall)
08:00-08:45	**Satellite Symposium 6** Palbociclib in the Evolving Landscape of HR+ mBC Treatment: Real-World Data and Future Directions				
08:45-09:00	**Break**				
09:00-09:45	**Plenary Lecture 5** Targeting the Cell Cycle Machinery in Breast Cancer – Where to from Here?	Plenary Lecture 5			
09:45-10:00	**Break**				
	[1F, Amber] Meet the Master (Shom Goel) 09:45-10:05				
10:00-11:15	**Symposium 10** Advancing Treatment Paradigms in HER2-Positive Metastatic Breast Cancer: Perspectives and Innovations	**Endoscopic and Robotic Breast Surgery Session** Advancing Breast Cancer Surgery: Cost, Innovation, and Technical Excellence in Robotic-Assisted Approaches	**Practicing Breast Surgeons Session 1** Breast Screening KOR	**Breast Imaging Session 1** Breast Density as an Image-Based Biomarker	**Session for Breast Cancer Survivors 1** (10:00-10:55) AI
10:55-11:15					**Break**
11:15-11:35	**Break**				
11:35-12:50	**Insights of GBCC 2025**	Insights of GBCC 2025	**Practicing Breast Surgeons Session 2** Clinical Management of Benign Breast Disorder KOR	**Breast Imaging Session 2** Consensus in Postoperative Surveillance	**Session for Breast Cancer Survivors 2** (11:15-12:30) AI
12:30-12:50					**Break**
12:50-13:00	**Break**				
13:00-13:30	**Closing Ceremony**				
13:30-14:30	**Break**				
14:30-15:25					**Session for Breast Cancer Survivors 3** (14:30-15:25) AI
15:25-15:40					**Break**
15:40-17:05					**Session for Breast Cancer Survivors 4** (15:40-17:05) AI

ePoster : Passage between Grand Hall and Ida (Speaker's Lounge)
Exhibition: Vista 3+Hall Lobby (B2), Grand 2+3 (B1)

한국어 통역이 제공되는 세션입니다.
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.**
(AI 통역이 제공되는 세션입니다.)

Day 1 April 17 (Thu)

09:00-10:15 Symposium 1 RM 1 (Vista 1+2)

Optimal Approach of Loco-Regional Management for "The" Patient

Moderator **Kweon Cheon Kim**
Chosun Univ. Hospital, Korea

Moderator **Olga Kantor**
Dana-Farber Cancer Institute, U.S.A.

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De-escalation Strategies for Axillary Surgery in Early-Stage Indolent Breast Cancer
The Royal Marsden NHS Foundation Trust, United Kingdom

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Local Control After Recurrence: When to Do Re-sentinel Biopsy, Re-radiotherapy
Dana-Farber Cancer Institute, U.S.A.

Speaker **Sung Gwe Ahn** 12
Sequencing Systemic Therapy and Local Control for Advanced BCs
Gangnam Severance Hospital, Korea

09:00-10:15 Panel Discussion 1 RM 2 (Grand 1)

Optimal Neoadjuvant Strategy for ER+ Breast Cancer

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

Moderator **Erica Mayer**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Kyung-Hun Lee** 45
Neoadjuvant vs. Adjuvant Chemotherapy for ER+ Breast Cancer
Seoul National Univ. Hospital, Korea

Speaker **Sherene Loi** 46
Emerging Option of Neoadjuvant Immunotherapy for ER+ Breast Cancer
Univ. of Melbourne, Australia

Speaker **Erica Mayer** 47
Current Status and Future Directions of Neoadjuvant Hormonal Therapy
Dana-Farber Cancer Institute, U.S.A.

All Discussion

09:00-10:15 Symposium 2 RM 3 (Walker 1)

Current Status, Challenges, and Future Directions of Breast Cancer Screening in Asia

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

Moderator **Hongping Song**
Xijing Hospital, China

Speaker **Jae Kwan Jun** 13
Screening for Breast Cancer in Korea: Yesterday, Today and Tomorrow
National Cancer Center, Korea

Day 1 April 17 (Thu)

Speaker **Hongping Song** *14*
Breast Cancer Screening in China: Policies, Current Status, and Key Challenges
Xijing Hospital, China

Speaker **Rashmi Sudhir** *15*
Breast Cancer Screening in India: Policies, Current Status, and Key Challenges
Apollo Hospitals Jubilee Hills, India

09:00-10:15 Special Session RM 4 (Walker 2)

OASIS Project (Joint Session of KBCSG-JCOG-BCT)

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

Moderator **Tadahiko Shien**
Okayama Univ. Hospital, Japan

Moderator **Bruce Mann**
Univ. of Melbourne, Australia

Speaker **Hiroji Iwata** *96*
Introduction of OASIS Project
Nagoya City Univ., Japan

Speaker **Chihwan David Cha** *97*
Ongoing and Proposal Trials (KBCSG)
Hanyang Univ. College of Medicine, Korea

Speaker **Yuko Takahashi** *99*
Omission of Adjuvant Endocrine Therapy for ER+T1ab BC
Okayama Univ. Hospital, Japan

Speaker **Kaori Terata** *100*
Omission of Axillary Dissection for cN+BC
Akita Univ. Hospital, Japan

Speaker **Nicholas Zdenkowski** *102*
Ongoing and Proposal Trials (BCT)
Breast Cancer Trials (ANZ), Australia

All Discussion

09:00-10:15 Oral Presentation 1 RM 5 (Art Hall)

Moderator **Sang Yull Kang**
Jeonbuk National Univ. Hospital, Korea

Moderator **Tae-In Yoon**
Dongnam Institute of Radiological & Medical Sciences, Korea

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The Effect of Axillary Surgery on the Prognosis of IBTR after BCS
ASAN Medical Center, Korea

Presenter **Tae Hoon Lee** *169*
What Is the Appropriate Radiation Dose to Axillary Nodes with Prior Metastasis in cN+ Breast Cancer Downstaged to ypN0 After Preoperative Systemic Therapy: A Comprehensive Dosimetric Analysis
Samsung Medical Center, Korea

Day 1 April 17 (Thu)

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Seoul National Univ. Hospital, Korea

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Samsung Medical Center, Korea

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Seoul National Univ. Bundang Hospital, Korea

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Guy's and St Thomas' NHS Foundation Trust, United Kingdom

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Percutaneous Cryoablation with Palliative Intent for Breast Cancer Patients: Feasibility, Safety and Tumor Ablation Rate
Queen Mary Hospital, Hong Kong

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Initial Experience on Broadening the Use of Cryoablation on early Breast Cancers
The Univ. of Hong Kong, Hong Kong

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Comparative Incidence Rates and Survival Rates in BRCA-positive patients: A Meta-Analysis of Active Surveillance versus Risk Reduction Mastectomy
Makati Medical Center, Philippines

10:30-11:45 Symposium 3 RM 1 (Vista 1+2)

Advancing Care in Breast Cancer for Young Women: Biology, Treatment, and Beyond

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

Moderator **Ann Partridge**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Yeon Hee Park** *16*
Unique Challenges in Breast Cancer for Young Women: What's Different?
Samsung Medical Center, Korea

Speaker **Ann Partridge** *17*
Endocrine Treatment Strategies for Young Women: Tailoring for Optimal Outcomes
Dana-Farber Cancer Institute, U.S.A.

Speaker **Matteo Lambertini** *18*
BRCA Mutations in Young Women's Breast Cancer: Risk, Treatment, and Implications for Family Planning
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

Day 1 April 17 (Thu)

10:30-11:45 **Panel Discussion 2** **RM 2 (Grand 1)**

Margin Assessment After Breast Conserving Surgery

Moderator **Byung Ho Son**
ASAN Medical Center, Korea

Moderator **E. Shelley Hwang**
Duke Univ. School of Medicine, U.S.A.

Speaker **E. Shelley Hwang** 48
Width of Closest Margin: Greater the Safer?
Duke Univ. School of Medicine, U.S.A.

Speaker **Su Ssan Kim** 49
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ASAN Medical Center, Korea

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Cancer Institute Hospital of Japanese Foundation for Cancer Research, Japan

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The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

Moderator **Eun Young Kim**
Kangbuk Samsung Hospital, Korea

Speaker **Eun Yoon Cho** 64
ER-Low and HER2-Low Breast Cancer: Pathological and Clinical Landscape
Samsung Medical Center, Korea

Speaker **Eun Young Kim** 65
Lobular Carcinoma: Current Concepts and Clinical & Therapeutic Implications
Kangbuk Samsung Hospital, Korea

Speaker **Nariya Cho** 66
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Seoul National Univ. Hospital, Korea

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Policy on Breast Cancer

Moderator **Hyukjai Shin**
Myongji Hospital, Korea

Moderator **Takashi Ishikawa**
Tokyo Medical Univ., Japan

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Emory Univ., U.S.A.

Day 1 April 17 (Thu)

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Siriraj Hospital, Mahidol Univ., Thailand

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National Cancer Center of Mongolia, Mongolia

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Chungbuk National Univ. Hospital, Korea

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The Catholic Univ. of Korea, Incheon St. Mary's Hospital, Korea

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National Univ. of Singapore, Singapore

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Univ. of St.Gallen, Switzerland

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Presenter **Po-Hsiang Huang** 184
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National Taiwan Univ. Hospital, Taiwan

Day 1 April 17 (Thu)

12:00-12:45 Plenary Lecture 1 RM 1 (Vista 1+2)

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

Speaker **Ann Partridge** *2*
Improved Understanding, Care and Outcomes for Young Breast Cancer Patients
Dana-Farber Cancer Institute, U.S.A.

13:00-13:45 Satellite Symposium 1 RM 1 (Vista 1+2)

Astrazeneca & Daiichi Sankyo

Moderator **Ho Yong Park**
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Dae-Won Lee** *148*
Breakthroughs in Treatment of HER2 Expressing Metastatic Breast Cancer
Seoul National Univ. Hospital, Korea

13:00-13:45 Satellite Symposium 2 RM 2 (Grand 1)

Lilly Korea

Moderator **Joohyuk Sohn**
Yonsei Univ. College of Medicine, Korea

Speaker **Matteo Lambertini** *150*
First CDK4/6 Inhibitor for HR+/HER2- EBC: Abemaciclib-Increasing the Chance for Cure
Univ. of Genova - IRCCS Policlinico San Martino Hospital, Italy

14:00-14:45 Plenary Lecture 2 RM 1 (Vista 1+2)

Moderator **Sung-Ja Ahn**
Chonnam National Univ. Medical School, Korea

Speaker **Reshma Jagsi** *3*
Advances in Tailoring Radiation Therapy for Breast Cancer
Emory Univ., U.S.A.

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

Molecular Tumor Board: NGS-Guided Decision Making

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

Moderator **Pedram Razavi**
Memorial Sloan Kettering Cancer Center, U.S.A.

Speaker **Jee Hyun Kim** *51*
Case Presentation
Seoul National Univ. Bundang Hospital, Korea

Speaker **Pedram Razavi**
Case Presentation
Memorial Sloan Kettering Cancer Center, U.S.A.

Day 1 April 17 (Thu)

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

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

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

All Discussion

15:00-16:15 **Symposium 4** **RM 3 (Walker 1)**

Navigating Hormone Receptor-Positive Metastatic Breast Cancer: Innovations and Challenges

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

Moderator **Shigehira Saji**
Fukushima Medical Univ., Japan

Speaker **Hee Kyung Ahn** *19*
CDK4/6 Inhibitors: Challenges and Beyond
Samsung Medical Center, Korea

Speaker **Erica Mayer** *20*
ET-Based Combinations and Novel Agents in HR+/HER2- Advanced Breast Cancer
Dana-Farber Cancer Institute, U.S.A.

Speaker **Shigehira Saji** *21*
ADCs in HR+/HER2- Advanced Breast Cancer
Fukushima Medical Univ., Japan

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

15:00-16:15 **Oral Presentation 3** **RM 5 (Art Hall)**

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Moderator **Joohyun Woo**
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Yonsei Univ. College of Medicine, Korea

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Day 1 April 17 (Thu)

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All India Institute of Medical Sciences, India

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Kyungpook National Univ., Korea

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EDIL3+ CAFs Promote Lymph Node Metastasis by Disrupting Lymphatic Endothelial Barriers in Breast Cancer
Second Affiliated Hospital of Zhejiang Univ. School, China

Presenter **Zhao Xian Ni** *192*
Reclassification of Germline BRCA1/2 Variants of Uncertain Significance Following Breast Cancer Next Generation Sequencing
The Univ. of Hong Kong, Hong Kong

16:30-17:45 Symposium 5 RM 2 (Grand 1)

Liquid Biopsy in Breast Cancer

Moderator **Joohyuk Sohn**
Yonsei Univ. College of Medicine, Korea

Moderator **Ben Ho Park**
Vanderbilt Univ. Medical Center, U.S.A.

Speaker **Heather Parsons** *22*
Current Technologies in Liquid Biopsy: A Comprehensive Review
Dana-Farber Cancer Institute, U.S.A.

Speaker **Pedram Razavi** *23*
Liquid Biopsy in Early Breast Cancer: MRD Monitoring, Early Detection, and Adaptive Therapeutic Decisions
Memorial Sloan Kettering Cancer Center, U.S.A.

Speaker **Ben Ho Park** *24*
Biomarkers and Resistance in Metastatic Breast Cancer: Tailoring Liquid Biopsy Approaches
Vanderbilt Univ. Medical Center, U.S.A.

16:30-17:45 Education Session 2 RM 3 (Walker 1)

Innovative Approaches in Precision Medicine

Moderator **Jong Won Lee**
ASAN Medical Center, Korea

Day 1 April 17 (Thu)

Moderator **Jennifer Ligibel**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Jennifer Ligibel** 68
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Dana-Farber Cancer Institute, U.S.A.

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Kakao Healthcare, Korea

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JNPMEDI, Korea

16:30-17:45 Symposium 6 RM 4 (Walker 2)

Neurotization in Breast Reconstruction: Enhancing Outcome and Patient Quality of Life

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Samsung Medical Center, Korea

Moderator **Visnu Lohsiriwat**
Siriraj Hospital, Mahidol Univ., Thailand

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Seoul National Univ. Bundang Hospital, Korea

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An Educational Video as an Aid in Pre-test Genetic Counselling in a Breast Clinic of a Multicultural Asian City
The Univ. of Hong Kong, Hong Kong

Presenter **Suyeon Kim** *199*
Adherence to Hormonal Therapy in Breast Cancer Patients: EHR-based Retrospective Data Analysis
ASAN Medical Center, Korea

Presenter **Lisa Clara Schiess** *200*
Non-pharmacological Interventions for Distress and Anxiety in Patients with Breast Cancer and their Family Caregivers: A Systematic Review and Meta-Analysis
Univ. of Basel, Switzerland

Day 2 April 18 (Fri)

08:00-08:45 **Satellite Symposium 3** **RM 1 (Vista 1+2)**

Novartis Korea

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

Speaker **Sherene Loi** *152*
Transforming HR+/HER2- Breast Cancer Care with Ribociclib: A Clinical Perspective
Univ. of Melbourne, Australia

09:00-10:15 **Special Session** **RM 1 (Vista 1+2)**

GBCC's Outstanding Oral Presentation 1

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

Moderator **In Hae Park**
Korea Univ. Guro Hospital, Korea

Presenter **Chihwan David Cha** *107*
Contributing Factors of Contralateral Breast Cancer Among Breast Cancer Patients with BRCA Mutation (KoREa-BSG 06-2)
Hanyang Univ. College of Medicine, Korea

Presenter **Seung Ho Baek** *108*
Pathogenic Variant Frequency in Multi-gene Panel Testing of Germline BRCA-negative Breast Cancer Patients with Hereditary Risk Factors
Yongin Severance Hospital, Korea

Discussant **Stephanie M. Wong**
Discussion for Abstract AAA001 and AAA002
Jewish General Hospital Segal Cancer Centre, Canada

Presenter **Ni Chao** *109*
Joint Label-Guided Analysis of Tumor microenvironment Causality and Clinical outcomes in Breast Cancer Using Multisequence MRI and Artificial Intelligence
Second Affiliated Hospital, School of Medicine, Zhejiang Univ., China

Presenter **Young-Jin Lee** *110*
Re-evaluation of HER2 Pathology and the Prognostic Implications of HER2 Ultra-low and Low in Estrogen Receptor-Positive Breast Cancer
ASAN Medical Center, Korea

Discussant **Jiwon Koh**
Discussion for Abstract AAA003 and AAA004
Seoul National Univ. Hospital, Korea

09:00-10:15 **Panel Discussion 4** **RM 2 (Grand 1)**

Integrative Approaches in Local Control for Breast Cancer

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

Moderator **Judy Boughey**
Mayo Clinic, U.S.A.

Day 2 April 18 (Fri)

Speaker **Judy Boughey** 52
Breast-Conserving Surgery for Multiple Ipsilateral Breast Cancer
Mayo Clinic, U.S.A.

Speaker **E. Shelley Hwang** 53
Axillary Management According to the Subtype
Duke Univ. School of Medicine, U.S.A.

Speaker **Jai Min Ryu** 55
Immediate Reconstruction After Ipsilateral Breast Recurrence
Samsung Medical Center, Korea

All Discussion

09:00-10:15 Symposium 7 RM 3 (Walker 1)

Salvage Treatment for Locoregional Recurrence

Moderator **Suzy Kim**
SMG-SNU Boramae Medical Center, Korea

Moderator **Jean-Michel Hannoun-Levi**
Antoine Lacassagne Cancer Centre, Univ. Cote d'Azur, France

Speaker **Jong-Ho Cheun** 28
Enhancing Local Treatment Strategies: Innovation and Challenges
SMG-SNU Boramae Medical Center, Korea

Speaker **Jean-Michel Hannoun-Levi** 30
Salvage Reirradiation for In-Breast Recurrence
Antoine Lacassagne Cancer Centre, Univ. Cote d'Azur, France

Speaker **Chikako Yamauchi** 32
Management for Non-Axillary Regional Recurrence
Shiga General Hospital, Japan

09:00-10:15 Nursing Session 1 (Kor.) RM 4 (Walker 2)

Comprehensive Patient Care for ABC Patients Treated with Radiotherapy

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

Moderator **Byonghee Jeon**
Yonsei Univ. Severance Hospital, Korea

Speaker **Hyungran Lee** 140
Breast Reconstruction and Radiation Therapy: From Breast Cancer Patient Perspective
Kyung Hee Univ., Korea

Speaker **Hye Sung Moon** 141
Use of Radiotherapy in Advanced Breast Cancer: The Role of a Nurse
Ewha Womans Univ. Medical Center, Korea

Speaker **Byunghee Son** 142
Patient Education for Breast Cancer Patients Undergoing Radiation Therapy
Yonsei Cancer Center, Korea

Day 2 April 18 (Fri)

09:00-10:15 **GBCC-TBCS Joint Session** **RM 5 (Art Hall)**

Breast Cancer Research in Two Technology Powerhouses: Korea and Taiwan

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

Moderator **Chi-Cheng Huang**
Taipei Veterans General Hospital, Taiwan

Speaker **Jung Eun Choi** *116*
Big Data Analysis of Electronic Health Records for Breast Cancer Patients
Yeungnam Univ. Medical Center, Korea

Speaker **Il-Yong Chung** *117*
Big Data Analysis of National Healthcare Data for Breast Cancer
ASAN Medical Center, Korea

Speaker **Han Fang Cheng** *118*
AI-Powered Research of Breast Cancer
Taipei Veterans General Hospital, Taiwan

Speaker **Yi-Hsin Yang** *119*
Balancing Privacy Regulations and Data Utilization in Breast Cancer Research
National Health Research Institute, Taiwan

All Discussion

10:30-11:45 **Special Session** **RM 1 (Vista 1+2)**

GBCC's Outstanding Oral Presentation 2

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

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

Presenter **Soo Yeon Baek** *111*
Adherence to Adjuvant Tamoxifen Among Premenopausal Patients with Breast Cancer in the ASTRRA Trial
Ajou Univ. Hospital, Korea

Presenter **Zhao Bi** *112*
Clinical and Translational Study for the Strategy Optimization of Neoadjuvant Endocrine Therapy in HR+/HER2- Breast Cancer
Shandong Cancer Hospital & Institute, China

Discussant **Hiroji Iwata**
Discussion for Abstract AAA005 and AAA006
Nagoya City Univ., Japan

Presenter **Jayme Natasha Paggao Paggao** *113*
Accuracy of OPTIMIST Trial criteria in Predicting Pathologic Complete Response Following Neoadjuvant Systemic Therapy
Univ. of the East Ramon Magsaysay Memorial Medical Center, Philippines

Presenter **Jijung Jung** *114*
Redefining Criteria for Omitting Axillary Surgery Following Neoadjuvant Systemic Therapy in Patients with Breast Cancer
Seoul National Univ. Hospital, Korea

Day 2 April 18 (Fri)

Discussant **Bruce Mann**
Discussion for Abstract AAA007 and AAA008
Univ. of Melbourne, Australia

10:30-11:45 **Panel Discussion 5** **RM 2 (Grand 1)**

Collaborative Strategies for Brain Metastases in Breast Cancer

Moderator **Gun Min Kim**
Yonsei Univ. College of Medicine, Korea

Moderator **Nancy Lin**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Nancy Lin** 56
Screening or Early Detection of Brain Metastases and the Treatment in the Era of New Agents
Dana-Farber Cancer Institute, U.S.A.

Speaker **Young Zoon Kim** 57
Recent Update on Neurosurgical Management of Breast Cancer Brain Metastasis
Sungkyunkwan Univ. School of Medicine, Korea

Speaker **Yutaro Koide** 58
Novel Radiotherapeutic Strategies in Brain Metastases: Including New Perspectives in the Era of ADCs and Immunotherapy
Aichi Cancer Center Hospital, Japan

All Discussion

10:30-11:45 **Education Session 3** **RM 3 (Walker 1)**

Optimal Surgical Treatment for Early to Advanced BC

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

Moderator **Tadahiko Shien**
Okayama Univ. Hospital, Japan

Speaker **Jiwon Koh** 71
Pathological Features, Breast Cancer Risk and Optimal Treatment in LCIS
Seoul National Univ. Hospital, Korea

Speaker **Tristen Park** 72
Surgical Controversies in Inflammatory Breast Cancer
Mount Sinai Hospital, U.S.A.

Speaker **Tadahiko Shien** 73
Surgical Controversies in De Novo Metastatic Breast Cancer
Okayama Univ. Hospital, Japan

10:30-11:45 **Nursing Session 2 (Kor.)** **RM 4 (Walker 2)**

Motherhood in Breast Cancer Survivor: Challenges and Opportunities

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

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Moderator **Sue Kim**
Yonsei Univ., Korea

Speaker **Jeonghee Ahn** 143
Motherhood and Pregnancy Planning Among Young Breast Cancer Survivors
Hanyang Univ., Korea

Speaker **Eun-Young Jun** 144
Experience in Running a Vitality Recovery Program for Couples with Women's Cancer: Focusing on Breast Cancer
Daejeon Univ., Korea

Speaker **Eunkyung Hwang** 145
Psychosocial Intervention for Children of Breast Cancer Patients
Seoul National Univ. Hospital, Korea

10:30-11:45 GBCC-JBCS Joint Session RM 5 (Art Hall)

JAPAN-KOREA Breast Cancer Research International Dialogue for Global Excellence (J-K BRIDGE)

Moderator **Jun Won Min**
Dankook Univ. Hospital, Korea

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

Speaker **Chihwan David Cha** 129
Data on BRCA in Korea
Hanyang Univ. College of Medicine, Korea

Speaker **Kumiko Kida** 130
Data on BRCA in Japan
St. Luke's International Hospital, Japan

Speaker **Young-Jin Lee** 131
Fertility Preservation Survey Study
ASAN Medical Center, Korea

All Discussion

Speaker **Jeeyeon Lee** 133
Surgical Trends in Korea
Kyungpook National Univ. Chilgok Hospital, Korea

Speaker **Hitomi Mori** 134
Surgical Trends in Japan
Japanese Red Cross Fukuoka Hospital, Japan

All Discussion

12:00-12:45 Plenary Lecture 3 RM 1 (Vista 1+2)

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

Speaker **Judy Boughey** 4
Management of the Axilla in Patients Treated with Neoadjuvant Chemotherapy
Mayo Clinic, U.S.A.

Day 2 April 18 (Fri)

13:00-13:45 **Satellite Symposium 4** **RM 1 (Vista 1+2)**

MSD KOREA

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

Speaker **Jieun Lee** 154
Pembrolizumab: Writing a New Chapter in eTNBC
The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

13:00-13:45 **Satellite Symposium 5** **RM 2 (Grand 1)**

Roche Korea co.,Ltd

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

Speaker **Jee Hung Kim** 156
Time is Treatment: How PHESGO is Reshaping the HER2+ Breast Cancer Care
Gangnam Severance Hospital, Korea

14:00-14:45 **Plenary Lecture 4** **RM 1 (Vista 1+2)**

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

Speaker **Charles Swanton** 6
Tracking Triple Negative Breast Cancer Evolution and Immune Evasion: Insights from TRACERx
The Francis Crick Institute, United Kingdom

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

From Neoadjuvant to Adjuvant: Optimizing Post Neoadjuvant Systemic Therapy

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

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

Speaker **In Hae Park** 33
Optimizing Adjuvant Treatment After Neoadjuvant Treatment in TNBC-ICI and Beyond
Korea Univ. Guro Hospital, Korea

Speaker **Yoon-Sim Yap** 35
New Approach of Neoadjuvant & Adjuvant Treatment in HER2 Positive Breast Cancer
- De-escalation and Novel Agents
National Cancer Centre Singapore, Singapore

Speaker **Yen-Shen Lu** 36
Tailoring Neo & Adjuvant Treatment in HR Positive EBC
National Taiwan Univ. Hospital, Taiwan

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15:00-16:15 **Panel Discussion 6** **RM 2 (Grand 1)**

How Deep Impact of gBRCA1/2 Sequencing

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

Moderator **Tira Tan**
National Cancer Centre Singapore, Singapore

Speaker **Hee Yeon Kim** 59
gBRCA1/2 Genes in Breast Cancer: Real-World Data and the Value of Universal Testing
Inje Univ. Busan Paik Hospital, Korea

Speaker **Tira Tan** 61
Endocrine-Resistant Breast Cancer in gBRCA Carriers
National Cancer Centre Singapore, Singapore

Speaker **Stephanie M. Wong** 62
Survival Analysis After Risk-Reducing Surgeries in BRCA Carriers with Breast Cancer
Jewish General Hospital Segal Cancer Centre, Canada

All Discussion

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

Antibody-Drug Conjugates in Clinical Practice: Bridging Innovation and Real-World Application

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

Moderator **Jennifer Ligibel**
Dana-Farber Cancer Institute, U.S.A.

Speaker **Jennifer Ligibel** 75
From Development to Current Status: The Evolution of ADCs
Dana-Farber Cancer Institute, U.S.A.

Speaker **Kyong Hwa Park** 76
Beyond HER2 & TROP2: New Targets and Strategic Advances
Korea Univ. Anam Hospital, Korea

Speaker **Sherene Loi** 77
Mechanisms of Resistance and Overcoming Strategies
Univ. of Melbourne, Australia

15:00-15:50 **Junior Doctors Forum** **RM 4 (Walker 2)**

Moderator **Ku Sang Kim**
Kosin Univ. Gospel Hospital, Korea

Speaker **Nancy Lin** 137
The Key Points of Starting and Establishing an Institutional Database and Cohort Studies
Dana-Farber Cancer Institute, U.S.A.

Speaker **Joon Jeong** 138
The Experience of Being a Research Fellow Overseas
Gangnam Severance Hospital, Korea

Day 2 April 18 (Fri)

15:00-16:15 **GBCC-SSO Joint Session** **RM 5 (Art Hall)**

Treatment Strategies for Low-Risk Ductal Carcinoma in Situ

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

Moderator **E. Shelley Hwang**
Duke Univ. School of Medicine, U.S.A.

Speaker **E. Shelley Hwang** *121*
Surgical Treatment (Surveillance or Operation)
Duke Univ. School of Medicine, U.S.A.

Speaker **Jong Eun Lee** *122*
Endocrine Treatment (Omission or Medication)
Soonchunhyang Univ. Hospital Cheonan, Korea

Speaker **Haeyoung Kim** *124*
Radiation Treatment (Omission or Radiotherapy)
Samsung Medical Center, Korea

All Discussion

16:05-17:45 **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
SNB Omission vs RT Omission in a Postmenopausal, 68YO Women with a cT1N0, G2, HR+HER2- Tumor

Team 3 vs. Team 4
Postmenopausal, 62YO Women had 2cm Calcification on Screening Mammography. Biopsy Diagnosed this as DCIS, Grade 2, ER/PR Positive, Minimal Risk Factors

16:30-17:45 **Symposium 9** **RM 1 (Vista 1+2)**

From Genomics to Biomarker

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

Moderator **Charles Swanton**
The Francis Crick Institute, United Kingdom

Speaker **Charles Swanton** *37*
Mechanisms of Immune Evasion and Control in Breast Cancer
The Francis Crick Institute, United Kingdom

Speaker **Shom Goel** *38*
Molecular Determinants of CDK4/6 Inhibitor Response – What Have We Learned?
Peter MacCallum Cancer Centre and Univ. of Melbourne, Australia

Day 2 April 18 (Fri)

Speaker **Ben Ho Park** *39*
Biomarkers for Breast Cancer: Predictive vs. Prognostic; Clinical Validation vs. Clinical Utility
Vanderbilt Univ. Medical Center, U.S.A.

16:30-17:45 **Special Session** **RM 2 (Grand 1)**

Clinical Controversy Session: Omission of SLNB in Early Breast Cancer

Moderator **Olga Kantor**
Introduction
Dana-Farber Cancer Institute, U.S.A.

Speaker **Wonshik Han**
De-escalation of Axillary Staging: Lessons from Clinical Trials and Real-world Practice
Seoul National Univ. Hospital, Korea

Speaker **Hae Jin Park**
Axillary Management in the Era of De-escalation: Radiation Oncologist's Perspective
Hanyang Univ. Seoul Hospital

Speaker **Bruce Mann**
Less is More: Redefining Surgical Standards in Breast Cancer
Univ. of Melbourne, Australia

Speaker **Sung Hoon Sim**
Systemic Therapy Decision-making Without Axillary Staging: A Medical Oncologist's Perspective
National Cancer Center, Korea

All Discussion

All Wrap up

16:30-17:45 **Education Session 5** **RM 3 (Walker 1)**

Breast Reconstruction and RT

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

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

Speaker **Reshma Jagsi** *78*
Patient-Reported Outcome After Breast Reconstruction with RT
Emory Univ., U.S.A.

Speaker **Seung Yong Song** *79*
Evaluation and Management for Capsular Contracture
Yonsei Univ. College of Medicine, Korea

Speaker **Tae Hoon Lee** *80*
Strategy to Minimize RT Toxicity
Samsung Medical Center, Korea

Day 2 April 18 (Fri)

16:30-17:45 **GBCC-CACA Joint Session** **RM 5 (Art Hall)**

New Developments in Systemic Management for High-Risk Early-Stage Hormone-Receptor-Positive, HER2-Negative Breast Cancer

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

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

Speaker **Qiao Li** *126*
Risk Stratification in Early Breast Cancer Adjuvant Use of CDK4/6 Inhibitors
Cancer Hospital, Chinese Academy of Medical Science, China

Speaker **Soo Jung Lee** *127*
Risk Stratification in Early Breast Cancer: Who Truly Benefits from CDK4/6 Inhibition? (Biomarker Driven Approach)
Kyungpook National Univ. Chilgok Hospital, Korea

Panelist **Bo Chen**
The First Hospital of China Medical Univ., China

Panelist **Binbin Cong**
Shandong Cancer Hospital and Institute, China

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

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

Panelist **Yongsheng Wang**
Shandong Cancer Hospital & Institute, China

All Discussion

Day 3 April 19 (Sat)

08:00-08:45 **Satellite Symposium 6** **RM 1 (Vista 1+2)**

Pfizer Korea

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

Speaker **Hee Kyung Ahn** 159
Palbociclib in the Evolving Landscape of HR+ mBC Treatment: Real-World Data and Future Directions
Samsung Medical Center, Korea

09:00-09:45 **Plenary Lecture 5** **RM 1 (Vista 1+2)**

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

Speaker **Shom Goel** 7
Targeting the Cell Cycle Machinery in Breast Cancer – Where to from Here?
Peter MacCallum Cancer Centre and Univ. of Melbourne, Australia

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

Advancing Treatment Paradigms in HER2-Positive Metastatic Breast Cancer: Perspectives and Innovations

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

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

Speaker **Jieun Lee** 40
Treatment Landscape for HER2-Positive MBC: Exploring Novel Therapies Beyond T-Dxd
The Catholic Univ. of Korea, Seoul St. Mary's Hospital, Korea

Speaker **Soo-Chin Lee** 41
Emerging Questions in the Treatment of HER2-Positive MBC: 1) Does Endocrine Therapy Still Have a Role in HR+/HER2-Positive Disease? 2) Can We Safely Discontinue Systemic Therapy in Long Responder?
National Univ. Cancer Institute, Singapore (NCIS), Singapore

Speaker **Min Hwan Kim** 42
Real-World Outcomes for HER2-Positive MBC: Exploring Global Perspectives and Regional Differences in Treatment Approaches
Yonsei Univ. College of Medicine, Korea

10:00-11:15 **Endoscopic and Robotic Breast Surgery Session** **RM 2 (Grand 1)**

Advancing Breast Cancer Surgery: Cost, Innovation, and Technical Excellence in Robotic-Assisted Approaches

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

Day 3 April 19 (Sat)

Moderator **Fiona Tsui-Fen Cheng**
Shin Kong Wu Ho-Su Memorial Hospital, Taiwan

Speaker **Giada Pozzi** 92
Balancing Innovation and Economics: The Cost-Effectiveness of Robot-Assisted Nipple Sparing Mastectomy
Candiolo Cancer Institute, Italy

Speaker **Fiona Tsui-Fen Cheng** 93
Experiences in Pioneering Advances in Robotic Breast Cancer Surgery
Shin Kong Wu Ho-Su Memorial Hospital, Taiwan

Speaker **Hyung Seok Park** 94
Technical Challenges and Solutions for Robot-Assisted Nipple-Sparing Mastectomy in Large and Ptotic Breasts
Yonsei Univ. College of Medicine, Korea

10:00-11:15 Practicing Breast Surgeons Session 1 (Kor.) RM 3 (Walker 1)

Breast Screening

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

Speaker **Yumi Kim**
Usefulness of Blood Test (Mastocheck2) in Breast Cancer Screening and Follow Up
CHA Gangnam Medical Center, Korea

Speaker **Hyo-Jae Lee**
Optimizing Breast Cancer Detection in Dense Breasts: A Comparative Approach to Digital Breast Tomosynthesis and Ultrasound
Chonnam National Univ. Hospital, Korea

Speaker **Sung Ui Shin**
Overview of Auto Ultrasound and Hand Held Ultrasound
Seoul National Univ. Hospital, Korea

10:00-11:15 Breast Imaging Session 1 RM 4 (Walker 2)

Breast Density as an Image-Based Biomarker

Moderator **Woo Kyung Moon**
Seoul National Univ. Hospital, Korea

Moderator **John Shepherd**
Univ. of Hawai'i, U.S.A.

Speaker **John Shepherd** 83
Mammographic Breast Density: Assessment and Clinical Implications
Univ. of Hawai'i, U.S.A.

Speaker **Boyoung Park** 84
Mammographic Breast Density as a Predictor of Breast Cancer Risk in Korean Women
Hanyang Univ. College of Medicine, Korea

Day 3 April 19 (Sat)

Speaker **Somin Jeon** *86*
Utilizing the Korean National Health Insurance and Breast Cancer Screening Database for Breast Cancer Risk Assessment Research
Hanyang Univ. College of Medicine, Korea

10:00-10:55 **Special Session** **RM 5 (Art Hall)**

Session for Breast Cancer Survivors 1: Understanding the Basics of Breast Cancer

Moderator **Soo Yeon Baek**
Ajou Univ. Hospital, Korea

Speaker **Soo Yeon Baek**
Why Does Breast Cancer Happen? Exploring Causes and Risk Factors
Ajou Univ. Hospital, Korea

Speaker **Enver Özkurt**
The Spectrum of Breast Cancer: Understanding Subtypes
Istanbul Demiroglu Bilim Univ., Republic of Türkiye

Speaker **Sue Kim**
BRCA and Genetic Counseling: Unveiling Your Genetic Risk
Yonsei Univ., Korea

Speaker **Eun Sook Ko**
Diagnosis and Follow-Up: The Pathway to Monitoring Your Health
Samsung Medical Center, Korea

All Q&A

11:15-12:30 **Special Session** **RM 5 (Art Hall)**

Session for Breast Cancer Survivors 2: Battling the Storm: Antihormonal Therapy, Chemotherapy, Immunotherapy, and Beyond

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

Speaker **Shinji Ohno**
Hormonal Harmony: The Art of Antihormonal Therapy
Sagara Hospital, Japan

Speaker **Hyun Jo Youn**
The Sands of Time: How Long Should We Walk Together?
Jeonbuk National Univ. Hospital, Korea

Speaker **Bo Kyoung Ku**
Balancing the Scales: Managing the Side Effects of Hormonal Therapy
ASAN Medical Center, Korea

Speaker **Kyung-Hun Lee**
Warriors of the Body: Understanding Chemotherapy's Fight
Seoul National Univ. Hospital, Korea

Speaker **Han Jo Kim**
Awakening the Inner Guardian: The Promise of Immunotherapy
Soonchunhyang Univ. Hospital Cheonan, Korea

Day 3 April 19 (Sat)

Speaker **Hye Sung Won**
Precision Strikes: The Power of Targeted Therapy
The Catholic Univ. of Korea, Uijeongbu St. Mary's Hospital, Korea

All Q&A

11:35-12:50 **Special Session** **RM 1 (Vista 1+2)**

Insights of GBCC 2025

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

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

Speaker **Jeong Eon Lee**
Surgery
Samsung Medical Center, Korea

Speaker **Janice Tsang**
Early Breast Cancer
The Univ. of Hong Kong, Hong Kong

Speaker **Seock-Ah Im**
Advanced Breast Cancer
Seoul National Univ. Hospital, Korea

Speaker **Heather Parsons**
Translational Research
Dana-Farber Cancer Institute, U.S.A.

11:35-12:50 **Practicing Breast Surgeons Session 2 (Kor.)** **RM 3 (Walker 1)**

Clinical Management of Benign Breast Disorder

Moderator **Young San Jeon**
Goo Hospital, Korea

Speaker **Haejung Kim**
BI-RADS 5th Edition: Microcalcification Update
Samsung Medical Center, Korea

Speaker **Hyewon Ro**
Microcalcification: Mammoguide VABE Technique w/o Stereotactic Instrument
Honest-U Surgery Clinic, Korea

Speaker **Jun Won Min**
Appropriate Management of ADH and Low Risk DCIS
Dankook Univ. Hospital, Korea

11:35-12:50 **Breast Imaging Session 2** **RM 4 (Walker 2)**

Consensus in Postoperative Surveillance

Moderator **Young Mi Park**
Inje Univ. Busan Paik Hospital, Korea

Day 3 April 19 (Sat)

Moderator **Janie Lee**
Univ. of Washington, U.S.A.

Speaker **Janie Lee** *88*
Postoperative Imaging Surveillance in the United States
Univ. of Washington, U.S.A.

Speaker **Jung Min Chang** *89*
Postoperative Imaging Surveillance in Korea
Seoul National Univ. Hospital, Korea

Speaker **Jong Han Yu** *90*
What is the Optimal Surveillance Protocol in Korea
Samsung Medical Center, Korea

14:30-15:25 **Special Session** **RM 5 (Art Hall)**

Session for Breast Cancer Survivors 3: The Power of Localized Treatments: Surgery, Reconstruction, and Radiotherapy

Moderator **Jai Min Ryu**
Samsung Medical Center, Korea

Speaker **Jai Min Ryu**
The Sculptor's Touch: Exploring Surgical Paths in Breast Cancer
Samsung Medical Center, Korea

Speaker **Jae Hoon Jeong**
Phoenix Rising: The Art and Science of Reconstruction
Seoul National Univ. Bundang Hospital, Korea

Speaker **Kyubo Kim**
Rays of Hope: Illuminating the Role of Radiation Therapy
Seoul National Univ. Bundang Hospital, Korea

Speaker **Nayeon Kim**
Embracing the New Me: Learning to Love Your body After Surgery
Samsung Medical Center, Korea

All Q&A

15:40-17:05 **Special Session** **RM 5 (Art Hall)**

Session for Breast Cancer Survivors 4: Timeless Journeys and Lifelong Resilience

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

Speaker **Hee Jeong Kim**
Blossoms in Spring: The Challenges of Young Women with Breast Cancer
ASAN Medical Center, Korea

Speaker **Young-Joon Kang**
Autumn Leaves: Navigating Breast Cancer in Later Years
The Catholic Univ. of Korea, Incheon St. Mary's Hospital, Korea

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Speaker	**Jae Yong Jeon** The Gentle River: Preventing and Managing Lymphedema *ASAN Medical Center Univ. of Ulsan College of Medicine, Korea*
Speaker	**Seockhoon Chung** Quieting the Mind: Finding Rest in Sleepless Nights *ASAN Medical Center, Korea*
Speaker	**Hyo-Won Kim** The Unspoken Bond: Young Mothers and the Secret Burden *ASAN Medical Center, Korea*
Speaker	**So-Youn Jung** The Long Road Home: Preventing and Managing Long-Term Complications *National Cancer Center, Korea*
Speaker	**Janice Tsang** Stepping Stones: Life Lessons from Survivors *The Univ. of Hong Kong, Hong Kong*
All	Q&A

Oral Presentation

OP001 **The Effect of Axillary Surgery on the Prognosis of IBTR after BCS** *168*
Jongyeon Yoon, Tae-Kyung Yoo, Sae Byul Lee, Jisun Kim, Il Yong Chung, Beom Seok Ko, Hee Jeong Kim, Byung Ho Son, Jong Won Lee

OP002 **What Is the Appropriate Radiation Dose to Axillary Nodes with Prior Metastasis in cN+ Breast Cancer Downstaged to ypN0 After Preoperative Systemic Therapy: A Comprehensive Dosimetric Analysis** *169*
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OP004 **Is it necessary to remove suspicious calcification in hormone receptor negative and HER2 positive breast cancer who received neoadjuvant chemotherapy, especially in pathologic complete response** *171*
Cho Eun Lee, Jeong Eon Lee, Seok Jin Nam, Seok Won Kim, Jonghan Yu, Byung Joo Chae, Se Kyung Lee, Jai Min Ryu

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OP007 **Percutaneous Cryoablation with Palliative Intent for Breast Cancer Patients: Feasibility, Safety, and Tumor Ablation Rate** *174*
Yuk-Kwan Chang, Ava Kwong

OP008 **Initial Experience on Broadening the Use of Cryoablation on early Breast Cancers** *175*
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Plenary Lecture

Go Beyond Cure of
Breast Cancer

Improved Understanding, Care and Outcomes for Young Breast Cancer Patients

Ann Partridge

Dana-Farber Cancer Institute, Department of Medical Oncology, U.S.A.

Breast cancer (BC) is a leading cause of cancer related deaths in women age 40 years and younger, and a major cause of morbidity otherwise, worldwide. Young women are more likely to develop more aggressive subtypes of breast cancer and emerging data suggest that the effect of age on breast cancer recurrence and death varies by tumor subtype, with young age particularly prognostic in women with ER positive disease. Understanding the biologic underpinnings of cancers that arise in younger women, potential differences in host responses including very premenopausal women or recently pregnant women, is critical to develop novel interventions and improve outcomes. There is also mounting evidence that access to care and behavioral differences leading to suboptimal treatment contribute to disparities for young women, including the relatively poor adherence to adjuvant hormonal therapy among young women. Support of young patients, including management of non-adherence, with attention to unique issues facing young women including desire for future fertility and pregnancy, has been the subject of recent research for this vulnerable population who, unsurprisingly, are at increased risk of psychosocial distress compared with older breast cancer survivors. Novel, acceptable, scalable interventions to address this population's needs are under investigation. Finally, given that most young women will live for many decades after a diagnosis of breast cancer, it is imperative that we follow this population over time and study their long-term, late effects in survivorship.

Advances in Tailoring Radiation Therapy for Breast Cancer

Reshma Jagsi

Emory Univ., Department of Radiation Oncology, U.S.A.

Multiple historical and more recent landmark trials have helped to refine the evidence base for treating breast cancer with radiotherapy. At one end of the spectrum, studies have sought to reduce the toxicity and burden of radiation therapy by investigating more efficient, hypofractionated courses of radiation to the whole breast and/or partial breast. Other studies have sought to identify groups of women with sufficiently low risk of locoregional recurrence that they might safely consider omitting radiotherapy altogether even after breast-conserving surgery. This lecture, after examining the studies seeking to optimize radiotherapeutic management in patients with lower risks of recurrence, will reflect briefly on optimization of care more generally, before shifting to the other end of the spectrum of aggressiveness. It will review recent trials investigating the role of regional nodal irradiation, including the landmark EBCTCG meta-analysis that recently revealed a modest benefit to regional nodal irradiation in all node-positive patients, thanks to advances in radiation techniques that have reduced the cardiac mortality associated with older regimens. It will briefly reflect on how response to neoadjuvant chemotherapy may help us further tailor recommendations regarding regional nodal irradiation before concluding with a consideration of the most aggressive cancers treated with radiotherapy, such as inflammatory breast cancer and future directions for intensification of therapy in such cases. In this way, the presentation will review highlights of key trials along with the detailed findings of landmark meta-analyses to provide attendees with insights regarding the balance of risks and benefits of different approaches for patients with varying levels of nodal involvement and biological risk. In particular, it will emphasize the benefits observed in terms of disease control and putative mechanisms. It will also reflect on the evolving evidence regarding treatment-related toxicity and the many advances in radiation treatment planning that have led to differences between historical trials and more recent ones. Ultimately, it will provide information with practical utility to those wishing to counsel patients about their individualized risks as well as expected benefits, so that each patient may make informed choices reflecting her own values and preferences for care.

Management of the Axilla in Patients Treated with Neoadjuvant Chemotherapy

Judy Boughey

Mayo Clinic, Department of Surgery, U.S.A.

Neoadjuvant chemotherapy (NAC) is known to decrease the extent of disease in the breast and reduce the likelihood of nodal positivity and thus can increase rates of breast conservation and decrease need for axillary node dissection and its associated morbidities.

Several prospective clinical trials have assessed the false negative rate (FNR) of SLN after NAC for patients with clinically node positive disease (cN1) at presentation and demonstrated FNRs ranging from 8 to 14%. Multiple ways to decrease the FNR of axillary surgery after NAC have been identified including use of dual tracer mapping, resection of at least 2 SLNs, placing a marker in the biopsy-proven positive node and ensuring resection of that node at surgery (targeted axillary dissection, TAD) and use of IHC to evaluate for residual disease in the SLNs.

Surgeons have incorporated SLN after NAC into their clinical practice for patients presenting with cN1 disease who have a good response to NAC. Studies from institutional cohorts indicate low regional recurrence rates with the use of SLN surgery after NAC with omission of axillary lymph node dissection (ALND) in those that have negative SLNs. Furthermore, a large retrospective cohort of patients across centers in Europe and the US showed low locoregional recurrence rate at 5 years with SLN or TAD only in patients with ypN0 disease and showed no difference between SLN and TAD.

For patients with positive SLN(s) after NAC currently ALND is recommended. Rates of additional positive nodes on ALND in this setting are 45-60% and vary by the number of positive SLNs. Furthermore, it is important to remember that this nodal disease is chemotherapy resistant disease.

The Alliance for Clinical Trials in Oncology A11202 clinical trial is evaluating ALND versus axillary radiation in patients with residual node positive disease (ypN+). Of the 841 that underwent ALND, additional positive nodes on ALND were identified in 46.4% of patients (47.8% in those with macrometastatsis and 38.4% in those with micrometastasis, $p = 0.06$). Likelihood of additional nodal metastasis increased with the number of positive SLN(s) 33.2% with 1 positive SLN had additional positive nodes, compared to 52.9% of those with 2 positive SLNs, 71.3% of those with 3 positive SLNs, and 83.9% of those with 4 or more positive SLNs. Outcome data from this trial is awaited to guide management guidelines.

Evaluation of patients with isolated tumor cells (ITCs) in the SLN after NAC in a large retrospective cohort of centers across Europe and the US showed no difference in outcome between those selected to undergo ALND and those who did not undergo ALND. This data seems to indicate ALND may be reasonable to consider omission in patients with ITCs, although this has not been shown in prospective studies and there is selection of

patients by surgeon and patient preference.

Recent similar retrospective cohort review of patients with micrometastatic disease in the SLN(s) after NAC across centers in the US and Europe comparing those selected for ALND and those selected for omission of ALND will be reported at the Society of Surgical Oncology in late March 2025 and data will be presented as part of this talk at the meeting.

Consideration of axillary radiation in place of axillary dissection for patients with residual positive SLNs after NAC is currently being evaluated in prospective clinical trials, however this is already being selectively implemented in some cases in the absence of data from the prospective trials. Short-term outcomes of patients that have positive SLN(s) after NAC and are selected for omission of ALND are similar to those selected for ALND, indicating that for appropriately selected patients' omission of ALND may be considered, however prospective randomized trial data are awaited.

In patients that are clinically node negative at diagnosis there is ongoing evaluation of potential omission of axillary surgery for patients with a complete pathologic response in the breast after NAC for triple negative or HER2 positive breast cancer. Trials are ongoing in this area.

Tracking Triple Negative Breast Cancer Evolution and Immune Evasion: Insights from TRACERx

Charles Swanton

The Francis Crick Institute, United Kingdom

"Mechanisms of Immune Evasion and Control in Breast Cancer" There have been significant advancements in genomic data and bioinformatics tools, which have improved early diagnosis, treatment, and follow-up using biomarkers in breast cancer. Biomarkers provide measurable indicators of disease characteristics and help tailor treatment strategies in precision medicine. To date, multiple biomarkers have been associated with immune checkpoint inhibitor (CPI) response, such as sources of antigen that elicit T cell responses, mechanisms of immune evasion that drive resistance and markers of immune infiltration. Emerging data have highlighted the importance of considering cancer evolution in the context of a predatory immune microenvironment. Using genomics, we have been able to identify novel factors influencing clinical outcomes such as the presence of extrachromosomal DNA (ecDNA), a common origin for amplified oncogenes across human cancers including breast cancer, but also a mechanism that frequently amplifies immunomodulatory and inflammatory genes, such as those that modulate lymphocyte-mediated immunity and immune effector processes. Furthermore, we have developed state-of-the-art bioinformatics tools to classify the disruption of the class I human leukocyte antigen (HLA) molecules and their implications for immune evasion and tumour evolution. We identified extensive variability in HLA allelic expression and pervasive HLA alternative splicing in normal breast tissue. In breast TCGA cohorts, 35% of estrogen receptor-positive (ER+) cancers harbored class I HLA transcriptional repression, while HLA tumor-enriched alternative splicing occurred in 15% of ER+ cancers. These data highlight the importance of genomics in biomarker discovery using our knowledge and understanding of breast cancer evolution to inform the impact of immune evasion and control on clinical outcome

Targeting the Cell Cycle Machinery in Breast Cancer – Where to from Here?

Shom Goel

Peter MacCallum Cancer Centre and Univ. of Melbourne, Department of Cancer Biology and Therapeutics, Australia

Dysregulation of the cell cycle is a hallmark of cancer, and in hormone receptor-positive breast cancer, therapeutic targeting of cyclin-dependent kinases (CDKs) has yielded substantial clinical benefit. However, emerging resistance to CDK4/6 inhibitors (CDK4/6i) presents a significant challenge, necessitating deeper biological insights and next-generation therapeutic strategies.

This talk highlights the intricate regulatory network of the mammalian cell cycle, involving cyclins, CDKs (particularly CDK4/6 and CDK2), and tumour suppressors such as RB and p53. I will explore how cancer cell lineage, differentiation status, genetic alterations, and cell cycle plasticity collectively influence CDK dependency and drug response.

CDK4/6 inhibitors have validated CDK4/6 as therapeutic targets, inducing G1 arrest and senescence in sensitive tumours. Yet, resistance mechanisms—mediated via reactivation of RB phosphorylation through alternative pathways such as CDK2/cyclin E, PI3K/AKT/mTOR, or MAPK signalling—are common in clinical settings. In response, novel strategies have been devised.

Selective CDK4 inhibition represents a promising approach to overcome resistance while mitigating CDK6-associated haematologic toxicity. Atirmociclib, a potent CDK4-selective inhibitor, has demonstrated early signs of clinical efficacy and reduced neutropenia in both preclinical models and early-phase trials, underscoring its potential as first-line or salvage therapy when combined with endocrine agents.

Parallel efforts are targeting CDK2, identified as a critical bypass pathway in CDK4/6i-resistant tumours. CDK2-selective inhibitors show potential to reinstate cell cycle arrest when combined with CDK4 inhibitors or endocrine therapy. Laboratory models confirm elevated cyclin E1 and increased CDK2 activity as resistance hallmarks, and early clinical trial data are emerging.

Collectively, these data suggest that dual or sequential inhibition of CDK4 and CDK2 could be a rational strategy to forestall or overcome resistance in HR+ breast cancer. However, further clinical data are needed to clarify optimal patient selection, timing, and therapeutic combinations. Additionally, the variable toxicity profiles across agents highlight the need for caution until more robust evidence is available.

In conclusion, as we deepen our understanding of cell cycle regulation in breast cancer, precision targeting of CDKs remains a cornerstone of therapeutic innovation

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De-escalation Strategies for Axillary Surgery in Early-Stage Indolent Breast Cancer

Marios Konstantinos Tasoulis

The Royal Marsden NHS Foundation Trust, Department of Surgery, United Kingdom

Axillary surgery has significantly evolved over the past 60 years, from radical procedures involving removal of all the axillary lymph nodes to more tailored approaches. Therefore, we have witnessed a shift in practice from axillary lymph node dissection (ALND) to sentinel lymph node biopsy (SLNB) for patients with clinically node negative disease even when limited nodal burden is identified (isolated tumour cells, micrometastasis or up to 2 nodes with macrometastasis). Moreover, SLNB has been established as standard practice in patients with clinically node positive disease that convert to clinically node negative following treatment with neoadjuvant chemotherapy. These approaches represent significant advances in surgical de-escalation with an important next step being the potential omission of axillary surgery altogether especially in patients with early-stage indolent breast cancer. Indolent breast cancer is usually defined as a small tumour that is hormone receptor positive, and HER2 negative with a low Ki67 expression (< 15%).

An important step in the work up before axillary surgery is the performance of an axillary ultrasound scan, which is considered a standard part of the diagnostic protocol in many practices. However, the ASCO guidelines in 2021 suggested that for patients with clinically node negative early-stage breast cancer when the sentinel lymph node is likely to be negative, a pre-operative axillary ultrasound is not recommended. This is mainly driven by the fact that axillary imaging may identify low burden disease in the axilla potentially leading to more radical axillary surgery as the same guidelines recommend ALND in the presence of node positive disease upfront. However, even in this setting, there may be an option of de-escalation of axillary surgery. This is now supported by the NCCN guidelines suggesting that for patients with early-stage indolent breast cancers that would otherwise fit the ACOSOG Z011 criteria, even if 1 or 2 abnormal nodes are identified in the pre-operative work up, SLNB may still be considered. This has introduced the concept of primary targeted axillary dissection (TAD) that involves removal of the pre-operatively biopsy-proven metastatic axillary lymph node and the sentinel lymph nodes without proceeding to ALND if limited nodal disease (≤ 2 nodes) is identified.

The next step in axillary de-escalation strategies for early-stage, indolent breast cancers would be to omit SLNB. Initially, this idea was tested in older patients with results from seminal trials leading to the adoption of this approach by the Choosing Wisely campaign which has also been endorsed by the Society of Surgical Oncology. Based on this recommendation routine SLNB should not be routinely offered to patients ≥ 70 years of age with clinically node negative, hormone receptor positive and HER2 negative early-stage breast cancer. A similar recommendation is also made by the NCCN and ASCO guidelines suggesting that SLNB may be considered optional in patients with indolent disease especially if the omission of the procedure is unlikely to affect adjuvant systemic therapy or radiotherapy decision-making. The idea of omitting SLNB has recently been extended to younger patients following results from the SOUND trial that included women with cT1N0 indolent breast

cancer showing no difference in distant disease-free survival comparing SLNB with no axillary surgery. Another study supporting this approach was the INSEMA trial that similarly included patients with clinically node negative breast cancer, the majority having indolent disease. The results showed no difference in terms of invasive disease-free and overall survival comparing SLNB with no axillary surgery providing further data regarding the potential benefit of this approach. Other studies have also shown similar results and therefore it is imperative that the multidisciplinary teams including surgical, medical and radiation oncologists work closely to implement de-escalation of axillary surgery strategies in appropriate patients without escalating other treatment modalities to compensate for the less extensive surgery.

Local Control After Recurrence: When to Do Re-sentinel Biopsy, Re-radiotherapy

Olga Kantor

Dana-Farber Cancer Institute, Department of Surgery, U.S.A.

Although contemporary rates of locoregional recurrence are low in the era of effective systemic therapies, local recurrence can be a challenging event for patients, especially in the setting of ipsilateral breast tumor recurrence after prior breast conserving therapy. Mastectomy is the appropriate approach in this setting for many patients, however there are certain opportunities where it is likely safe to consider repeat breast conservation based on patient preferences. Cases of lower risk breast cancers that may be eligible for omission of radiation therapy could be good candidates for breast conserving surgery alone, and re-irradiation may be an option for many patients as well, with data supporting adequate long term control. In terms of axillary management, attempt at repeat sentinel lymph node biopsy is appropriate in most patients, although some patients may be candidates for omission of axillary surgery. Overall, disease features and patient input are key for local therapy decision making, as is multidisciplinary discussion.

Sequencing Systemic Therapy and Local Control for Advanced BCs

Sung Gwe Ahn

Gangnam Severance Hospital, Department of Surgery, Korea

Neoadjuvant systemic therapy (NAST) has become a standard approach for locally advanced breast cancer (LABC), aiming to reduce tumor size, facilitate breast-conserving surgery, and assess treatment response. Following NAST, surgical decisions for both the breast and axilla require careful consideration of multiple factors, including tumor response, residual disease, and patient-specific characteristics. This presentation explores key considerations in post-NAT surgical planning, including the extent of surgery, sentinel lymph node biopsy (SLNB) feasibility, and management of axillary disease. The role of imaging and pathological assessment in determining residual tumor burden is also discussed. Additionally, we examine the implications of surgical approaches on prognosis, recurrence risk, and patient outcomes. A multidisciplinary approach is crucial for optimizing treatment strategies, ensuring oncologic safety while minimizing surgical morbidity.

Additionally, we will delve into the synergy between radiotherapy and immunotherapy, particularly in the neoadjuvant setting. Key highlights will include a discussion of the Check-Ray trial and the PEARL study. Through these emerging data, we will examine how integrating radiotherapy with immunotherapy may enhance treatment efficacy and shape the future of personalized approaches for advanced breast cancer.

Screening for Breast Cancer in Korea: Yesterday, Today and Tomorrow

Jae Kwan Jun

National Cancer Center, Department of Epidemiology, Korea

In 2002, the National Cancer Screening Program (NCSP) for breast cancer was implemented based on the first 10-Year National Cancer Control Plan. Since its implementation, the NCSP has provided biennial mammography screening for Korean women aged 40 and older. Currently, over 4.5 million women participate each year, with a screening rate of 65.4%. This organized, population-based program has significantly contributed to the early detection of breast cancer. Breast cancer is now the most common cancer among Korean women, with approximately 30,000 new cases each year. Despite the steadily increasing incidence, mortality rates have remained stable. This is largely attributed to the growing proportion of early-stage breast cancer, which increased from 54.8% in 2005 to 64.7% in 2022, contributing to continuous improvements in survival rates. Considering that more than half of target population for breast cancer screening have dense breasts, ensuring the sustainability of the NCSP will require a full transition to full-field digital mammography (FFDM) and efforts to reduce disparities arising from the concentration of FFDM equipment in metropolitan areas.

Breast Cancer Screening in China: Policies, Current Status, and Key Challenges

Hongping Song

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Background: Breast cancer is a significant health concern in China, with both incidence and mortality rates on the rise among Chinese women. The disease burden is unevenly distributed, with higher rates in the eastern and central regions and in urban areas compared to the western and rural areas. The peak incidence age for breast cancer in China is between 50 to 60 years, which is 5 to 10 years earlier than in Western women. Despite improvements in survival rates, the 5-year relative survival rate in China is still nearly 10% lower than that in the USA.

Screening Programs and Policies: China has implemented several breast cancer screening programs, with two organized programs initiated in 2009 and 2012, targeting rural and urban areas respectively. The "Two cancers" screening program for rural women, launched in 2009, aimed to screen 1.2 million women aged 35–59 within 3 years, using clinical breast examination and ultrasound. By 2019, this program was incorporated into basic public health services and rolled out nationwide. The national-level institutions are responsible for developing technical protocols and conducting routine management and quality control.

Screening Coverage and Challenges: The screening coverage rate in China is relatively low, with only 30.9% of rural women screened by 2019. The detection rate of breast cancer is also low at 0.85%, compared to 3.3% in Japan and 2.69% in South Korea. Challenges include low participation rates, unequal distribution of medical resources, inadequate funding, and insufficient screening quality.

Future Directions: The Chinese government is working to address these challenges by increasing the screening rate and improving the quality of screening. New technologies such as Automated Breast Ultrasound are being explored to enhance the efficiency and accuracy of breast cancer screening. Efforts are also being made to train more radiologists and to establish a remote screening network to cover more areas.

Conclusions: Breast cancer poses a significant health challenge in China, with a high and rising incidence and mortality rate. Despite the implementation of national screening programs and the use of ultrasound as the primary screening modality, challenges remain in achieving high coverage and quality screening. Future directions include the integration of new technologies and the expansion of the screening network to improve outcomes for Chinese women.

Breast Cancer Screening in India: Policies, Current Status, and Key Challenges

Rashmi Sudhir

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Breast cancer is the most common cancer and the leading cause of cancer deaths among Indian women, and the incidence rate is steadily rising every year. The incidence rate of breast cancer in India is 25.8 per 100,000 women (varying between 5/100,000 Female population in rural areas to 30/100,000 in urban areas) which is much lower than in the West. However, unlike the West, more than 2/3rds of breast cancer cases (60-70%) are diagnosed in the late stage (stage III & IV) leading to high morbidity and mortality. There are various national organisations such as the National Program for Prevention and Control of Cancer (NPPCC), Indian Council of Medical Research (ICMR), Ayushman Bharat, National Cancer Grid (NCG) & Breast Imaging Society India (BISI) working towards cancer prevention, control, routine screening and standardized cancer treatment across India. Due to lower incidence rates and the young population structure of India, population-based mammographic screening is not feasible here. The national organisations recommend monthly Breast self-examination (BSE), periodic clinical breast examination (CBE) of women above 25 years of age by trained health care workers and Opportunistic screening with mammography for women with increased risk & concerned women. BISI recommends annual mammography screening for the average woman beginning at the age of 40 years and supplemental ultrasound for women with dense breasts. Women between 30-39 years are encouraged to be screened with mammograms and /or ultrasound after a clinical evaluation. Less than 10% of eligible women undergo mammography screening, and CBE has limited reach in rural areas. Because of low mammography screening, there is late-stage diagnosis leading to a higher financial burden with limited treatment options and higher mortality rates. The key challenges in breast cancer screening are lack of awareness, lack of infrastructure and trained manpower, high cost & limited access to mammography screening, higher prevalence of dense breasts among Indian women and policy implementation gaps between urban and rural populations. There are various strategies which could be implemented to fill the gap between the urban and rural areas such as mobile mammography units and breast clinics, awareness campaigns, financial assistance by subsidized rates, promotion of opportunistic screening, more government-private partnerships, telemedicine and AI integration. In conclusion, "Awareness, Accessible, Affordable and Action" are the key elements to fighting breast cancer in India.

Unique Challenges in Breast Cancer for Young Women: What's Different?

Yeon Hee Park

Samsung Medical Center, Korea

Endocrine Treatment Strategies for Young Women: Tailoring for Optimal Outcomes

Ann Partridge

Dana-Farber Cancer Institute, U.S.A.

BRCA Mutations in Young Women's Breast Cancer: Risk, Treatment, and Implications for Family Planning

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Breast cancer is the most frequent malignancy among young women, with an incidence that varies based on genetic and environmental factors. Among hereditary causes, carrying a germline pathogenetic or likely pathogenic variant (PV) in the BRCA1 and/or BRCA2 genes is particularly relevant. The risk of carrying this genetic defect is higher among women diagnosed with breast cancer at a young age (defined as 40 years or younger at breast cancer diagnosis) as compared to older patients. Hence, genetic testing is recommended in all women with breast cancer diagnosed at a young age. Carrying a PV in the BRCA genes has clear clinical implications on screening and prevention, local and systemic treatments as well as reproductive health and survivorship.

Among the unique challenges to be considered in the management of breast cancer in young BRCA carriers, the indication for intensive surveillance and risk-reducing surgeries is critical. Recent data have suggested that both risk-reducing bilateral mastectomy and risk-reducing bilateral salpingo-oophorectomy are associated with improved survival outcomes among young BRCA carriers with breast cancer.

In addition, special considerations on systemic treatment should be considered including the indication for targeted treatments like poly (ADP-ribose) polymerase inhibitors (PARPi). The recent update of the OlympiA trial has further reinforced the indication for one year of adjuvant olaparib following standard chemotherapy in BRCA carriers with high-risk HER2-negative breast cancer.

Importantly, the impact of anticancer treatments and risk-reducing surgeries on patients' ovarian reserve, pregnancy wish, and breastfeeding are crucial aspects to be considered. As early as possible after diagnosis, all women diagnosed at reproductive age should receive complete oncofertility counseling irrespective of disease stage; the presence of a germline BRCA PV adds additional burden. However, several recent data have provided evidence on the feasibility and safety of fertility preservation techniques and on the possibility of having a pregnancy following treatment completion. Proper management of long-term toxicities, including bone and cardiovascular health as well as menopause-related symptoms, is needed and requires proper multidisciplinary care to optimize quality of life.

This presentation reviews the clinical, therapeutic and survivorship implications of breast cancer in young BRCA carriers. Personalized strategies integrating genetic counseling, tailored surveillance and survivorship programs, as well as innovative therapies are essential for improving prognosis and well-being in these young patients. Multidisciplinary care and further academic research efforts are critical to improve the management of breast cancer in young BRCA carriers.

CDK4/6 Inhibitors: Challenges and Beyond

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Cyclin-dependent kinase (CDK) 4/6 inhibitors in combination with endocrine therapy have become the standard first-line treatment for patients with metastatic hormone receptor (HR)-positive, HER2-negative breast cancer. These agents have consistently demonstrated significant improvements in progression-free survival (PFS) across multiple phase III trials, with studies also reporting overall survival (OS) benefits. Despite the survival benefits achieved, several critical challenges remain, including the identification of predictive biomarkers to better select patients most likely to benefit, the elucidation of mechanisms underlying acquired resistance, the determination of optimal timing and sequencing with other agents, and the development of novel upfront combination strategies involving additional targeted therapies to overcome resistance. This presentation will provide an updated summary of clinical evidence and ongoing research efforts addressing these challenges.

ET-Based Combinations and Novel Agents in HR+/HER2- Advanced Breast Cancer

Erica Mayer

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Management of metastatic hormone receptor positive HER2 negative (HR+/HER2-) breast cancer has evolved dramatically over the past several years, with improved outcomes and substantially advanced treatment pathways due to the emergence of novel agents. For the past decade, first-line therapy for the majority of patients has consisted of endocrine therapy partnered with a CDK4/6 inhibitor, a regimen which improves not only progression-free but also overall survival. Despite success of the regimen, eventually disease may progress, enabled through a variety of resistance mechanisms. Interrogating tumor genomics to identify actionable mutations has become a major strategy to personalize subsequent therapies. Tumors with alterations in the PIK3CA/AKT/PTEN pathway may be offered a pathway inhibitor such as capivasertib or alpelisib, and patients with high risk recurrence of HR+ disease with a PIK3CA mutation may benefit from early introduction of a first-line inavolisib triplet. Oral selective estrogen receptor degraders (SERDs) and related estrogen receptor targeting agents may provide greater activity against cancers with acquired endocrine resistance, particularly those with an ESR1 mutation. The oral SERD elacestrant is approved as monotherapy in pretreated patients with tumors harboring an ESR1 mutation. Additional oral SERDs, including imlunestrant, camizestrant, and giredestrant, have demonstrated activity and are in registrational trials. An additional maneuver in the pretreated space includes continuation of a CDK4/6 inhibitor after prior CDK4/6 inhibitor, with activity seen from switching to abemaciclib or ribociclib from a prior agent, and novel CDK inhibitors are in trials as a next generation approach. The mTOR inhibitor everolimus remains an option for pretreated patients as well, particularly when actionable mutations are not present. The continued introduction of novel agents as well as expanded use of ctDNA tumor profiling will likely continue to transform the management of metastatic HR+ HER2- breast cancer.

ADCs in HR+/HER2- Advanced Breast Cancer

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ADCs in HR+/HER2- Advanced Breast Cancer; what is the role of "chemotherapy"?

The role of chemotherapy in HR+HER2- Advanced Breast Cancer (ABC) is changing significantly. Basically as proposed by Dr Hortobagyi in 1998 (Hortobagyi GN. NEJM 1998), it is used after resistance to endocrine therapy and for life-threatening metastases or at the discretion of the attending physician.

However for the latter, the RIGHT choice (Lu YS, JCO 2024) and PADMA (Loibl S, SABCS 2024) studies have shown that chemotherapy as first treatment after diagnosis is becoming extremely less significant. This is due to the high efficacy of CDK4/6 inhibitor combination therapy, but the intrinsic role of chemotherapy needs to be re-examined. In this context, the development of ADCs as chemotherapy after endocrine therapy plus CDK4/6 inhibitor resistance has progressed, with three ADCs playing important roles at present. This session will discuss the current status of ADCs and how the use of this potent chemotherapy can improve prognosis and quality of life.

Current Technologies in Liquid Biopsy: A Comprehensive Review

Heather Parsons

Dana-Farber Cancer Institute, U.S.A.

Liquid Biopsy in Early Breast Cancer: MRD Monitoring, Early Detection, and Adaptive Therapeutic Decisions

Pedram Razavi

Memorial Sloan Kettering Cancer Center, U.S.A.

Biomarkers and Resistance in Metastatic Breast Cancer: Tailoring Liquid Biopsy Approaches

Ben Ho Park

Vanderbilt Univ. Medical Center, Department of Medical Oncology, U.S.A.

The treatment landscape for metastatic breast cancer (MBC) has been transformed by our growing understanding of tumor heterogeneity and resistance mechanisms. Liquid biopsy, particularly through cell-free DNA (cfDNA) and circulating tumor DNA (ctDNA) has emerged as a powerful, non-invasive tool for real-time molecular profiling and therapeutic decision-making. However, challenges remain in optimizing its application to predict resistance, track tumor evolution, and refine personalized therapy.

This talk will explore the latest advancements in biomarker-driven approaches to overcoming therapeutic resistance in MBC, with a focus on tailoring liquid biopsy strategies to enhance precision oncology. Key findings from studies, including how genomic alterations such as ESR1 mutations, PIK3CA mutations, and BRCA1/2 deficiencies drive resistance to endocrine and targeted therapies will be discussed. Additionally, novel insights from epigenetic regulation, immune modulation, and metabolic adaptations that influence tumor persistence and how they might be identified by liquid biopsies will be discussed.

Through case studies and emerging clinical trial data, the current future integration of how liquid biopsy technologies can be leveraged will be discussed, focusing on both the quantitative and qualitative aspects of cfDNA/ctDNA to detect targetable alterations, monitor treatment response, and identify novel resistance pathways. Special attention will be given to the integration of liquid biopsy into routine clinical practice via molecular tumor boards, and implications for guiding next-generation therapeutic strategies.

As we advance towards a future of truly personalized breast cancer treatment, it is imperative to refine liquid biopsy methodologies to improve sensitivity, specificity, and clinical actionability. By integrating multi-omic profiling and computational approaches, we can accelerate the transition from biomarker discovery to clinical implementation, ultimately improving outcomes for patients with metastatic breast cancer.

Neurotization in Breast Reconstruction: A Review and Exploration of Ongoing Research

Joseph Kyu-Hyung Park

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Loss of breast sensation after mastectomy and reconstruction remains a major unmet need that impacts safety, intimacy, and quality of life. Neurotization—the surgical reconnection of sensory nerves—offers a reproducible way to restore protective and pleasurable sensation to the reconstructed breast. This presentation reviews the current state of neurotization techniques in both autologous and implant-based breast reconstruction.

In autologous reconstruction, sensory nerves from flaps like the DIEP or PAP are coapted to chest wall intercostal nerves, often with the aid of nerve allografts. For implant-based reconstruction, especially in nipple-sparing cases, targeted reinnervation of the nipple–areolar complex has shown promising results using cadaveric nerve grafts. Emerging experimental strategies, such as direct dermal neurotization and bioelectronic interfaces, further expand options for cases where conventional nerve coaptation is not possible.

Recent randomized controlled trials and meta-analyses confirm that neurotization significantly improves tactile and thermal recovery, patient-reported outcomes, and satisfaction scores—without increasing complication rates. With minimal added operative time and growing technical feasibility, sensory neurotization is becoming an essential element of modern breast reconstruction. Ongoing trials and innovations continue to push the frontier toward fully sensate, functionally restored breasts.

Oncoplastic Surgery: Enhancing Quality of Life Through Cosmetic and Sensory Satisfaction

Visnu Lohsiriwat

Siriraj Hospital, Mahidol Univ., Thailand

Abdominal Flap Neurotization: Technical Tips and Outcomes

Goo-Hyun Mun

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Breast sensation is a crucial aspect of reconstruction and has been shown to enhance patient satisfaction. Numerous studies have reported significant improvements in sensation following neurotization procedures during reconstruction. The technique of neurotizing an abdominal flap continues to evolve, requiring careful consideration during its implementation.

Meticulous planning and precise harvesting of nerves in both the abdomen and chest contribute to a high success rate of neurotization, often eliminating the need for long nerve grafts. In immediate reconstruction, a sensory nerve-preserving mastectomy performed by the oncologic surgeon facilitates better alignment between the donor and recipient nerves. If a nerve length deficiency persists, autologous or allogeneic nerve grafts can be used to bridge the gap.

Following neurotization, diligent follow-up is essential to assess sensory recovery and overall outcomes. The author has performed over 140 cases of abdominal flap neurotization, observing significant improvements in sensation and patient-reported outcomes. This presentation will highlight key surgical techniques and the latest results achieved.

Enhancing Local Treatment Strategies: Innovation and Challenges

Jong-Ho Cheun

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Introduction

Locoregional recurrence (LRR) of breast cancer remains a significant clinical challenge despite advancements in multimodal treatment approaches. Defined as the reappearance of malignancy in the ipsilateral breast, chest wall, or regional lymph nodes, LRR presents varying prognostic implications depending on biological characteristics, previous treatments, and time to recurrence. This chapter explores the current surgical strategies for managing LRR, integrating evidence-based recommendations and emerging considerations.

Definition and Incidence of Locoregional Recurrence

LRR can be classified into two major categories: Local recurrence involves the ipsilateral breast, incision site, or overlying skin. Regional recurrence includes affected regional lymph nodes, including axillary, supraclavicular, and internal mammary nodes.

Due to improvements in adjuvant therapy and surgical techniques, LRR rates have significantly declined to 3-6% at 10-year, and 10-30% at 20-year. Despite reduced incidence, LRR is often associated with biologically resistant disease, leading to poor survival outcomes. The reported 5-year disease-free survival (DFS) ranges from 24-60%, while overall survival (OS) varies between 42-80%, depending on recurrence location and tumor biology.

Surgical Management of Ipsilateral Breast Tumor Recurrence (IBTR)

When breast cancer recurs in the ipsilateral breast, distinguishing between true recurrence (TR) and new primary (NP) is crucial: True Recurrence (TR) occurs in the same quadrant, typically within 2-3 years, and shares the same tumor subtype as the primary lesion. Instead, New Primary (NP) develops in a different quadrant, usually beyond three years, and may present with different tumor subtypes.

After IBTR, salvage Mastectomy is considered as the standard of care, especially for patients with prior radiation exposure or extensive disease burden. However, repeat Breast-Conserving Surgery (Re-BCS) is considered as the alternative treatment of salvage mastectomy, especially for select patients with tumor size ≤ 2 cm and recurrence beyond four years. Studies have demonstrated comparable survival outcomes to mastectomy, but re-irradiation may be necessary, increasing risks of poor cosmesis and radiation toxicity.

Management of Chest Wall Recurrence After Mastectomy

For patients experiencing recurrence at the chest wall post-mastectomy, treatment decisions depend on operability: Wide excision with maximum safe resection is performed for operable disease, while neoadjuvant systemic therapy is initiated to facilitate resection for inoperable Disease.

Postoperative Radiotherapy is recommended for high-risk cases. In previously irradiated patients, further radiation therapy must be carefully considered to balance local control with potential toxicity.

Management of Nodal Recurrence

Surgical and radiotherapeutic interventions for nodal recurrence vary based on prior treatment history: For axillary lymph node recurrence, if previous axillary lymph node dissection (ALND) was performed, tumor resection is the preferred approach. If prior sentinel lymph node biopsy (SLNB) was conducted, ALND is generally recommended. For supraclavicular/Internal Mammary Node (SCN/IMN) recurrence, radiation therapy remains the standard treatment.

Axillary Node Re-staging Considerations

There is currently no consensus on the routine re-staging of the axilla after LRR. Repeat SLNB is a potential option, but its feasibility varies as identification rates range from 52-81% in different studies and false-negative rates remain a concern, emphasizing the need for further research into its prognostic and therapeutic implications.

Future Directions and Limitations

Despite progress in LRR management, several gaps in evidence persist: Most data are derived from retrospective single-institution studies, so analysis from the multi-center data are necessary. Moreover, prospective cohort study would be essential to warrant the results.

Conclusion

Surgical intervention remains central to managing locoregional recurrence in breast cancer. Treatment strategies must be tailored based on prior therapies, tumor characteristics, and patient-specific factors. As systemic therapies continue to evolve, integration with surgical and radiotherapeutic approaches will be key to optimizing both survival and quality of life for patients experiencing LRR.

Salvage Reirradiation for In-Breast Recurrence

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For primary breast cancer, the ipsilateral local recurrence rate after conservative treatment

combining lumpectomy plus external beam irradiation ranges between 4% and 6% at 10 years and between 10% and 15% at 20 years of follow-up. According to data reported by Miller et al., the number of breast cancer survivors in the United States will increase by 22% between 2019 and 2030. These data suggest that the number of patients experiencing a second ipsilateral breast cancer event (2nd IBCE) will increase dramatically during the next decades.

Currently, salvage mastectomy (SM) is adopted as the usual standard treatment for 2ndIBCE.

However, encouraging results after second conservative treatment (2nd CT) combining lumpectomy plus tumor bed re-irradiation have been reported in large retrospective study and phase 2 prospective clinical trial. Recently, the GEC-ESTRO reported the results of a match-paired analysis for patients experiencing a 2nd IBCE comparing, SM versus 2nd CT. With a median follow-up (MFU) of 60 months, no significant difference in terms of oncological outcome was observed between the two salvage therapeutic options.

These findings are all the more important as breast-conserving surgery with radiation therapy is

associated with clinically meaningful improvements in psychosocial and sexual well-being while

mastectomy (even with a surgical reconstruction) has a negative impact on body image, selfconfidence and quality of life and could lead to a higher rate of unemployment compared to breastconserving. Furthermore, van Maaren et al., even reported 10-year overall survival improvement after conservative treatment versus mastectomy for primary breast cancer. On the same line, de Boniface J et al., shown that for T1-2 N0-2 breast cancers, breast-conserving surgery plus radiotherapy showed improved 6-year specific and overall survival. All these quality-of-life and potential oncological outcome improvements constitute important expected benefice of a 2nd CT for a woman experiencing 2ndIBCE.

Since the first publication in 1980, of the 2nd CT results by a French team of breast surgeons and radiation oncologists, and assuming that SM remains the historical standard of care, the management of 2nd IBCE is still under debate balancing between a radical approach and a deescalation therapeutic option based on 2nd breast preservation. In this frame, ESMO proposed a new classification system in cancer treatment de-intensification indicating that non-inferiority randomized clinical trials represented the gold standard trial design for this purpose. Unfortunately, until now, no phase 3 trial providing consistent clinical results has been proposed mainly because of clinical and methodological considerations resulting in lack of convincing data allowing considering 2nd CT an acceptable therapeutic option.

Despite these encouraging data showing that 2nd CT can be a valuable alternative to mastectomy, currently, the international and national recommendations/guidelines remain non-equivoque in regards to 2nd IBCE treatment. In the US, NCCN and American Cancer Society guidelines consider SM the standard treatment for 2nd IBTE. While assuming that radical surgery remains the standard option, Saint Gallen conference and ESMO guidelines as well as European country recommendations (UK, Italy, Germany, France), propose to discuss a 2nd CT in specific clinical situations.

During this symposium, "Salvage Re-irradiation for In-Breast Recurrence" approach will be discussed based on its rational, technical feasibility, 2nd IBTE prognostic factors (selection criteria), oncological outcome and toxicity profile.

Management for Non-Axillary Regional Recurrence

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Advances in radiation therapy (RT) and perioperative systemic therapy have significantly reduced the incidence of local and regional breast cancer recurrence. However, such recurrences still occur at a certain probability, and their management remains crucial and often challenging. While axillary lymph node (LN) recurrences are often resectable, but recurrences outside the axilla, such as in the supraclavicular (SC) or internal mammary (IM) LNs, are more difficult to remove radically, necessitating treatment with RT and systemic therapy. Moreover, it should be noted that these recurrences are not merely regional but also associated with a high risk of distant metastasis.

In RT, the presence or absence of prior perioperative RT influences treatment decisions. If the recurrent area was not previously irradiated or was not included in the initial radiation field, planning RT is relatively straightforward. However, if prior irradiation was performed, careful consideration must be given to the previously delivered dose and the tolerance dose of normal tissues within the re-irradiation field.

There is no high-level evidence for the treatment of non-axillary LN recurrences, and individualized management is required based on each case's specific conditions. This presentation will provide an overview of salvage RT for SC and IM LN recurrences, including a review of relevant literature and guidelines.

Optimizing Adjuvant Treatment After Neoadjuvant Treatment in TNBC-ICI and Beyond

In Hae Park

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Triple-negative breast cancer (TNBC) is an aggressive and heterogeneous subtype of breast cancer associated with poor prognosis. Although neoadjuvant chemotherapy (NAC) has become the standard of care in early-stage TNBC, a significant proportion of patients fail to achieve a pathological complete response (pCR), and these patients remain at high risk of recurrence. Therefore, there is a critical unmet need to optimize adjuvant treatment strategies for patients with residual disease as well as for those who achieve pCR but still carry a risk of recurrence.

The recent addition of immune checkpoint inhibitors (ICIs), such as anti-PD-(L)1 agents, to NAC has changed the treatment landscape of TNBC. The incorporation of ICIs into neoadjuvant regimens has led to significant improvements in pCR rates and event-free survival (EFS), and as such, this approach has now been established as the standard of care for high-risk early-stage TNBC. However, despite these advances, several important questions remain.

Firstly, TNBC is a highly heterogeneous disease with diverse molecular and clinical characteristics. Thus, a "one-size-fits-all" approach may not be sufficient to address the needs of all TNBC patients. While ICIs benefit a subset of patients, others may derive limited or no benefit from current neoadjuvant immunotherapy approaches. Biomarkers that can predict response to ICIs and identify patients who might benefit from alternative or additional therapies are urgently needed. Furthermore, there is growing recognition that patients with residual disease after NAC plus ICIs represent a distinct high-risk population in need of novel adjuvant strategies.

Secondly, several clinical trials have explored various adjuvant treatments for patients with residual disease following NAC. For instance, capecitabine has demonstrated survival benefit in TNBC patients with residual invasive disease. More recently, the addition of adjuvant olaparib for patients with germline BRCA mutations and residual disease has been shown to significantly improve outcomes. However, optimal sequencing and combination strategies, particularly following neoadjuvant ICIs, remain undefined. New approaches such as antibody-drug conjugates and other emerging targeted therapies are being investigated in the adjuvant setting, and these may provide new opportunities to improve outcomes for patients with residual disease.

Thirdly, while much attention has been focused on patients with residual disease, those who achieve pCR are often considered to have a favorable prognosis. Nonetheless, a subset of these patients continues to experience recurrence, including in sanctuary sites such as the brain. Brain metastasis in TNBC is a clinically significant event associated with poor outcomes, and currently, no specific preventive strategies are in place. Identifying

high-risk patients among those with pCR, through genomic, molecular, or immune profiling, may enable the development of tailored adjuvant strategies aimed at preventing late recurrences and brain metastases.

In this presentation, I will review the current landscape of adjuvant treatment following NAC in TNBC, focusing on the evolving role of ICIs, and discuss emerging data and ongoing trials aimed at improving outcomes for both patients with residual disease and those achieving pCR. I will also address the challenges of personalizing therapy in the context of TNBC heterogeneity and highlight future directions for research, including the role of biomarkers in guiding adjuvant therapy decisions.

Ultimately, moving beyond a one-size-fits-all approach and optimizing adjuvant strategies based on individual patient risk and tumor biology will be critical to improving long-term outcomes in TNBC.

New Approach of Neoadjuvant & Adjuvant Treatment in HER2 Positive Breast Cancer - De-escalation and Novel Agents

Yoon-Sim Yap

National Cancer Centre Singapore, Singapore

Tailoring Neo & Adjuvant Treatment in HR Positive EBC

Yen-Shen Lu

National Taiwan Univ. Hospital, Taiwan

Mechanisms of Immune Evasion and Control in Breast Cancer

Charles Swanton

The Francis Crick Institute, United Kingdom

Breast cancer is the most commonly diagnosed cancer and the main cause of cancer-related mortality in women worldwide. Despite advances in our knowledge of the underlying genetic alterations and improvements in treatment, 25-30% of patients with early breast cancers still relapse with distant metastatic disease. At present, there is a clear unmet clinical need to improve our understanding of breast cancer evolution, and the drivers of genomic instability in primary breast cancers.

To this end, we have analysed multi-region sequencing data from 280 treatment-naïve primary breast cancer tumour regions sampled from 139 patients with triple-negative breast cancer (TNBC) prospectively enrolled into the Breast TRACERx and SCANDARE studies. Here we aim to decipher breast cancer evolution determine the relationship between intratumor heterogeneity and clinical outcomes.

In TNBC, 74% of tumours demonstrate a whole-genome doubling (WGD) event, ~77% of which were clonal and 16% were subclonal, suggesting that WGD is primarily an early event in TNBC evolution. Furthermore, 7% of tumours with WGD demonstrated clonal followed by subclonal WGD events. We observe that defects in homologous recombination repair (HRD) occur early in TNBC evolution, which may be driven by the truncal selection of BRCA1 mutations. Furthermore, the extent of HRD was significantly higher in BRCA mutated TNBC tumours, with 17% of TNBC tumours demonstrating either germline or tumour driver mutations in BRCA in addition to an LOH event in the wild-type allele. BRCA-wild-type tumours were significantly enriched for clonal WGD events, suggesting increased chromosomal instability early in cancer evolution in these tumours. Parallel evolutionary events occur in 22% of TNBC tumours, demonstrating loss of genes such as FAT1 and B2M recurring in separate subclones of the same tumour on two or more occasions.

These data illustrate the evolutionary landscape of primary TNBC tumours and highlight the magnitude of events driving chromosomal instability in TNBC.

Molecular Determinants of CDK4/6 Inhibitor Response – What Have We Learned?

Shom Goel

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CDK4/6 inhibitors have transformed the therapeutic landscape of hormone receptor-positive (HR+) breast cancer, improving overall survival in the metastatic setting and disease-free survival in selected patients receiving adjuvant therapy. As these agents become foundational in clinical practice, there is growing urgency to understand the molecular determinants that govern treatment response and resistance.

This talk will explore the complexities of CDK4/6 inhibitor biology, focusing on the disconnect between early preclinical biomarker hypotheses and the realities revealed through clinical trials. While initial expectations posited that CCND1 amplification and CDKN2A (p16) loss would predict sensitivity, large-scale biomarker analyses—such as those from PALOMA and MONALEESA trials—have largely failed to validate single-gene predictors of response. Notably, the cyclin D1–CDK4 axis is a lineage-defining feature of luminal mammary epithelium, helping to explain the broad benefit seen in HR+ breast cancer.

Nevertheless, certain molecular alterations may identify subgroups with reduced benefit. RB1 loss, though rare in first-line disease, is biologically and clinically associated with resistance. Similarly, emerging data suggest that germline BRCA2-mutated tumours may harbour co-alterations and biologic properties that contribute to inferior outcomes following CDK4/6 inhibition. The role of ESR1 mutations remains uncertain. Although these mutations accumulate following combined endocrine and CDK4/6 inhibitor therapy, they do not consistently predict lack of benefit. As such, their current utility is limited to guiding endocrine therapy choices.

Gene expression profiling offers a broader perspective, with studies identifying basal-like signatures as potentially predictive of poorer outcomes. However, there remains a lack of consensus on validated gene signatures to exclude patients from CDK4/6 inhibitor therapy.

Moving forward, a paradigm shift is underway: rather than dichotomising patients into responders and non-responders, we must characterise them along a risk spectrum. Integrating clinical, genomic, and transcriptomic features into composite predictive models may better identify those at high risk of early progression—patients who might benefit from alternative or intensified first-line strategies.

In conclusion, while CDK4/6 inhibitors provide benefit to the majority of HR+ breast cancer patients, further refinement in predicting individual outcomes is needed. Progress will depend on harmonising clinical and molecular data to drive personalised treatment decisions and improve therapeutic precision.

Biomarkers for Breast Cancer: Predictive vs. Prognostic; Clinical Validation vs. Clinical Utility

Ben Ho Park

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The role of biomarkers in breast cancer continues to evolve as precision oncology advances. Biomarkers are essential for guiding clinical decision-making, but a critical distinction exists between predictive and prognostic markers, as well as between their clinical validation and clinical utility. While prognostic biomarkers inform overall disease outcome independent of treatment, predictive biomarkers identify patients likely to respond to specific therapies. Understanding these differences is essential for integrating biomarkers into routine clinical practice.

This talk will explore the landscape of breast cancer biomarkers, from well-established markers such as ER, PR, HER2, and Ki-67 to emerging genomic and liquid biopsy-based signatures. The challenges of translating promising biomarker discoveries from validation studies into clinically actionable tools with real-world utility will be discussed. Examples that will be highlighted include genomic alterations such as PIK3CA mutations, ESR1 mutations, and BRCA1/2 deficiencies, as well as the role of multi-gene assays (e.g., Oncotype DX, MammaPrint) in risk stratification and treatment selection.

Additionally, the regulatory and practical challenges associated with biomarker implementation, will be discussed, including pre-analytical/analytical validity, reproducibility, and the differences between technical and biologic limits of detection. Review of how biomarkers are being used to refine adjuvant therapy decisions, will also be discussed, including endocrine therapy resistance management, and response prediction for targeted therapies such as CDK4/6 and PI3K inhibitors.

As we move toward a more personalized and dynamic approach to breast cancer treatment, it is critical to not only identify robust biomarkers but also ensure they are meaningfully integrated into clinical practice. Future directions in biomarker research, including liquid biopsy applications, and their potential to supplement or replace response to therapies and RECIST criteria, will be discussed, with an emphasis on the potential to transform patient care.

Continual refinement of our approach to biomarker clinical validation and utility will enable us to bridge the gap between discovery and clinical impact, with the end goal of positively impacting the lives of patients with breast cancer.

Treatment Landscape for HER2-Positive MBC: Exploring Novel Therapies Beyond T-Dxd

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The development of trastuzumab and its implementation in the treatment of metastatic HER2-positive breast cancer have dramatically transformed the therapeutic landscape and significantly improved survival outcomes in HER2-positive MBC. Approximately ten years after trastuzumab was approved, another monoclonal antibody, pertuzumab, was developed. The combination of trastuzumab, pertuzumab, and docetaxel further enhanced survival outcomes and has since become the standard first-line treatment for HER2-positive MBC until present.

There are various therapeutic options for targeting HER2. Trastuzumab and pertuzumab are the most well-known monoclonal antibodies directed against HER2. Trastuzumab emtansine (T-DM1), an antibody-drug conjugate (ADC), has demonstrated improved progression-free survival (PFS) compared to the combination of capecitabine and lapatinib (HER2 targeting tyrosine kinase inhibitor) in the second-line setting. Additionally, T-DM1 has shown superior survival outcomes in later-line settings when compared to treatment of physician's choice.

Recently, the landscape of anti-HER2 treatment is evolving quickly with numerous novel agents under development. Among novel agents, trastuzumab deruxtecan (T-Dxd) has gained the greatest interest. T-Dxd is a potent antibody-drug conjugate, with high potency of topoisomerase I inhibitor payload. In the phase II DESTINY-Breast01 trial, T-DXd demonstrated remarkable efficacy in heavily pretreated HER2-positive metastatic breast cancer (MBC) patients, achieving a median progression-free survival (PFS) of 19.4 months (95% CI: 14.125.0). These results led to its accelerated FDA approval in December 2019 as a third-line treatment option. The phase III DESTINY-Breast02 trial further confirmed these findings, with T-DXd showing a doubling in median PFS compared to treatment of physician's choice (17.8 vs. 6.9 months, $P = 0.0001$).

Based on outstanding results of DESTINY-Breast01 and 02, DESTINY-03 compared the activity of T-Dxd vs. T-DM1 as 2nd-line treatment in HER2 positive MBC. T-Dxd has proven its superiority in mPFS (28.8 vs. 6.8 months) and mOS (data not reached) and achieved FDA approval as 2nd line treatment in May 2022. Subgroup analysis of DESTINY-Breast03 showed superior efficacy of T-Dxd compared to T-DM1 in patients with brain metastasis, suggesting new treatment options in HER2 positive MBC patients with brain metastasis.

At present, there is no standard treatment option after progression of T-Dxd. Novel anti-HER2 agent is currently being introduced into clinical trials and evaluating the role in later lines of treatment. Anti-HER2 biparatopic antibody such as zanidatamab is currently being investigated in phase 3 trial, which enrolls patients who showed disease progression after T-Dxd. Novel ADCs, TKIs are also in development, and combination with immune-checkpoint inhibitor is also being investigated. Major progress is anticipated in the era of HER2 positive MBC, with improvement of survival outcome in near future.

Emerging Questions in the Treatment of HER2-Positive MBC: 1) Does Endocrine Therapy Still Have a Role in HR+/HER2-Positive Disease? 2) Can We Safely Discontinue Systemic Therapy in Long Responder?

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The management of HER2-positive metastatic breast cancer (MBC) continues to evolve, with a growing focus on treatment optimization to improve patient outcomes while minimizing unnecessary toxicity. Two key areas of ongoing investigation are the role of endocrine therapy in hormone receptor-positive (HR+)/HER2+ MBC and the feasibility of discontinuing systemic therapy in long responders. These issues are critical in personalizing therapy and improving patient quality of life while minimizing unnecessary treatment.

Endocrine therapy has historically played a limited role in HR+/HER2+ MBC due to intrinsic endocrine resistance driven by HER2 pathway activation. However, recent clinical trials have explored whether adding CDK4/6 inhibitors to HER2-targeted therapy can overcome this resistance and expand the role of endocrine therapy. The monarcHER, PATRICIA, and DETECT V trials have collectively demonstrated that incorporating CDK4/6 inhibitors into maintenance endocrine therapy with anti-HER2 therapy results in at least non-inferior if not superior PFS than standard anti-HER2 therapy + chemotherapy in previously treated patients. The PATINA trial further demonstrated the efficacy of adding CDK4/6 inhibitor to maintenance endocrine therapy in the first-line setting after induction chemotherapy. These findings suggest a paradigm shift in which endocrine therapy, when paired with targeted agents, may serve as a durable treatment option, challenging the traditional reliance on chemotherapy.

In parallel, there is increasing interest in whether systemic therapy can be safely discontinued in long responders. The STOP-HER2 trial is a phase II, non-randomized trial of either continuation or cessation of systemic therapy among patients who have been receiving first-line anti-HER2 therapy without disease progression for at least 36 months. The Free-HER trial is enrolling patients who are in sustained complete remission for at least 36 months while on the same anti-HER2 directed therapy, stopping therapy in these patients while monitoring them using circulating tumor DNA (ctDNA) to detect early progression to guide therapy resumption or switch to next line therapy. These studies aim to establish criteria for safely discontinuing anti-HER2 therapy without compromising long-term disease control, potentially sparing patients from indefinite treatment-related toxicity.

Together, these ongoing research efforts highlight the increasing role of personalized treatment strategies in HER2+ MBC. The integration of CDK4/6 inhibitors into HR+/HER2+ therapy is reshaping the management of endocrine resistance, while ongoing trials may provide crucial data to redefine treatment approaches in patients with prolonged disease control. As these trials mature, their findings will help refine clinical decision-making, balancing efficacy with quality of life considerations for patients with HER2+ MBC.

Real-World Outcomes for HER2-Positive MBC: Exploring Global Perspectives and Regional Differences in Treatment Approaches

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The therapeutic landscape of HER2-positive metastatic breast cancer (MBC) has changed dramatically in recent years, with significant improvements in survival outcomes demonstrated in clinical trials of new HER2-targeted antibody-drug conjugates (ADCs) and tyrosine kinase inhibitors (TKIs). Nevertheless, HER2-positive MBC remains a generally lethal disease, and ethnic and regional disparities continue to hinder optimal treatment worldwide. This presentation will provide a comprehensive overview of real-world data (RWD) on HER2-positive MBC, with a focus on the following key areas:

1. Are We Improving? Survival Trends in Real-World and Clnical Trial Data

The development of anti-HER2 antibodies, TKIs, and ADCs has significantly improved survival in HER2-positive MBC patients, and real-world studies have quantified the magnitude of these gains. For example, the French nationwide ESME study (ESMO 2020) showed that the median overall survival (OS) for HER2-positive breast cancer increased from 39.1 months in 2008 to 58.0 months in 2013surpassing survival gains seen in other subtypes. Similarly, a study from MD Anderson Cancer Center (Cancers 2021) demonstrated that OS significantly improved over time in estrogen receptor-positive (ER+)/HER2+ subtypes and showed a trend toward improvement in ER-negative (ER)/HER2+ subtypes (5-year OS increased from 33% to 43% between 19951998 and 20152017). A Korean real-world study of the CLEOPATRA regimen also reported a median OS of 58.3 months.

2. Long-Term Responders in HER2-Positive MBC

A pressing question in HER2-positive MBC is: Can patients be cured? Real-world studies have identified several predictors of long-term response, including younger age at diagnosis, hormone receptor co-expression, low disease burden, non-visceral metastases, surgical resection of metastatic lesions, nodal or locoregional rather than distant metastases, and favorable response to first-line therapy. Whether trastuzumab can be safely discontinued in long-term responders remains inconclusive, although some complete responders (CRs) have shown durable remission after discontinuation. Notably, the CR rate with second-line T-DXd is reported to be ~6% in real-world studies, but long-term follow-up is needed to assess outcomes in this group.

3. Real-World Data on Brain Metastases

Brain metastasis remains a major clinical challenge in HER2-positive MBC. Real-world data consistently identify brain metastases as an independent poor prognostic factor. In the resistHER study, the median time from MBC diagnosis to central nervous system (CNS) involvement was just 10.8 months, underscoring the need for early detection and proactive management. Recently, results from a phase II study on brain metastasis

surveillance were published, further supporting this approach.

4. Regional and Economic Disparities in Access to Anti-HER2 Therapies

Numerous studies have reported disparities in access to high-cost anti-HER2 therapies based on geographic location, healthcare systems, and institutional resources. Variability in national health insurance policies contributes to unequal treatment access, leading to notable differences in survival outcomes. These findings underscore the need for value-based strategies to ensure equitable access to innovative anti-cancer therapies for HER2-positive MBC patients worldwide.

5. Real-World Data on Recently Approved Agents and HER2-Targeting Biosimilars

Recent clinical trials have introduced several promising treatment options for HER2-positive MBC, including T-DXd, tucatinib, and T-DM1. Beyond their clinical trial efficacy, real-world studies support their effectiveness and tolerability in broader patient populations. Additionally, HER2-targeting biosimilars (e.g., Ontruzant, Herzuma) have gained widespread acceptance globally, and real-world evidence supports their comparable efficacy and safety in managing HER2-positive breast cancer.

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Panel Discussion

Go Beyond Cure of
Breast Cancer

Neoadjuvant vs. Adjuvant Chemotherapy for ER+ Breast Cancer

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Neoadjuvant chemotherapy (NAC) is a well-established treatment modality for locally advanced breast cancer, offering benefits such as tumor downstaging and the opportunity for breast-conserving surgery. While NAC is commonly utilized across various breast cancer subtypes, its role in hormone receptor-positive (HR+) breast cancer presents unique considerations. Traditionally, HR+ tumors have been considered less sensitive to chemotherapy compared to other subtypes. While HR+ breast cancers generally exhibit lower pCR rates with NAC compared to HER2-enriched or triple-negative subtypes, NAC can still provide valuable clinical benefits for patients. These benefits may include tumor shrinkage facilitating less extensive surgery, in vivo assessment of drug sensitivity, and potential eradication of micrometastatic disease. However, the relatively lower pCR rates have led to ongoing research focused on identifying predictive biomarkers for chemosensitivity within the HR+ subgroup and exploring combination strategies with endocrine therapy and targeted agents to enhance response rates. The integration of genomic and molecular profiling is increasingly important in tailoring neoadjuvant approaches for HR+ breast cancer.

Neoadjuvant chemotherapy remains a relevant treatment option for a subset of HR+ breast cancer patients, particularly those with high-risk features. Understanding the nuances of chemosensitivity within this heterogeneous subtype and strategically incorporating endocrine and targeted therapies are crucial for optimizing treatment outcomes. Future research should continue to focus on identifying reliable predictive markers and developing personalized neoadjuvant strategies to improve the efficacy of systemic therapy and ultimately enhance long-term outcomes for patients with HR+ breast cancer. The current landscape of NAC use in HR+ breast cancer, highlighting its potential benefits, limitations, and the ongoing efforts to optimize its application in this patient population will be discussed in the session.

Emerging Option of Neoadjuvant Immunotherapy for ER+ Breast Cancer

Sherene Loi

Univ. of Melbourne, Australia

Current Status and Future Directions of Neoadjuvant Hormonal Therapy

Erica Mayer

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Although preoperative chemotherapy has a substantial role in the management of the proliferative subsets of breast cancer, including HER2 positive and triple negative disease, rates of pathologic compete response for hormone receptor positive (HR+) breast cancer remain low. There has been great interest in utilizing preoperative endocrine therapy for HR+ breast cancer, yet exploration in clinical trials presents specific challenges. Endocrine monotherapy using an aromatase inhibitor can lead to clinical response, however requires prolonged exposure, typically at least 6 months of therapy. Best candidates for preoperative endocrine therapy may have disease that is biologically more sensitive to endocrine based approaches, and can potentially be identified with a favorable genomic risk score. Determining efficacy of preoperative endocrine therapy can be challenging, as pathologic response at surgery does not appear to be an adequate indicator of efficacy. Novel alterative measurements, including on-treatment Ki-67, dynamic change in Ki-67, or calculation of the PEPI score on therapy, may be more effective in predictive response from therapy as well as likelihood of a favorable long term outcome. Prospective studies have suggested real-time treatment tailoring based on initial response to endocrine therapy as well as genomic risk score can effectively assign patients to effective and tolerable therapy. The addition of a CDK4/6 inhibitor to preoperative endocrine therapy can deepen cell cycle arrest, as measured by Ki-76, compared to endocrine therapy alone, yet without difference in pathologic response at surgery. However, prospective studies have suggested similar benefit from preoperative endocrine therapy and CDK4/6 inhibitor therapy versus preoperative chemotherapy for appropriately selected HR+ disease, offering an alternative preoperative strategy for patients when preoperative therapy is indicated. Future studies will evaluate novel imaging in the preoperative space, for example FES PET, potentially more effective endocrine strategies, and novel targeted partners. Further research is necessary to help grow the role of preoperative endocrine therapy for patients with early HR+ HER2- breast cancer.

Width of Closest Margin: Greater the Safer?

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Practice-changing clinical trials of the 1970s and 1980s which randomized patients with localized breast cancer to either mastectomy, or breast conserving surgery (BCS) with radiotherapy (RT) established the long-term oncologic equivalence of the two options. Since the publication of these landmark studies, BCS has become the preferred choice for most patients presenting with early-stage disease. A successful breast conserving operation relies on the ability to achieve "clear margins," but the definition of this term has lacked standardization, with negative margin standards varying from one institution to the next. Moreover, margin assessment is an inherently imperfect process, significantly impacted by tissue handling and processing techniques. Indications for reexcision following BCS have also varied widely, with 90-day reexcision rates ranging from 0 to 100% in one study. These factors have challenged comparison of treatment outcomes between cohorts.

In 2014, society members from ASTRO and SSO analyzed published studies in which margin width for BCS performed for invasive cancer was compared to outcomes. Based on this analysis, "no ink on tumor" was defined as the preferred definition of a negative margin for invasive cancer. Two years later, a similar analysis was performed for pure DCIS undergoing BCS, with 2mm or greater defined as a negative margin for DCIS. Adoption of these guidelines has significantly reduced reexcision rates both in single institution and population-based studies, with cost saving estimates as high as $3500 for every woman who is able to avoid a reexcision. Recently there have been studies that challenge the guidelines for DCIS suggesting that "no ink on tumor" may be sufficient in the DCIS setting as well.

Recently, intraoperative margin assessment technologies have been approved by the FDA in the United States and in Europe, and may further improve reexcision rates. Best practices including preoperative localization of nonpalpable lesions, intraoperative imaging of the specimen, and routine excision of additional margins have been incorporated into standard of care in many centers. Dissemination of these best practices will ensure the excellent outcomes that can be expected for patients undergoing BCS.

Integration of Margin Status and Subsequent Radiotherapy

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Breast-conserving therapy has been a standard treatment for early stage breast cancer patients. In Korea, BCS is being performed for about two thirds of cases after 2010.

After BCS of invasive breast cancer, many tumor and host factors influence local control rate. Of these, pathologic margin status has been known as an independent significant risk factor. In 2014, SSO-ASTRO recommended the definition of negative margin as "no ink on tumor". It was reported that the guideline decreased rates of reoperation which could be associated with patients' discomfort, surgical morbidity and the sacrifice of normal tissue. As for the same reason, in some cases, reoperation cannot be feasible. Some investigators tried to reveal that the escalated boost dose can replace the reoperation. But it was valid for only short follow up period, and resulted in moderate to severe radiation fibrosis. For APBI indication, most RCT's adopt the eligibility of more than 2mm margin. Recently, ASTRO revised APBI eligibility for margin from not less than 2mm to negative margin.

For DCIS, SSO-ASTRO recommended 2mm-margin as adequate for BCT including whole breast RT in 2016. Radiation effectively reduced IBTR in margin-positive patients, but it also failed to replace reoperation even with the escalated boost dose.

When considering radiation therapy for margin-positive breast cancer patients, such factors as the orientation of positive margin, the burden of residual disease, the patients' need for breast conserving, and the possibility of IBTR and late radiation fibrosis should be considered. In 2018, ASTRO recommended moderate escalation of boost dose for positive margins.

The effective systemic treatments are being developed rapidly and they have a positive effect on local control. For now, there are insufficient data for radiation therapy of margin-positive breast cancer, ongoing trials about the role of boost RT can be helpful to refine the volume and dose of radiation therapy.

Safe Margins for Different Tumor Types?

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The evaluation of surgical margins after breast-conserving surgery (BCS) is a critical aspect of balancing oncological safety and cosmetic outcomes in breast cancer treatment. At our institution, margin assessment to determine postoperative treatment strategies is not exclusively conducted by pathologists providing the final pathology report but involves a collaborative effort among radiologists and breast surgeons responsible for surgical planning.

Surgeons performing BCS aim to achieve "complete excision of breast cancer." To this end, the extent of cancer is preoperatively assessed using mammography, ultrasonography (US), and magnetic resonance imaging (MRI). The resection area is determined by projecting the extent of cancer onto breast surface of the patient. Despite the limited specificity of MRI, areas of suspected non-mass enhancement undergo further evaluation with second-look US and fine-needle aspiration (FNA) to assist in defining the extent of disease. Invasion of cancer into the skin or pectoralis major muscle is assessed using US and MRI, guiding decisions on whether to excise overlying skin or partially resect the tumor bed involving the pectoralis major muscle. Tissue mammography is routinely performed for all breast cancer cases to confirm the location of masses and calcifications within the specimen. Resected specimens are oriented with marking strings in the operating room. The specimen is then fixed to a board by the surgeon to prevent it from losing its original shape, inked on the side margin, and fixed in formalin. Specimens are sliced at 5-mm intervals, and pathological evaluation is conducted to whole specimens.

A unique feature in Japan's pathological evaluation process is the creation of a "cancer mapping," a diagram that plots the extent of cancer. This approach facilitates comparison with imaging findings and pathological result. The resected specimen is compared with preoperative imaging findings, and when sufficient distance is confirmed between cancer and inked lateral margins, complete excision is deemed achieved. In such cases, patients are presented with the option to omit radiation therapy as part of a prospective study in our institute.

Among 512 consecutive cases of invasive carcinoma without lymph node metastasis or lymphovascular invasion, where complete excision was confirmed and postoperative radiation therapy was omitted, the 10-year ipsilateral breast tumor recurrence (IBTR) rate was 4.9%. Subtype-specific 10-year IBTR rates were as follows: ER-positive/HER2-negative (n = 387): 4.9%, ER-positive/HER2-positive (n = 22): 4.6%, ER-negative/HER2-positive (n = 14): 8.3%, and ER-negative/HER2-negative (n = 83): 5.1%. No significant differences were observed among subtypes. These findings highlight the critical importance of confirming complete tumor excision, and patient enrollment in prospective interventional trials is ongoing in our institute.

Stratification of local recurrence risk following BCS may facilitate individualized treatment strategies. The first step in this process involves evaluating residual cancer within the conserved breast. Historically, whole-breast irradiation has been performed based on the assumption that complex intraductal spread or multifocal disease prevent accurate assessment of residual disease. While not all patients can omit radiation therapy after BCS, our results suggest that carefully selected patients may be offered this option regardless of subtype. As this study represents a single-institution analysis, further investigations are planning to evaluate its generalizability.

Molecular Tumor Board: NGS-Guided Decision Making

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Advances in cancer genomic analysis and molecular profiling over the past decades have led to advancements in cancer treatment and emergence of precision medicine. Precision medicine requires multiple processes including, identifying specific biomarkers or alterations from genomic sequencing, discussing the optimal drugs for each patient guiding overall sequence of treatment. And this led to the establishment of interdisciplinary molecular tumor boards (MTB). MTB team usually includes physicians- oncologists of medicine/surgery/radio-oncology, pathologist, geneticist, bioinformatician, study coordinator etc. The MTB team essentially reviews both patients' molecular profiling, along with pathology, imaging, clinical history to primarily interpret the targeted therapies of choice by matching the drugs to the alterations identified from sequencing. MTB reports include sample info (tumor site, plasma, date) and assay of molecular testing (TGS, WES, gene list etc.), and all classes of identified molecular alterations (SNVs, CNVs, rearrangements, TMB, signature etc.) to draw the optimal interpretation. While the area of precision medicine accounted mostly for advanced patients with multiple lines of previous treatments, recent data for the early-stage patients suggest the benefit in guiding local therapy and prognostication. Understanding the complex process and the benefit of MTB is becoming a more essential component in precision medicine. Also achieving the good quality of molecular profiling data and choosing the appropriate assay is crucial. In this session of MTB, we will discuss four cases of advanced and early breast cancer cases to understand the benefits of MTB and also, to expand our knowledge on the essential components of MTB.

Breast-Conserving Surgery for Multiple Ipsilateral Breast Cancer

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Historically patients diagnosed with more than one focus of breast cancer within one breast have been recommended mastectomy rather than breast conservation, due to high rates of local recurrence in early studies in the late 1980s. More recent retrospective studies have indicated that local recurrence rates may be more acceptable.

The ACOSOG/Alliance Z11102 clinical trial was a prospective single arm study to evaluate local recurrence rates after breast conserving surgery followed by whole breast radiation with boost to each lumpectomy site. The primary endpoint of the study was to assess whether the 5-year local recurrence rate was < 8%. The study enrolled patients with 2 or 3 foci of biopsy-proven breast cancer from July 2012 to August 2016. Conversion rate to mastectomy was 7.1%. Cosmetic outcome was rated as good or excellent by 70% at 2 years. Of 204 patients evaluable for the primary end point, six patients developed local recurrence [estimated cumulative incidence of local recurrence at five years 3.1% (95% CI; 1.3-6.4)]. Local recurrence rates were lower in the patients who had had a preoperative MRI and in those patients with estrogen receptor positive disease that received adjuvant endocrine therapy. The majority of the patient's enrolled in the trial were postmenopausal with ER positive, HER2 negative breast cancer and had only two foci of disease in the breast. Overall, this trial provides data to support that breast conserving therapy, with lumpectomy followed by radiation, is a reasonable consideration for patients with multiple ipsilateral breast cancer.

Axillary Management According to the Subtype

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As systemic therapies have become more widespread and increasingly effective, the management of the axilla for early-stage breast cancer has undergone substantial evolution, from the historically espoused axillary lymph node dissection (ALND) to selective omission of axillary surgery. Since sentinel node biopsy (SLNB) was established as an accurate and less morbid assessment of the overall status of the axillary nodes, there has been ongoing debate about the appropriate extent of axillary surgery for an individual patient, and how tumor subtype could help drive these recommendations. Recent key trials in the management of the axilla in both the adjuvant and neoadjuvant settings have provided important evidence in this regard, including which patients and tumor types should be considered for de-escalation.

In the adjuvant setting, two trials that have evaluated the role of completion axillary node dissection in patients with a clinically negative axilla but a positive sentinel node. The AMAROS Trial randomized patients to either completion ALND or axillary radiation, and confirmed that axillary radiation conferred equivalent disease-free survival (DFS) and overall survival (OS) to ALND, with axillary radiation associated with lower arm morbidity. ACOSOG Z0011 evaluated a similar population with randomization to either ALND or no additional surgery and similarly showed equivalent DFS at 10 years (HR 0.85; 95% CI 0.62-1.17). ACOSOG Z0011 participants had a median age of 55 years at diagnosis, and 84% had hormone receptor (HR)-positive disease; HER2 data have not been published for this trial. The POSNOC trial evaluated a comparable population, comparing adjuvant therapy alone with adjuvant therapy plus axillary treatment (either completion ALND or axillary RT); this study is fully accrued but has not yet reported its first planned analysis. Recent studies have gone even one step further, reporting outcomes with omission of axillary surgery in patients who present with a negative axillary ultrasound. The SOUND trial randomized 1463 patients (median age 60; 88% ER+/HER2-) to either SLNB or no SLNB and found no difference in DFS between groups. Similar findings were reported by the INSEMA investigators, who found equivalent invasive disease-free survival in patients who had omission of SLNB compared to those who had SLNB (HR 0.91; 95% CI 0.73-1.14). In both trials, more than half of patients were older than 60 years at diagnosis, with 88.5% of patients in the SOUND study diagnosed with HR+/HER2- cancer.

In the neoadjuvant setting, there is little controversy over patients who present with a clinically negative axilla and negative sentinel nodes following systemic treatment. However, there is keen interest in patients who present with node-positive disease and remain node-positive. Ongoing trials seek to determine the appropriate extent of axillary surgery for these patients following neoadjuvant chemotherapy (NAC), including the role of tumor subtype. The Alliance A11202 Trial enrolled patients who have residual disease in the axilla following NAC and randomized them to either ALND or no further axillary surgery; this trial has not yet reached its primary endpoint. For patients who convert from a node-positive to node-negative axilla, NSABP B-51

presented preliminary data that showed that those patients randomized to receive regional nodal irradiation (RNI) had equivalent invasive disease-free interval compared to patients without RNI (HR 0.88; 95% CI 0.60-1.29; unpublished data). Notably, 56% of patients in this study had HER2+ disease and 21% had TNBC.

These trials are setting the stage to position axillary surgery as a more targeted recommendation for breast cancer without leading to increased axillary recurrence rates. To date, the existing data support de-escalation of axillary surgery, particularly for patients at least 60 years of age with HR-positive disease, including omission of axillary surgery in select patients with a negative preoperative axillary ultrasound. We await the findings of studies such as POSNOC, TAXIS, and A11202 for additional evidence to better guide clinical recommendations in this rapidly evolving area.

Immediate Reconstruction After Ipsilateral Breast Recurrence

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With an observed 5-10% rise in ipsilateral breast tumor recurrence (IBTR) following breast-conserving surgeries, addressing this recurrence effectively poses notable treatment challenges. The decision-making process for surgical management should integrate oncological priorities, aesthetic outcomes, and the psychological well-being of patients. Immediate reconstruction post-IBTR is becoming a viable option to restore breast contour while addressing cancer treatment concurrently.

This presentation will cover principles and outcomes of immediate reconstruction after IBTR, reviewing contemporary protocols and techniques used in surgical oncology and plastic surgery. It emphasizes a multidisciplinary approach that includes surgical oncologists, reconstructive surgeons, and oncologists. Various reconstructive methods, such as autologous tissue transfer and implant-based techniques, will be discussed, with a focus on their usage, benefits, and possible complications.

Recent studies show that immediate reconstruction can lead to satisfactory aesthetic results, support emotional recovery, and potentially ease follow-up therapies. However, careful patient selection is crucial, with considerations such as tumor size, grade, and comorbid conditions shaping surgical choices.

The presentation will highlight clinical cases and outcomes to enhance understanding and encourage discussion about managing IBTR with immediate reconstruction. By sharing insights into evidence-based practices and patient counseling strategies, it seeks to reveal innovative approaches for better outcomes in this complex patient group.

Screening or Early Detection of Brain Metastases and the Treatment in the Era of New Agents

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Based on real-world data from the French ESME database, and U.S. Flatiron database, the incidence of brain metastases in patients with metastatic breast cancer (MBC) is highest in those with triple-negative or HER2-positive subtypes. The two-year cumulative incidence of brain metastases in patients with TN MBC in the ESME database was 45% and was 29-49% in those with HER2+ MBC depending on hormone receptor status. In the U.S. Flatiron database, by third line of systemic therapy, between 21-36% of patients with TN or HER2+ MBC had developed brain metastases. In the absence of systematic screening for brain metastases, these figures likely represent an underestimate of the true prevalence of brain metastases in patients with MBC. Whether routine screening brain MRI should be recommended to patients with MBC remains controversial, with differences between ABC7, ASCO, and ESMO guidelines. Results of multiple prospective studies are starting to report out. In a Korean study that included brain MRI at baseline, first treatment switch, and end of second line therapy, the cumulative incidence of brain metastases in patients with TN and HER2+ was 27-38%. In a U.S. based trial with a baseline and 6- month brain MRI, approximately one-quarter of patients were found to have brain metastases across all subtypes, including ER+/HER2-negative disease. Ongoing studies are elucidating the impact of screening on quality of life and neurological outcomes.

Once a patient is diagnosed with brain metastases, multidisciplinary collaboration is essential in weighing each of the options that may be available to patients, from local therapy to systemic therapy. Advances in systemic therapy have been greatest in HER2-positive breast cancer, where the current NCCN guidelines include a growing list of CNS-active regimens, such as tucatinib-capecitabine-trastuzumab, T-DXd, T-DM1, high dose trastuzumab and pertuzumab, neratinib-capecitabine, and lapatinib-capecitabine. Other active regimens not currently listed in the NCCN guidelines include the combination of TDM1 with neratinib or tucatinib, and combinations of trastuzumab with chemotherapy. There are a number of novel blood-brain-barrier (BBB) penetrant HER2-targeted tyrosine kinase inhibitors (e.g. ZN1041, IAM1363) in early-phase clinical trials. For patients with HER2-negative tumors, the data are more sparse; however, activity of chemotherapy drugs such as capecitabine, anthracyclines, platinums, and eribulin has been reported. Additionally, there are emerging data for the potential role of antibody drug conjugates, including T-DXd and Sacituzumab. Ongoing clinical trials are testing a wide variety of ADCs, such as patritumab deruxtecan, datopotamab deruxtecan, ARX788, and others. Finally, for patients with ER-positive brain metastases, trials incorporating the novel oral SERDs are of interest. For example, the ELECTRA trial is testing the combination of elacestrant and abemaciclib.

Overall, the expanding array of systemic options with clinically meaningful intracranial activity, as well as continued advances in radiation and surgical techniques, means that multidisciplinary discussions for clinical decision-making have become increasingly critical to the optimal management of patients with brain metastases.

Recent Update on Neurosurgical Management of Breast Cancer Brain Metastasis

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Breast cancer is the most common malignancy among women worldwide, and the main cause of death in patients with breast cancer is metastasis. Metastasis to the central nervous system occurs in 10% to 16% of patients with metastatic breast cancer, and this rate has increased because of recent advancements in systemic chemotherapy. Because of the various treatments available for brain metastasis, accurate diagnosis and evaluation for treatment are important. Magnetic resonance imaging is one of the most reliable preoperative examinations not only for diagnosis of metastatic brain tumors but also for estimation of the molecular characteristics of the tumor based on radiographic information such as the number of lesions, solid or ring enhancement, and cyst formation.

Surgical resection continues to play an important role in patients with a limited number of brain metastases and a relatively good performance status. A single brain metastasis is a good indication for surgical treatment followed by radiation therapy to obtain longer survival. Surgical removal is also considered for two or more lesions if neurological symptoms are caused by brain lesions of >3 cm with a mass effect or associated hydrocephalus. Although maximal safe resection with minimal morbidity is ideal in the surgical treatment of brain tumors, supramarginal resection can be achieved in select cases. With respect to the resection technique, en bloc resection is generally recommended to avoid leptomeningeal dissemination induced by piecemeal resection. An operating microscope, neuronavigation, and intraoperative neurophysiological monitoring are essential in modern neurosurgical procedures, including tumor resection.

More recently, supporting surgical instruments have been introduced. The use of endoscopic surgery has dramatically increased, especially for intraventricular lesions and in transsphenoidal surgery. An exoscope helps neurosurgeons to comfortably operate regardless of patient positioning or anatomy. A tubular retractor can prevent damage to the surrounding brain tissue during surgery and is a useful instrument in combination with both an endoscope and exoscope. Additionally, 5-aminolevulinic acid (5-ALA) is a promising reagent for photodynamic detection of residual tumor tissue. In the near future, novel treatment options such as high-intensity focused ultrasound (HIFU), laser interstitial thermal therapy (LITT), oncolytic virus therapy, and gene therapy will be introduced.

Keywords: Metastatic brain tumor; breast cancer; neurosurgical technique

Novel Radiotherapeutic Strategies in Brain Metastases: Including New Perspectives in the Era of ADCs and Immunotherapy

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Advancements in systemic therapies, including antibody-drug conjugates and immunotherapy, have prolonged the survival of breast cancer patients and demonstrated efficacy, including in patients with brain metastases. These developments have led to shifts in intracranial disease management, necessitating optimized local and systemic treatment strategies. Stereotactic radiosurgery (SRS) has become the preferred local therapy over traditional whole-brain radiotherapy (WBRT) for unresectable brain metastases. Recently, the demand for repeat SRS has increased for recurrent metastases, including local progression and distant metastases following prior SRS. Despite its growing clinical relevance, repeat SRS presents challenges regarding treatment efficacy, toxicity, and optimal sequencing with systemic therapies. With prolonged survival, the need for salvage treatment after prior SRS may increase, requiring a careful balance between maintaining local control and minimizing neurotoxicity and neurocognitive decline. When evaluating repeat SRS, alternative options should always be considered, including surgical resection, conventional WBRT, hippocampal-avoidance WBRT, CNS-effective systemic therapies, and active surveillance for asymptomatic metastases. From a new perspective, this presentation will examine the role of repeat SRS in managing recurrent brain metastases, focusing on its impact on initial failure patterns and distinguishing local recurrence from distant metastases. We will evaluate the latest evidence on its efficacy, safety considerations, and the evolving indications for repeat radiation in the context of novel systemic agents. Additionally, we will explore future directions to refine patient selection and optimize treatment sequencing. By addressing these critical issues, we aim to refine the integration of repeat SRS into contemporary treatment paradigms for breast cancer brain metastases.

gBRCA1/2 Genes in Breast Cancer: Real-World Data and the Value of Universal Testing

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The identification of germline BRCA1/2 mutations has long been recognized as a critical factor in assessing breast cancer risk. Advances in next-generation sequencing (NGS) and multigene panel testing have revolutionized the landscape of genetic screening, significantly impacting both preventive strategies (especially surgical options) and therapeutic interventions. More recently, BRCA1/2 mutation status has gained increasing clinical relevance in guiding treatment decisions for patients already diagnosed with breast cancer.

For individuals harboring pathogenic or likely pathogenic (PV) variants in BRCA1/2, targeted therapies such as olaparib and talazoparib have emerged as standard treatments in both early-stage and metastatic breast cancer. This growing body of evidence has led to calls for broader BRCA1/2 testing. However, there remains a lack of consensus on universal testing criteria, leaving clinicians with unclear guidance regarding which patients to test and which additional genes to include in germline genetic panels.

Challenges in Genetic Testing Implementation

One of the primary obstacles to genetic testing is the inconsistency in current testing guidelines and criteria, creating confusion for both healthcare providers and patients. The National Comprehensive Cancer Network (NCCN) provides detailed cancer testing and management guidelines, but these may not be feasible for implementation in resource-limited settings.

In contrast, the American Society of Breast Surgeons recommends BRCA1/2 testing for all breast cancer patients. The American Society of Clinical Oncology (ASCO) and the Society of Surgical Oncology (SSO) advocate for testing all newly diagnosed breast cancer patients aged 65 years or younger. For patients older than 65, testing is recommended based on personal and family history, ethnicity, or eligibility for PARP inhibitor therapy.

Initially, BRCA1/2 testing criteria were designed to prioritize individuals with a high probability ($\geq 10\%$) of carrying a PV, mainly due to the high cost of testing and the limited availability of trained genetic counselors. Moreover, early BRCA testing was primarily conducted in academic research institutions, with limited understanding of its clinical implications.

Over the past decade, the landscape of genetic testing has evolved significantly. The cost of testing has decreased, results are now available more rapidly, and actionable findings have increased in clinical importance. These advancements suggest the need to reassess current testing criteria, emphasizing simplification, accessibility, and the identification of a larger number of BRCA1/2 carriers to improve patient outcomes.

Expanding Treatment Options Through BRCA1/2 Testing

Determining BRCA1/2 mutation status in breast cancer patients could broaden treatment options beyond conventional chemotherapy. The identification of BRCA mutations has allowed for the integration of PARP inhibitors into the standard treatment paradigm, offering targeted therapy options that may enhance disease control and patient survival.

In this panel discussion, we will explore the clinical and practical benefits of universal BRCA1/2 testing and present recent real-world data on its impact in testing accessibility, treatment selection, and outcomes for BRCA-associated breast cancer patients. By addressing the challenges and opportunities in expanding genetic testing criteria, we aim to facilitate a more comprehensive and equitable approach to breast cancer management.

Endocrine-Resistant Breast Cancer in gBRCA Carriers

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Oestrogen receptor-positive (ER+) breast cancer is the most prevalent subtype among germline BRCA mutation carriers, particularly in those with BRCA2 mutations. Despite this, endocrine-resistant disease remains a clinical challenge in this population. Over the past decade, significant strides have been made in the management of ER+ breast cancer, including the integration of CDK4/6 inhibitors and PARP inhibitors into treatment paradigms. In the early-stage, high risk setting, adjuvant olaparib had demonstrated survival benefit in germline BRCA carriers, and CDK inhibitors such as abemaciclib have shown efficacy in reducing recurrence in ER+, HER2-negative breast cancer. In the metastatic setting, both drug classes have demonstrated an extension in progression-free survival. However, emerging real-world and retrospective evidence suggests that germline BRCA carriers derive less benefit from CDK4/6 inhibitors as compared to BRCA wildtype individuals.

This discrepancy has led to increasing interest in uncovering the underlying mechanism of resistance to CDK inhibitors in the context of a BRCA-mutated ER+ setting. Proposed mechanisms include alterations in DNA damage response pathways, inherent genomic instability and possible decoupling of the cell cycle regulatory axis from endocrine signalling. These mechanisms may render CDK4/6 inhibition less effective or lead to earlier emergence of resistance.

Contemporary clinical trials such as OlympiA and EMBRACA have demonstrated clear benefits of PARP inhibition in BRCA-associated breast cancers, solidifying their role in HER2-negative metastatic breast cancers. CDK4/6 inhibitors have not been specifically studied in BRCA mutated cohorts within randomized trials and retrospective analyses raises concerns about attenuated responses in this group. Furthermore, questions remain about optimal sequencing strategies, potential combinatorial approaches and whether distinct therapeutic strategies are warranted for BRCA-mutated ER+ breast cancer compared to their wild-type counterparts.

We will explore the biologic underpinnings of endocrine resistance in germline BRCA mutation carriers, review existing data from retrospective studies and subgroup analyses of major trials as well as discuss implications for clinical practice. We will also highlight emerging therapeutic strategies and identify areas for future research which would be aimed at overcoming resistance and improving outcomes for this unique patient population.

Survival Analysis After Risk-Reducing Surgeries in BRCA Carriers with Breast Cancer

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Female BRCA1/2 and PALB2 germline pathogenic variant carriers have an increased lifetime risk of breast cancer and may wish to consider risk-reducing mastectomy (RRM) for surgical prevention. Quantifying residual lifetime risk and the absolute benefit from RRM requires careful consideration of a patient's age, pathogenic variant, and their personal history of breast cancer. Historically, patients have been counselled that RRM does not necessarily prolong survival relative to high-risk surveillance, although recent studies suggest a possible survival benefit of bilateral RRM in unaffected BRCA1 carriers. In affected carriers who have breast cancer, therapeutic mastectomy will prevent future primary cancers but does not mitigate the risk of an ipsilateral recurrence from one's index malignancy. For affected carriers, contralateral breast cancer risk also varies according to pathogenic variant and age at the time of index breast cancer. In BRCA1 patients, there is a 40% risk of developing a contralateral breast cancer at 20 years, but this can range from as high as 60% to as low as 38% if under 40 or over 50-years-old at time of first breast cancer diagnosis. In BRCA2 carriers, 20 year contralateral breast cancer risk is 26%, but also ranges from 20-68% depending on the age at index breast cancer. Recent data from cohort studies suggests that contralateral RRM may impact survival in BRCA carriers, specifically BRCA1 carriers and young BRCA carriers diagnosed under the age of 40, although further data and longer follow up are needed to confirm these findings. This talk will review all the available evidence around the impact of surgery on survival outcomes.

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ER-Low and HER2-Low Breast Cancer: Pathological and Clinical Landscape

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Recent advancements in breast cancer research have illuminated the complexities and heterogeneity of this disease, particularly focusing on estrogen receptor (ER)-low and human epidermal growth factor receptor 2 (HER2)-low subtypes. These classifications challenge the traditional dichotomy of hormone receptor status and HER2 overexpression, necessitating a understanding of their biological behaviors and clinical implications.

The definition of ER-low and HER2-low breast cancers with pathological and clinical characteristics will be reviewed.

Clinically, patients with ER-low and HER2-low tumors may experience unique treatment responses, with standard hormonal therapies often proving less effective. Emerging treatment modalities, including novel anti-HER2 agents and immunotherapy, are currently being explored in clinical trials, illustrating the urgent need for tailored therapeutic strategies.

We will also discuss the implications of these findings for clinical practice, emphasizing the importance of precise biomarker testing and personalized treatment approaches to improve outcomes for patients within this subgroup. Ultimately, understanding the pathological and clinical landscape of ER-low and HER2-low breast cancer is crucial for refining therapeutic algorithms and enhancing patient care in this evolving field.

Lobular Carcinoma: Current Concepts and Clinical & Therapeutic Implications

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Lobular Carcinoma: Radiological Implication

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Invasive lobular carcinoma (ILC) is characterized by single-cell infiltration with an insinuating growth pattern, often leading to minimal architectural distortion and subtle findings on mammography and ultrasound (US) [1,2]. Additionally, ILC has a higher likelihood of multifocality and contralateral breast involvement, posing challenges in detection, diagnosis, and disease extent assessment. Compared to other breast cancers, ILC is associated with higher rates of positive resection margins after breast-conserving surgery, a higher nodal stage at diagnosis, and a greater number of positive lymph nodes at surgery [1,2].

Over the past decade, there has been growing interest in using preoperative breast US and breast MRI to better evaluate tumor extent and axillary lymph node status in patients with ILC [3]. However, despite their potential, these imaging modalities have not consistently improved the achievement of negative surgical margins or the accurate assessment of nodal stage.

This lecture aims to propose effective imaging interpretation strategies to enhance surgical outcomes by analyzing the preoperative US and MRI features of ILC cases from our institution. Between 2020 and 2021, a total of 1473 consecutive patients (mean age, 54 ± 10.2 years; range, 2987 years) with 1531 tumors (128 lobular, 1403 ductal, and 58 bilateral cancers) underwent preoperative breast US and dynamic contrast enhanced-MRI followed by surgery. All analyses were conducted on a breast-based rather than a patient-based approach.

The reoperation rate due to positive surgical margins was significantly higher in ILC than in ductal carcinoma (8.6% [11/128] vs. 4.3% [61/1403]; $P = 0.045$). Bilateral breast cancer was also more frequent in lobular carcinomas (15.6% [20/128] vs. 6.8% [96/1403]; $P = 0.001$).

On MRI, lobular cancers tended to be underestimated in size relative to ductal cancers, with a mean size discrepancy of 0.9 cm ± 2.2 vs. 0.1 cm ± 1.4, respectively ($P < 0.001$). The correlation between tumor sizes on MRI and histopathology was also lower for lobular cancers than for ductal cancers (Spearman's rho, 0.567 vs. 0.758; $P < 0.001$). The correlation improved when the total tumor size, including both mass and non-mass enhancement, was considered rather than mass size alone, though this difference did not reach statistical significance (Spearman's rho: 0.567 vs. 0.407; $P = 0.095$). Notably, in lobular carcinoma, tumor size measurements on delayed-phase MRI showed stronger correlation with histopathologic size than those on early-phase MRI (Spearman's rho, 0.715 vs. 0.567; $P = 0.044$).

Regarding nodal status, the rate of axillary lymph node metastasis was similar between ILC and IDC (25.8% [33/128] vs. 19.7% [276/1403]; $P = 0.107$). However, among the 54 patients with pathological N2 or higher stage, more patients with lobular cancers had N2 or higher stage (9.3% [12/128] vs. 3.0% [42/1403], $P = 0.001$) than those with ductal carcinoma.

The false-negative rate of axillary lymph node assessment on US was higher in patients with ILC than those with IDC, though the difference did not reach statistical significance (15.7% [16/102] vs. 11.2% [122/1090]; $P = 0.194$).

These findings highlight the unique imaging challenges of ILC, particularly in assessing tumor extent and nodal status. The higher rates of positive surgical margins and bilateral disease emphasize the need for careful preoperative evaluation and suggest the potential benefits of incorporating delayed-phase imaging and assessing both mass and non-mass enhancement. Regarding axillary lymph node staging, awareness of the higher likelihood of advanced nodal disease and higher false-negative rates in imaging for lobular carcinoma is essential for more precise preoperative assessment and surgical planning.

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Incorporating Comprehensive and Integrative Medicine

Jennifer Ligibel

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Integrative Therapies are treatments that are focused on the whole person, informed by evidence, and make use of all appropriate therapeutic and lifestyle approaches, healthcare and disciplines to achieve optimal health and healing. Although there is no formal definition of which treatments are considered "integrative", therapies such as acupuncture, massage, mediation and yoga are generally regarding in this category. Integrative Therapies are widely used by patients with breast cancer, during and after cancer treatment.

In this session, we will explore use of Integrative Therapies as a part of breast cancer care. We will discuss evidence of recent randomized trials testing the impact of acupuncture, yoga and other integrative modalities on common symptoms of breast cancer treatment including joint pain, hot flashes and fatigue. We will then discuss new guidelines from the Society for Integrative Oncology and the American Society of Clinical Oncology, grading the evidence for various integrative therapy modality in patients with breast cancer, and talk about future directions in research.

Integration of Big Data and AI on Healthcare Research

Yong Hyun Cho

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The integration of Artificial Intelligence (AI) and Big Data is transforming healthcare research, particularly in the field of Real-World Evidence (RWE). As RWE continues to play a vital role in regulatory decision-making and clinical innovation, the demand for scalable, systematic, and privacy-preserving methodologies has grown. However, traditional data processing remains labor-intensive, fragmented, and constrained by privacy regulations.

This session introduces AI-driven solutions that enhance RWE research. First, we present Large Language Model (LLM)-based data processing, which automates the extraction of critical clinical information from unstructured sources, significantly reducing time and effort. Second, we introduce HRS, a Big Data Search Engine that streamlines cohort selection and data visualization for RWE studies. Third, we discuss Federated Learning, a privacy-preserving AI approach that enables multi-institutional collaboration without exposing sensitive patient data, ensuring secure and efficient analysis of Electronic Medical Records (EMR).

By integrating AI, Big Data, and clinical expertise, we enhance exploratory data analysis, pharmacovigilance, and drug efficacy assessments, ultimately accelerating healthcare advancements while ensuring data security and regulatory compliance. This session highlights how AI-powered analytics are shaping the future of evidence-based medicine.

Digital Clinical Trials-Precision Medicine from Patients

Hyung-Jun Kim

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The advancement of digital technology is accelerating the innovation of clinical trial processes. Traditional paper-based clinical trial documentation has transitioned to electronic formats (eCRF, Electronic Document), enhancing data security, accessibility, and operational efficiency. With approximately 70% of global pharmaceutical and biotech R&D expenditures allocated to clinical trials, improving efficiency is crucial for reducing costs and accelerating drug development.

In particular, Decentralized Clinical Trials (DCT) leverage IT technologies to minimize physical site visits for patients while enhancing the collection of Real-World Data (RWD). Remote data collection through digital medical devices increases patient convenience and provides researchers with more precise data.

Additionally, the significance of Patient-Reported Outcomes (PRO) is growing, emphasizing the collection of data that reflects patients' actual experiences and disease burden. The U.S. FDA continues to release guidelines on PRO, encouraging the adoption of electronic Clinical Outcome Assessment (eCOA) systems to improve the evaluation of treatment outcomes.

This presentation explores the digital transformation of clinical trials, the application of the DCT model, and the utilization of patient-centered data, discussing the future direction of clinical research.

Pathological Features, Breast Cancer Risk and Optimal Treatment in LCIS

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Lobular neoplasia encompassing both invasive lobular carcinoma (ILC) and lobular carcinoma in situ (LCIS) was first introduced in 1941. With the discovery of E-cadherin and its role in lobular neoplasia in 1990s, biallelic inactivation has been recognized as a key pathognomic feature in lobular neoplasia. Though there is no doubt that ILC is a malignancy, the 8th edition of the AJCC Cancer Staging Manual omitted LCIS in the Tis, regarding LCIS as a benign entity. However, within the 5th edition of the World Health Organization (WHO) classification of breast tumors, atypical LCIS subtypes were introduced, including florid LCIS and pleomorphic LCIS. In addition to the diagnostic dilemma on variable subtypes of LCIS, there are currently no consensus guidelines on the optimal surgical management of these lesions. In this session, we aim to understand the histopathologic features of LCIS subtypes and current views on the management of these lesions.

Surgical Controversies in Inflammatory Breast Cancer

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Inflammatory breast cancer (IBC) is an aggressive and rare breast malignancy accounting for 2–5 % of breast cancers and responsible for 7- 10 % of breast cancer-related deaths.

It is characterized by progressive erythema, edema, and skin thickening with "peau d'orange" changes in at least one third of the breast. Tumor emboli in the dermal lymphatics is a pathognomic histopathologic but not required for diagnosis.

This talk will review the guidelines for trimodality therapy which includes neoadjuvant systemic therapy followed by modified radical mastectomy, with removal of all initially involved skin to negative margins and post mastectomy radiation. Overall and progression free survival has improved markedly in the context of modern systemic therapy, with 5 -year OS survival ranges now in the 70% for HER2+ IBC. Guideline line concordant, trimodality therapy is established to be associated with the best survival. In the US, varying trends of adherence to guideline concordant care and disparities of timely receipt of GCC in different demographic groups has been investigated. Lastly, Over the last few decades, several innovations in systemic therapy have resulted in rising rates of pathologic complete response (pCR) in both the affected breast and the axilla. The latter may present an opportunity for de-escalation of breast or lymph node surgery in patients with IBC. Immediate breast reconstruction and skin/nipple sparing mastectomy are also topics under investigation in this setting.

Surgical Controversies in De Novo Metastatic Breast Cancer

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Background: The role of primary tumor resection (PTR) in de novo stage IV breast cancer remains controversial. Several retrospective studies have suggested a survival benefit, but these studies suffer from biases such as patient selection, variable timing of surgery, and heterogeneous systemic therapies. Prospective trials, including JCOG1017, have been conducted to determine whether PTR improves overall survival (OS) in this setting. Additionally, there is growing interest in surgical management for oligometastatic breast cancer, where local therapy may enhance long-term disease control. This study presents the final results of JCOG1017 and discusses the evolving role of surgery in metastatic breast cancer.

Methods: JCOG1017 was a randomized controlled trial comparing PTR plus systemic therapy versus systemic therapy alone in de novo stage IV breast cancer. Patients first underwent 3 months of primary systemic therapy (PST) based on their clinical subtype and metastatic status. Patients who did not progress were randomized to either PTR plus systemic therapy (surgery group) or systemic therapy alone (no-surgery group). The primary endpoint was OS, with secondary endpoints including local relapse-free survival (LRFS), progression-free survival (PFS), local symptom control, and adverse events. A secondary analysis explored the impact of surgical margins on prognosis and the potential benefit of PTR in different subgroups. Additionally, we reviewed data on surgery for oligometastatic breast cancer and the role of metastasis-directed therapy.

Results: Among 570 enrolled patients, 407 were randomized (surgery: 202, no-surgery: 205). OS was not significantly different between groups (HR 0.86, 90% CI 0.691.07, $p = 0.13$; median OS: 69 months in the no-surgery group vs. 75 months in the surgery group). However, subgroup analysis suggested potential OS benefits in premenopausal patients and those with single-organ metastasis.

PTR significantly improved local control, with a longer LRFS in the surgery group (median 63 vs. 20 months, HR 0.42, $p < 0.0001$). The rates of grade 2 or higher ulceration and bleeding were lower in the surgery group (5.7%) compared to the no-surgery group (19.2%) (HR 0.268, $p = 0.0003$).

The analysis of PST efficacy in 569 patients showed a non-progression (non-PD) rate of 77.2% (ER-HER2-: 78.2%, ER+HER2-: 75.4%, ER-HER2+: 92.9%, ER+HER2+: 66.7%). The overall response rate (ORR) was 29.0%, varying by subtype (ER-HER2-: 36.4%, ER+HER2-: 13.4%, ER-HER2+: 81.0%, ER+HER2+: 40.3%). In multivariable analysis, non-PD was significantly associated with postmenopausal status (OR 1.673, $p = 0.0240$) and PgR positivity (OR 2.391, $p = 0.0019$). Patients with PD at 3 months had significantly worse OS (HR 0.501, $p < 0.0001$), emphasizing the prognostic importance of early treatment response.

Regarding surgical margins, patients with positive margins (n = 22) had worse prognosis, with most cases

involving incomplete resections at the chest wall. Notably, adjuvant radiotherapy was not used post-surgery, which may have influenced outcomes.

Surgery for Oligometastatic Breast Cancer: Emerging evidence suggests that local therapy may improve outcomes in oligometastatic breast cancer, defined as ≤5 metastatic lesions. Retrospective studies and phase II trials (SABR-COMET, OLIGO-BC) suggest a potential survival benefit with aggressive local therapy. However, prospective randomized trials such as BR002 have not confirmed this effect. The JCOG2110 trial is currently investigating the role of metastasis-directed therapy in oligometastatic breast cancer with systemic treatment.

Discussion: Our findings confirm that PTR does not improve OS in unselected de novo stage IV breast cancer patients but provides significant local control benefits. The potential OS benefit in premenopausal patients and those with limited metastatic disease suggests that patient selection is critical. Additionally, the strong prognostic impact of early response to PST highlights the need for careful treatment monitoring.

For oligometastatic disease, defining optimal patient selection criteria remains a challenge. Factors such as the number of metastatic lesions, single-organ versus multi-organ involvement, disease-free interval, and systemic therapy response must be considered when determining the role of local therapy.

Conclusions: PTR does not improve OS in all de novo stage IV breast cancer patients but significantly reduces local complications. It may be beneficial for selected patients, particularly those who are premenopausal or have limited metastases. For oligometastatic breast cancer, local therapy may improve outcomes, but further prospective trials are needed to establish optimal treatment strategies.

From Development to Current Status: The Evolution of ADCs

Jennifer Ligibel

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Since the approval of trastuzumab emtansine for the treatment of HER-2 positive breast cancer in 2013, antibody drug conjugates (ADC's) have rapidly become the preferred first and second-line agents for patients with metastatic breast cancer across tumor subtypes. In this session, we will briefly review the history and biology of ADCs. We will then discuss seminal trials that led to approval of trastuzumab deruxtecan, sacituzumab govitecan, and most recently, datopotamab deruxtecan. We will discuss drug sequencing across tumor subtypes, and will review on-going efforts to determine optimal sequencing based on tumor subtype and biomarker expression.

Beyond HER2 & TROP2: New Targets and Strategic Advances

Kyong Hwa Park

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The advent of HER2- and TROP2-targeted therapies has significantly improved outcomes for patients with advanced breast cancers, yet challenges such as resistance, tumor heterogeneity, and limited patient response necessitate the exploration of new therapeutic targets. This lecture will discuss emerging antigenic targets, including, HER3, B7-H3, ROR1, LIV-1, and CEACAM5, which hold promise for expanding the arsenal of targeted therapies. Patritumab deruxtecan, the novel anti-HER3 monoclonal antibody-containing ADC, has been investigated in a Phase II single arm study. Results showed a promising clinical efficacy with manageable toxicity profiles in patients with hormone receptor (HR)-positive/HER2-negative unresectable locally advanced/metastatic breast cancer who had progressed on CDK-4/6 inhibitors plus endocrine therapy and one line of chemotherapy. Other ADCs targeting newer proteins are in earlier studies. A particular focus will be placed on next-generation antibody-drug conjugates (ADCs), bispecific ADCs as innovative approaches to overcoming therapeutic resistance.

Mechanisms of Resistance and Overcoming Strategies

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Patient-Reported Outcome After Breast Reconstruction with RT

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Both post-mastectomy radiotherapy and breast reconstruction provide important benefits to patients with breast cancer. The optimal integration of these treatments has until recently been guided by limited evidence and anecdotal experience. In recent years, there have been a number o fhigh-quality studies incorporating the use of validated, condition-specific health-reported quality of life measurement using patient-reported outcomes. In this presentation, I will discuss what these studies have taught us regarding the risks and benefits of different approaches to reconstruction type and timing with respect to radiation delivery. Specifically, I will discuss three North American studies: the MROC prospective multicenter cohort study, the FABREC trial, and the RT-CHARM trial. I will reflect on the findings that show that postmastectomy radiotherapy is associated with significantly increased incidence of complications and decreased patient-reported satisfaction among women with implant reconstruction, whereas autologous reconstruction appears to mitigate that risk. I will further review the compelling evidence that shows that moderate hypofractionation appears no less safe than conventional fractionation in this context. By reviewing this evidence, I hope to provide attendees with a comprehensive synthesis of the most up-to-date information so that they may appreciate the many complex trade-offs that must be taken into account and ultimately share their insights with patients who are considering both post-mastectoomy radiotherapy and breast reconstruction.

Evaluation and Management for Capsular Contracture

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Capsular contracture is one of the major concerns following prosthetic breast reconstruction surgery. It occurs when the scar tissue, or capsule, that naturally forms around the breast implant tightens and compresses the artificial implant. Risk factors developing this condition are infection, hematoma, radiation, smooth implant (compared to textured), subglandular position (compared to submuscular)

Evaluation of capsular contracture can be conducted by history taking, physical examination, imaging and finally classification.

This condition usually occurs for a few months after surgery or radiation, although it tends to increase over time. Common symptoms include shape distortion, firmness, discomfort and pain in rarely severe cases. Imaging study can be useful. Ultrasound or MRI can be used supportively for determining the implant position, rupture, deflation, or fluid collection. MRI, in particular, is highly sensitive and can help in assessing the integrity of the implant and the extent of scar tissue formation.

Considering the information together, surgeons can classify the capsular contracture. The most used system is Baker classification, although it has its own limitations.

< Baker Classification >
Grade 1: Soft capsule, no visible distortion
Grade 2: Hardened capsule on palpation, no visible distortion
Grade 3: Hardened capsule on palpation, with visible distortion
Grade 4: Hardened capsule on palpation, with visible distortion, with patient discomfort (pain)

Management can be divided into conservative and surgical options. Conservative management can be considered in low grade capsular contracture, usually Baker 1 and 2. Anti-inflammatory medications and leukotriene inhibitors such as montelukast (Singulair) or cromolyn sodium may reduced inflammation and fibrosis. Other maneuvers include massage or phonophoresis(ultrasound) but have less evidence. Surgical interventions can be considered in severe cases, usually Baker 3 or 4, with patient agreement. Surgeon can perform capsulectomy, capsulotomy, implant replacement or conversion to autologous breast reconstruction. Recently, the use of acellular dermal matrix to cover the silicone surface gains popularity based on the improved biocompatibility compared to silicone surface.

In summary, capsular contracture is a complex issue in prosthetic breast reconstruction that requires a tailored approach. The management strategy depends on the severity of the condition, and the patient's needs. Regular follow-up is key to ensuring optimal outcomes and addressing any recurrence of the condition.

Strategy to Minimize RT Toxicity

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Postmastectomy radiotherapy (PMRT) is well known for improving oncologic outcomes in patients with T3, N+ breast cancer. Given these benefits, PMRT is often indicated alongside breast reconstruction. However, PMRT also increases the risk of complications in breast reconstruction. To achieve the best oncologic and cosmetic outcomes, optimizing both radiotherapy and reconstruction is essential.

The impact of PMRT varies depending on the type of breast reconstruction, broadly categorized as implant-based or autologous reconstruction. Multidisciplinary discussions, including input from radiation oncologists, are encouraged before proceeding with reconstruction. In general, implant-based reconstruction has higher rates of complications and reconstructive failure than autologous reconstruction when combined with PMRT. However, as not all patients are candidates for autologous reconstruction, implant-based reconstruction remains a viable option. Despite a 10-20% risk of reconstructive failure, most patients can successfully undergo implant-based reconstruction with PMRT.

Among implant-based reconstruction methods, the two-stage approach, tissue expander insertion followed by exchange to a permanent implant, is preferred over direct-to-implant reconstruction when PMRT is indicated. However, real-world data often show comparable complication rates between the two approaches, likely due to patient selection factors. This suggests that direct-to-implant reconstruction can be safely performed with PMRT when carefully managed. In two-stage reconstruction, the timing of PMRT and the exchange to a permanent implant must be carefully considered, particularly in patients undergoing adjuvant systemic therapy. As no high-level evidence exists to establish an optimal sequence and reported complication rates vary widely, no clear consensus has been reached.

Historically, some groups considered immediate autologous reconstruction a contraindication when PMRT was indicated, based on concerns about increased complication rates. However, recent studies have shown comparable complication rates between immediate and delayed autologous reconstruction. As a result, immediate autologous reconstruction is now widely practiced and considered a safe option in patients requiring PMRT.

Practical challenges in PMRT planning can arise, particularly with implant-based reconstruction, as implants and tissue expanders introduce greater anatomical variation than autologous reconstruction. Some institutions recommend partial deflation of the tissue expander before PMRT to minimize anatomical distortions, but this approach carries a risk of re-inflation failure due to post-radiotherapy skin fibrosis and contracture. Advanced radiotherapy techniques, such as volumetric-modulated arc therapy (VMAT), can effectively address anatomical variations, even with fully inflated tissue expanders. However, while VMAT improves dose conformity, it also results in a wider low-dose distribution. Radiation oncologists must carefully weigh the risks and benefits of

different radiation techniques for each patient.

Target delineation in implant-based reconstruction should align with the ESTRO-ACROP consensus guidelines to optimize treatment. As most local recurrences after mastectomy occur in the skin and subcutaneous tissue, the guideline recommends routinely including the ventral side of the implant or tissue expander in the target volume, while the dorsal side should only be treated if there is a substantial risk of recurrence beneath the dorsal breast fascia. Excluding the implant or tissue expander from the target volume provides dosimetric advantages, potentially reducing radiation-related toxicity.

Hypofractionation has become the standard approach in breast radiotherapy, significantly improving patient convenience while reducing treatment costs. However, while hypofractionation has been widely adopted for intact breasts, high-level evidence supporting its use for reconstructed chest walls has only recently emerged. Both the FABREC trial and the RT Charm trial randomized patients with breast reconstruction to either conventional or hypofractionated PMRT schedules. Neither study found significant differences in quality of life, complication rates, or oncologic outcomes, though longer follow-up is needed for definitive conclusions.

In summary, PMRT for reconstructed breasts is oncologically safe with acceptable toxicity levels. However, complication rates vary depending on the reconstruction method, each with distinct considerations. It is advisable to assess the indication for PMRT when planning reconstruction. Advanced radiation techniques are available and may be beneficial in select clinical scenarios.

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Breast Imaging Session

Go Beyond Cure of
Breast Cancer

Mammographic Breast Density: Assessment and Clinical Implications

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Breast density is one of the strongest common risk factors for breast cancer. Despite over 30 years of research on quantitative methods for areal and volumetric breast density, it is still most commonly defined using a 4-level semiquantitative score. However, recent advancements in deep learning now enable more precise, reproducible, and clinically meaningful measures of density and texture, which show stronger associations with both interval cancer risk and long-term breast cancer risk. In this presentation, we will explore state-of-the-art risk assessment methods for full-field and 3D mammography, along with novel density and texture measures derived from alternative imaging technologies such as handheld and 3D breast ultrasound. Finally, we will examine the Diversity of Ranks and Accuracy (DIRAC) approach, which predicts when imaging biomarkers will complement each other to enhance risk stratification of both low- and high-risk patients.

Mammographic Breast Density as a Predictor of Breast Cancer Risk in Korean Women

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Breast density is considered a key factor in breast cancer risk. It has been indicated as a significant marker with a two to four-fold increased risk for women with heterogeneously or extremely dense breasts compared with those with non-dense breasts. There are two distinct characteristics in the distribution of breast density in Korean women a higher proportion of dense breasts in young women and a rapid decrement in breast density as age increases. The proportion of dense breasts was more than 80% in women aged less than 50, which was higher than Western women, but the proportion of dense breasts became less than 20% in women aged 70 or more, which was lower than Western women. Regarding the age-specific association between breast density and breast cancer, Western countries and East-Asian countries showed inconsistent patterns. In Western countries, the age-specific breast cancer incidence increases with age; however, the prevalence of dense breasts decreases with increasing age. However, in Asian countries, both the age-specific breast cancer incidence and the proportion of dense breasts decrease with increasing age.

As a temporal trend, the proportion of age-standardized dense breasts has steadily increased since 2010 in Korea. From an ecological perspective, the increased prevalence of dense breasts in women was positively related to the prevalence of smoking, drinking, lack of exercise, early menarche, premenopausal status, nulliparous, non-breastfeeding, and negatively associated with the prevalence of overweight and obesity. The increased prevalence of dense breasts was associated with the increase in the breast cancer incidence rate, and the variation in the prevalence of dense breasts could explain 96 % of the variation in breast cancer incidence. In the aspect of association among individual levels, lower BMI, reproductive health, and behavioral factors were closely associated with dense breasts in Korean women. These overlapped factors associated with dense breast and breast cancer incidence would suggest breast density as a surrogate marker reflecting cumulative exposure to reproductive health and behavioral factors.

Recently, breast density has been incorporated into the breast cancer prediction model. When additionally included in the previously developed model, including mammographic breast density, it can potentially improve risk prediction models for breast cancer, but all models demonstrated limited discrimination accuracy. It has been suggested that models with multiple risk factors are often time-consuming and possibly prone to bias; thus, simplifying the risk prediction model for breast cancer is necessary. Density-related measures from screening mammograms at the time of screen may be superior predictors of cancer compared with conventional risk factors. Not only density but other findings from mammography screening could be applied to future breast cancer risk prediction. In addition, breast density, in combination with a family history of breast cancer, could help identify high-risk groups of breast cancer. Korean women aged 40-49 with a family history of breast cancer and dense breasts or women aged 65 or more with sisters with breast cancer and dense breasts would be the

target for chemoprevention for breast cancer. Screening guidelines recommend mammographic breast screening for women aged 40-74 years in the USPSTF and 40-69 years in Korea. However, women aged 75 years or more with dense breasts might have a similar risk of breast cancer to women aged 40-69 years. Thus, even in older women aged 75 years or more, breast cancer screening may be performed routinely based on an individual's risk, in consideration of the other risk factors.

Considering recommended mammographic screening intervals, changes in mammographic density or findings from mammography could be applied to future risk prediction. Longitudinal measures of BI-RADS breast density may better predict a woman's risk of breast cancer than a single measure. Although breast density decreases as age increases, some of the women show increased density as age increases. These women need monitoring for future breast cancer risk.

Utilizing the Korean National Health Insurance and Breast Cancer Screening Database for Breast Cancer Risk Assessment Research

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Overview of the National Health Insurance and Health Examination System

In Korea, the National Health Insurance (NHI) system ensures healthcare coverage for all citizens, while the medical aid program provides government-subsidized healthcare services to low-income individuals. The NHIS-National Health Information Database (NHID) is a public database developed using data collected by the National Health Insurance Service (NHIS). The NHIS is responsible for governing and managing the storage and transfer of this data [1]. As a mandatory social health insurance system, the NHIS covers all Korean citizens. The predominant payment model for inpatient care in Korea is fee-for-service, which results in all medical usage data being transferred to the NHID [1].

Structure of the National Health Insurance System-National Health Information Database (NHIS-NHID)

The NHID consists of demographic information, income-based insurance contributions, a healthcare utilization database, a national health screening database, and a healthcare provider database. Individual information is linked through the resident registration number. Depending on the research purpose, the NHID provides a customized database with de-identified join keys replacing the resident registration number for researchers. Since they contain information that could compromise research participant privacy, the databases are not publicly available and are housed on the NHIS institutional file storage. [1]

Procedure to obtain the data

NHIS data are available only to authorized researchers who have submitted an IRB application and received approval from the NHIS committee. As of March 2025, three main types of NHIS data are provided for research purposes: 1) the National Sample Cohort, 2) the customized National Health Information Database, and 3) Pseudonymized Data Linkage. To access the data, all studies must follow these steps: 1) apply for and receive IRB approval from the institution of the principal investigator, 2) submit a research plan and IRB approval to NHIS and obtain approval for data usage from the NHIS committee, 3) complete data extraction and fee payment, and 4) receive a data cloud room assignment and conduct data analysis. The period from data application to data availability may take up to six months. After receiving approval from NHIS, only authorized researchers can access the registered data and must conduct all analyses at designated analysis centers affiliated with NHIS. The fee for data usage depends on the size of obtained data.

Data structure for breast cancer risk assessment study

Overall, to apply to NHIS for a breast cancer risk assessment study, customized data should be obtained,

including information from general health screening data, breast cancer screening data, and medical records data. In the general health screening data, demographic information (including age, sex, income, region, etc.) and lifestyle habits (alcohol consumption, smoking habits, etc.) can be obtained from questionnaires, while data on health-related conditions (such as BMI, blood pressure, cholesterol level, etc.) can be extracted from screening results. In the breast cancer screening database, information on cancer-related factors (such as family history of cancer, menopause, parity, etc.) can be obtained from the cancer screening questionnaire, while mammography screening results (such as breast density and other mammographic features) can also be accessed from the mammography screening results. For breast cancer outcomes, the information can be defined using the medical record database. In the NHIS database, cancer outcomes are usually determined by a combination of the International Classification of Disease (ICD)-10 code (e.g., invasive breast cancer C50) and the catastrophic illness code for cancer [2]. The catastrophic illness code is associated with cost-sharing for out-of-pocket expenses related to high-burden diseases in Korea, ensuring its high validity for specific disease classifications. Depending on the study design, researchers should determine the appropriate data period for obtaining risk factor information (from the general health and breast cancer screening databases) and the required follow-up duration for breast cancer outcomes.

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Postoperative Imaging Surveillance in the United States

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Postoperative Imaging Surveillance in Korea

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Breast cancer is the most common cancer among Korean women. Unlike Western women, the age-specific incidence rates in Korean women peak around ages 4554 and then decline with age. This higher incidence of breast cancer in younger women is particularly observed in Asian countries, where breast density tends to be higher.

Given the earlier onset of breast cancer, the National Cancer Screening Program of Korea recommends biennial mammography for women aged 4069 years. For women aged 70 and above, mammography screening is continued based on individual risk and preference. This guideline applies to all women, regardless of their breast cancer risk or personal history of breast cancer (PHBC).

In Korea, mammography and supplemental whole-breast US or MRI examinations (regardless of patient age or mammographic density) are covered by with the reimbursement policy of the Korea National Health Insurance Service. Annual mammography with semiannual supplemental whole-breast US or MRI examinations is often performed in tertiary hospitals for the first 5 years after breast cancer treatment, and annual mammography with supplemental US or MRI examinations are peformed thereafter. Although there is no guideline or screening program specified for women with a PHBC, annual mammography, combined with semiannual supplemental whole-breast US or MRI, is performed for the first 5 years after breast cancer treatment, followed by annual mammography with supplemental US or MRI thereafter. Mammography, along with supplemental whole-breast ultrasound (US) or MRI examinations (regardless of patient age or mammographic density), is covered by the reimbursement policy of the Korea National Health Insurance Service. This policy provides women with a PHBC easier access to breast imaging examinations.

In this lecture, we will discuss postoperative imaging surveillance in Korea, including the results of these screenings. We will also address the current challenges and future directions for postoperative imaging.

What is the Optimal Surveillance Protocol in Korea

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Breast cancer is currently the most common cancer among women worldwide, and clinical outcome of breast cancer has improved through advances in treatment and early detection. However, even after a long time, recurrence or new breast cancers occur. A high proportion of these recurrence are distant metastases, which are also a major cause of death. The possibility of recurrence, especially distant metastasis, despite advances in treatment outcomes and the passage of time, requires many breast cancer patients to undergo regular follow-up exams for a long period of time.

However, in the case of asymptomatic cases, there is no clear evidence that various imaging tests and blood tests targeting distant metastasis actually improve breast cancer survival. Therefore, many clinical practice guidelines do not recommend various imaging tests or blood tests in the asymptomatic case, and recommend regular breast imaging tests (Mammography) and physical examinations. However, in many practices, various follow-up exams are performed at various time intervals depending on the patient's anxiety(fear of recurrence), clinically individual decision of doctors, medical system(insurances), and cultural environment of medical system and society.

Sometimes, any radiologic exams can be harmful to the patients, as well as the financial and time burden of unnecessary exams, and it is not clear whether these many exams actually contribute to improving the survival of breast cancer patients.

Based on the recent advances of cancer biology studies, the development of new drugs have improved clinical outcomes, and the early detection of cancer recurrence due to the continuous development of various methods are making us think differently about the current clinical practice guidelines based on old studies. In fact, CDK 4/6 inhibitors, immunomodulatory agents, and various ADCs are extending the survival period even after recurrence, and various tests that confirm Minimal Residual Disease, such as ctDNA, are presenting us a different perspective than before about the early detection of cancer recurrence.

In considering these changes, this presentation will review the current clinical practice guidelines, the current follow-up tests and their results through real-world data.

In addition, this presentation will briefly introduce recent studies related with surveillances for Korean breast cancer patients and review the individually recurrence prediction model for individual surveillance strategies, and hope to discuss on the proper surveillance strategy for breast cancer.

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Endoscopic and Robotic Breast Surgery Session

Go Beyond Cure of
Breast Cancer

Balancing Innovation and Economics: The Cost-Effectiveness of Robot-Assisted Nipple Sparing Mastectomy

Giada Pozzi, Guglielmo Gazzetta, Luca Resca, Zaira Pellin, Corrado Lauro, Riccardo Carnino, Antonio Toesca

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Robotic Nipple-Sparing Mastectomy (R-NSM) is an emerging technique in breast surgery that offers potential advantages in cosmesis, precision, and ergonomics. While its adoption has increased globally, its oncological safety and cost-effectiveness remain subjects of debate.

This article reviews the technical aspects, surgical outcomes, and economic considerations associated with R-NSM. We provide a comparative analysis of R-NSM versus Conventional Nipple-Sparing Mastectomy (C-NSM), including operative times, materials, outcomes and costs. Additionally, we assess the impact of different robotic platforms (Multiport vs Single-Port) based on our institutional experience.

Existing data suggest that R-NSM is comparable to C-NSM, with studies reporting lower rates of nipple necrosis and improved aesthetic and patient-reported outcomes. However, R-NSM requires a longer operative time and incurs higher costs, with an additional expense of approximately 4.100 EUR (4.400 USD) per procedure. The primary cost drivers include longer OR times (+1.040 EUR), increased disposable and semi-disposable material costs (+1.635 to +2.258 EUR), and robotic system acquisition and maintenance expenses. Our analysis indicates that the cost difference between Multiport and SP R-NSM is minimal (~43 EUR on average), with no statistically significant impact (Cohen's $d = 0.049$). The Single-Port system, although newer and less widely available than the Multiport system, presents an alternative for further evaluation.

The limitations of this study include its single-institution setting, which may not be fully generalizable to all healthcare settings, especially lower-volume institutions. Additionally, it does not incorporate a formal cost-utility analysis using Quality-Adjusted Life Years (QALYs), a key metric in healthcare economics.

In conclusion, R-NSM cost and long-term oncological data remain key considerations for widespread implementation. High-volume centers may find it more feasible due to cost distribution across multiple surgical specialties, while smaller institutions may face challenges in financial sustainability. Further multi-center trials and cost-effectiveness studies are necessary to define the role of R-NSM in routine clinical practice.

Experiences in Pioneering Advances in Robotic Breast Cancer Surgery

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Robotic breast surgery, although first proposed by surgeons as early as 2015, has over the years become a commonly performed procedure in Asian countries, especially in South Korea. In Taiwan, Dr. Lai pioneered this approach in 2017, and by 2019, the first Robotic Mastectomy consensus statement on this then-novel surgical technique was published in the *Annals of Surgery*. However, the Western breast surgery community remains hesitant, maintaining an inexplicably high level of skepticism toward this method. In 2024, the GBCC also invited experts in this field to conduct a second consensus meeting.

From 2018 to the present, I have performed the highest number of robotic mastectomies plus one-stage DTI in Taiwan, and have continued relentlessly. The first 200+ cases involved only mastectomies, as Taiwan had not yet introduced the SP system. Using the fourth-generation Xi system for axillary lymph node (LN) dissection or sentinel lymph node biopsy (SLNB) initially proved somewhat cumbersome. Nevertheless, through perseverance, we ultimately overcame these challenges. At my center, all robotic mastectomies for cancer treatment in 100% of cases are now using the Xi system for axillary procedures.

Given that most hospitals are equipped with the Xi system, I share insights on optimizing axillary operations with this platform. I hope this experience can offer valuable insights to peers navigating similar technical transitions.

Technical Challenges and Solutions for Robot-Assisted Nipple-Sparing Mastectomy in Large and Ptotic Breasts

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In the early stages of robotic breast surgery, patients with large, ptotic breasts—typically C-cup or larger—were often excluded from the surgical indications. Due to the intrinsic nature of robotic procedures, which are performed through small incisions and within narrow anatomical spaces, surgeons with limited experience in robotic techniques found it particularly challenging to operate on patients with larger breast volumes. Furthermore, early cases were primarily conducted to assess the feasibility of the procedure, necessitating a more selective approach in patient inclusion.

As surgical experience with robotic nipple-sparing mastectomy (RNSM) accumulated, pioneering surgeons began to expand the indications. This led to the application of RNSM in patients with larger, ptotic breasts. Conventionally, performing nipple-sparing mastectomy in such patients is more complex than in those with smaller, non-ptotic breasts. The reasons include limited surgical visibility due to redundant skin and glandular tissue, as well as broader dissection areas that increase surgical fatigue.

However, in the hands of experienced surgeons, the advanced articulating capabilities of robotic arms and enhanced visualization of deep anatomical planes allowed for effective execution of RNSM even in large, ptotic breasts. These technological advantages helped mitigate the expected increase in difficulty and fatigue, enabling safe and efficient surgical outcomes.

This presentation will provide a background on breast volume and ptosis in relation to surgical challenges, review clinical data on the application of robotic mastectomy in large-volume breasts, and discuss the advantages and limitations of robotic surgery in these difficult cases.

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Introduction of OASIS Project

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The OASIS Project is not a link between national academic societies (JBCS, KBCS et al), but rather a clinical trials group. This Project is an international organization that promotes clinical trials, especially cohort studies and Consists of JCOG (Japan Clinical Oncology Group), BCT (Breast Cancer Trials), and KBCSG (Korea Breast Cancer Study Group) at the start of 2020, and then in January 2025, TBCC was added from Taiwan.

The strong point of OASIS Project as follows

1. Allows studies to be conducted on a large number of patients (economies of scale)
2. Same time zone (less stress during web and face-to-face meetings)
3. Racial differences can be verified (Asians in Japan and Korea vs. Westerners in Australia and NZ)
4. Allows examination of differences in living conditions within the same race (Korea vs. Japan)

This Project was held the first meeting in Tokyo in January 2020. The meeting was then suspended for a while due to COVID-19, but will resume in 2023. The most recent was held in Nagoya in January 2025. A cohort study of male breast cancer has already begun. In addition, Japan and Korea will participate in a prospective study held at BCT. JCOG is planning to propose a new study at this meeting as well.

The future perspective of OASIS Project was complete the 1st step which Establishment of exchanges and reliability, in addition to understand the differences in the healthcare environment. The 2nd step is the Initiation of cohort study, personnel exchange and Expansion of group members. The final step is the Disseminating Evidence from Asia to the World and Establishing a third pole in clinical trials.

Ongoing and Proposal Trials (KBCSG)

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The Korean Breast Cancer Study Group (KBCSG) has actively developed and implemented a variety of clinical trials aimed at refining treatment strategies and incorporating genomic information into therapeutic decision-making. This presentation highlights key ongoing and proposed KBCSG trials, focusing on endocrine therapy de-escalation, surgical strategies post-neoadjuvant therapy, and management of elderly populations. In parallel, KBCSG is pursuing international collaborative research initiatives including OASIS project to generate robust, globally relevant evidence across Asian countries.

INTERSTELLAR (KBCSG-25) is a prospective, non-inferiority trial designed to evaluate whether endocrine therapy with ovarian function suppression (OFS) can replace chemotherapy in premenopausal women with node-positive, low genomic risk breast cancer. Inspired by the RxPONDER trial, INTERSTELLAR investigates whether the observed benefit of chemotherapy is due to induced menopause rather than direct cytotoxicity. Eligibility includes ER+/HER2- premenopausal women ($\leq$50 years) with pN1 or micrometastases and an Oncofree® decision index $\leq$20. A total of 604 patients will be enrolled over 2 years at 17 Korean hospitals, with follow-up planned for 5 years.

TASc-FORS (KBCSG-32) is a large retrospective real-world study evaluating the feasibility of tamoxifen monotherapy in low-risk premenopausal patients defined by an Oncotype DX® recurrence score $\leq$15. The study seeks to describe patterns of endocrine therapy use—including duration and OFS implementation—and assess survival outcomes. Over 12,000 patients from 11 hospitals will be included, with data such as tumor biology, treatment modalities, recurrence patterns, and survival. This study aims to contextualize genomic risk-based treatment stratification in Korean clinical practice.

PRESERVE (KBCSG-34) is a prospective, multicenter study that evaluates the oncologic safety of preserving the nipple-areolar complex (NAC) in patients with resolved nipple invasion following neoadjuvant systemic therapy (NST). The trial aims to verify the subareolar margin malignancy rate after clinical/radiologic resolution. A total of 283 patients across 11 centers will be enrolled over 3 years with an additional 3 years of follow-up.

KBCSG-35 is a retrospective, multicenter study examining adjuvant treatment de-escalation in elderly patients ($\geq$70 years) with ER or PR (+), HER2 (-), node-negative early breast cancer. The study focuses on real-world outcomes associated with omission or modification of radiotherapy (RT) and endocrine therapy (ET), including shortened duration or low-dose ET. This study will address the need for evidence-based, age-adapted treatment protocols in Korea's aging population.

Finally, NEO-NAUTILUS trial is a randomized, multicenter, phase III study designed to determine the oncologic safety of omitting SLNB in patients with clinically negative axilla following NST. This trial enrolls

patients with invasive breast cancer (clinical stage T1–T3) who have completed NST and are confirmed node-negative on post-treatment axillary ultrasound. A total of 604 patients will be randomized within 6 weeks after NST to either undergo breast-conserving surgery (BCS) with SLNB or BCS alone (no SLNB). This trial contributes to the growing body of evidences supporting axillary de-escalation in excellent responders.

Omission of Adjuvant Endocrine Therapy for ER+T1ab BC

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Background: We previously reported an analysis of the impact of adjuvant endocrine therapy (ET) for patients with ER+ and HER2- T1a/bN0M0 breast cancer (BC) (Breast Cancer Res Treat, 202, 473–483, 2023) .For the whole cohort, adjuvant ET significantly reduced distant metastases, but the absolute overall survival (OS) difference was small.

The presence of medical comorbidities related to treatment toxicity and the estimated life-expectancy differ based on age, affecting the clinical impact of ET.

There may be settings where comorbidities result in a sufficiently short, expected OS such that the benefit of ET will not outweigh risk. In multivariate analysis, age (≦ 55 vs > 55) was not an independent risk factor for distant metastasis. Here we evaluate the impact of adjuvant ET for ER+/HER2- T1a/bN0M0 breast cancer by age-specific subgroups, focusing on younger (≦ 40) and older (≧ 65) population.

Methods: This is a multicenter retrospective cohort study that evaluated the impact of adjuvant ET for patents with ER+/HER2- T1a/bN0M0 BC who underwent primary breast cancer surgery between 2008 and 2012 in 47 institutes of the Japan Clinical Oncology Group (JCOG). We analyzed distant metastatic-free survival (DMFS) and OS using Kaplan-Meier estimates with log-rank test in patients treated with and without ET in each of three age-specific subgroups (< 40, 41-64, and 65 > years of age).

Results: Median follow-up was 9.2 years; the median age was 55. Of 4756 eligible patients, 417 patients were < age 40 (331 and 86 with and without ET, respectively), and similarly, 3087 patients were aged 41-64 (2633 and 454) and 1252 patients were > age 65 (1025 and 227). In the < 40 subgroup, 9-year DMFS was 97.2% with ET and 91.0% without ET ($p = 0.023$), and similarly, 9-year OS was 97.8% vs. 97.0% ($p = 0.954$). In the > 65 subgroups), 9-year DMFS was 92.6% vs. 84.0% ($p < 0.01$), and 9-year OS was 93.8% vs. 84.9% ($p < 0.01$). In those aged 41-64, no significant difference was observed in DMFS and OS between patients with and without ET.

Conclusions: Adjuvant endocrine therapy was associated with improved DMFS in the younger (< 40) and older (> 65) population and was associated with improved OS in those > 65. The lack of benefit in patients aged 41-64 is likely due to individual tumor and treatment factors. Based on the results, we would like to propose the collaborative project via OASIS.

Omission of Axillary Dissection for cN+BC

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A brief background discussion:

Axillary lymph node dissection (ALND), which can induce lymphedema, has been omitted in clinically node-negative(cN0) patients with positive sentinel lymph nodes (SLNs) if they meet the eligibility criteria of ACOSOG Z0011. Furthermore, the omission of ALND has been attempted through targeted axillary dissection (TAD) in patients whose clinically node-positive(cN+) status converts to ycN0 after neoadjuvant chemotherapy. However, ALND remains the standard of care in patients with cN+ who undergo upfront surgery.

Trial design:

Tailored Axillary Surgery (TAS) in Patients with Clinically Node-Positive Breast Cancer in the Upfront Surgery Setting (jRCT s061220113) is a prospective, single-arm, multicenter phase II feasibility trial with the participation of 41 hospitals belonging to the breast cancer study group of Japan Clinical Oncology Group (JCOG). Tailored axillary surgery (TAS) procedure removes labeled lymph node (LN) with clip, wire, or tattoo, palpable LNs, and SLNs. ALND is performed after TAS. These LNs removed by ALND other than TAS are defined as non-TAS LNs.

Eligibility criteria:

The eligibility criteria are as follows: 1) histologically proven invasive breast cancer, 2) upfront surgery is planned, 3) pathologically diagnosed metastatic LN (cytology or core needle biopsy), 4) 1-3 LN metastases in level I by imaging, 5) cT1-3, and 6) females aged ≥ 18 and ≤ 74 years on the enrollment date.

Specific aims:

This trial aims to establish a surgical method of tailored axillary surgery (TAS) among patients with cN+ who undergo upfront surgery and to determine the appropriate criteria for the next phase III TAS trial which omits ALND by TAS safely. The primary endpoint is the non-TAS LNs positive rate. Clinicopathological factors (the number of suspected metastases by imaging, the number of metastases in LNs resected by TAS, tumor size, and invasive ductal/lobular carcinoma) are analyzed to predict the non-TAS LN metastasis rate. The secondary endpoints are TAS LNs identification rate, marked LN resection rate, arm edema incidence rate, and QOL.

Statistical methods:

In this trial, among the combinations of factors involved in treatment selection, the objective is to narrow down the combinations that will result in a non-TAS metastasis-positive rate less than 10% when TAS is performed. For a single combination, 167 cases need to be considered to reject a non-TAS metastasis-positive rate of 10% or more (5% one-sided alpha error, 70% power, and 5% expected value). However, performing these studies for all combinations lacks feasibility. Therefore, we decided to improve the accuracy of estimation by using a regression model with the non-TAS metastasis-positive rate as the outcome variable and the factors involved in treatment selection as explanatory variables and to search for combinations of factors with a non-TAS metastasis-positive rate less than 10%. Based on the rule of thumb that a sample size of at least ten times the number of factors is required when using regression methods, a regression model is used when 60 cases are accumulated. The combinations with a 90% confidence upper limit of less than 10% of non-TAS metastasis positivity as the predictive value of the regression model will be selected as candidate combinations that fulfill the conditions. If the accuracy of the predictive value is considered insufficient, 60 cases will be added sequentially up to a maximum of 300 cases.

Present accrual and target accrual:

The patient recruitment was started in April 2023. Up to 300 patients will be enrolled over a 2-year recruitment period. Two hundred and seventeen patients have enrolled until February 2025. The results are currently under analysis. Detailed findings will be released soon. We will plan to initiate a phase 3 trial within this year.

Ongoing and Proposal Trials (BCT)

Nicholas Zdenkowski

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Breast Cancer Trials (BCT) is the collaborative clinical trials group representing Australia and New Zealand. BCT has over 110 trial sites and over 800 members from broad multidisciplinary backgrounds. Members include medical oncologists, surgeons, radiation oncologists, clinical trial coordinators, psychologists and other allied health professionals. Over 18,000 patients have been recruited to BCT trials over the group's 44 year history. BCT conducts research across early stage and metastatic breast cancer, including systemic therapy, locoregional therapy, translational research and supportive care.

BCT collaborates with groups internationally, with an emerging focus on the Asia-Pacific region, particularly through links with the Japanese Clinical Oncology Group (JCOG) and the Korean Breast Cancer Study Group (KBCSG). BCT also works with major European, North American and South American groups. We recognise the need for international collaboration to produce practice changing results that improve the lives of breast cancer patients. There is great strength in our region in breast cancer research and true global representation is needed for results that are relevant to the population that we care for in clinical practice.

The current recruiting BCT portfolio includes: EXPERT, using PAM50 to guide omission of radiotherapy after breast conserving surgery; OPTIMA, investigating PAM50-directed systemic therapy for node positive ER+ breast cancer; Neo-N, investigating a 12-week neoadjuvant course of carboplatin, paclitaxel, relatlimab and nivolumab for stage I and II TNBC; TUGETHER, investigating trastuzumab, tucatinib and pembrolizumab for pre-treated metastatic HER2+ breast cancer; OLIO, investigating neoadjuvant paclitaxel, Olaparib and durvalumab for young women with HRD-positive, ER+ early breast cancer; and CAMBRIA-2, an international phase 3 trial of adjuvant camizestrant for high risk ER+ breast cancer.

Future trials include: PROSPECTIVE, using pre-operative MRI to guide radiotherapy omission in unifocal non-TNBC; a consumer-led project on communication around treatment decisions for early stage breast cancer; OPTIMA-young, an extension of the OPTIMA trial into a young patient population, and ROSALIE, to investigate omission of adjuvant radiotherapy in patient who have a pathological complete response to neoadjuvant chemotherapy. Multiple additional ideas are in discussion and along the spectrum of progression towards activation. BCT has working specialty subgroups and a scientific committee; a concept development workshop annually; an annual Scientific Meeting; and initiatives to support young investigators and proof-of-principle projects in addition to major project coordination.

BCT recognises the opportunities for breast cancer research in the Asia-Pacific region, and will continue to work towards collaborative projects to solve problems that are of high importance to our region.

Treatment Inequity in Breast Cancer: Necessity of Global Collaboration

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Racial and ethnic inequities in mortality and morbidity have sadly been demonstrated in multiple diverse human health conditions. Breast cancer is no exception, as highlighted in the recent landmark Lancet Breast Cancer Commission Report. Indeed, as the Lancet Commission suggests, breast cancer provides a unique opportunity to understand causal mechanisms and target appropriate interventions to reduce unacceptable inequities in health treatments and outcomes. This presentation will first review the key themes identified by the Lancet Breast Cancer Commission, focusing on the fundamental observation that although meaningful advances have been made, there are nonetheless many groups that are still being systematically left behind. The presentation will reflect on the 40% reduction in mortality in high income countries like the US and UK over time and juxtapose that to evidence collected that demonstrates that Black women in the United States are not only more likely to experience differences in mortality and morbidity, including financial toxicity. It will review studies of the many drivers of disparities in outcomes by race in the US, including studies that show that Black and Asian women who receive radiation therapy are less likely to receive more efficient and less toxic hypofractionated regimens, receive higher cardiac dose, experience greater pain, and are more likely to have their expected treatment-related side effects under-recognized by their treating providers. The studies presented will help to illuminate the underlying mechanisms by which these unacceptable disparities develop, suggesting fruitful paths for interventions to ensure that the benefits of the many advances we have made in treating breast cancer reach all patients equitably, both within countries and across the globe.

Disparities in Access to Systemic Treatment in Asia

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The accessibility of these treatments can be evaluated across three key dimensions: availability, affordability, and accessibility. The introduction of novel treatment modalities for breast cancer is often associated with high costs, raising concerns regarding their budgetary impact and the sustainability of healthcare systems. Asian countries exhibit significant economic diversity, which influences access to oncology medicines. With the increasing efficacy of newly developed cancer drugs, their prices have risen substantially. This trend has exacerbated inequities in access to effective treatments, particularly for patients in lower-income countries.

A survey assessing disparities in breast cancer drug access found that access was generally good and relatively homogeneous across most Asian countries for drugs included in the World Health Organization's Essential Medicines List (WHO EML). However, significant barriers to access persist in low-income and some lower-middle-income countries. Moreover, access to innovative cancer therapies remains limited in most Asian countries, except for some high-income countries. Enhancing drug affordability and developing targeted strategies to address these disparities could contribute to improved breast cancer care. Such initiatives should be based on value of cancer medicine and be carefully balanced with each country's financial constraints and healthcare policies.

Current Treatment of Breast Cancer in Mongolia

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INTRODUCTION: As of 2023, breast cancer ranks 6th among the most prevalent cancers in Mongolia, and 4th among women. Alarmingly, around 35% of breast cancer cases in Mongolia are diagnosed at advanced stages (III and IV), a trend influenced by the historically nomadic lifestyle of the population, which has contributed to challenges in healthcare delivery and early detection, especially in remote areas. Therefore, early detection remains a challenge due to a shortage of trained breast specialists, limited access to diagnostic equipment (mammography) across the nation's remote areas as well as inadequate public health education. In response, Mongolia has implemented a nationwide breast cancer screening program in 2021 and this initiative has led to an increase in early-stage diagnoses and a steady rise in the number of detected cases each year.

In October 2021, the NCCM established the Breast Center with the goal of offering equitable breast cancer care that meets international standards and the Breast center has been supported by a Multidisciplinary Team (MDT), consisting of specialists in breast imaging, breast and reconstructive surgery, pathology, medical and radiation oncology, rehabilitation, genetics, clinical laboratory, cancer registry, psychotherapy, nursing, supportive and palliative care, and gynecology. Notably, since 2022, the Breast center has collaborated with international institutions, including the University of Utah and the University of Minnesota for monthly tumor board discussions aligned with ESMO and NCCN guidelines. Additionally, starting in 2023, the Breast Center has been holding weekly tumor board meetings in collaboration with breast specialists from Tbingen University Hospital in Germany.

METHOD: Currently, around 90% of breast cancer cases are treated at the Breast Center of the NCCM and following collected data were obtained from the NCCM database of 2016-2024. Regarding breast cancer surgeries performed at the NCCM, in 2016, 94% of surgeries were MRM, 3% were breast-conserving surgery (BCS), and 1% were BRS. By 2022, the percentage of MRM surgeries decreased to 51%, while BCS increased to 42.1%. In 2023, MRM surgeries accounted for 42.4%, BCS surgeries for 40.3%, and breast reconstruction surgeries for 8.5%. As of 2024, MRM accounted for 20.2%, BCS for 70.9%, and BRC for 7.8%. As shown, the surgical treatments for breast cancer have evolved over the decades, transitioning from Halsted Radical Mastectomy (HRM), which involved complete removal of the breast, chest muscles, and lymph nodes (19822001) to Modified Radical Mastectomy (MRM) and Partial Mastectomy became the preferred method from (2005- 2010), and Breast Reconstruction Surgery (BRS) (2010-2021). Between 2010 to 2021, BRS was performed but was primarily limited to palliative care for advanced-stage cases. In recent years, oncoplastic and

reconstruction surgery has been integrated as part of a comprehensive treatment approach, prioritizing oncological safety, patient satisfaction, and aesthetic outcomes.

RESULT: The five-year survival rate for breast cancer in Mongolia remains at 48% as of 2023, significantly lower than the global average of approximately 85%. This disparity underscores the urgent need to improve early detection quality, public health education, the capacity of breast health specialists, and greater access to advanced treatments in every province of our country.

CONCLUSION: In recent years, the implementation of MDT at the Breast center of NCCM and regular consultations with international experts have allowed for more tailored breast cancer treatment, minimizing risks for each patient. As a result, the quality and accessibility of treatments have improved year by year, which led to notable increase in other surgical options due to the improved outcomes of neoadjuvant chemotherapy and hormone therapy and these expanded treatment options reflect a collective effort to improve patient outcomes.

However, the high-cost medical equipment required for breast-conserving and reconstructive surgeries is not covered by the insurance system, placing a significant financial burden on patients and restricting the available surgical options. Therefore, it is crucial to incorporate these procedures into the insurance system, with strong government support needed to ensure accessibility.

Additionally, further efforts are needed to enhance early detection strategies, optimize treatment accessibility in rural regions, and strengthen healthcare infrastructure. Continued investment in medical training, diagnostic technologies, and patient-centered care will be critical in narrowing the survival rate gap and ensuring long-term improvements in breast cancer management. Strengthening collaborations with international institutions and adopting emerging advancements in oncology will further support the mission of providing equitable and effective breast cancer care nationwide.

Contributing factors of contralateral breast cancer among breast cancer patients with BRCA mutation (KoREa-BSG 06-2)

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Background: It is well known that the cumulative risk of contralateral breast cancer (CBC) in BRCA1/2 carriers is significantly higher than non-carrier. We aimed to investigate clinico-pathologic parameters associated with the risk of CBC among breast cancer patients with BRCA1/2 mutation using correspondence analysis.

Methods: This retrospective study included patients with BRCA test between January 2008 and December 2015. The inclusion criteria comprised patients aged 20 to 80 years with invasive breast cancer (pT1-3, N0-3). We performed multivariate regression and correspondence analysis to assess contributing factors for CBC among subgroup by age and BRCA mutations.

Result: Four thousands and eight patients from 14 institutions were included for analysis. After median follow-up of 94 months, 281 events of CBC was observed. Among 576 patients with BRCA mutations, there was no difference in the probability of CBC between BRCA1 and 2 mutations ($p = 0.07$). According to the correspondence analysis, triple negative subtype (r = 0.93) and poor grade (r = 0.74) were the most associated factors with CBC among younger group (< 50 years) with BRCA1 mutation. For BRCA2 carrier, high Ki-67 labelling index (20%) were the strongest related factor regardless of age (r = 0.93). Among non-carrier, HER2 positive subtype (r = 0.85) and absence of chemotherapy (r = 0.76) were related with CBC in older group (50 years).

Conclusions: Although there was no difference in the risk of CBC between BRCA 1/2 mutations, different contributing factors were revealed by correspondence analysis. For young BRCA carrier with triple negative subtype and poor pathologic parameters (such as poor grade, high Ki-67 index), risk-reducing contralateral prophylactic mastectomy could be considered as a treatment strategy.

Pathogenic variant frequency in multi-gene panel testing of germline BRCA-negative breast cancer patients with hereditary risk factors

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Background: As interest in hereditary breast cancer grows, identifying mutations in cancer susceptibility genes has become increasingly important. However, the lack of standardized testing guidelines and other barriers such as high cost limit the widespread use of multi-gene panel testing. This study assessed the frequency of pathogenic variants detected through multi-gene panel testing and evaluates the relevance of multi-gene panel testing.

Methods: We retrospectively analyzed germline BRCA mutation-negative patients with risk factors for hereditary breast cancer who underwent next-generation sequencing (NGS) using a 176-gene panel assay at Gangnam Severance Hospital between July 2020 and June 2024. The frequency of pathogenic or likely pathogenic variants (PV/LPV) was assessed. In this study, high-penetrance genes associated with hereditary breast cancer included ATM, BARD1, CHEK2, PALB2, RAD51C, and RAD51D.

Result: Among 1,569 germline BRCA mutation-negative patients, 824 (52.52%) underwent NGS. PV/LPV in at least one gene was identified in 124 patients (15.05%). The most frequently mutated gene was MUTYH (3.03%, 25/824). PV/LPV in high-penetrance genes for hereditary breast cancer was detected in 26 patients (3.16%, 26/824). When stratified by the number of risk factors, PV/LPV in high-penetrance genes was identified in 2.21% (13/588) of patients with a single risk factor and in 5.51% (13/236) of those with multiple risk factors.

Conclusions: This study demonstrates that multi-gene panel testing identified a significant frequency of PV/LPV in cancer susceptibility genes among patients at risk for hereditary breast cancer. Notably, patients with multiple risk factors had a higher likelihood of harboring additional high-penetrance gene mutations beyond BRCA. These findings support the potential necessity of multi-gene panel testing in selected high-risk populations.

Joint Label-Guided Analysis of Tumor microenvironment Causality and Clinical Outcomes in Breast Cancer Using Multisequence MRI and Artificial Intelligence

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Background: The tumor microenvironment (TME) plays a crucial role in the prognosis and effectiveness of neoadjuvant treatment (NAT) for early-stage breast cancer. However, traditional TME evaluation, which relies on invasive biopsies, is prone to spatial biases and is challenging to conduct repeatedly during NAT. This can lead to inaccurate assessments and suboptimal decision-making.

Methods: We developed an AI-driven framework combining Whole Slide Images (WSI) with multi-sequence 3D (Multiparametric MRI) mpMRI (e.g., DCE-MRI, T1, T2, DWI) to create a deep learning model for spatiotemporal fusion. The model uses a TILs (Tumor Infiltrating Lymphocytes) + TSR (Tumor Stromal Ratio) joint label (TILshighTSRhigh, TILshighTSRlow, TILslowTSRhigh, TILslowTSRlow) to classify TME features and deliver interpretable results based on mpMRI's spatiotemporal data.

Result: WIth retrospective analysis of our own cohort (400 pts), we found that our joint labels were stronger associated with DFS and NAT response than single labels. Using data from multicenter BC cohorts (6 hospitals, 466 pts with mpMRIs), our AI-driven framework combines mpMRI's global view with WSI's localized insights to enhance TME analysis. It accurately classifies both macro features (e.g., cancer detection) and micro features (e.g., TIL+TSR), overcoming radiomics limitations by capturing tumor heterogeneity and biological complexity. The model achieved AUC: 95.2% and accuracy: 87.5% for cancer detection, outperforming mainstream models. For TILs+TSR labels, it showed strong performance in both training (AUC: 93.2%, ACC: 83.4%) and validation cohorts (AUC: 86.1%, ACC: 74.8%). In a secondary binary classification of TILshighTSRhigh (best prognosis and NAT response group) and others, our model predicted pCR rate in an independent NAT cohort (200 pts) with AUC: 93.2% and ACC: 91.5%.

Conclusions: This innovative integration of WSI and mpMRI provides a comprehensive TME characterization, enhancing interpretability and reducing reliance on complex radiomics pipelines. Our model bridges imaging and pathology, enabling non-invasive NAC outcome prediction and advancing breast cancer management with robust, multimodal AI solutions.

Re-evaluation of HER2 Pathology and the Prognostic Implications of HER2 Ultra-low and Low in Estrogen Receptor-Positive Breast Cancer

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Background: Recent studies have shown antibody-drug conjugates' efficacy in HER2-low breast cancer, but the classification and clinical significance of HER2 expression levels (ultra-low and low) remain debated, particularly regarding HER2 immunohistochemistry (IHC) score reproducibility and whether low HER2 expression represents a distinct breast cancer subtype.

Methods: We retrospectively analyzed 849 early-stage ER-positive, HER2-negative breast cancer patients who underwent Oncotype DX testing post-surgery. HER2 IHC slides were re-evaluated using a classification including ultra-low expression. Relationships between HER2 status and clinico-pathological features, multigene assay prognostic scores, and survival outcomes were investigated.

Result: After reclassification, 15.2% were HER2-null, 28.4% HER2-ultralow, 45.5% HER2-1+, and 11.0% HER2-2+. Of initial HER2-0 cases, 45.5% were reclassified as HER2-ultralow. Re-evaluated HER2 IHC scores significantly correlated with HER2 gene scores via qRT-PCR ($p < 0.001$). HER2-low cases showed significantly higher proportions of strong ER expression, wild-type p53 expression, and low Ki-67 compared to HER2-null ($p = 0.038$, 0.015, 0.002, respectively). HER2-ultralow showed no significant differences. Using ODx score threshold of 26, high-risk patient proportions were 20.9% for HER2-null, 13.3% for HER2-ultralow ($p = 0.057$), and 12.7% for HER2-low ($p = 0.020$). During 44-month median follow-up, HER2-low showed better recurrence-free survival in univariable analysis (HR 0.33, 95% CI 0.12-0.90, $p = 0.029$) compared to HER2-null, while HER2-ultralow showed no significance. However, multivariable analysis showed neither HER2-low nor ultralow had significant differences in ODx high-risk proportions or survival outcomes.

Conclusions: Existing HER2 interpretations may need re-examination for T-DXd treatment candidate selection. In ER-positive early breast cancer, HER2-low expression associates with better prognosis compared to HER2-null due to clinicopathological features. Neither HER2-ultralow nor low demonstrated independent prognostic significance versus HER2-null.

Adherence to adjuvant tamoxifen among premenopausal patients with breast cancer in the ASTRRA Trial

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Background: Adherence to adjuvant endocrine therapy has been shown to significantly reduce recurrence and improve survival. This study aimed to evaluate the impact of tamoxifen adherence on survival outcomes and identify factors influencing adherence among patients in the Addition of Ovarian Suppression to Tamoxifen in Young Women with Hormone-Sensitive Breast Cancer Who Remain Premenopausal or Regain Vaginal Bleeding After Chemotherapy (ASTRRA) trial.

Methods: Data were analyzed from the 8-year follow-up of the ASTRRA trial, which included premenopausal women under 45 years with estrogen receptorpositive breast cancer treated with surgery following adjuvant or neoadjuvant chemotherapy. Adherence was defined as taking tamoxifen for ≥80% of the planned prescription days. Survival outcomes were analyzed using the Kaplan-Meier method and log-rank tests, and logistic regression was employed to identify predictors of adherence.

Result: A total of 1,207 patients were included in the analysis. Among them, 96.1% (n=1,160) were adherent, while 3.9% (n=47) were in the low-adherence group. Patients in the low-adherence group showed significantly shorter disease-free survival ($p=0.024$), distant metastasis-free survival ($p=0.007$), recurrence-free interval ($p=0.002$), and breast cancer-free interval ($p=0.007$). No significant difference in adherence was observed between the tamoxifen-only and tamoxifen with ovarian suppression groups. Tumor stage, nodal stage, and extended endocrine therapy were not associated with adherence. However, younger age (<40 years) was a significant predictor of low adherence, with the low-adherence group being younger on average.

Conclusions: Adherence to tamoxifen is associated with improved survival outcomes. Ovarian function suppression was not associated with tamoxifen adherence. Patients under 40 are at increased risk of poor adherence. Targeted interventions are warranted to improve adherence in this population.

Clinical and translational study for the strategy optimization of neoadjuvant endocrine therapy in HR+/HER2- breast cancer

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Background: The iDFS absolute benefit of CDK4/6i was 4.9-7.6%. Considering AEs and health economic benefits, screening patients who can truly benefit from CDK4/6i intensive therapy can avoid under/over-treatment. Purpose was to screen out prime population sensitive to conventional endocrine therapy or CDK4/6i, and explore potential mechanisms related to NET-resistance.

Methods: Stage II-III postmenopausal HR+/HER2- patients with Ki-67 > 10% were prospectively enrolled in multicenter clinical trial (Clinical trial: NCT05809024). Patients received NET with AIs for 2 weeks firstly, then biopsy was performed again. Patients were grouped according to Ki-67 (cut-off 10%): (A) AIs-response (Ki-67 ≤ 10% after NET), patients underwent surgery; (B) AIs-nonresponse (Ki-67 > 10%), patients received AIs+CDK4/6i (Dalpiciclib) for 1 cycle, then performed surgery. The breast tumor tissues before NET, after AIs, after AIs+CDK4/6i were taken for single-cell transcriptome sequencing.

Result: From February 2023 to October 2024, a total of 70 patients were enrolled in this analysis. After 2 weeks of AIs, 31.4% (22/70) had Ki-67 > 10% (AIs-nonresponse). Among these AIs-nonresponsive patients, 63.6% (14/22) had Ki-67 > 10% after AIs+CDK4/6i for 1 cycle (CDK4/6i-response), and 36.4% (8/22) had Ki-67 ≤ 10% after AIs+CDK4/6i for 1 cycle (CDK4/6i-nonresponse). Twenty-three underwent single-cell sequencing (AI-response, n = 7; AI-nonresponse, n = 12; CDK4/6i-response, n = 2; CDK4/6i-nonresponse, n = 2). Seven cell clusters were identified: B cells, CD8+T cells, Endothelial, Epithelial, Fibroblasts, Macrophages, and Mast Cells. Mast cells was significantly more abundant in AIs-nonresponse. Malignant epithelial cells was significantly increased in CDK4/6i-nonresponse. Estrogen-response and E2F-targets pathway were significantly upregulated in CDK4/6i-nonresponse. Transcriptome sequencing of 52 samples showed increased expression of BATF, PMAIP1, SERPINA6 and SIAH2 in CDK4/6i-nonresponse group.

Conclusions: Neoadjuvant endocrine therapy identified patients sensitive to AIs based on their Ki-67 response. For patients initially unresponsive, CDK4/6i combination therapy significantly reduced Ki-67 levels, highlighting these individuals as potential candidates for intensive adjuvant therapy with CDK4/6i. Additionally, malignant epithelial cells and SERPINA6 emerged as potential therapeutic targets for addressing CDK4/6i-resistance.

Accuracy of OPTIMIST trial criteria in predicting pathologic complete response following neoadjuvant systemic therapy

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Background: The OPTIMIST (omission of breast surgery among patients with predicted pathologic complete response after neoadjuvant systemic therapy) trial is an ongoing study that utilizes MRI tumor size and lesion-to-background signal-to-enhancement ratio (L-to-B SER), previously shown to accurately predict pathologic complete response (pCR) after neoadjuvant systemic therapy (NST). This study evaluated the pCR predictive ability of the OPTIMIST trial MRI criteria, which, in the trial, is supplemented by vacuum-assisted biopsy.

Methods: A retrospective analysis was conducted on breast cancer patients who underwent NST followed by surgery at Seoul National University Hospital (January 2016-December 2020). Inclusion criteria matched the OPTIMIST trial, enrolling patients with cT1-2, cN0-2, M0 invasive ductal carcinoma of HER2-positive, triple-negative (TNBC), or estrogen receptor (ER)-low-positive (ER < 10%) subtypes. Patients with inflammatory, diffuse, or multifocal breast cancer were excluded. Post-NST, MRI were reviewed for residual tumor size and L-to-B SER, with MRI-defined complete response as tumor size ≤ 1 cm, L-to-B SER ≤ 1.6, and microcalcifications ≤ 2.0 cm on mammography. pCR was defined as the absence of residual invasive cancer or ductal carcinoma in situ (DCIS) in surgical specimens.

Result: Among 499 patients (mean age 50.4), TNBC was most common (46.7%), followed by HR+HER2+ (29.5%), HR-HER2+ (16.6%), and ER-low-positive (7.2%). Pathology confirmed pCR in 191 patients (38.3%), while 255 (51.1%) had residual cancer and 53 (10.6%) had DCIS. MRI size alone predicted pCR with 65.7% accuracy, improving to 73.1% with L-to-B SER and microcalcifications. On univariate analysis, only MRI size (OR 4.53; 95% CI 3.1-6.6) and L-to-B SER (OR 13.48; 95% CI 8.8-20.7) were significantly associated with pCR ($p < 0.05$). Multivariate analysis confirmed SER as the strongest predictor (OR 10.75, 95% CI 6.7-17.2; $p < 0.001$).

Conclusions: This study highlights MRI tumor size and SER as reliable predictors of pCR, supporting their role in selecting patients for minimally invasive approaches and possibly surgery omission.

Redefining criteria for omitting axillary surgery following neoadjuvant systemic therapy in patients with breast cancer

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Background: Historically considered indispensable to breast cancer treatment, axillary surgery is increasingly omitted when it does not negatively impact patient outcomes. While three single-arm trials(ASLAN, ASICS, EUBREAST-01) are exploring feasibility of omitting axillary staging surgery in cN0-1 patients achieving breast pathologic complete response (pCR) after neoadjuvant systemic therapy (NST), evidence for those achieving ypN0 regardless of breast pCR remains limited. Addressing this gap, the present study evaluates candidate criteria for safely omitting axillary surgery in patients expected to achieve ypN0, regardless of breast pCR status.

Methods: Stringent criteria were applied to select candidates likely to achieve ypN0: patients with cT1-T3, cN0 breast cancer, regardless of subtype, and a subset of cN1 patients with HER2-positive or TNBC subtypes who achieved >50% tumor size reduction on MRI after NST. Patients with suspicious lymph nodes on post-NST ultrasound were excluded. This retrospective study reviewed all patients treated at SNUH between 2017 and 2022 to evaluate clinicopathologic outcomes in eligible cases.

Result: A total of 395 patients (median age 51 years, IQR 4457) met the inclusion criteria. Most patients had cT2 (86.8%), with 49.6% cN0 and 50.4% cN1. Subtypes were HR+HER2- (10.4%), HR+HER2+ (29.6%), HR-HER2+ (20.0%), and TNBC (40.7%). Histologic grades were predominantly grade II (53.3%) and III (44.7%). After surgery, breast pCR was confirmed in 46.1%, and axillary pCR in 95.2%, with ypN1 in 17(4.3%), and ypN2 in 2(0.5%) patients. During a median follow-up of 4.1(2.75.4) years, 11 patients experienced recurrence: 1 breast, 1 axillary, 1 supraclavicular node, and 8 distant metastases. 5- and 10-year DFS rates were 95.8% and 92.6%, with OS rates at 97.2% and 94.1%, respectively.

Conclusions: Our findings demonstrate a low nodal positivity rate (4.8%) after NST in patients selected with stringent criteria, supporting the feasibility of omitting axillary surgery in this group. A randomized controlled trial is planned to further evaluate oncologic safety.

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Go Beyond Cure of
Breast Cancer

Big Data Analysis of Electronic Health Records for Breast Cancer Patients

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Electronic health records (EHRs) have become a crucial data source for understanding real-world clinical patterns and outcomes in breast cancer care. In Korea, the increasing availability of structured clinical data from hospital-based EHRs and multi-institutional studies has enabled the generation of large-scale datasets, providing insights beyond those captured in randomized controlled trials. The most representative EHR-based dataset in Korea is the Korea Breast Cancer Society (KBCS) registry. The KBCS registry collects comprehensive clinical information through an online platform (https://registry.kbcs.or.kr/ecrf), including patient age, body mass index, socioeconomic status, tumor stage, treatment modalities, pathological type, and molecular subtype. In addition to the KBCS registry, various research groups - including the Korean Breast Cancer Survivorship Study Group or the Korea Robot-Endoscopic Minimal Access Breast Surgery Study Group (KoREa-BSG) - have utilized EHRs to build specific datasets. This presentation will introduce several EHR-based breast cancer studies conducted in Korea and explore the methodological challenges and limitations of EHR-based research, such as missing data, inter-institutional variability, and the lack of standardized data formats.

Big Data Analysis of National Healthcare Data for Breast Cancer

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South Korea has built various government-led databases, especially in healthcare. The entire population is covered by national health insurance, enabling the creation of a comprehensive claims database. Unlike traditional cancer registries focused only on treatment and outcomes, this dataset allows analysis of long-term health issues among breast cancer survivors. The National Cancer Center also collects national cancer incidence data from hospitals. Recently, the government integrated these databases into a unified platform, offering researchers broader access. This presentation introduces Korea's clinical big data and shows how it supports research on breast cancer survivors and health policy.

AI-Powered Research of Breast Cancer

Han Fang Cheng

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Artificial intelligence (AI) is emerging as a powerful tool in breast cancer diagnosis, risk assessment, and treatment planning. This talk explores the integration of AI into real-world oncology practice across multiple domains.

A major concern is data bias. Most AI models are trained on Western datasets, which fail to capture the unique characteristics of Asian breast cancer patients. This discrepancy affects diagnostic accuracy and treatment recommendations, as disease presentation and progression patterns often differ between Asian and Western populations. Standardizing datasets with diverse patient data, particularly from Asian cohorts, is essential for developing effective AI tools for these populations.

AI applications are transforming several key areas of breast cancer research and management. In Breast Imaging and Risk Prediction, AI enhances early detection while providing more accurate risk stratification. Pathology and Histopathological Analysis through whole-slide imaging (WSI) enables more precise cancer subtyping and identification of prognostic features. Molecular Testing and Biomarker Discovery utilizes machine learning to identify novel biomarkers and predict treatment responses. AI systems for Tumor Evaluation monitor treatment effectiveness, while Clinical Trial Matching algorithms connect patients with appropriate research opportunities. In Patient Care and Management, AI tools facilitate better communication between healthcare providers and patients throughout their cancer journey, while Treatment Decision Support systems help clinicians determine optimal therapeutic approaches by analyzing complex multimodal data.

Given Taiwan and South Korea's strong medical infrastructure and comprehensive healthcare databases, both nations are well-positioned to develop AI models specifically tailored for Asian breast cancer patients. However, institutional and regulatory challenges must be addressed to realize AI's potential in routine clinical practice. Federated learning presents a potential solution to privacy concerns, allowing institutions to collaborate on AI training without direct data sharing.

The success of AI in breast cancer ultimately depends on its implementation as a decision-support tool that enhances rather than replaces medical expertise, bridging research innovations with practical clinical applications to improve patient outcomes.

Balancing Privacy Regulations and Data Utilization in Breast Cancer Research

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Modern development in precision medicine requires large-scale and in-depth data to advance healthcare continually. Typically, data accounting for individual genetic, phenotypes, and lifestyle factors, as well as longitudinal follow-up of clinical treatment outcomes, are essential. In response to the requirement for broad participation from community and patient populations, many government agencies have implemented necessary regulations to ensure privacy protection and data security. Corresponding data controllers should strive to earn the trust of patients and the public by maintaining a high standard of security and transparency throughout the data governance process.

The National Biobank Consortium of Taiwan (NBCT) is a government-funded project, currently managed by the National Health Research Institutes, Taiwan. The NBCT collaborates with 37 biobanks in Taiwan, including 32 hospital biobanks and five institutes. Under the Human Biobank Management Act, which was announced in 2010, all biobanks are subject to a legal and ethical framework for storing, managing, and utilizing participants' biospecimens and health data. Our team designed and implemented the NBCT CDM (Common Data Model) system, which accumulates standardized clinical data across hospitals. We developed a distributed system to harmonize electronic health records, including in-depth clinical information on the patient journey. We collaborate with hospitals to integrate their Electronic Health Record (EHR) data into our common data model, allowing hospitals to provide clinical data for research purposes. Our goals are to assemble a set of common oncology data elements, to maintain sufficient cancer data quality, and to facilitate interoperability of medical data for patient care and research across NBCT collaborated institutes. In this talk, I shall present our efforts and current accomplishments in our innovative NBCT CDM system and our proof of concept project to investigate the feasibility of comparative effectiveness breast cancer research.

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Go Beyond Cure of Breast Cancer

Surgical Treatment (Surveillance or Operation)

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DCIS Surgical Treatment: Surveillance or Operation?

Approximately 50,000 women in the United States are diagnosed each year with ductal carcinoma in situ (DCIS) of the breast. The clinical relevance of DCIS lies in its role as a potential precursor of invasive cancer. However, for any given DCIS lesion, both the likelihood and rate of invasive progression remain difficult to predict. Consequently, almost all patients diagnosed with DCIS are treated with locoregional therapy, often combined with radiotherapy (RT). In the United States, an estimated 30% of patients with DCIS undergo mastectomy, and about half receive adjuvant RT as part of their treatment. The increased treatment of DCIS has not resulted in reduction in invasive cancer incidence, calling into question whether and how much current DCIS treatments are reducing future risk of invasive breast cancer.

Because patients with DCIS have a generally excellent prognosis, there have been efforts to reduce some treatment measures, particularly in those with DCIS at low risk for invasive progression. To date, de-escalation of DCIS treatment has focused on identification of a low-risk phenotype using molecular risk classifiers such as the DCIS Score (Exact Sciences) and the DCISionRT (PreludeDx) to reduce the need for RT by limiting radiation only to those patients most likely to recur. Several de-escalation studies are also studying whether surgery itself may be omitted in those patients with low risk of invasive progression, with surgery only offered to those patients who develop invasive cancer while on active monitoring. These trials will help define the future role of surgery for DCIS, especially in those patients with low-risk DCIS, significant comorbidities precluding locoregional treatment, or limited life expectancy.

Endocrine Treatment (Omission or Medication)

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Endocrine treatment for Low grade DCIS

1. Definition of DCIS and Low-Risk Criteria

DCIS is defined as a pre-invasive breast cancer that lacks the potential to spread unless it progresses to invasive cancer. Low-risk DCIS is usually defined as low or intermediate grade, ER-positive, HER2-negative, no comedo necrosis, screen-detected microcalcifications, size ≤ 2.5 cm, and age > 40 years. However, different studies have slightly different criteria for low-risk DCIS. For example, the LORIS trial in the UK includes women aged 46 or over with low or lower half of intermediate grade, while the COMET trial in the USA includes women over 40 years with low or intermediate grade.

2. Endocrine Therapy: Advantages and Disadvantages

Endocrine therapy, primarily using tamoxifen and anastrozole, reduces the risk of recurrence in ER-positive DCIS. Tamoxifen has been shown to decrease new breast cancer events by 37% in the NSABP B-24 trial. However, endocrine therapy does not improve survival rates and is associated with side effects such as menopausal symptoms, thromboembolic events, and endometrial cancer risk for tamoxifen, and musculoskeletal disorders for anastrozole.

3. Recent Trials and Findings

NSABP B-24 and NSABP B-35 have demonstrated the efficacy of tamoxifen and anastrozole in reducing breast cancer events. The NSABP B-35 trial showed that anastrozole provided a significant improvement in the breast cancer-free interval compared to tamoxifen, particularly in women under 60. The NRG Oncology/RTOG 9804 and ECOG-ACRIN E5194 trials found that tamoxifen reduced overall and invasive breast cancer recurrence but not DCIS recurrence.

4. COMET Trial

The COMET trial compared active monitoring with guideline-concordant care for low-risk DCIS. At 2 years, active monitoring did not result in higher invasive cancer rates compared to guideline-concordant care, suggesting that active surveillance could be a viable option for low-risk DCIS. This trial highlights the potential for de-escalation of treatment in carefully selected patients.

5. Prognostic Markers and Future Directions

Prognostic markers such as grade, size, margins, necrosis, and immune markers like TILs are important for risk stratification. Future research should focus on accurate molecular and genomic profiling to guide precise individualized management and avoid overtreatment. Active surveillance and precision medicine approaches are being explored for low-risk DCIS.

6. Emerging Therapies and Challenges

Low-dose tamoxifen is being investigated as a safer alternative with fewer side effects. However, balancing benefits against side effects and quality of life issues remains a challenge. The global uptake of prescribed adjuvant endocrine therapy for DCIS is currently low, highlighting the need for better patient education and shared decision-making.

7. Conclusion

Endocrine therapy for low-risk DCIS is a preventive strategy with benefits and drawbacks. While it reduces recurrence risk, it does not impact survival rates and is associated with significant side effects. Future research should focus on personalized treatment approaches to optimize outcomes while minimizing overtreatment.

Radiation Treatment (Omission or Radiotherapy)

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Radiation treatment following breast-conserving surgery significantly reduces the risk of local recurrence in ductal carcinoma in situ (DCIS), even among patients classified as low-risk. Although radiotherapy consistently demonstrates a substantial reduction in ipsilateral breast tumor recurrence (IBTR), concerns persist regarding potential overtreatment in certain selected low-risk populations.

Low-risk DCIS is typically defined based on clinical-pathological features, including tumor size less than 2.5 cm, low-to-intermediate nuclear grade, clear surgical margins (≥ 2 mm), absence of comedo-type necrosis, and negative or weakly positive hormone receptor status. Emerging evidence suggests that additional biomarkers can enhance patient stratification. For instance, genomic assays such as the Oncotype DX DCIS Score (validated in the ECOG-ACRIN 5194 trial) provide valuable insights into recurrence risk, facilitating more precise treatment decisions. Recent findings from the ECOG-ACRIN E4112 trial (2024) further indicate that breast MRI can refine the selection of low-risk DCIS patients, potentially guiding decisions about omitting radiation. Similarly, the RTOG 9804 trial reported low recurrence rates among favorable low-risk patients managed without radiotherapy, supporting individualized de-escalation approaches.

Integration of predictive tools, such as genomic profiling assays (e.g., Oncotype DX DCIS Score, DCISionRT), and advanced imaging modalities like breast MRI, improves risk stratification accuracy. These developments allow clinicians to better identify patients for whom omission of radiotherapy might be appropriate, balancing treatment efficacy against the risk of overtreatment. Continued research is necessary to further validate and refine these predictive models, enabling more personalized and less intensive management strategies for carefully selected low-risk DCIS patients.

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Risk Stratification in Early Breast Cancer Adjuvant Use of CDK4/6 Inhibitors

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Risk Stratification in Early Breast Cancer: Who Truly Benefits from CDK4/6 Inhibition? (Biomarker Driven Approach)

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Early breast cancer (EBC) treatment decisions rely on accurate risk stratification to balance treatment benefits against potential toxicities. CDK4/6 inhibitors, such as abemaciclib and ribociclib, have shown promise in improving outcomes for high-risk hormone receptor-positive, HER2-negative EBC. However, not all patients derive the same level of benefit, highlighting the need for a biomarker-driven approach to refine patient selection.

Traditionally, risk assessment in EBC is based on clinical and pathological factors, including tumor size, nodal involvement, histologic grade, and Ki-67 proliferation index. However, these parameters have limitations in predicting which patients will benefit most from CDK4/6 inhibition. Genomic assays such as Oncotype DX, MammaPrint, and Prosigna have been used to classify recurrence risk, but their role in guiding CDK4/6 inhibitor use remains unclear.

One promising biomarker is Ki-67, a marker of cell proliferation, which has been suggested as a potential predictor of CDK4/6 inhibitor response. Patients with high Ki-67 expression may be more likely to benefit from treatment, as these inhibitors specifically target rapidly dividing cancer cells. Additionally, certain genomic alterations such as RB1 loss, CDKN2A amplification, and activation of the PI3K/AKT pathway have been linked to either sensitivity or resistance to CDK4/6 inhibitors.

Another emerging tool in risk stratification is circulating tumor DNA (ctDNA) analysis through liquid biopsy. This approach allows for the detection of minimal residual disease (MRD), which can help identify patients at a higher risk of relapse. By incorporating ctDNA monitoring, clinicians may be able to tailor treatment strategies more effectively and determine which patients require CDK4/6 inhibition.

Recent trials, including MONARCH-E and NATALEE, have demonstrated that CDK4/6 inhibitors benefit high-risk EBC patients, but their efficacy in intermediate-risk groups remains uncertain. A more precise, biomarker-driven approach could help identify patients who would benefit most from CDK4/6 inhibition, improving survival outcomes. Ongoing research aims to integrate molecular profiling and liquid biopsy techniques into clinical practice, enabling a more personalized treatment approach. As biomarker discovery advances, the goal is to move beyond broad clinical classifications and toward a precision medicine framework for EBC management.

A biomarker-driven strategy for CDK4/6 inhibitor use in EBC holds the potential to optimize treatment, enhance efficacy, and minimize unnecessary exposure to side effects. Future trials should focus on validating predictive biomarkers and refining patient selection criteria to ensure the best possible outcomes.

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Data on BRCA in Korea: Insights from Retrospective and Prospective Cohorts and Future Collaborative Directions

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Hereditary breast and ovarian cancer (HBOC) syndrome, largely attributable to BRCA1 and BRCA2 mutations, represents a distinct clinical subset with implications for cancer risk, management, and familial communication. Despite the increasing awareness of genetic susceptibility in breast cancer, data specific to the Asian population have been limited until recent years. This presentation aims to provide a comprehensive overview of three major Korean cohort studies—ON-BRCA II, K-CASCADE, and KOHBRA—highlighting key findings, current limitations, and future directions for international collaboration.

ON-BRCA II is a nationwide retrospective cohort study analyzing data from 575 BRCA mutation carriers treated between January 2008 and December 2018, with a median follow-up of 8.3 years. Conducted by the KoREa-BSG and involving 14 institutions, the study emphasizes the oncologic outcomes in this population, including locoregional and distant recurrences, contralateral breast cancer, and cause-specific mortality. The dataset is notable for its rich pathologic and treatment-related details, though missing data in areas such as family history and risk-reducing salpingo-oophorectomy (RRSO) limit some analyses. Findings from ON-BRCA II have led to subsequent investigations into metachronous contralateral breast cancer risk and prognostic implications of mutation location.

K-CASCADE, a prospective cohort initiated in 2019, is an international collaborative effort with Switzerland led by Prof. Maria C. Katapodi and Prof. Sue Kim. The primary aim is to evaluate psychosocial outcomes and communication patterns among individuals with HBOC-related mutations and their family members. As of April 2023, 628 participants have been enrolled through five tertiary centers in Korea. Approximately 94% are BRCA1/2 mutation carriers, and over 60% have a personal history of breast cancer. Although K-CASCADE offers critical insights into referral sources for genetic testing and family communication strategies, its limitations include a lack of detailed clinicopathological and survival data.

KOHBRA, a landmark prospective cohort study, was instrumental in defining the prevalence and penetrance of BRCA mutations in Korea. The study aimed to develop risk prediction models and investigate genetic and environmental modifiers of hereditary breast cancer. Despite its substantial contributions to genetic counseling guidelines, KOHBRA's research activities have been limited in recent years due to the absence of long-term oncologic outcome data.

Looking forward, this presentation proposes a framework for future international collaborations under the J-K BRIDGE initiative. Our efforts could not only enhance clinical care for BRCA mutation carriers but also support more effective dissemination of genetic information within families between Korea and Japan, ultimately advancing the goal of precision oncology.

Data on BRCA in Japan

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St. Luke's International Hospital, Japan

Fertility Preservation Survey Study

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Improved survival rates among breast cancer patients, attributable to advances in early detection and treatment modalities, have heightened the significance of quality of life considerations among cancer survivors. Fertility preservation represents a concern of comparable importance to the therapeutic interventions themselves for young breast cancer patients. This study aimed to evaluate the knowledge, attitudes, and clinical practices of physicians from Japan and South Korea regarding fertility preservation in young women with breast cancer, and to identify associated barriers and potential strategies for optimization.

A cross-sectional survey was conducted between March 4 and March 31, 2025, targeting members of the Japanese Breast Cancer Society (JBCS), Korean Breast Cancer Society (KBCS), and the Korean Society of Fertility Preservation (KSFP). The survey comprised 53 items addressing demographics, medical background, fertility preservation before treatment, and perspectives on post-treatment pregnancy. A total of 169 physicians responded, including 110 JBCS members, 45 KBCS members, and 14 KSFP members.

Statistical analysis revealed that Japanese respondents had a significantly higher mean age compared to Korean respondents (50.8 years vs. 47.2 years; $p = 0.013$). A significantly higher proportion of Korean respondents practiced in tertiary healthcare facilities (University medical centers, Comprehensive cancer centers) (93.2% vs. 42.7%; $p < 0.001$). Consequently, the proportion of breast oncologists and fertility specialists working in the same institution was significantly higher among Korean respondents (86.4% vs. 66.1%; $p = 0.006$).

No significant differences in perception and attitudes were observed between Korean and Japanese respondents. Of the total respondents, 76.2% indicated a belief that pregnancy could adversely impact breast cancer prognosis to some degree, while 83.3% expressed concern that ovulation stimulation for fertility preservation could potentially compromise oncologic outcomes. Approximately 67.2% expressed support for fertility preservation procedures. Notably, 34.2% reported unwillingness to accept any reduction in Disease-Free Survival (DFS) to accommodate pregnancy, and 21.1% presumed patients would share this perspective. Additionally, 21.4% maintained that oncologic treatment should invariably take precedence over fertility preservation.

Behavioral patterns demonstrated notable variations: 44.2% of Korean respondents reported "always" referring patients of reproductive age to fertility specialists prior to treatment initiation, whereas among Japanese respondents, the most frequent response was "sometimes" (38.7%) ($p = 0.056$). The overwhelming majority (89.6%) of all respondents acknowledged the necessity for improved fertility preservation counseling. Korean respondents identified multidisciplinary systems as the primary area for improvement (31.6%), while Japanese respondents prioritized sufficient counseling time (25.0%) ($p = 0.017$).

Regarding the optimal timing for conception attempts in hormone receptor-positive breast cancer patients, 60.2% recommended proceeding after 2 years of hormone therapy, 25.9% after 5 years of hormone therapy, and

9.6% indicated no definitively safe interval exists. The majority of respondents (57.6%) recommended temporary discontinuation of hormonal therapy for pregnancy attempts in patients with up to stage 2 disease. No significant differences were observed between respondents from the two countries on these question.

Additional comments for support programs related to fertility preservation and post-treatment pregnancy highlighted the need for financial support. Although both Korea and Japan legally permit fertility preservation procedures such as oocyte cryopreservation, national health insurance coverage for these high-cost procedures is not available. Several local governments provide limited financial assistance, but individuals must still bear a substantial financial burden. Therefore, financial support represents a significant issue requiring improvement. In future studies, we plan to investigate the importance of this issue through comparisons with countries that have established medical insurance coverage programs for fertility preservation procedures.

Surgical Trends in Korea

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Surgical trends in Korea have been changing rapidly since 2019 with the increasing popularity of robotic-endoscopic surgery. In particular, oncoplastic surgery, which was initially focused on breast reconstruction, has significantly shifted towards implant-based reconstruction. This transition has been driven by the ability to perform breast reconstruction through small incisions using robotic-endoscopic techniques. Consequently, this change has also influenced Korean breast surgeons' perceptions of oncoplastic breast surgery.

The Korean Breast Cancer Society and Korean Breast Oncoplastic Surgery Study Group (KOPBS) conducted a web-based survey to investigate trends and shifts in the perception of oncoplastic breast surgery. Additionally, there are plans to survey members of the Korean Breast Robot-Endoscopic Minimal Access Surgery Study Group (KoREa-BSG) to examine trends and evolving perceptions of robotic-endoscopic breast surgery in general.

In this lecture, I will talk about the evolving trends in breast surgery among Korean breast surgeons and present findings on the changing perceptions of OPS and robotic-endoscopic surgery. The two studies indicate that OPS is widely practiced among Korean breast surgeons and that advanced techniques, such as robot-assisted and endoscopic surgery, are increasingly being adopted. Furthermore, these trends and perceptions vary by age and individual preferences. Understanding these shifts is essential for optimizing patient care and enhancing surgical education programs. A valuable follow-up study could involve a comparative analysis of surgical trends between Korea and Japan through academic exchanges.

Surgical Trends in Japan

Hitomi Mori

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Introduction: Breast cancer surgery in Japan has evolved with advancements in treatment approaches and reconstruction techniques. I will introduce recent trends in surgical procedures, breast reconstruction rates, and the implementation of novel treatment methods.

Breast-Conserving Surgery (BCS) and Breast Reconstruction Rates: According to the Japanese Breast Cancer Society, 98,540 breast cancer cases were registered in 2021, showing an increasing trend. Of these, 99.4% were female patients and 0.6% were male. Among female patients, 54.7% underwent mastectomy, while 42.4% had BCS.

In the early 2000s, the BCS rate was approximately 60%. However, since 2006, the introduction of insurance coverage, from the National Health Insurance, for autologous breast reconstruction, followed by implant-based reconstruction in 2013, has contributed to a decline in BCS, with mastectomy cases exceeding 50%. In 2021, approximately 10% of patients who underwent mastectomy received breast reconstruction.

The breast reconstruction rate in Japan remains low compared to other developed countries. In South Korea, the reconstruction rate following mastectomy was 53% in 2018, while in the United States, it exceeded 40% in 2016. Several factors contribute to low reconstruction rate in Japan. Medical factors include a shortage of plastic surgeons specializing in breast reconstruction and a limited number of facilities offering the procedure. Patient-related factors include challenges with long-term hospitalization due to work and family responsibilities, as well as a lack of societal awareness and support.

Since 2020, insurance coverage has been expanded to include risk-reducing mastectomy and breast reconstruction for patients with a history of breast or ovarian cancer associated with hereditary breast and ovarian cancer syndrome (HBOC). This policy change may increase demand for breast reconstruction, underscoring the need for multidisciplinary collaboration between breast and plastic surgeons.

New Surgical Approaches: A promising advancement in breast cancer treatment is radiofrequency ablation (RFA), a minimally invasive, breast-preserving procedure. In Japan, RFA was approved for insurance coverage in December 2023, providing a non-surgical option for early-stage breast cancer. Eligible patients include those with tumors ≤ 1.5 cm, no axillary lymph node involvement, and no distant metastasis. RFA is performed in the operating room, and a sentinel lymph node biopsy is conducted as part of the standard procedure. One year after its approval, RFA has been gradually adopted nationwide.

Another major development is the introduction of robot-assisted nipple-sparing mastectomy (NSM), which was covered by insurance in August 2024. This procedure is indicated for patients with clinical stage cTis, 12 N0 breast cancer, who have no prior radiation therapy to the affected breast and no tumor invasion into the nipple-

areola complex or skin. While only a few institutions currently perform robot-assisted breast cancer surgery, the widespread availability of surgical robots in all Japan suggests that adoption of robot-assisted NSM will increase in the coming years.

Conclusion: Breast cancer surgery in Japan continues to evolve, with increasing mastectomy rates, low but gradually rising breast reconstruction rates, and the introduction of innovative techniques such as RFA and robot-assisted NSM. Expanding insurance coverage and enhancing collaboration between surgical disciplines may help address barriers to reconstruction and promote more comprehensive treatment options for breast cancer patients in Japan.

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The Key Points of Starting and Establishing an Institutional Database and Cohort Studies

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Institutional databases and cohort studies can serve as a rich source of valuable clinical information. When linked with biospecimen collection efforts, a wide array of clinical and translational questions can be asked and answered which complement the data that is traditionally collected from prospective clinical therapeutic trials. The cohorts program at Dana-Farber Cancer Institute (DFCI) comprises several distinct but interrelated programs: the Young Women's Cohort (Young and Strong), Metastatic Breast Cancer Cohort (EMBRACE), Triple-Negative Breast Cancer Registry, Older Patient's Cohort (ELEVATE), Early-Stage cohort (LEAP), Inflammatory Breast Cancer Cohort, and Male Breast Cancer Cohort. Our cohorts programs include collection of clinico-pathologic data, biospecimens (depending on the study, various combinations of archival tissue, blood, other fluids, stool), and patient reported outcomes, but also include support for oncology teams caring for patients and direct-to-patient, patient-facing education programs and resource connections. Examples of projects conducted using the cohorts program resources include: 1) studies of the prognostic impact and biological features of HER2-low versus HER2-zero breast cancer, 2) studies documenting the impact of changing local therapy management practices on clinical outcomes, 3) quality assurance studies to evaluate update of guideline-concordant care, 4) translational projects to understand the prevalence and prognostic impact of minimal residual disease in plasma, 5) studies of resistance mechanisms in the metastatic breast cancer (MBC) setting using serial plasma ctDNA samples, 6) studies of exceptional responders, 7) observational and interventional studies related to quality of care and quality of life in patients with MBC, and 8) descriptions of patterns of care in understudied populations, such as the very young or older patients with early-stage or metastatic breast cancer. Key aspects in initiating and maintaining strong registries and cohorts include prioritizing areas of particular interest, starting small and then building from a solid starting point, optimizing biospecimen collection, synergizing between projects, and building collaborations.

The Experience of Being a Research Fellow Overseas

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Even 10 or 20 years ago, most medical school professors were given the opportunity to study abroad. If the institution they applied to accepted their application, they could study abroad for a few months at the shortest and up to two years at the longest. At that time, domestic research infrastructure was inferior to that of advanced countries, so it can be said that those who actually completed the training returned and had a great impact on the qualitative improvement of domestic research. Recently, domestic research infrastructure and the network among domestic researchers are comparable to that of advanced countries, so the need for training and support from schools have decreased as in the past. However, training opportunities still exist, and for those who want to go on a training trip, it can be a time of opportunity or a time of no great significance to their careers, depending on the mindset with which they plan their training. The purpose of training can be various, such as being able to do basic or translational research that was difficult to access in clinical settings, or broadening their horizons in the clinical field and networking with various researchers. I had two training opportunities, and I would like to share my experiences.

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Nursing Session

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Breast Reconstruction and Radiation Therapy: From Breast Cancer Patient Perspective

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Breast reconstruction surgery following mastectomy has become an integral component of comprehensive breast cancer care, significantly impacting patients' quality of life and psychological well-being. However, the interplay between reconstructive surgery and adjuvant radiotherapy presents unique challenges and considerations for both healthcare providers and patients.

An overview of breast reconstruction options and radiation therapy sets the stage for understanding the complex interplay between these treatments. The timing of reconstruction, whether immediate or delayed, is crucial and significantly influenced by the potential need for radiation therapy. The decision-making process is multifaceted, involving extensive information gathering, consultations with healthcare providers, and careful consideration of long-term outcomes.

Nurses play a crucial role at the forefront of patient care, providing essential education about surgical procedures, potential complications, and the effects of radiotherapy on reconstructed breast tissue. They offer emotional support to help patients cope with anxiety and body image concerns, manage symptoms and side effects, and facilitate communication within the multidisciplinary healthcare team. Through effective care coordination, advocacy, and rehabilitation support, nurses enhance the recovery process and improve overall patient experiences.

The current session aims to explore the experiences of patients who have undergone breast reconstruction and subsequently received radiotherapy, focusing on clinical outcomes, patient satisfaction, and quality of life implications.

Use of Radiotherapy in Advanced Breast Cancer: The Role of a Nurse

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Radiotherapy (RT) is an essential treatment modality for breast cancer, playing a crucial role in improving local control, survival rates, and symptom relief. Recent advancements in RT, such as hypofractionated radiotherapy (HypoRT), have demonstrated significant benefits, including reduced treatment burden, improved patient adherence, and cost-effectiveness. HypoRT is now widely recommended by major guidelines, including ASTRO, NCCN, and ESTRO, for most breast cancer patients.

Technological innovations, such as surface-guided radiotherapy (SGRT), have enhanced treatment precision while eliminating the need for physical markers, improving patient comfort. In the management of advanced breast cancer (ABC), RT plays a critical role in controlling tumor growth and alleviating symptoms associated with metastatic disease. Whole-brain radiotherapy (WBRT) is commonly used for brain metastases, while stereotactic body radiotherapy (SBRT) is an effective approach for bone metastases, improving quality of life.

Nurses play a vital role throughout the RT process by assessing patients' physical and emotional conditions, providing education, and managing side effects such as skin reactions, fatigue, and pain. A multidisciplinary team (MDT) approach ensures personalized treatment, proactive care, and psychosocial support, ultimately enhancing patient satisfaction.

Future research should focus on refining nursing strategies to optimize RT outcomes and further improve the quality of life for ABC patients.

Patient Education for Breast Cancer Patients Undergoing Radiation Therapy

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The number of cancer patients receiving radiation therapy (RT) is increasing, with breast cancer being the most common type. Since RT is a key component of breast cancer treatment, patient education is essential to improve treatment outcomes and improve patients' quality of life.

Education should be provided throughout the entire RT process–before, during, and after treatment.

Before treatment, patients need to understand the procedure and maintain adequate arm mobility. Recently, digital tools such as YouTube videos, virtual reality, and chatbots have been introduced to improve patient understanding and reduce anxiety. With the adoption of surface-guided RT, which allows more comfortable and accurate treatment positioning, the content of pre-treatment education is also evolving.

During treatment, patient education focuses on managing fatigue and skin reactions–the most common side effects. Although modern techniques of hypofractionated RT and intensity-modulated RT have reduced these toxicities, basic skin care education remains important.

After treatment, patients are educated on possible late effects such as lymphedema and radiation pneumonitis. While the incidence of these complications has decreased with modern RT techniques, education remains essential, particularly for high-risk groups.

The role of the nurse is to provide ongoing, phase-specific education to support patients throughout their treatment journey.

Motherhood and Pregnancy Planning Among Young Breast Cancer Survivors

Jeonghee Ahn

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Breast cancer is most common cancer among women worldwide, and its incidence continues to increase. In Korea, a high proportion of breast cancer cases occur in premenopausal women, with many diagnosed during the reproductive years, especially before the age of 40. With advances in diagnosis and treatment, the 5-year survival rate now exceeds 90%, shifting attention toward post-treatment quality of life, including reproductive health and pregnancy planning. This issue is particularly important in Korea, where delayed marriage and childbirth have resulted in more women being diagnosed before completion of family planning, leading to an interest in pregnancy after treatment. Breast cancer treatments, such as chemotherapy and endocrine therapy, have gonadotoxic effects and cause delays in pregnancy, consequently reducing fertility. Although pregnancy rates are lower post-treatment in survivors of breast cancer compared to the general population, pregnancy after breast cancer is associated with a favorable long-term prognosis. Although the risks of cesarean delivery, low birth weight, and preterm birth have increased, the risk of congenital anomalies has remained unchanged. A qualitative study further showed that women with a history of breast cancer expressed a strong desire for pregnancy despite the ongoing fear of recurrence and concerns about their child's health. They viewed pregnancy as a sign of regaining health, a step toward returning to normal life, and a motivation to adopt a healthier lifestyle. Currently, no standardized guidelines are available for pregnancy planning after breast cancer treatment, which creates uncertainty for both patients and healthcare providers. Pregnancy planning is a complex process that requires shared decision-making (SDM) by taking into consideration clinical status, fertility, personal values, and family circumstances. However, effective SDM is hindered by limited counseling, treatment-centered care, lack of tailored information, and inadequate multidisciplinary coordination. To address these gaps, professional counseling that includes psychosocial support, integration of reproductive health into oncology care, and development of comprehensive decision aids is essential. These efforts could enhance reproductive autonomy and quality of life for young women while promoting reproductive health equity and supporting family planning within survivorship care.

Experience in Running a Vitality Recovery Program for Couples with Women's Cancer: Focusing on Breast Cancer

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Cancer is a life-altering event for patients and their partners that presents emotional, social, and physical challenges. These challenges often disrupt the quality of life (QoL) for both patients and their partners. The psychological effects of cancer on a patient may be strongly influenced by their interpersonal context and, particularly, their interactions with their partner. Especially, women with breast cancer suffer from problems such as decreased self-esteem, a decreased sense of femininity, weakness in sexual relations, and poor body image because of mastectomy, which disturbs their marital life. Breast cancer not only creates a severe mental burden for patients but also for their life partners. It is therefore important to identify relational and sexual problems in couples after cancer treatment, and to provide support for these problems.

Women with cancer and their partners need considerable intervention to resolve a variety of sexual and marital problems induced by cancer treatment. Considering the psychosocial adaptability and ability of partners to communicate effectively and cope together, there is wide interest in couple-focused interventions in cancer care. A couple-focused intervention systematically involves the intimate partner and focuses on the couple as a unit. This type of intervention can be beneficial for both patients and their partners who are dealing with cancer and related sexual problems. Adopting a couple-centered process may not only decrease negative cancer outcomes for both simultaneously but also support their mental growth and mutual flexibility. Such interventions have long-term effects on maintaining behavioral changes and reducing the concerns of intimate partners during daily care activities to support patients.

After cancer diagnosis, renegotiating sexual health with a partner is necessary to facilitate adjustment to illness, rebuild intimacy, and improve QoL. In contrast with many areas of health-related QoL that tend to improve over time, sexual concerns often persist for years after breast cancer survivors complete their primary treatment. Therefore, addressing sexual concerns can have positive benefits not only for the survivors' sexual outcomes but also for other aspects of their and their partners' individual and relationship wellbeing. Also, providing and receiving support from each other during couple-focused interventions promotes joint problem-solving and shared coping, and Positive coping enhances sexual adjustment and achieves a positive couple relationship.

There is no "one size fits all" solution, as individuals and couples cope with and manage these challenges in different ways. However, a couple-focused intervention reveals a spectrum of ways that couples managed the changes to their relationships and sexual health, such as creating shared understanding of sexual health after cancer and improving communication skills. Therefore, oncology nurses should consider the intimate partners' outcomes and conduct couple-focused interventions that contain more tailored elements to achieve better effects.

Psychosocial Intervention for Children of Breast Cancer Patients

Eunkyung Hwang

Seoul National Univ. Hospital, Department of Cancer Edu-info Center, Korea

In 2021, there were 28,860 cases of breast cancer, with 66.3% of patients being in their 30s to 50s. Accordingly, a significant number of breast cancer patients are expected to have minor children. In recent years, research has focused on the effects of parental breast cancer on minor children and their families. Studies have shown that children are at a higher risk of experiencing emotional and behavioral difficulties following a parent's breast cancer diagnosis.

The moderating factors influencing young children's successful adaptation after a parent's cancer diagnosis include the child's age, cognitive maturity, gender, the patient's gender, the nature of the parent's illness, family socioeconomic status, and social support networks. Notably, adolescent girls tend to experience psychological difficulties more frequently and intensely, and this appears to be even more evident when the diagnosed parent is their mother.

Additionally, factors mediating children's psychosocial outcomes include family coping, parent-child relationships, children's perception of the parental cancer diagnosis, and children's coping strategies. Based on these factors, effective intervention methods have been developed, which can be broadly categorized into family-centered, parent-centered, and child-centered approaches.

Family-centered interventions primarily focus on supporting the family system and teaching effective communication strategies. Parent-centered interventions mainly provide support to the diagnosed parent and help them develop communication skills, which in turn positively impact their children. Child-centered interventions have been shown to help children better understand cancer through education, provide a safe and supportive environment for open conversations and empathy, and enhance their coping skills.

Since the well-being of children of cancer patients also affects the overall well-being of the patient and their family, it is recommended that these intervention methods be more actively utilized in clinical settings to improve the psychosocial health of not only cancer patients but also their children and families.

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ENHERTU®	78.9 % cORR		
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Vs.	T-DM1 7.2 months mPFS (n=263; 95% CI: 6.8-8.3)	Chemotherapy 5.4 months mPFS (n=163; 95% CI: 4.4-7.1)	Chemotherapy 5.1 months mPFS (n=184; 95% CI: 4.2, 6.8)
Vs.	T-DM1 36.9% cORR (n=97, 95% CI: 31.0-43.0)		

* November 20, 2023, Data cutoff ** January 11, 2022, Data cutoff

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BICR, blinded independent central review; **CI,** confidence interval; **cORR,** confirmed objective response rate; **HER2,** human epidermal growth factor receptor-2; **HR,** hormone-receptor; **IHC,** immunohistochemical; **ISH,** in situ hybridization; **mBC,** metastatic breast cancer; **mPFS,** median progression-free survival; **SoC,** standard of care; **T-DM1,** trastuzumab emtansine.

STUDY DESIGN[2]: DESTINY-Breast03 was a Phase 3, multicenter, open-label, randomized, head-to-head study conducted on 524 patients with HER2+ unresectable or mBC in the second-line setting. This compared the efficacy and safety of ENHERTU® 5.4 mg/kg and T-DM1 3.6 mg/kg. The primary efficacy outcome measure was PFS assessed by BICR. This long-term survival analysis report on an exploratory analysis of DESTINY-Breast03 (data cutoff, 20 November 2023), with updated efficacy, including median OS, and safety data with longer follow-up.

STUDY DESIGN[3]: DESTINY-Breast04 was a a randomized, two-group, phase 3, open-label, multicenter trial to evaluate the efficacy and safety of trastuzumab deruxtecan as compared with the physician's choice of chemotherapy (capecitabine, eribulin, gemcitabine, paclitaxel, or nab-paclitaxel) in patients with HER2-low, unresectable or metastatic breast cancer. Low expression of HER2 was defined as a score of 1+ on immunohistochemical [IHC] analysis or as an IHC score of 2+ and negative results on in situ hybridization. Patients (n=557) were randomly assigned in a 2:1 ratio to receive trastuzumab deruxtecan (n=373) or the physician's choice of chemotherapy (n=184). The primary end point was progression-free survival in the hormone receptor–positive cohort. The key secondary end points were progression-free survival among all patients and overall survival in the hormone receptor–positive cohort and among all patients.

References 1. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Breast Cancer V2.2024. **2.** Cortés J, et al. Trastuzumab deruxtecan versus trastuzumab emtansine in HER2-positive metastatic breast cancer: long-term survival analysis of the DESTINY-Breast03 trial. Nat Med. 2024 Jun 2. doi: 10.1038/s41591-024-03021- 7. Online ahead of print. **3.** Modi S, et al. Trastuzumab deruxtecan in previously treated HER2-low advanced breast cancer. N Engl J Med. 2022;387(1):9-20 **4.** 엔허투®주 100 mg (트라스투주맙데룩스테칸) 의약품 상세정보 (Accessed on May, 2024) **5.** 건강보험심사평가원 공고 제 2024-85호.

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KR-16623 I Exp.2026-06(Prep.2024-06)
P24-294-2026.06-V1

Breakthroughs in Treatment of HER2 Expressing Metastatic Breast Cancer

Dae-Won Lee

Seoul National Univ. Hospital, Department of Medical Oncology, Korea

Human epidermal growth factor receptor 2 (HER2) overexpression or amplification is found in 18–20% of invasive breast cancer and is associated with aggressive nature. The development of HER2 targeting agents over the last few decades has dramatically prolonged the survival outcome of patients with HER2-positive breast cancer. Antibody-drug conjugates (ADCs) are a new drug entity which combines monoclonal antibody and cytotoxic payloads with a linker which enables the selective delivery of highly cytotoxic payloads to tumors. HER2 targeting ADCs have emerged as a promising class of cancer therapeutics not only in HER2-positive breast cancer but also in HER2-low breast cancer.

Trastuzumab deruxtecan (T-DXd) is an ADC consist of a HER2 monoclonal antibody covalently linked to a topoisomerase I inhibitor payload (DXd). T-DXd has a high drug-to-antibody ratio (8:1) with a tetrapeptide-based cleavable linker. The drugs membrane-permeable nature enables it to cross cell membranes and potentially exert anti-tumor activity on surrounding tumor cells regardless of HER2 expression.

In this satellite symposium, there will be a review on DESTINY-BREAST 01, 02, and 03 study which evaluated the efficacy of T-DXd in HER2-positive advanced breast cancer. In addition, there will be a detailed review on study results of T-DXd in HER2-positive breast cancer with brain metastases including the DESTINY-BREAST 12 study. Finally, the efficacy of T-DXd in HER2-low population will be covered by a general review on DESTINY-BREAST 04 study and a brief mention on DESTINY-BREAST 06 study.

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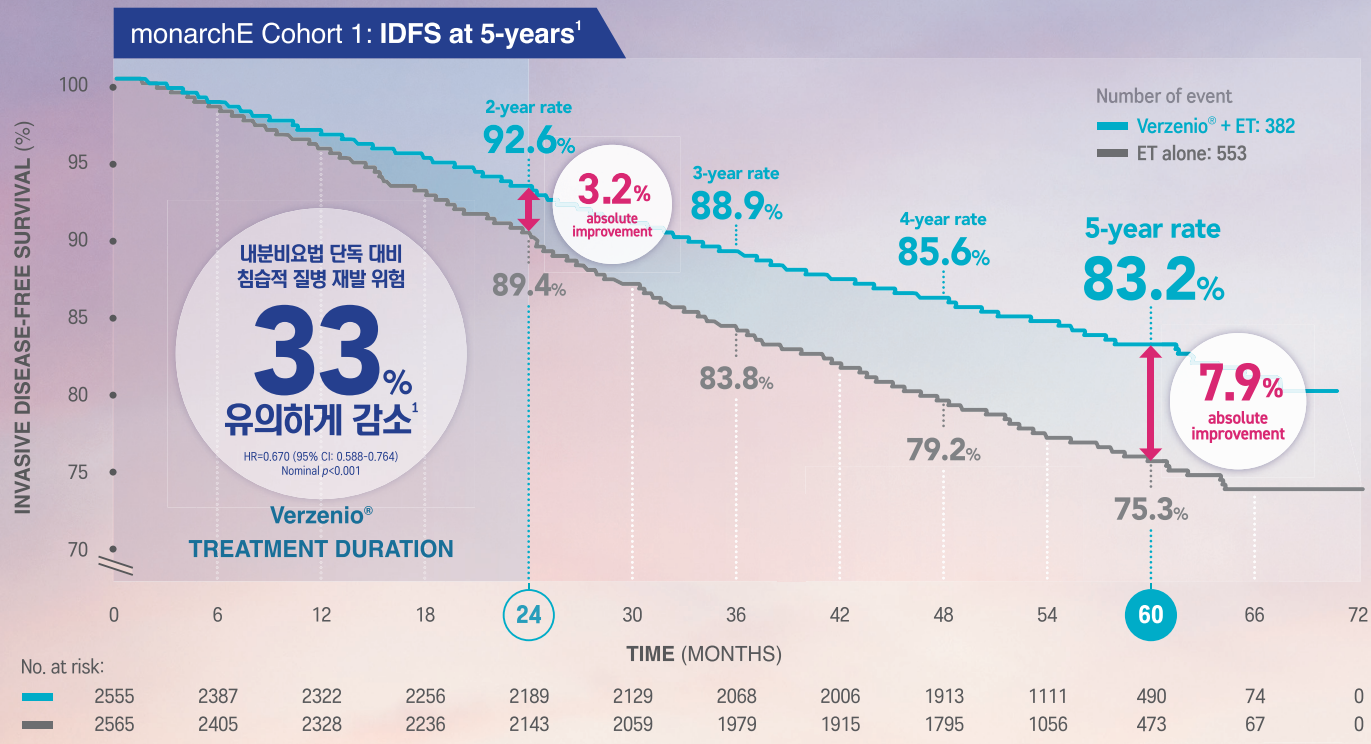

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2. 내분비 요법 후 질병이 진행된 HR+, HER2- 진행성 또는 전이성 유방암 여성의 치료에 풀베스트란트와 병용

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버제니오정150밀리그램 제품상세정보 자세히보기

IDFS: Invasive disease-free survival, **HR+:** hormone receptor positive, **HER2-:** human epidermal growth factor receptor 2 negative, **EBC:** early breast cancer, **ET:** endocrine therapy, **LHRH:** Luteinizing hormone releasing hormone

Reference 1. Rastogi P, *et al. J Clin Oncol.* 2024;42(9):987-993. **2.** 버제니오 식약처 허가사항(식약처 의약품통합정보시스템 https://nedrug.mfds.go.kr/) [Revised on 2024-12-24]

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PP-AL-KR-0750 [26 Feb 2027]

First CDK4/6 Inhibitor for HR+/HER2- EBC: Abemaciclib-Increasing the Chance for Cure

Matteo Lambertini

U.O. Clinica di Oncologia Medica, Univ. of Genova – IRCCS Ospedale Policlinico San Martino, Department of Medical Oncology, Italy

Breast cancer is the most commonly diagnosed malignancy in women, with a significant portion of cases being hormone receptor-positive/human epidermal growth factor receptor 2-negative (HR+/HER2-). Despite current treatments, disease progression remains common particularly in the cases with high-risk of recurrence, necessitating improved therapeutic approaches for HR+/HER2- breast cancer. This presentation examines the efficacy and safety of abemaciclib, the first CDK4/6 inhibitor approved for the adjuvant treatment of patients with early breast cancer (EBC) at high-risk of recurrence, as evidenced by the pivotal Phase III monarchE trial.

The monarchE trial provided evidence of the benefits of abemaciclib in high-risk HR+/HER2- early breast cancer. The five-year data from this trial demonstrated that the addition of abemaciclib to standard endocrine therapy resulted in a 33% reduction in recurrence risk over the five-year period. This notable reduction was observed consistently across various high-risk subgroups, leading to improved invasive disease-free survival and distant relapse-free survival.

These findings illustrate the substantial benefit of abemaciclib in reducing recurrence risk and improving long-term outcomes in the adjuvant setting. The consistent benefits observed in high-risk subgroups highlight its efficacy across different patient populations.

The results from the monarchE studies highlight the role of abemaciclib as an advancement in the treatment of HR+/HER2- breast cancer. By significantly extending survival and reducing recurrence in patients with high-risk EBC, abemaciclib has established itself as a key component in the fight against breast cancer.

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MONALEESA-7: N=672, 1:1 randomization. As 1L in advanced disease. KISQALI 600 mg or placebo once daily (3 weeks on/1 week off) + ET (letrozole 2.5 mg or anastrozole 1 mg or tamoxifen 20 mg orally) + LHRH agonist 3.6 mg. KISQALI is not indicated for concomitant use with tamoxifen.

ABC, advanced breast cancer; **AI,** aromatase inhibitor; **CDK4/6,** cyclin-dependent kinase 4/6; **ET,** endocrine therapy; **GnRHa,** gonadotropin-releasing hormone agonist; **HR,** hazard ratio; **mOS,** median overall survival; **OS,** overall survival.

References 1. Hortobagyi GN, et al. *N Engl J Med*. 2022;386:942-50. **2.** Slamon DJ, et al. *Annals of Oncology.* 2021; 32:1015-1024. **3.** Lu YS, et al. *Clin Cancer Res.* 2022;28:851-9.

Product Information

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2. PD-L1 발현 양성(CPS ≥10)이며, 수술이 불가능한 국소 재발성 또는 전이성 삼중음성 유방암 환자의 치료로서 항암화학요법과의 병용요법

References 1. 키트루다 허가사항. 식품의약품안전처.

[제품명] 키트루다®주 (펨브롤리주맙) 100 ㎎ **[금기] 다음 환자에는 투여하지 말 것** 이 약 및 그 구성 성분에 과민증인 환자 **[신중투여] 다음 환자에는 신중히 투여할 것** 자가면역질환이 있거나 만성적 혹은 재발성 자가면역질환의 기왕력이 있는 환자 **[이상사례] *임상시험에서 보고된 이상사례:** 대조 및 비대조 임상시험에서 총 2799명을 대상으로 이 약의 안전성을 분석하였다. 치료 기간의 중앙값은 4.2개월(범위: 1일 ~ 30.4개월)이었고, 6개월 이상 치료받은 환자는 1153명, 1년 이상 치료받은 환자는 600명이었다. 환자의 5%가 치료 관련 약물이상반응으로 이 약 투여를 중단하였다. 최종 투여 후 90일째까지 보고된 치료 관련 중대한 이상사례(SAE)는 이 약을 투여받은 환자의 10%에서 발생하였다. 발생한 치료 관련 중대한 이상사례 중 가장 흔하게 발생한 이상사례는 다음과 같다; 폐염증, 결장염, 설사, 발열. 치료 관련 중대한 이상사례로 자가면역성 간염과 부신기능저하증도 보고되었다. ***면역-매개 약물이상반응:** 흑색종 및 비소세포폐암 환자 2799명에 대한 면역-매개 약물이상반응은 다음과 같다. 갑상선 저하증. 갑상선기능항진증. 폐염증. 결장염. 부신부전. 간염. 뇌하수체염. 신장염. 제1형 당뇨병. **[일반적 주의]** 1) 면역-매개 약물이상반응: 면역-매개 폐염증, 면역-매개 결장염, 면역-매개 간염 (이 약) 및 간독성 (이 약과 엑시티닙 병용요법), 면역-매개 신장염, 면역-매개 내분비병증, 중증의 피부반응, 기타 면역-매개 약물이상반응, 이식 관련 약물이상반응. 이 약 투여 환자에서 중증인 사례와 치명적인 사례를 포함한 면역-매개 약물이상반응이 발생한 바 있다. 면역-매개 약물이상반응은 치료를 중단한 이후에도 발생할 수 있다. 의심되는 면역-매개 약물이상반응에 대해서는 적절한 평가를 통해 병인을 확인하고 약물이상반응의 중증도를 토대로 이 약 투여를 보류하고 코르티코스테로이드 투여를 고려한다. 1등급 이하로 개선되면 코르티코스테로이드를 최소 1개월 이상의 기간을 두고 점감 절차를 시작해야 한다. 면역 관련 약물이상반응이 코르티코스테로이드 사용으로 조절이 되지 않는 환자의 경우 다른 전신 면역억제제의 투여를 고려할 수 있다. 코르티코스테로이드 점감 절차를 실시한 이후에 약물이상반응이 1 등급 이하에 머무르면 이 약 투여를 재개한다. 중증 약물이상반응 사례가 다시 발생하면, 이 약 투여를 영구 중단한다. 작성일자: 2023년 8월 1일 **※ 키트루다를 처방하시기 전에 제품설명서를 참조하시기 바랍니다.**

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키트루다 제품설명서 전문

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Pembrolizumab: Writing a New Chapter in eTNBC

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Triple-negative breast cancer (TNBC) accounts 15-20% of all breast cancer, and is known to be aggressive in nature and prevalent in younger age population. The traditional treatment for early TNBC was based on surgery and postoperative adjuvant chemotherapy. After validation of the prognostic value of pathologic complete response (pCR) in TNBC, standard treatment is based on neoadjuvant chemotherapy, surgery and postoperative adjuvant chemotherapy.

As pembrolizumab has shown its survival benefit in metastatic setting, the role of pembrolizumab has expanded into neoadjuvant setting. The pivotal KEYNOTE522 trial has changed the treatment paradigm for stage II and III TNBC by introducing pembrolizumab as a standard treatment during neoadjuvant treatment. The KEYNOTE522 trial evaluated the role of pembrolizumab (18 cycles, 200 mg every 3 weeks) combined with four cycles of carboplatin (3 weekly) and paclitaxel (weekly or 3 weekly), followed by anthracycline plus cyclophosphamide (3 weekly), which powered the coprimary endpoint of increased pCR and EFS compared to placebo with chemotherapy. Addition of pembrolizuamb showed significant improvement in pCR and 60-months event free survival (EFS) rate, irrespsective of PD-L1 status, stage and nodal status. Recently published overall survival (OS) outcome also showed significant benefit in pembrolizumab arm, which strengthen the role of pembrolizumab in eTNBC. The immune-related adverse events were more common in neoadjuvant phase compared to adjuvant phase. Hypothyroidism was most common irAE, and manageable in grade 1-2 presentation.

Korean subgroup data also showed improvement of pCR and EFS in pembrolizumab arm (pCR rate 68% vs. 47%; 3-year EFS rate 93% vs. 70%) with similar safety profile.

At present, addition of pembrolizumab to neoadjuvant chemotherapy is suggested as standard treatment in early TNBC in NCCN and ESMO guideline.

Think about time stuck on an IV

Her2+ breast cancer patients may need up to **100 clinic hours each year** for treatment.[1,2]

Reimagine HER2+ breast cancer care.

With PHESGO, **effective treatment in minutes,** not hours is possible [3]

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 혀액지에 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 하복지에 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 병용투여 시, 도세탁셀은 초기용량으로 75mg/m²를 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 싸이클로스파마이드) 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 싸이클로스파마이드) 4주기 투여 후 이 약과 파클리탁셀 또는 도세탁셀 4주기 투여 • 수술 전 AC 요법 (독소루비신과 싸이클로스파마이드) 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, 비노델빈, 방사선 요법과 같이 이러한 질환과 연관이 있는 것으로 알려진 여러의 항종양약물 요법을 이전에 투여 받았거나 동시에 투여하는 경우가 있다. 이는 주입관련 이상사례의 일부분이거나 지연형 이상사례와 함께 나타날 수 있다. 전이성 유방종양과 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

Phesgo-2021-09-30-1.0

• PHESGO® 투약 중 또는 마지막 투약일로부터 7개월 이내에 임신한 경우 (주)한국로슈(02-3451-3600)로 즉시 보고해주시기 바랍니다.
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PHESGO®
PERTUZUMAB-TRASTUZUMAB

M-KR-00002563

Time is Treatment: How PHESGO is Reshaping the HER2+ Breast Cancer Care

Jee Hung Kim

Gangnam Severance Hospital, Department of Medical Oncology, Korea

PHESGO® is a novel subcutaneous (SC) formulation combining pertuzumab and trastuzumab with recombinant human hyaluronidase (rHuPH20). This fixed-dose combination aims to enhance treatment convenience for patients with HER2-positive breast cancer by offering an alternative to intravenous (IV) administration.

PHESGO® delivers pertuzumab and trastuzumab via SC injection, facilitated by rHuPH20, which temporarily degrades hyaluronan to allow the absorption of larger drug volumes. The administration involves a 15 mL loading dose and a 10 mL maintenance dose, injected into the thigh over approximately 58 minutes. The pharmacokinetic profiles of PHESGO® have been evaluated to ensure comparability with the traditional IV formulations.

Several clinical studies have demonstrated that PHESGO® achieves non-inferior serum trough concentrations and pathological complete response (pCR) rates compared to IV administration.

1. FeDeriCa (WO40324) (Phase III study evaluating PK (non-inferiority of Cycle 7 [pre-dose Cycle 8] pertuzumab serum Ctrough within PHESGO® vs. PERJETA + Herceptin IV), efficacy and safety of PHESGO® plus chemotherapy vs. PERJETA IV and Herceptin IV plus chemotherapy)

I. FeDeriCa met its primary objective: cycle 7 (pre-dose cycle 8) pertuzumab serum Ctrough within PHESGO® was non-inferior to PERJETA IV, GMR: 1.22 (90% CI = 1.14, 1.31)

II. PK secondary endpoint was met: cycle 7 (pre-dose cycle 8) trastuzumab serum Ctrough within PHESGO® was non-inferior to Herceptin IV, GMR: 1.33 (90% CI = 1.24, 1.43)

III. The tpCR rate of PHESGO® (59.7%) was nearly identical to that of P + H IV (59.5%) and consistent with previous data from trials with P + H + chemotherapy

IV. The safety profile of PHESGO® was comparable to that of P + H IV and consistent with previous P + H + chemotherapy trials; no new safety signals identified

V. Overall SAE, grade ≥ 3 AE and AESIs were balanced across arms

2. PHranceSCa (MO40628) (Phase II study evaluating patient preference, satisfaction and safety of PHESGO® vs. PERJETA + Herceptin IV)

I. 85% of patients (136/160; 95% CI = 79, 90%, 100% completion rate) preferred PHESGO® administration vs. 14% (22/160) of patients who preferred P + H IV administration

II. Main reasons for PHESGO® preference consistent with PrefHer:

- Less time spent at clinic (n = 119)
- Treatment administration more comfortable (n = 73)

III. Of the patients who preferred PHESGO® to P + H IV, 93% had a very strong or fairly strong preference
IV. TASQ results supported patient preference: more patients were "Very satisfied" or "Satisfied" with PHESGO® administration vs. P + H IV
V. PHESGO® was generally well tolerated, with a safety profile in line with previous studies using P + H IV administration. No new safety signals were observed, including when switching from IV to SC

3. PHaTiMa (ML42502) (Phase IIIb time-and-motion study of PHESGO® for the treatment of patients with HER2-positive eBC)

PHESGO® had significant time savings for patients and HCPs with PHESGO® vs. P + H IV or P IV + H SC. PHESGO® had significantly reduced resource utilization with PHESGO vs. P + H IV or P IV + H SC; safety was consistent with previous reports.

PHESGO® represents a significant advancement in the treatment of HER2-positive breast cancer by combining pertuzumab and trastuzumab into a single SC injection. This formulation offers comparable efficacy and safety to IV administration while enhancing patient convenience and quality of life. The adoption of PHESGO® may streamline treatment protocols and optimize resource utilization in oncology care settings.

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HR+/HER2- = hormone receptor-positive, human epidermal growth factor receptor 2-negative; **mBC** = metastatic breast cancer.

Reference 1. 입랜스®정 75 mg, 100 mg, 125 mg (팔보시클립) 제품설명서(개정년월일: 2023.11.16)

[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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PP-IBR-KOR-1104_16APR2026

Palbociclib in the Evolving Landscape of HR+ mBC Treatment: Real-World Data and Future Directions

Hee Kyung Ahn

Samsung Medical Center, Department of Medical Oncology, Korea

Palbociclib, the first CDK4/6 inhibitor developed for clinical use, has significantly reshaped the treatment paradigm for hormone receptor-positive (HR+)/HER2-negative metastatic breast cancer (mBC). The pivotal PALOMA-2 and PALOMA-3 trials demonstrated that palbociclib, in combination with endocrine therapy(ET), substantially improves progression-free survival (PFS) with a manageable safety profile, establishing it as a foundational treatment option in this setting. Although palbociclib did not demonstrate a statistically significant overall survival (OS) benefit in phase 3 trials for patients with HR+/HER2- mBC, real-world data have shown a meaningful improvement in OS, suggesting a potential survival benefit in broader clinical practice. In a real-world data of 2,888 patients, palbociclib was associated with improved real-world PFS, overall survival (OS), time to chemotherapy (TTC), and second-line PFS (rwPFS2) compared with AI alone, even when dose modifications were required. Importantly, dose reductions did not compromise efficacy.

Emerging data from other studies have expanded the potential indications for palbociclib. Young-PEARL, the first study comparing CDK4/6 inhibitor plus ET and cytotoxic chemotherapy capecitabine focused on premenopausal women with HR+/HER2– mBC, reported that palbociclib plus exemestane and ovarian suppression significantly prolonged PFS compared with capecitabine. Based on these results, the FDA expanded the indication for palbociclib in 2022 to include use in premenopausal women with HR+/HER2– mBC. The INAVO120 trial demonstrated superior PFS when inavolisib was added to palbociclib and fulvestrant in patients with PIK3CA-mutated HR+/HER2– mBC. The AFT-38 PATINA trial showed that adding palbociclib to maintenance endocrine and first line trastuzumab and pertuzumab significantly extended PFS in patients with HR+/HER2+ mBC. Moreover, palbociclib is also being studied in combination with other PI3K/AKT pathway inhibitors, such as gedatolisib and capivasertib, or selective estrogen receptor degraders(SERDs) in order to explore potential synergistic effects in overcoming treatment resistance in HR+/HER2– mBC. Taken together, these findings suggest that palbociclib's role in the treatment landscape continues to broaden.

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원료의약품 및 분량 1시린지(0.6밀리리터)중 (주성분) 페그필그라스팀(별규) … 6mg, (첨가제) 빙초산(글라시알아세틱에시드), 수산화나트륨, 소르비톨(30mg), 폴리소르베이트20(0.02mg), 주사용수 성상 무색의 용액이 충진 된 주사침이 달린 투명한 유리프리필드시린지 주사제 효능효과 악성종양에 대한 세포독성 화학요법을 투여 받는 환자의 발열성 호중구 감소증의 발생과 호중구 감소증의 기간 감소(만성골수성 백혈병과 골수이형성증후군은 제외함) **용법용량** 이 약 6mg을 항암화학요법 이후 약 24시간 후에 피하주사 *소아에 대한 사용 제한 *말기 신장애 환자를 포함한 신장애 환자에게 용량 변경은 추천되지 않음 **사용상 주의사항 1. 경고** 1) 치명적 비장 파열이 발생할 수 있음. 이 약 투여후 좌측 상복부, 어깨 통증이 있는 환자는 비장비대, 비장파열 검사 2) 급성 호흡곤란 증후군(ARDS)가 발생할 수 있음. 열, 폐 침윤, 호흡곤란이 있는 환자는 ARDS 검사. ARDS가 발생한 환자에는 투여 중지 3) 아나필락시스를 포함한 심각한 알러지 반응이 발생할 수 있음. 심각한 알러지 반응이 발생한 환자에는 투여를 영구 중지 4) 겸상적혈구질환 환자가 필그라스팀, 페그필그라스팀을 투여 받는 경우 중증, 때때로 치명적인 겸상적혈구발증이 발생할 수 있음 5) 페그필그라스팀과 필그라스팀이 작용하는 G-CSF수용체가 암세포에서 발견됨. 페그필그라스팀이 골수성 암과 골수이형성증을 포함한 암 종류를 증가시키는 요소로 작용할 수 있음 **2. 다음 환자에는 투여하지 말 것** 대장균으로부터 유래된 단백질, 페그필그라스팀, 필그라스팀 등에 과민증이 알려진 환자 **3. 다음 환자에는 신중히 투여할 것** 1) 악물 과민증의 병력이 있는 환자 2) 알레르기 소인이 있는 환자 **포장기한** 1시린지/박스 **저장방법** 냉장보관(2-8도), 진탕금지, 동결금지, 차광보관, 밀봉용기 **사용기한** 외부포장재에 표시된 사용기한 내에 사용 *제품에 대한 자세한 정보는 제품설명서를 참조해주시기를 바라며, 홈페이지(www.dksh.com/kr-ko/home)에서 확인하실 수 있습니다. [수입판매원] DKSH Korea Ltd.

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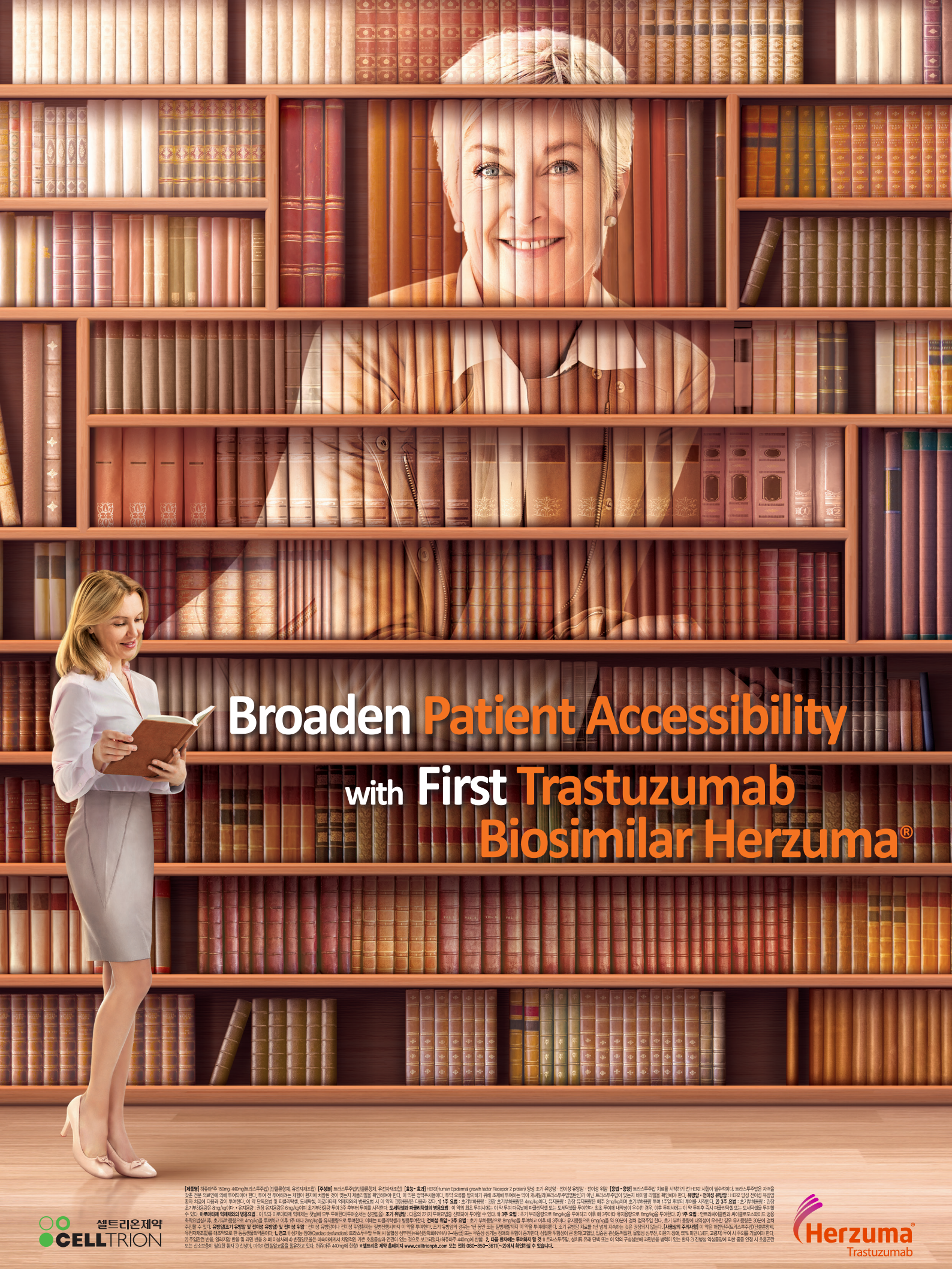

[제품명] 허즈마®주 150mg, 440mg(트라스투주맙) (단클론항체, 유전자재조합) **[주성분]** 트라스투주맙(단클론항체, 유전자재조합) **[효능·효과]** HER2(Human Epidermal growth factor Receptor 2 protein) 양성 조기 유방암 · 전이성 유방암 · 전이성 위암 **[용법·용량]** 트라스투주맙 치료를 시작하기 전 HER2 시험이 필수적이다. 트라스투주맙은 자격을 갖춘 전문 의료인에 의해 투여되어야 한다. 투여 전 투여하는 체형이 환자에 적합한 것이 맞는지 제품라벨을 확인하여야 한다. 이 약은 정맥주사용이다. 투약 오류를 방지하기 위해 조제해 투여하는 약이 케싸릴리트라스투주맙엠탄신가 아닌 트라스투주맙이 맞는지 바이알 라벨을 확인해야 한다. **유방암 · 전이성 유방암** : HER2 양성 전이성 유방암 환자 치료에 다음과 같이 투여한다. 이 약 단독요법 및 파클리탁셀, 도세탁셀, 아로마타제 억제제의 병용요법 시 이 약의 권장용량은 다음과 같다. **1) 1주 요법** : 초기부하용량 : 권장 초기부하용량은 4mg/kg이다. 유지용량 : 권장 유지용량은 매주 2mg/kg이며 초기부하용량 투여 1주일 후부터 투여한다. **2) 3주 요법** : 초기부하용량 : 권장 초기부하용량은 8mg/kg이다. • 유지용량 : 권장 유지용량은 6mg/kg이며 초기부하용량 투여 3주 후부터 투여한다 (시판한다). **도세탁셀과 파클리탁셀의 병용요법** : 이 약의 최초 투여시에는 이 약 투여 0.5일남에 파클리탁셀 또는 도세탁셀을 투여한다. 최초 투여에 내약성이 우수한 경우, 이후 투여시에는 이 약 투여후 즉시 파클리탁셀 또는 도세탁셀을 투여할 수 있다. **아로마타제 억제제와의 병용요법** : 이 약과 아로마타제 억제제는 첫날에 모두 투여한다(투여순서는 상관없음). **조기 유방암** : 다음의 2가지 투여요법중 선택하여 투여할 수 있다. **1) 1주 요법** : 초기 부하용량으로 8mg/kg을 투여하고 이후 매 3주마다 유지용량으로 6mg/kg을 투여한다. **2) 1주 요법** : 안트라싸이클린과 싸이클로포스파미드 병용 화학요법실시후, 초기부하용량으로 4mg/kg을 투여하고 이후 1주 마다 2mg/kg을 유지용량으로 투여한다. 이때는 파클리탁셀과 병용투여한다. **전이성 위암 • 3주 요법** : 초기 부하용량으로 8mg/kg을 투여하고 이후 매 3주마다 유지용량으로 6mg/kg을 약 90분에 걸쳐 점적주입 한다. 초기 부하 용량에 내약성이 우수한 경우 유지용량은 30분에 걸쳐 주입할 수 있다. **유방암(초기 유방암 및 전이성 유방암) 및 전이성 위암** : 전이성 유방암이나 전이성 위암환자는 질병진행시까지 이 약을 투여한다. 초기 유방암 치료를 1년 넘게 지속하는 것은 권장되지 않는다. **[사용상의 주의사항]** 이 약은 허셉틴(트라스투주맙)(단클론항체, 유전자재조합)을 대조약으로 한 동등성평가에서 **1. 경고** 1) 심기능 장애(Cardiac dysfunction): 트라스투주맙 투여 시 left ventricular systolic dysfunction(좌심실 심박출능 감소)을 포함한 심기능 장애가 보고되었다. 심기능 장애의 중증도는 경증부터 사망에 이르기까지 다양하다. 심기능 장애의 위험인자로는 심장질환 병력, 좌심실 박출률(LVEF)의 감소, 안트라싸이클린 계열 약물 투여 병력, 고령 등이 있다. 2) 심기능 장애(Cardiac dysfunction)와 트라스투주맙 투여 시 left ventricular systolic dysfunction(좌심실 심박출능 감소)을 포함한 심기능 장애가 보고되었다. 심기능 장애의 중증도는 경증부터 사망에 이르기까지 다양하다. 심기능 장애의 위험인자로는 심장질환 병력, 좌심실 박출률(LVEF)의 감소, 안트라싸이클린 계열 약물 투여 병력, 고령 등이 있다. 3) 폐독성(Pulmonary toxicity): 폐독성은 간질성 폐질환, 폐렴, 폐색성 폐질환, 폐 침윤, 폐부전, 폐 경색증, 호흡곤란증후군, 폐 경색증

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* 호르몬요법이 적합한 폐경기전 및 주폐경기 여성의 진행성 유방암
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† Study design: phase IIIb, open-label, multicenter trial conducted across 271 international centers. postmenopausal women with HR-positive were randomly assigned 1:1 to receive either adjuvant letrozole (2.5 mg) or anastrozole (1 mg) once per day until disease recurrence/relapse or for a maximum of 5 years.

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전문의약품

PRODUCT INFORMATION

졸라덱스 데포주사 (초산고세렐린) 【 성분 · 함량 】 이 약 1 프리필드실린지 (18.0 mg) 중 유효성분: 고세렐린아세트산염 (별규) 3.78 mg(고세렐린으로서 3.6 mg)첨가제: 락타이드/글리콜라이드공중합체 18.0 mg프리필드시린지**【 성 상 】**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 mg 을 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 데포를28 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 전3 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 생식샘자극호르몬(gonadotrophin)으로 배란을 촉진시킨다. 이 약에 의한 뇌하수체 억제는 일정하여 일부 경우, 성선자극호르몬 요구량이 증가될 수 있다. 적당한 시기의 황체기에 성선자극호르몬을 중지하고 사람융모성생식샘자극호르몬(hCG)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. 보조생식술의 경우: 다낭포성 난소 환자 문헌개정연월일: 2020 년 8 월 5 일 수입자: 한국아스트라제네카, 서울시 강남구 영동대로 517 아셈타워 21 층, 전화: (02) 2188-0800 공동판매자: 알보젠코리아주식회사, 서울시 영등포구 국제금융로 10 21FC 13 층, 전화: (02) 2047-7700 aZOL20200924

전문의약품

PRODUCT INFORMATION

아리미덱스 정(아나스트로졸) Arimidex tablet (Anastrozole) 【성분 • 함량】 1정(약 103mg)중 주성분 : 아나스트로졸 (별규) 1.0mg **【성 상】** 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.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). 문헌개정연월일 : 2021 년 7 월 19 일 수입자 : 한국아스트라제네카 보다 자세한 사항은 제품설명서 전문을 참고하시기 바랍니다 .aAR20210721

KR-13661 Exp. 2025-05 (Prep. 2023-05)

AstraZeneca Alvogen

【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

GC녹십자 JEIL 제일약품

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ref. 1) Lee KH, et al. Support Care Cancer 2016;24:1709-17.

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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.

제품설명서 루프린 제품설명서 전문은 식약처 의약품안전나라의 제품허가 사항 또는 QR 코드를 참고하시기 바랍니다.

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C-APROM/KR/LEU/0822 Date of preparation: Jul/2024

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Jongyeon Yoon, Tae-Kyung Yoo, Sae Byul Lee, Jisun Kim, Il Yong Chung, Beom Seok Ko, Hee Jeong Kim, Byung Ho Son, Jong Won Lee

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Background: Axillary surgery in patients with ipsilateral breast tumor recurrence (IBTR) is feasible, but its need and effect on oncologic outcomes are not well established. In this study, we have evaluated the need for axillary surgery in patients with clinically node-negative IBTR.

Methods: Breast cancer patients who underwent breast-conserving surgery (BCS) at Asan Medical Center between 1990 and 2017 and subsequently developed IBTR were identified. Only patients with a local recurrence of invasive cancer as a first event were included. Patients with clinically node-positive disease at the time of local recurrence were excluded. The chi-square test was used to compare clinicopathologic features, and the Kaplan Meier method and log-rank test were utilized for survival analysis to compare recurrence free-survival after IBTR (2nd RFS) according to whether axillary surgery was performed.

Result: A total of 200 patients with IBTR after BCS were identified for this study. The median disease-free interval between primary diagnosis and local recurrence was 35.5 months. 60 (30.0%) patients underwent axillary surgery to treat IBTR. At time of local recurrence, 92 (46.0%) patients underwent re-BCS. Patients who did not undergo axillary surgery at initial diagnosis, and patients undergoing salvage mastectomy for IBTR treatment were more likely to be treated with axillary surgery at time of IBTR. The median follow-up duration after local recurrence was 56.5 months. The 2nd RFS did not differ in patients who did or did not undergo axillary surgery (5-year 2nd RFS 61.0% in the axillary surgery group, 68.4% in the no axillary surgery group, respectively, log-rank test p-value = 0.308). Systemic treatment of the isolated local recurrence was comparable between the two groups.

Conclusions: In this study, oncologic outcomes did not differ according to axillary surgery in patients with IBTR. The omission of axillary surgery could be considered in these patients.

What Is the Appropriate Radiation Dose to Axillary Nodes with Prior Metastasis in cN+ Breast Cancer Downstaged to ypN0 After Preoperative Systemic Therapy: A Comprehensive Dosimetric Analysis

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Background: This study aims to determine optimal radiation dose to the axillary lymph nodes (ALN) for postoperative radiotherapy (PORT) in patients with cN+ breast cancer (BC) downstaged to ypN0 after preoperative systemic therapy (PST) and curative surgery with sentinel lymph node biopsy (SLNB).

Methods: A retrospective review of dosimetric data for ALN was conducted for 222 patients who received PORT between 2009 and 2018 in three institutions. The study included patients with cN1-2a BC downstaged to ypN0 following standard treatment, including PST, curative breast surgery, and SLNB. For all patients, the following ALN regions were contoured on simulation computed tomography for PORT: the ALN that harbored metastatic nodes before PST (pre-PST ALN_mets) and level I-III ALN (ALN_I-III). The mean radiation doses to these contours for each patient were calculated as percentages of the total dose delivered to the whole breast (WB) or chest wall (CW) (Dmean%). Disease-free survival (DFS) and overall survival (OS) were evaluated.

Result: The median value of the Dmean% in pre-PST ALN_mets, ALN_I, ALN_II, and ALN_III were 90.0% (IQR: 70.9-95.6%), 66.2% (IQR: 50.7-79.7%), 75.7% (IQR: 49.2-89.3%), and 87.4% (IQR: 6.2-98.2%), respectively. After median follow-up time of 80.4 months (IQR, 71.5-95.9 months), the 5-year DFS and OS were 91.4% and 96.8%, respectively. ALN recurrence occurred in 2 (0.9%) patients. The Dmean% of pre-PST ALN_mets in these patients were 57.8% and 98.4%, respectively. There were no significant differences in DFS or OS depending on Dmean% of the pre-PST ALN_mets ($\geq 80\%$ vs. $< 80\%$; 5-year DFS: 91.6% vs. 90.9%, $p = 0.871$; 5-year OS: 97.4% vs. 95.4%, $p = 0.328$).

Conclusions: In patients with cN1-2a/ypN0 BC who underwent PST and SLNB, AR was rare, even when the pre-PST ALN_mets did not receive the full dose delivered to the breast/CW. This suggests that the radiation dose to the ALN may need to be adjusted in this patient group.

Prospective feasibility study on delayed selective sentinel node biopsy for patients undergoing mastectomy for ductal carcinoma in situ

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Background: In patients with ductal carcinoma in situ (DCIS) undergoing total mastectomy, sentinel lymph node biopsy is typically performed during primary surgery to address the potential risk of invasive cancer. This study evaluated the feasibility of Sentinel lymph node (SLN) localization during primary surgery and its detection in secondary surgery if invasive cancer is diagnosed.

Methods: This prospective study enrolled patients diagnosed with DCIS and scheduled for mastectomy. Preoperative SLN mapping was performed using dye ± isotope, followed by intraoperative SLN localization with tagging sutures (Vicryl, later changed to Maxon) and surgical titanium clips (small, later changed to medium size). If invasive cancer was diagnosed postoperatively, secondary surgery was performed, and the primary outcome was the detection rate of localized SLNs during the second surgery.

Result: A total of 66 patients were enrolled in the study. Among them, 4 patients underwent intraoperative SLNB due to suspicious lymph node findings during surgery, but all were ultimately diagnosed with DCIS. Of the 66 patients, 6 (9.1%) were diagnosed with microinvasive cancer, and 9 (13.6%) were diagnosed with invasive cancer. During the primary surgery, SLN localization was performed on 1 node in 53 patients (85.5%) and on 2 nodes in 9 patients (14.5%). For the 9 patients diagnosed with invasive cancer, secondary surgery was performed with a median interval of 22 days from the primary surgery. In the initial two secondary surgeries, localized SLNs could not be identified. Subsequently, the protocol was adjusted to use a slow-absorbing suture, and medium-sized surgical titanium clips. After this modification, the detection rate for localized SLNs in the remaining 7 secondary surgeries was 100%.

Conclusions: This study demonstrates that SLN localization using simple and accessible techniques is a feasible approach in patients with DCIS undergoing total mastectomy. Further multicenter studies with larger sample sizes are warranted to confirm the reproducibility and generalizability of this approach.

Is it necessary to remove suspicious calcification in hormone receptor negative and HER2 positive breast cancer who received neoadjuvant chemotherapy, especially in pathologic complete response

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Background: Neoadjuvant chemotherapy (NAC) with target agent is widely used in HER2+ breast cancer, and lumpectomy and pathologic complete response (pCR) are often expected after NAC. However, there is still controversy for residual calcification in patients who underwent lumpectomy after NAC once pCR is confirmed. Therefore, we would like to investigate the clinical outcome of HER2 type breast cancer patients with confirmed pCR according to residual calcification.

Methods: This study is retrospective single center study. Patients who underwent surgery for invasive carcinoma between January 2015 and December 2020 were included. Among of them, patients who met the following criteria were analyzed; received NAC with target agents; with HER2 positive and ER status of 0 to 2 based on the total score of the modified allered score; underwent lumpectomy; with pCR confirmed by final pathology report; with suspicous calcification in preoperative mammography.

Result: Analysis was performed on 138 patients. The entire patients were divided according to the presence or absence of residual calcification, confirmed by postoperative mammography. None of the variables were significantly different between the two groups, except for age ($p = 0.038$). No survival outcomes showed statistically significancy; including local recurrence free survival, disease free survival, distant metastasis free survival and overall survival. For subgroup analysis according to yp T stage categorization, there was no statistically significant difference in survival outcomes in both subgroups, like total patients' survival outcomes.

Conclusions: The complete removal of suspicious calcification in breast cancer has always been considered important. In this study, we found that the prescence of residual calcification did not affect survival outcome. Of course, close observation of residual calcification will be necessary, but may provide a basis for minimizing the unnecessary aspects of invasive approaches. In further studies, it may be possible to extend this study by expanding according to specific subtyping of breast cancer.

Dosimetric parameters of the axillary-lateral thoracic junction as a risk factor for breast cancer-related lymphedema

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Background: Extensive regional nodal irradiation (RNI) is known to be associated with an increased risk of breast cancer-related lymphedema (BCRL). However, the definition of extensive RNI varies, leading to the inconsistencies in risk assessment. Recently, the axillary-lateral thoracic junction (ALTJ) has been proposed as a potential organ at risk (OAR), but its role remains controversial with conflicting evidence. This study aims to investigate the association between ALTJ dose-distribution parameters and BCRL development.

Methods: We identified patients with breast cancer who underwent mastectomy and postoperative radiotherapy between 2018 and 2020. BCRL was clinically defined with International Society of Lymphology (ISL) stage 2 or higher. We contoured the ALTJ retrospectively and used dosimetric and clinical parameters to develop Cox proportional hazard regression models. Subsequently, we conducted comparative analysis using random forest algorithms and Harrell's C-index.

Result: The study included 239 patients with a median follow-up of 34 months. Of these, 64.9% underwent axillary lymph node dissection (ALND) and 73.2% received extensive radiotherapy (RNI). While several ALTJ dosimetric parameters were associated with an increased risk of BCRL in univariate analysis, V25Gy of ALTJ remained consistent in multivariate analysis ($p = 0.036$). Furthermore, random forest analysis demonstrated an improved C-index for the model when ALTJ V25Gy was included instead of RNI (0.653 to 0.699), and this improvement persisted even when including the ISL stage 1 BCRL (0.595 to 0.677).

Conclusions: This study highlights the significance of considering the ALTJ as an OAR in patients who underwent postoperative radiotherapy for breast cancer. Incorporating dosimetric parameters of ALTJ into predictive models enhances prognostic accuracy and provides greater objectivity, particularly given the variability in extensive RNI field definitions among radiation oncologists.

Utility of pre-operative mapping of the blood supply to the nipple areolar complex for individualised pedicle planning during reduction mammoplasty for breast cancer: MAP-NAC, a cohort study

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Background: Preserving the nipple areolar complex (NAC), if oncologically safe, is an important aspect of a therapeutic reduction mammoplasty (TM). Determining anatomy to tailor NAC pedicles using handheld acoustic doppler (AD) may guide surgical decision-making and facilitate complex oncoplastic procedures including secondary pedicles.

Methods: A prospective single-centre consecutive patient cohort study to evaluate utility of pre-operative AD guided NAC mapping for women with breast cancer undergoing TM and/or symmetrising reduction mammoplasty (SM). Inclusion criteria were women >18 years and planned construction of at least 1 (i.e. unilateral/bilateral) NAC pedicle based on superficial branches of either 2nd (superior), 3rd (medial) anterior intercostal, lateral thoracic (lateral) arteries or a combination thereof. Exclusion criteria included planned inferior NAC pedicle TM/SM or bilateral NAC sacrifice. Arterial supply to NAC was skin-marked using an 8MHz AD after standard pre-operative mark-up and the pedicle was planned accordingly. The primary end point was to evaluate full or partial thickness NAC necrosis rates. The secondary end points were to measure rate of major pedicle change compared to planned pedicle and surgeon-rated benefit due to AD mapping.

Result: Between May 2022 and November 2023, 66 TMs and 56 SMs were undertaken in 78 women. Of total 122 breasts, pre-operative plan included 118 with NAC preservation. No patients had full thickness NAC necrosis; 1 breast had partial thickness NAC necrosis at the areolar edge that resolved with conservative treatment. The planned NAC pedicle altered for TM in 57% (95% CI: 45-69) and for SM in 26.7% (95% CI: 15-38) due to AD mapping which was statistically significant ($p < 0.001$). Consultants rated 'moderate' or 'major' benefit of AD in 85% and trainees in 98% of cases.

Conclusions: Using AD is a reproducible, non-invasive technique to tailor NAC pedicles facilitating safe and effective NAC pedicle design.

Percutaneous Cryoablation with Palliative Intent for Breast Cancer Patients: Feasibility, Safety, and Tumor Ablation Rate

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Background: Percutaneous cryoablation is a minimally invasive, locally ablative procedure which can be performed under local anesthesia. This study aims to evaluate its feasibility, safety, and tumor ablative rate for breast cancer patients who are not suitable for standard surgical treatment.

Methods: Patients with histologically confirmed breast cancer, tumor size ≤ 3 cm on ultrasound, unifocal lesion without skin or nipple-areolar complex involvement, either with poor premorbid status and high risk for general anesthesia, or stable metastatic disease, were prospectively recruited. Ultrasound-guided percutaneous cryoablation was performed. All patients would receive mammogram and ultrasound 1 year after the procedure.

Result: Nineteen patients (median age: 88 years, range: 82-93) were recruited between January 2023 and December 2024, all with poor premorbid status. Eighteen patients had invasive ductal carcinoma. Thirteen patients had clinically T1N0 disease, and 6 had T2N0 disease. The median tumor diameter on ultrasound was 18 mm (range: 9-35 mm). Seventeen patients were estrogen receptor positive and received primary hormonal treatment. All patients with the procedure performed under local anesthesia, except one requiring conversion to general anesthesia due to significant reflux. The median procedure time was 90 minutes (range: 34-117 minutes). The median pain score after the procedure was 1 on a scale of 1-10. The median hospital stay was 1 day. Two patients experienced frost injury of the skin, which resolved within a week with conservative management. Twelve patients have completed 1 year follow-up after procedure with mammogram and ultrasound performed. Three patients had increased vascularity peripheral to cryoablation site, with core biopsy performed, in which one patient showed invasive carcinoma and decided for conservative management.

Conclusions: Percutaneous cryoablation can be safely performed under local anesthesia with low morbidity and high tolerability in breast cancer patients even with poor premorbid status, potentially achieving complete tumor ablation. Longer-term oncological outcomes are pending.

Initial Experience on Broadening the Use of Cryoablation on early Breast Cancers

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Background: The ICE-3 trial final report in 2024 indicated that cryoablation is a feasible treatment for luminal breast cancers (BC) ≤ 1.5 cm. This study aimed to broaden the eligibility criteria for cryoablation to include T1 BC of all IHC subtypes.

Methods: This single-center, single-armed prospective trial assessed cryoablation for early-stage BC. Inclusion criteria included biopsy-confirmed invasive or in-situ BC ≤ 2 cm. Those with lobular carcinomas and tumors < 5 mm from the skin were excluded. Patients underwent contrast MRI and PET-CT scans to confirm eligibility. Cryoablation was performed by the same surgeons using intra-operative ultrasound guidance, with axillary surgery in the same setting if indicated. A 14 mm circumferential ablative margin was adopted. Procedure duration and iceball size were recorded, and patients were regularly followed for pain and complications. Contrast breast MRI, regional PET-CT scans, and core biopsies were conducted six weeks post-cryoablation to assess tumor viability.

Result: Among 53 patients, 33 received cryoablation. Out of the 20 excluded patients, 35% of the patients were excluded due to size discrepancy and 25% were excluded due to multifocal lesions detected from MRI screening. The median age was 64, and median tumor size was 11.95 mm. There were 4 (12.1%) DCIS and 29 (87.8%) invasive cancers, including 1 (3.4%) TNBC. The median procedure time was 52 minutes, with all patients undergoing two freeze-thaw cycles. The median final iceball size was 50.6 mm. The median pain score one week post-ablation was 1 out of 10, with no significant complications reported. 82.6% of patients had follow-up imaging 6-week post-cryosurgery and biopsy. Additionally, 71.4% of the patients had completed 1-year post-cryosurgery MRI/PET-CT. All displayed no radiological evidence of residual malignancy.

Conclusions: Cryoablation effectively ablated T1 BC, including TNBC. Further studies are needed to confirm its broader applicability. MRI scan is an essential tool to provide better patient selection.

Comparative Incidence Rates and Survival Rates in BRCA-positive patients: A Meta-Analysis of Active Surveillance versus Risk Reduction Mastectomy

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Background: A lifetime elevated risk of breast cancer is associated with women with BRCA1/BRCA2 mutation. Patients may opt to undergo prophylactic surgery, known as risk reduction mastectomy (RRM), or to engage in active surveillance (AS), which involves regular monitoring for the potential occurrence of breast cancer, among other preventive strategies. The efficacy of RRM has been the subject of numerous studies; however, no clear survival benefit exists between RRM and AS. The objective of this investigation is to compare the incidence rate and overall survival of BRCA-positive Breast Cancer patients who underwent RRM and AS.

Methods: This meta-analysis was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. A search was performed in PubMed/MEDLINE, EMBASE, CINAHL, and Cochrane databases from inception to November 2024 databases using search terms: "BRCA" AND "breast cancer" AND mastectomy AND "risk reduction". The study included prospective studies on adult women aged ≥ 18 years with no previous history of cancer who tested positive for BRCA DNA. The pooled Risk Ratio and Hazards Ratio with corresponding 95% CI were computed using inverse variance method for each outcome.

Result: A total of 5 studies were included wherein 1549 patients underwent risk reduction surgery while 3192 opted for active surveillance. The pooled risk ratio showed that the likelihood of breast cancer (RR = 0.05, 95%CI = 0.03 to 0.08, $p < 0.00001$) and mortality (HR = 0.36, 95%, CI = 0.21 to 0.60, $p < 0.0001$) are significantly reduced in the risk reduction surgery population compared to active surveillance.

Conclusions: In women with a BRCA1/BRCA2 gene mutation, risk reduction mastectomy reduces the incidence of breast cancer by almost twenty times and mortality by almost three times compared to active surveillance. It is important for healthcare providers to educate patients with these gene mutations and the option of risk-reduction mastectomy when making an informed decision about their breast cancer risk management.

Comparing AI-Enhanced Digital Mammography and Digital Breast Tomosynthesis for Interval Breast Cancer Detection: Interim Results from a Multi-Reader, Multi-Case Crossover Trial

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Background: Interval breast cancers (IBC), detected between routine screening rounds, are a key measure of breast cancer screening efficacy. This study compares artificial intelligence (AI)-enhanced digital mammography (DM+AI) versus Digital-Breast-Tomosynthesis (DBT) in detecting IBCs.

Methods: The EMory BrEast Imaging Dataset (EMBED) database used, contains racially diverse paired DM and DBT images. Women aged >40 years with biopsy-confirmed malignancies or normal screening verified through a 24-month follow-up were included. Cases with implants, pre-biopsy markers, or poor-quality images were excluded. Six breast radiologists participated in a crossover reading design with a one-month washout period. There were 53 eligible paired IBC images distributed into two groups: Group A (n = 27) and Group B (n = 26), with no significant differences in baseline characteristics, including age, breast density, lesion laterality, and pathology severity.

Result: Majority of IBCs occurred in heterogeneously dense breasts (59.3% in Group A vs. 65.4% in Group B). Most IBCs were invasive (85.2% in Group A vs. 80.8% in Group B; $p = 0.950$). In terms of imaging findings, masses were present in 33.3% of Group A and 23.1% of Group B ($p = 0.601$), while calcifications were present in 14.8% and 7.7%, respectively ($p = 0.701$). Structural distortions were rare (11.1% in Group A vs. 15.4% in Group B; $p = 0.957$), as was asymmetry (14.8% vs. 26.9%; $p = 0.455$). No statistically significant difference was found in overall IBC detection between DM+AI and DBT (OR = 0.81, $p = 0.527$). However, DBT was significantly better at detecting cancers that presented as a mass (OR = 0.13, $p = 0.0232$). No IBCs were detected in the extremely dense breast subgroup under either modality.

Conclusions: Given that DM+AI may reduce radiation exposure and potentially be more cost-effective, it presents a promising alternative for widespread screening programs. However, for women with extremely dense breasts, supplemental imaging remains essential.

Retrospective evaluation of interval breast cancer screening mammograms by radiologists and AI: Are these partially preventable?

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Background: Interval breast cancer (IBC), which is detected between two screenings within a mammography screening program (MSP), is often diagnosed in a later tumor stage and is linked to a more aggressive tumor biology and an increased mortality. Therefore, we analyzed whether an AI system can identify breast cancer signs in IBC screening mammograms.

Methods: IBC screening mammograms from a Swiss screening population were retrospectively analyzed by experienced radiologists and an AI system. Hereby, the retrospective evaluations of the radiologists were utilized to classify whether the IBC screening mammogram showed human visible signs of breast cancer (potentially missed IBCs) or not (IBCs without retrospective abnormalities). The AI system delivered a numeric case score and a prognostic risk score/ category per mammogram.

Result: 119 IBC cases were available with complete retrospective evaluations by radiologists and the AI system (ProfoundAI, iCAD). Thereof, 82 (68.9%) were classified as IBCs without retrospective abnormalities and 37 (31.1%) as potentially missed IBCs. 46.2% of all IBCs received a case score ≥ 25, 25.2% ≥ 50, and 13.4% ≥ 75. From the 25.2% of the IBCs ≥ 50 (vs. 13.4% of a no-breast cancer population), 45.2% have not been discussed during a consensus conference, representing 11.4% of all IBC cases. The potentially missed IBCs received significantly higher case scores and risk classifications than IBCs without retrospective abnormalities (case score mean: 54.1 vs. 23.1; high risk: 48.7% vs. 14.7%; $p < 0.05$). 13.4% of the IBCs without retrospective abnormalities received a case score ≥ 50, of which 62.5% have not been discussed during a consensus conference.

Conclusions: The findings demonstrate that an AI system can identify breast cancer signs in IBC screening mammograms, particularly in potentially missed IBCs but also in some IBCs without retrospective abnormalities where radiologists did not see anything; indicating its capability to improve MSP quality.

Enhancing Breast Cancer Risk Stratification in Women with Dense Breasts: Integrating Sonographic Glandular Tissue Assessment with the Mammography-based Risk Model

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Background: Ultrasound can distinguish glandular and fibrous tissue in dense breasts, with a higher glandular tissue component (GTC) reflecting less lobular involution being associated with a higher risk for breast cancer. This study evaluated whether GTC improves risk classification beyond the mammography-based AI model, Mirai.

Methods: This retrospective study involved women with dense breasts who underwent screening mammography and ultrasound between January 2012 and December 2015. Patients diagnosed with breast cancer within six months of initial mammography were excluded. GTC in the fibroglandular tissue was qualitatively classified as low (minimal/mild) or high (moderate/marked). 5-year risk by Mirai was categorized according to the NCCN thresholds: $< 1.7\%$ as average risk and $\geq 1.7\%$ as increased risk. Statistical analysis included Kaplan-Meier curves with log-rank tests and Cox regression. The predictive performance for breast cancer risk was assessed using the C-index and 5-year area under the receiver operating characteristic curve (AUC) across subgroups defined by Mirai score.

Result: Among 8435 women (mean age, 49 years), 137 developed breast cancer. In the average-risk group (n = 5700; 64 cancers), high GTC was associated with a higher probability of breast cancer ($p < .001$) and an independent hazard ratio of 2.66 (95% CI: 1.59, 4.39, $p < .005$). The C-index for GTC was 0.613 (95% CI: 0.547, 0.678), higher than 0.535 (95% CI: 0.459, 0.612) for Mirai. Similarly, AUC showed better prediction by GTC (0.603, 95% CI: 0.529, 0.677) compared to Mirai (0.521, 95% CI: 0.437, 0.605). In the increased-risk group (n = 2735; 73 cancers), no significant differences in cancer incidence were found between the low and high GTCs.

Conclusions: GTC on ultrasound is an independent predictor of breast cancer risk, particularly among women with dense breasts considered as average risk by the mammography-based AI model. Integrating GTC with mammography-based AI models can enhance risk stratification and provide personalized screening strategies for breast cancer.

Impact of Preoperative Breast MRI on Survival Outcomes for Breast Cancer Patients

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Background: Previous studies have shown no survival benefit from preoperative breast magnetic resonance imaging (MRI). However, evidence remains limited, and major guidelines recommend against the routine use of preoperative MRI. This study aimed to investigate the impact of preoperative breast MRI on survival outcomes in breast cancer patients.

Methods: We retrospectively reviewed the records of 12,390 breast cancer patients who underwent surgery at a single institution between 2004 and 2018. To minimize bias, ipsilateral breast tumor recurrence (IBTR) was analyzed for only patients who underwent breast-conserving surgery (BCS). Additionally, CBC (contralateral breast cancer) was analyzed for patients treated after 2010, when bilateral MRI was first introduced.

Result: Among all, 10,767 (86.9%) patients underwent preoperative breast MRI. After analyzing 7,896 patients who underwent BCS, preoperative breast MRI was significantly associated with lower IBTR rate on both log-rank test ($p < 0.001$; hazard ratio [HR], 3.09; 95% confidence interval [CI.] 2.26-4.23) and Cox-regression analysis ($p = 0.015$; HR 1.80; 95%CI.,1.12-2.90). CBC rate was also significantly higher for the non-MRI group ($p = 0.006$; HR 1.70; 95%CI.,1.00-2.89). However, both distant-metastasis free survival ($p < 0.001$; HR, 1.33; 95%CI.,0.99-1.81) and breast cancer specific survival ($p < 0.001$; HR, 2.50; 95%CI.,2.06-3.03) were significantly shorter for the non-MRI group, but it remained unsignificant after adjusting for other variables. Next, we investigated 8,213 patients who initially planned BCS. Those with positive resection margins at the initial specimen were more included in the MRI group (MRI vs. non-MRI, 14.9% vs 9.3%, $p < 0.001$). However, the rate of intraoperative conversion to mastectomy was significantly higher for the non-MRI group (1.8% vs. 2.9%, $p = 0.036$). There was no difference in the rate of performing mastectomy as a secondary re-operation between the two groups (1.9% vs. 2.5%, $p = 0.293$).

Conclusions: Performance of preoperative breast MRI was significantly associated with lower IBTR and CBC rates, as well as a reduced rate of intraoperative conversion to mastectomy. Further multi-institutional studies are warranted.

Clinical significance of Incidental focal hypermetabolic PET-CT breast lesions

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Background: Positron emission tomography combined with computed tomography (PET-CT) is an imaging modality that has been widely used in the evaluation of initial treatment response, staging and recurrence of many primary extramammary malignancies. The rate of incidental breast malignancies detected on PET-CT has shown various results in previous studies. The aim of this study is to determine the clinical significance of incidental hypermetabolic breast lesions detected in positron emission tomography and computed tomography (PET-CT) performed in patients without a known primary breast malignancy.

Methods: This is a retrospective analysis from a single tertiary cancer referral centre. We analysed the number of incidental focal hypermetabolic PET-avid breast lesion and compared the patient's age, maximum standardized uptake value (SUVmax) of the incidentalomas, number of lesions identified from breast imaging, size and BiRADS score of lesions, hormone receptor status from final histology, and management pathway of the diagnosed primary breast cancer.

Result: We retrospectively identified 92,193 patients who had PET-CT from year 2007-2024 in our institution. 68 patients were found to have incidental hypermetabolic PET-CT breast lesions, within this cohort, 41.2%(n = 28) were found to have primary breast cancer, 8.8%(n = 6) were found to have extramammary malignancy and 50%(n = 34) were found to be benign or with no clinical significance. Amongst patients with primary breast cancer detected incidentally on PET-CT, the median SUVmax is 3.35 (IQR, 2.15-4.62) and majority (78%, n = 22) scored BiRADS of 4-5. Within this group, 71.4%(n = 20) underwent breast surgery, 7.1%(n = 2) required chemotherapy due to metastatic disease, whereas 21.4%(n = 6) was managed with primary endocrine therapy.

Conclusions: Focal hypermetabolic breast incidentalomas, although a rare occurrence, represent a high yield for detection of primary breast malignancy. Therefore, urgent breast imaging and biopsy is warranted to further characterize these lesions to ensure early breast cancer detection and timely management.

Prognostic Value of Pretreatment 18F -FDG PET/CT Parameters in Patients with Hormone Receptor-Positive, HER2-Negative Metastatic Breast Cancer Treated with CDK4/6 Inhibitor Plus Endocrine Therapy

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Background: Cyclin-dependent kinase 4/6 inhibitors (CDK4/6i) with endocrine therapy (ET) have improved survival in hormone receptor-positive, human epidermal growth factor receptor 2 negative (HR+/HER2-) metastatic breast cancer (MBC). The prognostic value of 18F-FDG PET/CT parameters in this setting remains unclear. This study evaluated the significance of pretreatment PET parameters in this population.

Methods: We retrospectively analyzed patients with HR+/HER2- MBC who underwent 18F-FDG PET/CT before initiating CDK4/6i plus ET between 2018 and 2023. Maximum standardized uptake values (SUVmax), whole-body metabolic tumor volume (MTV), and total lesion glycolysis (TLG) were measured. Survival analysis on progression-free (PFS) and overall survivals (OS) was performed using Cox regression analysis and Kaplan-Meier methods using median values as cutoffs.

Result: Among 374 patients, 82 (21.9%) had de novo metastatic disease and 357 (95.5%) received CDK4/6i as first-line therapy. During median follow-up of 44 months, Kaplan-Meier analysis showed patients with high SUVmax (≥ 7.6), MTV (≥ 21.2 cm^3), and TLG (≥ 78.9) had significantly shorter PFS and OS (all $p < 0.05$). In multivariable Cox analysis, all parameters independently predicted PFS (adjusted HR for SUVmax: 1.46, 95% confidence interval [CI] 1.09-1.97; MTV: 1.56, 95% CI 1.14-2.13; TLG: 1.57, 95% CI 1.16-2.13) The overall associations between PET parameters and PFS appeared to be consistent across subgroups according to menopausal status, progesterone receptor status, histologic grade, Ki-67, endocrine sensitivity and type of CDK4/6i.

Conclusions: Pretreatment 18F -FDG PET/CT parameters predict survival outcomes in patients with HR+/HER2- MBC receiving CDK4/6i with endocrine therapy, suggesting their utility for risk stratification.

BreastTumor.ai: Artificial Intelligence-powered Diagnosis of Breast Tumour Pathologies Using Histological Images

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Background: Breast cancer ranks as the most common cancer affecting women globally, with approximately 2.3 million new diagnoses reported in 2021. In South Korea, its incidence has substantially increased over the past two decades. Early and accurate diagnosis is crucial to improving treatment outcomes. This study investigates the potential of Artificial Intelligence (AI) to support pathologists and advance digital pathology for breast cancer diagnosis. It focuses on classifying malignant tumors, including mucinous carcinoma, lobular carcinoma, papillary carcinoma, and ductal carcinoma, alongside benign tumors such as tubular adenoma, phyllodes tumor, fibroadenoma, and adenosis, using 400x histological images.

Methods: The Breast Cancer Histopathological Image dataset from Kaggle was used in this study. Data augmentation techniques, including Gaussian blur, rotation, adjustment of brightness and horizontal flip were applied to enhance the dataset. A total of 31,250 images (3,940 per class) were analyzed. The dataset was split into training and testing sets using an 80:20 ratio. Four Deep Learning (DL) models namely, EfficientNet, ResNet50, DenseNet-121, and VGG-16 were implemented. The models' performance was evaluated using metrics such as accuracy, recall, specificity, F1 score and precision.

Result: EfficientNet achieved an overall accuracy of 98.65%, precision of 98.68%, recall of 98.68%, F1 score of 0.9866, and specificity of 99.81%. EfficientNet leads across all performance metrics, followed by VGG-16, ResNet50, and then DenseNet-121.

Conclusions: The study highlights the utility of AI, particularly EfficientNet, in enhancing diagnostic accuracy and advancing digital pathology for breast tumors. This approach has the potential to improve diagnostic workflows, aid pathologists, and ultimately enhance patient outcomes. Future efforts will aim to validate the model's performance in real-time clinical settings and streamline its integration into patient care.

Three-dimensional HER2 analysis may identify more patients eligible for trastuzumab deruxtecan compared to conventional immunohistochemistry

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Background: Trastuzumab deruxtecan (T-DXd) has demonstrated efficacy in HER2-low and HER2-ultralow breast cancers in prospective randomized controlled trials. Considering HER2 spatial heterogeneity, we hypothesized that three-dimensional (3D) analysis of HER2 may identify more patients eligible for T-DXd compared to conventional immunohistochemistry (IHC).

Methods: We prospectively collected tumor specimens from 30 patients with HER2 IHC 0 breast cancer in our hospital. We repeated HER2 IHC staining and performed a novel 3D HER2 analysis comprised of HER2 immunofluorescence, optical clearing, and confocal imaging acquisition on 200-μm thick slides. 3D HER2-low was defined as weak, incomplete membrane staining in >10% of tumor cells on any layer of immunofluorescence imaging, which is equivalent to a conventional IHC slide. 3D HER2-ultralow was defined as weak, incomplete membrane staining in ≤10% of tumor cells on any layer of immunofluorescence imaging. 3D HER2-null was defined as no membrane staining on any layer of immunofluorescence imaging. We compared HER2 expression between conventional IHC and the novel 3D analysis.

Result: We excluded one tumor sample in which only ductal carcinoma in situ could be found. Of the remaining 29 tumor samples, 3 were HER2-low, 8 were HER2-ultralow, and 18 were HER2-null on IHC. Utilizing 3D HER2 analysis, 13 were 3D HER2-low, 9 were 3D HER2-ultralow, and 7 were 3D HER2-null. Of the 8 HER2-ultralow tumors, 5 were 3D HER2-low, 2 were 3D HER2-ultralow, and 1 was 3D HER2-null. Of the 18 HER2-null tumors, 6 were 3D HER2-low, 6 were 3D HER2-ultralow, and 6 were 3D HER2-null. 3D HER2 analysis led to a 65.5% overall change in HER2 scoring. In HER2-null tumors assessed by conventional IHC, 66.7% became potentially eligible for T-DXd treatment, i.e., at least HER2-ultralow, by the 3D HER2 analysis.

Conclusions: 3D analysis of HER2 expression may identify more patients eligible for T-DXd treatment compared to conventional IHC.

Extracellular Vesicle Biomarkers as Tools for Real-Time Monitoring of Drug Resistance in Breast Cancer

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Background: Drug resistance in breast cancer poses a major challenge, emphasizing the need for prognostic biomarkers to predict therapeutic response and guide precision medicine. Extracellular vesicles (EVs), as key mediators of intercellular communication, play a crucial role in drug resistance mechanisms. This study explores the potential of EV-derived miRNA and protein markers for predicting tumor response during neoadjuvant chemotherapy (NAC).

Methods: EV protein and miRNA profiles, along with their mRNA targets, were analyzed in drug-resistant clones from three breast cancer cell lines. Tumor-derived EVs were isolated and characterized for miRNA and protein markers. Differentially expressed EV miRNAs (DE-miRNAs) were validated using plasma samples from 72 breast cancer patients (35 non-responders, 37 responders).

Result: Five EV miRNAs (miR-125b, miR-146a, miR-484, miR-1246, miR-1260b) and three membrane proteins (MDR1, MRP1, BCRP) were identified as key biomarkers of drug resistance. The EV miRNA panel achieved an AUC of 0.95 (75% sensitivity, 95% specificity), while EV protein markers showed 81.82% sensitivity and 92.86% specificity. Non-responder EV profiles revealed distinct pathways, including cell mitosis, metabolism, drug transport, and immune response.

Conclusions: EV-derived miRNA and protein markers show strong potential for predicting therapeutic response and monitoring drug resistance in TNBC patients undergoing NAC. These findings contribute to developing predictive tools and advancing precision oncology in breast cancer management.

Leveraging CRISPR/Cas9-Based ctDNA Assay for Early-Stage Breast Cancer Detection: A Pilot Study

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Background: Early detection of circulating tumor DNA (ctDNA) in patients with breast cancer offers a promising avenue for timely diagnosis and treatment monitoring. However, ctDNA levels in early-stage cancer can be extremely low, posing significant challenges for existing technologies. To address these limitations, we aimed to evaluate whether precise CRISPR/Cas9-based ctDNA enrichment method could enable early detection of ctDNA in breast cancer patients.

Methods: A 16-cluster breast cancer diagnostic panel was developed using an integrated database of breast cancerassociated genetic variants, drawing on clinical mutation data (e.g., COSMIC, TCGA). Tissue and blood samples were collected from patients at multiple time points (preoperative and 14 days post-surgery). Tissue specimens were collected at the time of surgery, and blood samples were collected on two time points (preoperative and 14 days post-surgery). Whole-exome sequencing was performed on tumor tissues, and the 16-cluster panel was applied to both tissue and plasma-derived cell-free DNA samples. CRISPR/Cas9-mediated depletion of wild-type DNA was employed to enhance the detection of low-frequency variants.

Result: In a pilot analysis of an early-stage breast cancer patient (T1N0M0, Stage I), a TP53_p.R175C mutation was identified in both the tumor tissue and preoperative blood sample using MUTE-seq, indicating that CRISPR/Cas9-mediated ultra-sensitive enrichment supports reliable detection of low-frequency ctDNA variants. Conversely, in a locally advanced breast cancer patient (cT3N1M0) who received neoadjuvant chemotherapy, PIK3CA_p.H1047R and GATA3_p.D336Gfs*1 mutations were detected in the surgical tissue specimen but not in the concurrent blood sample.

Conclusions: Our findings indicate that CRISPR/Cas9-based ctDNA enrichment can overcome limitations in detecting ultra-low-frequency variants and may improve the sensitivity and specificity of ctDNA assays in early-stage breast cancer. Further large-scale prospective studies are warranted to validate these results and assess the clinical utility of this approach in early detection and monitoring of breast cancer.

Advancing HER2 Status Profiling of HER2-Low Breast Cancer through Extracellular Vesicle Tumor DNA Detection

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Background: Recent advances in HER2-targeted therapies have highlighted the clinical significance of HER2-low breast cancer, a distinct subgroup characterized by low levels of HER2 protein expression. This underscores the critical need for innovative diagnostic tools to reliably identify HER2-low status, enabling optimized therapeutic strategies for patients who were previously ineligible for HER2-targeted therapies.

Methods: In this study, we investigated the diagnostic potential of tumor-derived extracellular vesicles (TDEs) as a less invasive platform for real-time HER2 profiling. Using an immunoaffinity-based isolation method, TDEs were extracted from six breast cancer cell lines: MDA-MB-231, MCF7, ZR-75-1, MDA-MB-453, BT-474, and SK-BR-3.

Result: HER2 expression in extracellular vesicles was confirmed via flow cytometry, revealing a strong correlation with tumor cell HER2 profiles ($r = 0.971$, $p < 0.001$). Copy number variations (CNVs) in the ERBB2/EIF2C ratio were quantified from extracellular vesicle-derived tumor DNA (etDNA) using droplet digital PCR, with results closely matching CNVs in cell line DNA ($r = 0.987$, $p < 0.001$). Clinical validation was performed with plasma samples from 33 breast cancer patients. CNV analysis of etDNA showed a strong correlation with HER2 status in primary tumors ($p < 0.01$). Receiver operating characteristic (ROC) analysis yielded an area under the curve (AUC) of 0.796, with 53.8% sensitivity and 100% specificity in distinguishing HER2-low from HER2-negative patients. These results underscore the clinical utility of TDEs as a less invasive yet accurate approach for determining HER2 status.

Conclusions: Our findings demonstrate that TDE-based liquid biopsy is a promising tool for addressing the unmet diagnostic need in HER2-low breast cancer, with potential applications in real-time treatment stratification. Further validation in larger, prospective studies is needed to confirm its clinical utility.

Paired genomic profiling of triple negative breast cancer to understand the mechanisms of chemoresistance and develop novel treatment targets

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Background: Localised triple-negative breast cancer (TNBC) is treated with neoadjuvant chemotherapy (NACT) followed by surgery, and those with a pathological complete response have excellent long-term survival. However, patients who have residual disease after NACT have a high risk of recurrence. This study aimed to compare the genomic profile of tumor at baseline and in residual disease post-NACT to identify novel mutations that may be targeted.

Methods: In patients diagnosed with stage I-III TNBC, we performed whole exome sequencing (WES) in the baseline biopsy and the residual disease after dose-dense anthracycline and taxane-based NACT. DNA was isolated from tissue using QIAamp DNA isolation kits, and Whole-Exome sequencing libraries were prepared using Twist V2 Exome Kit (Illumina Inc). Prepared libraries were sequenced on Illumina Novaseq X plus to generate a mean on target of 300X for somatic samples and 2x150bp reads/sample. Pipelines were designed to identify pathogenic/likely pathogenic mutations in these samples.

Result: Of 60 paired samples collected for analysis, 23 pairs of biopsy and residual tumor tissue passed all the quality checks. The median age of patients was 36 years, and two-thirds were stage III. We analyzed the 897 variants exonic unique identified in the primary tumor of non-pathCR patients. Of the 897 variants, 28 were silent variants (27 synonymous and 1 nonframeshift substitution), 797 were non-synonymous, 68 stopgain variants, 2 startloss, and frameshift insertion were observed. Further, we analyzed the 286 variants exonic unique identified in the residual tumor of non-pathCR patients. Of the 286 variants, 11 were silent variants, 252 non-synonymous, 22 stopgain variants, and 1 startloss were observed. ATM, SMAD4, ERBB4 and AR genes were unique genes mutated in the residual disease as compared with the primary tumor at a frequency of over 10%.

Conclusions: We identified ATM, SMAD4, ERBB4 and AR genes as targets for residual disease in TNBC.

EDIL3/Del-1-Mediated Phosphorylation of AMPKβ Drives Triple-Negative Breast Cancer Progression

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Background: Developmental Endothelial Locus-1 (Del-1), also known as Edil-3, is a secreted glycoprotein present in extracellular vesicles in the plasma of breast cancer patients. Studies suggest that Del-1 may play a role in triple-negative breast cancer (TNBC), a subtype with high mortality despite accounting for only 15%-20% of breast cancers. However, the mechanisms by which Del-1 exerts its effects in TNBC are unclear. AMP-activated protein kinase (AMPK), a key energy sensor, has been linked to various cancers. This study focuses on AMPK's β subunit (β-CBM), which is often amplified in tumors, to evaluate its role in TNBC progression.

Methods: RT-PCR and Western blot were used to assess AMPK subunit expression and related protein levels. CRISPR/Cas9 Del-1 knockout cell lines and pharmacological AMPKβ activators were employed in combination with tumor progression assays (MTT, MTS, BrdU, and Matrigel transwell) to study proliferation, invasion, and survival. Genetically mutated phospho-mimetic AMPKβ was overexpressed to evaluate its impact on TNBC progression.

Result: TNBC cells, particularly those with mesenchymal stem-like properties, exhibited significantly elevated expression of both Del-1 and AMPKβ. While AMPKα levels remained consistent, the β subunit of AMPK showed a significant increase. Overexpression of Del-1 and pharmacological stimulation of AMPKβ both promoted cell proliferation and invasion. In contrast, CRISPR/Cas9-mediated Del-1 knockout suppressed AMPKβ expression and inhibited these processes. Del-1 overexpression led to increased AMPKβ levels; however, activation of AMPKβ did not influence Del-1. Additionally, Del-1 was found to phosphorylate AMPKβ at S108, and phospho-mimetic AMPKβ overexpression notably accelerated TNBC cell progression.

Conclusions: Del-1 promotes TNBC progression by upregulating and phosphorylating AMPKβ at S108, driving cell proliferation and invasion. AMPKβ activation is essential for Del-1-mediated effects, as Del-1 knockout reduces AMPKβ levels and inhibits TNBC cell progression. These findings suggest that AMPKβ could be a potential therapeutic target for aggressive TNBC subtypes.

EDIL3+ CAFs Promote Lymph Node Metastasis by Disrupting Lymphatic Endothelial Barriers in Breast Cancer

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Background: Axillary lymph nodes (LNs) are the primary metastatic target of breast cancer. However, mechanisms underlying LN metastasis mediated by the tumor microenvironment (TME) remain elusive. This study aims to identify key stromal cell subpopulations and elucidate their mechanisms in promoting LN metastasis.

Methods: Single-nucleus RNA sequencing (snRNA-seq) was employed to identify cancer-associated fibroblast (CAF) subpopulations associated with high LN metastasis. Functional assays, including siRNA knockdown, lentiviral overexpression, CCK-8, tube formation, wound healing, endothelial permeability, and trans-endothelial migration assays, were conducted to investigate the effects of EDIL3 on lymphatic endothelial cell (LEC) function. In vivo studies utilized immunofluorescence, HE staining, and live imaging in mouse models to confirm the role of EDIL3 in promoting breast cancer LN metastasis. Transcriptomic sequencing, western blotting, and small-molecule inhibitors were employed to elucidate the molecular mechanisms by which EDIL3 regulates LEC permeability.

Result: SnRNA-seq analysis of clinical samples (n = 9) identified an EDIL3+ CAF subpopulation significantly enriched in primary breast tumors with high LN metastasis. The presence of EDIL3+ CAFs in TME was positively correlated with axillary LN burden and poor patient survival. EDIL3 expression was predominantly localized to specific CAF subsets. Using immortalized 4T1 breast cancer CAF cell lines, we demonstrated that EDIL3+ CAFs significantly increased LEC permeability, with EDIL3 identified as a key mediator. In vitro, EDIL3 did not influence LEC proliferation, migration, or lymphangiogenesis but disrupted their tight junction integrity, leading to increased permeability. In vivo, EDIL3 enhanced lymphatic vessel permeability, promoting breast cancer LN metastasis. Mechanistically, EDIL3 regulated LEC permeability through the integrin αvβ3/Src/ERK signaling pathway.

Conclusions: This study identifies, for the first time, an EDIL3+ CAF subpopulation in primary breast tumors that is closely associated with high LN metastasis. EDIL3 serves as a key mediator by disrupting LEC barrier integrity via the integrin αvβ3/Src/ERK pathway, thereby facilitating LN metastasis.

Steroid Inhibitor Modulates Macrophage Polarization to Enhance Tumor-Infiltrating Lymphocyte-Mediated Anti-Tumor Effects

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Background: Steroid hormones, as immune modulators, influence various aspects of immune activity. Particularly in steroid-responsive breast cancer, the relationship between endogenous steroid hormones and malignant tumor progression is evident. This study aims to evaluate the antitumor potential of Posaconazole in a triple-negative breast cancer (TNBC) mouse model and explore its synergistic effects when combined with anti-PD-1 antibody.

Methods: TNBC orthotopic mouse models were established using the E0771 cell line to assess the impact of Posaconazole on tumor growth. Additionally, a humanized immune system was reconstructed in severely immunodeficient mice, and MDA-MB-231 cells were injected to generate a TNBC huPBMC-NOG model for verification of Posaconazole's antitumor effects. In C57BL/6 mice, the combination of Posaconazole and anti-PD-1 antibody was investigated for synergistic antitumor effects. Tumor immune microenvironment modulation by Posaconazole was analyzed using RNA sequencing, immunohistochemistry, cytokine assays, and flow cytometry.

Result: Posaconazole significantly suppressed tumor growth in both TNBC orthotopic and humanized mouse models. The combination of Posaconazole and anti-PD-1 antibody showed superior tumor suppression compared to monotherapy. Flow cytometry and transcriptomic analysis revealed that Posaconazole promoted Th1 cell differentiation and M1 macrophage polarization, improving the tumor immune microenvironment. Furthermore, the combination treatment enhanced CXCL9 and CXCL10 secretion, boosting the recruitment of cytotoxic T lymphocytes (CTLs) and effectively killing tumor cells.

Conclusions: This study demonstrates that Posaconazole, by modulating the immune microenvironment and promoting Th1 cell differentiation and M1 macrophage polarization, significantly inhibits TNBC tumor growth, both as a monotherapy and in combination with anti-PD-1 antibody. These findings provide new strategies and potential therapeutic combinations for TNBC immunotherapy.

Reclassification of Germline BRCA1/2 Variants of Uncertain Significance Following Breast Cancer Next Generation Sequencing

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Background: Germline BRCA1/2 (gBRCA1/2) variants of uncertain significance (VUSs) present challenges for genetic risk assessment and clinical management in breast cancer (BC) patients. Somatic mutational signatures (MS), as the fingerprints of generic mutation patterns, are linked to endogenous and exogenous factors that have influenced cancer development. One specific MS, Signature3 (Sig3), is associated with BRCA1/2 deficiency or homologous recombination deficiency (HRD). This study aims to establish a comprehensive framework for reclassifying gBRCA1/2 VUSs by performing next-generation sequencing (NGS) and analyzing MS via the lens of multi-omics.

Methods: A total of 381 unselected BC patients from Hong Kong underwent comprehensive sequencing, including an 812-gene panel tumor-normal sequencing, RNA sequencing, and DNA methylation sequencing, alongside TCGA-BRCA cohort data to explore our reclassification pipeline preliminarily. From our cohort, we further selected 22 patients with gBRCA1/2 mutations and 20 without for tumor-only whole exome sequencing (WES) on the Illumina platform. We employed a novel computational tool, SigMA, designed to accurately identify HRD-associated MS, particularly in gene panel sequencing data, for the analysis of MS profiling.

Result: In the TCGA-BRCA cohort, SigMA Sig3 exhibited greater efficiency in detecting biallelic pathogenic BRCA1/2 mutations in WES data compared to gene panel data. In our cohort, we utilized 381 paired panel sequencing data to investigate a tumor-only WES somatic mutation filtering strategy. According to the somatic MS derived from our filtering strategy, SigMA Sig3 successfully identified 100% of pathogenic gBRCA1/2 mutations.

Conclusions: We preliminary found that Sig3 could provide additional evidence to support the reclassification of gBRCA1/2 VUSs and could serve as a predictive biomarker for PARP inhibitor responses. WES might be a better option for more accurate and thorough MS analysis than targeted panel sequencing in clinical setting. This continued research is essential for classifying VUSs to provide enhanced risk assessment and management strategies for affected individuals and families.

Neoadjuvant Pembrolizumab Plus Chemotherapy Followed by Adjuvant Pembrolizumab in Early-Stage TNBC: Overall Survival Results From the Phase 3 KEYNOTE-522 Study in Asian Patients

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Background: In KEYNOTE-522 (NCT03036488), neoadjuvant pembrolizumab plus chemotherapy followed by adjuvant pembrolizumab significantly improved pCR, EFS, and OS vs neoadjuvant chemotherapy alone in high-risk, early-stage TNBC. Asian patients had improved pCR and EFS, consistent with the global population. Here we report updated EFS and OS results from the prespecified IA7 subgroup analysis of KEYNOTE-522 in patients from Asia.

Methods: Patients (≥ 18 years) with untreated, locally advanced TNBC were randomized 2:1 to neoadjuvant pembrolizumab 200 mg or placebo Q3W, plus carboplatin and paclitaxel for 4 cycles, followed by pembrolizumab or placebo plus cyclophosphamide and doxorubicin or epirubicin for 4 cycles. After surgery, patients received pembrolizumab or placebo for 9 cycles or until recurrence or unacceptable toxicity. Stratification factors were nodal status (positive vs negative), tumor size (T1-T2 vs T3-T4), and carboplatin schedule (Q3W vs QW). Dual primary endpoints are pCR (ypT0/Tis ypN0) and EFS; a key secondary endpoint is OS. No alpha was assigned to this analysis.

Result: Patients (n = 216) in Asia were randomized to pembrolizumab (n = 136) or placebo (n = 80). By data cutoff (March 22, 2024), median (range) time from randomization was 76.2 (66.0-82.9) mo. Twelve patients (8.8%) in the pembrolizumab arm and 16 patients (20%) in the placebo arm died (HR, 0.41; 95% CI, 0.19-0.86). The 60-mo OS rate (95% CI) was 91.9% (85.8-95.4) and 81.1% (70.5-88.1), respectively. EFS HR is 0.43 (95% CI, 0.23-0.81), consistent with previous report. Grade ≥ 3 treatment-related AEs occurred in 109 (80.1%) and 64 patients (81.0%), respectively. No treatment-related AEs led to death.

Conclusions: Neoadjuvant pembrolizumab plus chemotherapy followed by adjuvant pembrolizumab showed clinically meaningful OS improvement and manageable safety versus neoadjuvant chemotherapy in Asian patients with early-stage TNBC, consistent with the global population. A clinically meaningful improvement in EFS was maintained after median follow-up of > 6 years.

Discovery of 14-3-3 proteins YWHAB/YWHAZ as regulators of CDK4/6 inhibitor resistance

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Background: Hormone receptor-positive (HR+) breast cancer, defined by positive ER and/or PR staining, is the most common subtype. The standard treatment for metastatic and high-risk early HR+ breast cancer includes CDK4/6 inhibitors (palbociclib, ribociclib, abemaciclib) with endocrine therapy, significantly improving survival with a well-tolerated profile. However, resistance remains a challenge, often driven by CDK6 overexpression, Rb loss, and alterations in CDK2, cyclin E, AURKA, HER2, and the Hippo pathway. Despite ongoing research, post-CDK4/6 targeted therapies remain limited, emphasizing the need for novel resistance mechanisms to enhance treatment efficacy.

Methods: Previous studies have identified CDK6 amplification as a mechanism of CDK4/6 inhibitor resistance. We hypothesized that CDK6-binding proteins play a role in mediating this resistance. To investigate, we utilized proximity labeling proteomics to identify proteins in close proximity to CDK6. Using the CDK6-D224Y mutant, we compared protein interactions to determine which factors may contribute to resistance. This approach aims to uncover novel resistance mechanisms, providing potential targets for improving therapeutic strategies in CDK4/6 inhibitor-resistant breast cancer.

Result: Proximity labeling experiments identified the 14-3-3 family protein YWHAB (14-3-3 Protein Beta) as differentially bound to overexpressed wild-type CDK6 (CDK6 WT) compared to the CDK6-D224Y mutant. Silencing YWHAB led to proteasome-dependent downregulation of CDK6 protein expression and reversed resistance caused by CDK6 overexpression. Transcriptomic analyses from TCGA, METABRIC, and other datasets showed that YWHAB downregulation correlated with improved overall and progression-free survival in patients treated with CDK4/6 inhibitors. These findings suggest that targeting YWHAB may enhance therapeutic efficacy and overcome resistance in CDK4/6 inhibitor-treated HR+ breast cancer.

Conclusions: Our study unveils a previously undescribed mechanism that regulates CDK4/6 inhibitor resistance and suggests the potential of further investigation of 14-3-3 proteins, especially YWHAB and YWHAZ, in breast cancer research.

Abemaciclib in Combination with Hormonal Therapy for Chemotherapy-Treated Patients with ER+/HER2- Metastatic Breast Cancer

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Background: Combination therapy with CDK4/6 inhibitors and endocrine therapy as the first-line and second-line treatments has been standard therapy in patients with HR+ HER2- metastatic breast cancer (MBC) based on clinical trials. On the other hand, in clinical practice, CDK4/6 inhibitors are used not only as first-/second-line but also for patients receiving prior chemotherapy in metastatic setting. However, the efficacy and safety of combination therapy in these patients remain unclear.

Methods: We conducted a multi-institutional prospective cohort study to obtain real-world evidence about the clinical efficacy and safety of combination therapy with abemaciclib and endocrine therapy for chemotherapy-treated patients with HR+/HER2- MBC.

Result: 181 patients were registered from December 2019 to November 2022. Median PFS for abemaciclib was 10.3 (95%CI: 8.4-12.0) months and median overall survival was 25.2 (95%CI: 12.5-18.0) months. Median number of endocrine therapies for MBC was 1 regimen. Median PFS of the patients treated with abemaciclib as maintenance therapy after chemotherapy (n = 71) was 13.8 months (95%CI: 11.8-20.2). Median PFS of patients with prior treatment history with CDK4/6 inhibitor (palbociclib) (n = 59) was 6.6 months (95%CI: 4.8-8.5). Patients with one or two chemotherapy regimens in the previous line (n = 143) had a significantly longer PFS than those with three or more regimen (n = 30) (median PFS: 10.6 months versus 6.5 months, p = 0.039). As for safety, severe adverse events including diarrhea (6.9%), fatigue (4.6%), appetite loss (2.9%), nausea (1.7%), vomiting (1.2%), interstitial lung disease (1.2%), arthralgia (0.6%), infection (0.6%), up to grade 3, were observed; these were consistent with known abemaciclib profile.

Conclusions: Abemaciclib, in combination with endocrine therapy, demonstrated considerable efficacy and manageable safety profiles in chemotherapy-treated HR+/HER2- MBC patients. Notably, the extended PFS of over one year, when abemaciclib is used as maintenance therapy after chemotherapy due to reasons other than disease progression, underscores its potential utility.

Changes in the degree of satisfaction and quality of life in breast cancer patients who are candidates for breast conservation but opted for mastectomy: a single-center prospective study

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Background: Breast-conserving surgery (BCS) and total mastectomy (TM) provide comparable survival outcomes for early breast cancer patients. Thus, surgical choice is now a shared decision-making process. However, the impact of choosing TM over BCS on quality of life (QoL) and satisfaction remains unclear. This study examined the impact of TM on QoL and satisfaction in BCS-eligible patients who voluntarily opted for TM.

Methods: Newly diagnosed breast cancer patients eligible for BCS at Seoul National University Hospital (Nov 2021-June 2024) were prospectively enrolled based on surgical preference. QoL and satisfaction were assessed using the BREAST-Q and Decision Regret Scale (DRS) at baseline and 6-24 months postoperatively.

Result: A total of 68 patients were enrolled; 28 opted for TM, and 40 underwent BCS, with two patients lost to follow-up in the TM group. The TM group was significantly older than the BCS group (57.92 vs. 51.43 years, $p = 0.015$), and had larger preoperative tumor sizes (25.77 mm vs. 17.88 mm, $p = 0.001$). Postoperatively, satisfaction with the breast (62.0 vs. 53.3, $p = 0.013$) and physical well-being (chest) (83.9 vs. 77.5, $p = 0.004$) decreased significantly. Satisfaction with the breast was significantly lower in the TM group compared to BCS (62.7 vs. 38.7, $p < 0.001$). Psychosocial well-being (80.3 vs. 58.1, $p < 0.001$), sexual well-being (55.3 vs. 24.2, $p < 0.001$), and physical well-being (80.9 vs. 72.9, $p = 0.043$) were all lower in the TM group. When comparing pre- and postoperative scores, the TM group experienced greater declines in breast satisfaction (-1.38 vs. -21.34, $p = 0.007$), psychosocial well-being (5.71 vs. -8.40, $p = 0.004$), and sexual well-being (1.55 vs. -17.83, $p = 0.004$). The TM group also had significantly higher DRS scores (21.92 vs. 13.52, $p = 0.036$), indicating greater regret.

Conclusions: TM patients experienced greater declines in QoL and higher regret. These findings highlight the need to consider QoL impacts in shared decision-making for early breast cancer treatment.

An educational video as an aid in pre-test genetic counselling in a breast clinic of a multicultural Asian city

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Background: Genetic predisposition plays a significant role in breast cancer (BC) risk. In Hong Kong, genetic testing (GT) and counselling are increasingly in demand due to new treatment options for BRCA1/2 mutations. However, a shortage of genetic professionals necessitates more efficient counselling methods. This study aims to compare the effectiveness of using an educational video during pre-test genetic counselling (PGC) and to evaluate whether knowledge uptake is comparable between counselling by a genetic counsellor and video-aided counselling.

Methods: The Hong Kong Hereditary Breast Cancer Registry developed an 8.5-minute video in English and Chinese about hereditary BC and ovarian cancer (OC) GT. We invited females aged ≥ 18 eligible for the GT and attending the breast clinic in Tung Wah Hospital of Hong Kong. The GT eligibility criterion included BC aged ≤ 45, bilateral BC, triple-negative BC, OC, or family history of BC/OC. This study was a randomized control trial using convenience sampling due to the clinical setting. Participants were blindly assigned to one of the following groups based on their appointment times: video-only group, video with question time group, or control group receiving traditional in-person counselling. Knowledge quizzes were administered pre- and post-counselling.

Result: 283 participants (mean age: 47.04) were recruited, with 90.8% having at least secondary education. Baseline quiz mean scores were similar across groups ($F(2,280) = 0.044$, $p = 0.957$). Post-counselling mean scores increased significantly in all groups ($p < 0.001$), with a Wilcoxon Signed-Ranks test confirming improvement ($Z = -14.127$, $p = 0.000$). Video-aided PGC significantly reduced counselling time (mean: 10.62 minutes) compared to traditional counselling (mean: 19.42 minutes).

Conclusions: Video-aided PGC with question time is a viable alternative to traditional counselling for BC/OC patients in densely populated areas like Hong Kong. It provides comparable knowledge transfer while enhancing PGC efficiency and addressing the shortage of genetic professionals.

Adherence to Hormonal Therapy in Breast Cancer Patients: EHR-based Retrospective Data Analysis

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Background: Breast cancer accounts for 6.9% of cancer-related deaths and generally has a good prognosis. Studies have shown a strong correlation between adherence to hormonal therapy and improved prognosis, with better adherence leading to lower recurrence rates. However, poor adherence increases the risk of adverse outcomes, highlighting the need for proactive risk management. Identifying key predictive factors and focusing on critical periods for adherence can help optimize treatment outcomes.

Methods: This retrospective study analyzed 6,019 breast cancer patients from an initial cohort of 23,193, diagnosed between 2010 and 2018 who underwent surgery and completed 5 years of anti-estrogen therapy. Patients with multiple primary cancers, no surgery, carcinoma in situ, or metastatic cancer at diagnosis were excluded. Medication adherence was measured using the Medication Possession Ratio (MPR) as the proportion of days covered within a year, adjusted to prevent values exceeding 100%. Adherence trends were analyzed by age (5-year intervals) and four treatment groups: SERMs, AIs, SERMs to AIs, and AIs to SERMs.

Result: The 5-year MPR showed a consistent decline over time, with annual averages decreasing from 97.65 in the first year to 61.12 in the fifth year. Patients transitioning from SERMs to AIs had the highest adherence (5-year average MPR: 87.57), while those on AIs-only had the lowest (81.36). Patients aged 40-45 showed the highest adherence (86.19), whereas older patients aged 65+ had significantly lower adherence (72.74). Younger patients aged 20-25 also showed relatively low adherence, with a 5-year average MPR of 75.29. These findings underscore variability in adherence across both treatment and age groups.

Conclusions: Our study highlights the need for age-tailored approaches to improving medication adherence among breast cancer patients, particularly for those undergoing long-term therapies. Additionally, considering the type of medication, such as SERMs or AIs, and their associated side effects and efficacy is crucial in developing these strategies.

Non-pharmacological Interventions for Distress and Anxiety in Patients with Breast Cancer and their Family Caregivers: A systematic review and meta-analysis

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Background: Breast cancer remains a leading cause of mortality worldwide. Family caregivers provide vital physical assistance, emotional, and psychosocial support, particularly in outpatient settings. The chronic nature of breast cancer significantly impacts both patients and their caregivers, emphasizing the interdependent nature of their responses to the disease. This interdependency highlights the necessity for effective non-pharmacological interventions (NPIs) that address the needs of both members of the dyad. However, variations exist in the levels of evidence and grades of recommendation for these interventions, indicating a need for establishing standardized guidelines. We conducted a meta-analysis to evaluate the efficacy of NPIs on breast cancer patients' and caregivers' distress and anxiety, to determine which types of NPIs are most effective.

Methods: We searched four major databases for randomized clinical trials (RCTs) testing NPIs targeting both patients with breast cancer (and other solid tumors) and their caregivers. Two reviewers independently screened 8,277 studies by title/abstract and 563 full texts. Data were assessed for Risk of Bias, and synthesized with standard meta-analytic methods. Effect sizes were based on random-effects and Hedges' g unbiased approach.

Result: Data from 24 RCTs with a cumulative sample of 4,461 individuals (31.4% breast cancer). The mean patient and caregiver age was 54.7 and 53 years, respectively. NPIs included: psychoeducation (e.g. cancer education), skills training (e.g. stress management), therapeutic counseling (e.g. cognitive-behavioral therapy), or behavior modification (e.g. exercise training). Findings showed significant reduction in caregiver distress and anxiety at 0-3 months ($g = 0.287$, 95% CI [0.059, 0.515]) but the effects were not sustained beyond 3 months. Patient distress and anxiety were not reduced significantly, but findings showed trends for improvements at 0-3 and 3.1-6 months.

Conclusions: Analyses are ongoing. Our robust findings can inform policymakers about adjustments to the healthcare system to formally acknowledge the support of caregivers in the cancer care continuum.

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Poster Presentation

Go Beyond Cure of
Breast Cancer

Breast Self Examination Practice and its Determinants among Women in Indonesia: A Systematic Review of, Meta Analysis and Meta Regression

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Background: Breast cancer (BC) presents a significant healthcare challenge in Indonesia, yet there has been limited evaluation of Breast Self-Examination (BSE) as routine BC Screening practice. This study aimed to aggregate and analyze the prevalence of BSE practice, compare its rate between Java island (urban area) and non-Java islands (rural area), and identify factors influencing BSE adoption among the Indonesian population.

Methods: A comprehensive search was conducted across Cochrane Library, PubMed, Google Scholar, and SINTA (Indonesian Web of Science and Technology Index) from September 2017 to 2022. For a systematic review of prevalence, we generated a CoCoPop (Condition, Context, Population) framework to define the inclusion criteria. The study followed the Preffered Reporting Items for Systematic Review and Meta -analysis (PRISMA) and registered in the Prospective Registered of Systematic Reviews (PROSPERO) with registration number CRD42022362907. Metaanalysis was performed using Review Manager 5.4.

Result: The national prevalence of BSE practice was found to be 43.14% (95% CI: 36.08 - 50.20, $p < 0.001$).The prevalence of BSE practice was higher in Java island (44.58%) compared to Non-Java islands (41.62%). University students exhibited the highest BSE practice prevalence at 49.90%. Factors such as good knowledge, positive attitudes towards BSE, a family history of BC, Family support and exposure to BC-related information significantly associated with a higher rate of BSE practice.

Conclusions: BSE practice remains relatively low in Indonesia, particularly in non Java Islands. To address this, collaborative and integrative programs should be implemented to promote BSE as a regular BC screening practice.

Identifying Genetic and Clinical Risk Factors for Breast Cancer-Related Lymphedema (BCRL): Toward Personalized Prevention

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Background: Breast cancer is the most prevalent cancer in Indonesia, with 27.7% of patients developing BCRL. Genetic factors, such as the GJA4 gene, play a role in BCRL development, highlighting the need for understanding to aid identification and prevention. Therefore, this study aimed to investigate the association of GJA4 mutation and other clinical factors in breast cancer patients undergoing axillary lymph node dissection (ALND) to predict BCRL.

Methods: This prospective cohort study was conducted on 106 breast cancer patients who consecutively underwent ALND in Dharmais Cancer Hospital from October 2022 until February 2024. Patients were followed up for 12 months to assess BCRL development using indocyanine green (ICG) lymphography. Clinical data was obtained from medical records. GJA4 mutations were analyzed from the DNA of peripheral blood samples using Sanger sequencing. A multivariate Cox regression analysis evaluated the association between BCRL risk, genetics, and clinical factors.

Result: The patient's mean age is 49 years and the mean body mass index (BMI) is 26.2 (kg/m2). BCRL developed in 56 (52.8%) patients. GJA4 mutations were identified in 40 (37.7%) patients which consist of 25 (44.6%) patients with BCRL and 31 (55.4%) patients without BCRL. The Cox regression model demonstrated that GJA4 mutation (HR = 1.73, 95% CI: 1.01-2.99, $P = 0.047$) and BMI (HR = 1.75; 95% CI: 1.02-3.02; $P = 0.043$) were significantly associated with an increased risk of BCRL.

Conclusions: Patients with a GJA4 mutation and elevated BMI have a higher risk of developing BCRL. These findings highlight the importance of considering genetic factors in BCRL risk assessment. Further research is needed to validate these results and explore the underlying mechanisms.

Poster Presentation

Risk Prediction Model for Lymphedema Following Axillary Lymph Node Dissection of Patients with Advanced-Stage Breast Cancer in Dharmais Cancer Hospital

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Background: Lymphedema is a chronic complication that commonly occurs after axillary lymph node dissection (ALND) in breast cancer patients. Numerous studies have attempted to develop prediction models based on clinical risk factors as an early prevention effort. However, there is no specific prediction model that can be widely implemented. This study aimed to evaluate the prediction model for lymphedema after ALND in advanced breast cancer patients at Dharmais Cancer Hospital.

Methods: This was a retrospective cohort study of 174 patients with advanced-stage breast cancer from November 2019 to November 2023. Lymphedema status was determined by indocyanine green (ICG) lymphography. Multivariate Cox regression was used to screen for the risk factor of lymphedema. The area under the receiver operating characteristic curve (AUC) and calibration were calculated as an index for the predictive value of the scoring system.

Result: Lymphedema was identified in 88/174 (50.6%) patients, and the onset of lymphedema was mostly experienced in the first 12 to 36 months after ALND. Risk factors associated with lymphedema include obesity (RR = 1.33; $p = 0.182$), diabetes (RR = 1.72 $p = 0.040$), neoadjuvant chemotherapy (RR = 0.69; $p = 0.131$), and adjuvant chemotherapy (RR = 1.59; $p = 0.108$). The lymphedema prediction model had moderate discrimination ability with an AUC value of 0.706 (95% CI 0.629-0.783; $p < 0.05$). A cut-off point ≥23 was chosen to differentiate the risk of lymphedema with a sensitivity of 80.2% and specificity of 50.5%.

Conclusions: The prediction model developed in this study is sufficiently effective for clinicians to use to estimate the risk of lymphedema, especially for advanced-stage breast cancer patients in our hospital. However, further research is needed to analyze the incidence and risk factors of lymphedema using a prospective design, more specific predictors, and multicenter studies to obtain more representative data for the patient population in Indonesia.

Current Issues and Future Prospects of Hereditary Breast and Ovarian Cancer (HBOC) Surveillance through Regional Medical Cooperation Networks in Fukuoka City of Japan

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Background: BRCA1/2 genetic testing is covered by insurance in Japan, making Hereditary Breast and Ovarian Cancer (HBOC) treatment a routine part of medical care. To ensure smooth HBOC surveillance and improve patient care, regional HBOC medical cooperation networks are being established for breast and ovarian cancers. This report discusses the current challenges and prospects of this approach.

Methods: The Department of Genomic Medicine of our hospital has developed an HBOC treatment flow involving relevant medical departments within the hospital. This coordinated system allows for HBOC surveillance to be conducted collaboratively. Patients who cannot undergo genetic testing at our facility are referred to other hospitals within the Regional HBOC Medical Cooperation Network. A genetic test report is generated and shared with the patients' relatives for further testing.

Result: From 2021 to the present, 12 out of 25 BRCA-positive patients received genetic counseling. Surveillance is being conducted either within the hospital or in collaboration with other hospitals for all 12 cases. Four patients (with five affected breasts) underwent risk-reducing mastectomy (CRRM), and two patients underwent risk-reducing salpingo-oophorectomy (RRSO).

Conclusions: Patients who received genetic counseling were more likely to engage in surveillance and consider risk-reducing surgeries. Additionally, their relatives were more likely to participate in surveillance programs through affiliated facilities. For patients who did not receive genetic counseling, referrals were made for companion diagnostics or treatments. One significant challenge identified is the variability in costs for surveillance between different facilities. However, affiliated hospitals have streamlined the process by allowing users to book breast MRI exams via LINE, a messaging app. HBOC treatment and surveillance are progressing smoothly with medical cooperation across the community. In the future, expanding collaboration with other medical departments such as urology and gastroenterology may further enhance HBOC care for patients with hereditary genetic risk.

Age-specific Histologic and Molecular Characteristics of Breast Cancer and International Comparison

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Background: Breast cancer occurs across a wide age range and consists of various histological and molecular subtypes. We clarified age-specific characteristics (adolescent and young adult (AYA), premenopausal, postmenopausal, and elderly groups) and identified similarities and differences between Asian and Western countries.

Methods: This study included 912 patients with primary breast cancer who underwent resection without neoadjuvant chemotherapy between January 2009 and December 2024.Histological diagnoses and immunohistochemical staining results were evaluated. Our data were also compared to other published studies worldwide.

Result: Age at surgery ranged from 24 to 96 years, with a median of 67 years. The age distribution showed two peaks: 45-49 years and 70-74 years. From 2009 to 2014, there were 214 cases; from 2015 to 2019, 298 cases; and from 2020 to 2024, 400 cases, reflecting an increasing trend, especially among patients aged 20-29 and 40-44, which increased 2.0-2.5 times in the last five years. Analysis by age group revealed that non-invasive cancer was most prevalent in the AYAs (33%), which was 2.2-2.75 times higher than other groups. AYA patients had no invasive lobular carcinoma and had higher percentages of special types excluding ductal and lobular compared to premenopausal and postmenopausal groups. Luminal subtype was least common in the AYAs (56%) and most common in the pre-/post-menopausal groups (83-85%). The elderly group had the highest rate of triple-negative breast cancer (12%). International comparisons showed a single peak after 65 years in the US, UK, and Australia, while in countries like Korea, Taiwan, and China, a peak was seen at 45-50 years with a gradual decline post-menopause. Recent trends, as in Japan, showed a second peak in postmenopausal women.

Conclusions: Histological and molecular features of breast cancer vary by age group. We observed the differences between Asian and Western countries, suggesting that including Asian populations in international clinical trials is crucial.

Poster Presentation

Risk of herpes zoster among female breast cancer survivors in Japan

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Background: Breast cancer (BC) survivors are known to have a risk of developing herpes zoster, but more details, such as the risk according to follow-up time and chemotherapy status, are unknown.

Methods: We conducted a matched cohort study using data from the JMDC claims database that covers company employees and their family members in Japan. Between January 2005 and December 2019, women aged 18-74 years with and without BC were matched with a 1:4 ratio for age and entry timing to the database. Using stratified Cox regression analysis, we estimated and compared the risks for herpes zoster between the groups, overall, and by follow-up time (< 1 year and 1-10 years from the BC diagnosis, separately), adjusted for comorbidities, BMI, smoking, and drinking habits. Furthermore, the risk of chemotherapy (no chemotherapy, one regimen [anthracycline or taxane], two regimens [anthracycline and taxane]) during the first year after BC diagnosis was estimated using an unstratified Cox regression analysis in which the reference group was women without BC. In this analysis, participants were followed up from one year after the matching, further adjusted for radiotherapy.

Result: Among 24,017 BC survivors and 96,068 matched women (mean age 50.5 years), herpes zoster occurred among 1,673 and 3,111 women (incidence rate of 24.2 and 10.6 cases/1000 person-years, respectively). The adjusted hazard ratios of overall, < 1 year, 1-10 years were 2.37 (95% Confidence Interval 2.22-2.53), 2.86 (2.55-3.20), and 2.18 (2.01-2.36), respectively. By treatment, no chemotherapy (n = 11,143), one regimen (n = 2,104), and two regimens (n = 4,367) had 636, 161, and 324 herpes zosters. The adjusted hazard ratios were 1.63 (1.45-1.82), 2.10 (1.76-2.49), and 2.39 (2.08-2.75), respectively.

Conclusions: BC survivors in Japan showed an increased risk of herpes zoster than women without BC, and the hazard ratio was higher during the first year from the BC diagnosis and among those with chemotherapy.

Poster Presentation

BRCA1/2-mutated breast cancer patients: time course of contralateral breast cancer and prognostic analysis

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Background: Since April 2020, some HBOC diagnoses and treatments, including BRCA genetic testing and risk-reducing surgery, have been covered by insurance in Japan. This has led to an increasing number of breast cancers being tested for BRCA1 and BRCA2 gene mutations, both before and after surgery. We perform nearly 300 primary breast cancer operations each year. In 2023, 277 breast cancer operations were performed, of which 152 (54.9%) were breast-conserving surgery. This puts our hospital at the top of the list for breast cancer operations in Fukuoka City. We hereby present the results of the analysis of cases of BRCA gene mutations carried out at our hospital.

Methods: We analysed 460 BRCA genetic tests performed at our hospital between August 2018 and November 2024.

Result: In BRCA genetic testing for breast cancer, 381 people were diagnosed for an initial disease diagnosis, whereas 79 people were diagnosed for a companion diagnosis. Of these, 41 (8.9%) cases had BRCA1/2 pathogenic variants, with 12 BRCA1 mutations and 22 BRCA2. Of the patients with the BRCA1/2 mutations, 34 were diagnosed for an initial breast cancer (34/381, 8.9%), and seven (7/79, 8.9%) were diagnosed for a companion diagnosis. The median age was 39 years (range 24-80) in the BRCA1/2-mutated breast cancer patients. There were 10 cases (10/34, 29%) of bilateral breast cancer (5 metachronous and 5 synchronous), with metachronous contralateral breast cancer (14.7%) occurring on average 12.3 years after surgery for the primary breast cancer. The locoregional recurrence rate was 9.8% (4/34), with 2 subcutaneous recurrences and 2 ipsilateral breast recurrences. Of these, one case (2.4%) had synchronous lung metastases, and the type of breast surgery was 2 breast-conserving surgery and 2 mastectomy. Two cases (4.9%) died of breast cancer.

Conclusions: We report favourable outcomes in patients with BRCA1/2 mutation-positive breast cancer at our hospital, although longer follow-up is needed.

Risk-reducing mastectomy and salpingo-oophorectomy in women with hereditary breast and ovarian cancer: A single-institute experience following coverage by Japanese national medical insurance

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Background: Risk-reducing mastectomy (RRM) and risk-reducing salpingo-oophorectomy (RRSO) are preventive options for women with hereditary breast and ovarian cancer (HBOC). The Japanese national medical insurance began covering RRM and RRSO for patients with HBOC in April 2020.

Methods: We retrospectively analyzed 59 individuals with pathogenic germline variants (PGVs) from 55 families diagnosed with HBOC between 2010 to 2024 to assess the prevalence of RRM and RRSO after April 2020 (Yokohama Clinical Oncology Group:YCOG 2002 study).

Result: The median age at diagnosis was 50 years. Ten individuals (16.9%) were diagnosed before April 2020, whereas 49 (83.1%) were diagnosed afterward. PGVs included BRCA1 (28 individuals) and BRCA2 (31 individuals). The most common cancer was breast cancer (74.6%), followed by ovarian (13.6%) and pancreatic cancer (3.3%); 15.0% had no cancer history. RRM was performed in 19 of 41 individuals (46.3%), with the highest rate observed among BRCA1 PGV individuals (55.0%). RRSO was conducted in 30 of 41 individuals (73.1%), with higher rates among BRCA1 and BRCA2 PGV individuals. None of the individuals without a history of breast and/or ovarian cancer underwent these procedures. The median age was 50 for RRM and 49 for RRSO. Most surgeries (64.7% for RRM and 76.0% for RRSO) occurred within a year of genetic testing. Multivariate analysis showed that breast cancer history was strongly associated with RRM.

Conclusions: National insurance coverage has enhanced access to genetic testing and preventive surgeries, with 46.3% and 73.1% undergoing RRM and RRSO, respectively. However, individuals without a cancer history remain underrepresented.

Impact of Breast Cancer Treatment on the Microbiome: A Comparative Analysis of Pre- and Post-Treatment Changes

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Background: The microbiome is closely associated with breast cancer, with previous studies suggesting its potential role in the diagnosis, treatment, and prognosis of the disease. This study provides a comprehensive analysis of the microbiome before and after treatment in breast cancer patients, experimentally validating the potential role of specific microbiota as biomarkers.

Methods: This study included two groups: a pre-treatment group consisting of patients histologically diagnosed with breast cancer, and a post-treatment group consisting of patients who had completed surgery, chemotherapy, and radiotherapy and were undergoing maintenance hormonal therapy. Serum, stool, and urine samples were collected from both groups. Microbial analysis was conducted by extracting extracellular vesicles (EVs), amplifying them using 16S rRNA primers (the V3-V4 region), and sequencing the amplified products with the MiSeq platform (Illumina, USA). Changes in the microbiome were evaluated alongside key clinical markers before and after treatment.

Result: Microbiome analysis revealed a general decrease in microbial diversity across most samples, with a significant increase in certain symbiotic microbiota. Specifically, urine samples showed an increased relative abundance of the phylum Firmicutes after treatment of breast cancer, while other phyla either decreased or disappeared. At the genus level, Pseudomonas and Sphingomonas exhibited a marked increase after treatment. These genera are known to be relatively abundant in healthy controls and have frequently been identified in previous studies as biomarkers differentiating patients with breast cancer from healthy individuals. The post-treatment microbiome exhibited a trend toward resembling those of healthy controls. Further investigation of Pseudomonas revealed that extracellular vesicles derived from this genus suppressed the growth of breast cancer cell lines. Mechanistically, this effect was linked to the regulation of Cyclin E2, demonstrating the involvement of symbiotic bacteria in the cell cycle regulation of breast cancer cells.

Conclusions: These findings provide valuable insights into the role of the microbiome in breast cancer management and recovery.

Impact of Socioeconomic Disparities on Breast Cancer Diagnosis, Treatment and Survival: Insights from the K-CURE Dataset

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Background: Socioeconomic status (SES) significantly influences breast cancer diagnosis, treatment, and survival. This study evaluates the impact of SES on survival outcomes and treatment patterns in Korean breast cancer patients using the K-CURE database.

Methods: A total of 111,585 women diagnosed with breast cancer (C50) in Korea from 2014 to 2019 were analyzed using the K-CURE database. SES was stratified by health insurance premiums into medical benefit (lowest SES) and four income quartiles. Kaplan-Meier survival analysis and Cox proportional hazards regression were used to assess cancer-specific survival (CSS) and overall survival (OS), adjusting for stage, treatment patterns, and other confounders.

Result: Across all patients, survival rates were significantly lower in those who did not undergo surgery (HR = 3.31, 95% CI: 3.073.57), chemotherapy (HR = 2.65, 95% CI: 2.352.99), or hormone therapy (HR = 2.93, 95% CI: 2.773.10). Delayed treatment initiation (≥ 4 weeks) also contributed to poorer outcomes (HR = 1.29, 95% CI: 1.221.37, $p < 0.0001$). Lower SES was associated with less favorable survival outcomes. Medical benefit patients had the lowest survival rates, with adjusted HRs of 1.71 for CSS (95% CI: 1.531.92) and 1.78 for OS (95% CI: 1.601.98) compared to the highest SES quartile (reference). These disparities were most pronounced in distant-stage disease, where survival gaps between SES groups were amplified. SES also influenced treatment accessibility, with lower SES groups being less likely to undergo surgery and adjuvant therapies, underscoring inequities in cancer care delivery.

Conclusions: This study highlights significant SES-related disparities in breast cancer survival in Korea. Timely treatment and comprehensive care play critical roles in improving survival outcomes. Efforts to address healthcare inequities and expand access to cancer care are essential, particularly for socioeconomically disadvantaged patients. Future research leveraging the K-CURE dataset should focus on developing targeted strategies to close survival gaps and promote equity in cancer outcomes.

Post-Surgical Inflammatory Biomarkers as Prognostic Indicators in Early Breast Cancer: A Comparison of Surgical Methods

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Background: Inflammation influences cancer progression and outcomes, particularly after surgery. While breast-conserving surgery (BCS) with radiotherapy shows survival outcomes comparable or superior to total mastectomy (TM), the underlying biological mechanisms remain unclear. This study investigates the association between surgical methods, inflammation-related proteins, and survival outcomes in early breast cancer.

Methods: A retrospective study analyzed 3,403 patients with early breast cancer treated at Asan Medical Center from 2013 to 2017. Patients aged 20-70 years who underwent BCS or TM were included, excluding those with distant metastasis, prior cancers, inflammatory breast cancer, or ductal carcinoma in situ. Proteomic analysis was conducted on 84 patients from a typical cohort with post-operative serum samples collected within one month of surgery. The Olink Target 96 Inflammation panel analyzed 92 inflammatory proteins via proximity extension assay (PEA).

Result: Among 3403 early breast cancer patients, significant differences in baseline characteristics were observed between the BCS (n = 2,249) and TM (n = 1,154) groups, such as tumor size (≤ 2 cm: 67.5% vs. 44.2%) and nodal metastasis (32.5% vs. 53.6%) ($p < 0.001$). Survival outcomes, particularly recurrence-free interval (RFi), were higher in the BCS group (92.4% vs. 82.0%, $p < 0.001$). Proteomic analysis in 84 patients revealed higher levels of pro-inflammatory cytokines (IL-8, IL-6, MCP-3, AXIN-1, CASP-8) in TM patients and elevated anti-inflammatory cytokines (CD5, NT-3, Flt3L) in BCS patients. Recurrence was associated with increased levels of CXCL11, PD-L1, CD40, and IL15RA, while no-recurrence patients had higher EN-RAGE levels.

Conclusions: Inflammation-related proteins differ by surgical method and recurrence status, suggesting their potential as biomarkers for precision medicine in early breast cancer. Further research may improve prognostication and guide personalized treatment strategies.

Poster Presentation

Clinical Outcomes of Lobular Carcinoma in situ (LCIS): Risk of Invasive Cancer Development

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Background: Lobular carcinoma in situ (LCIS) is a non-invasive lesion that is considered a risk factor for invasive cancer development. With its exclusion from the TNM classification by the 8th edition of the AJCC guidelines, the management guidelines for LCIS have shifted from surgical intervention to active surveillance. However, studies on the risk of invasive cancer development and its associated factors in pure LCIS patients without concurrent invasive cancer or ductal carcinoma in situ (DCIS) remain limited.

Methods: This study is a retrospective analysis of 106 patients diagnosed with LCIS (K-ICD code D05.0X) between 2008 and 2018. Among the 160 patients with LCIS, those combined with invasive cancer or DCIS (n = 53) and those received non-Tamoxifen anti-hormonal therapy (n = 1) were excluded. This study evaluated the impact of Tamoxifen use and histologic type on the development of invasive cancer. Patient characteristics were compared using the Mann-Whitney U test and Fisher's exact test. Risk factors were assessed through Kaplan-Meier survival analysis and multivariable Cox regression.

Result: All 106 patients underwent surgical treatment, and among them, 9 developed invasive cancer. The incidence of invasive cancer was higher in the non-Tamoxifen group compared to the Tamoxifen group (11.9% vs. 6.3%), but the difference was not statistically significant (HR 2.031; 95% CI: 0.544-7.579; $p = 0.292$). Although the difference in invasive cancer incidence by histologic type was not statistically significant, pleomorphic LCIS showed a trend toward a higher risk of invasive cancer development compared to classic LCIS, with results approaching statistical significance (HR 3.856; 95% CI: 0.922-16.126; $p = 0.064$).

Conclusions: Pleomorphic LCIS showed a tendency toward a higher risk of invasive cancer development compared to classic LCIS. The incidence of invasive cancer was higher in the non-Tamoxifen gorup than in the Tamoxifen group. However, post-operative Tamoxifen use did not significantly reduce the risk of invasive cancer development.

Poster Presentation

Psychosocial Characteristics of Women with Hereditary Breast Cancer Adhering to Appropriate MRI Screening: the K-CASCADE Cohort Study

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Background: Regular yearly MRIs are recommended as risk management for women with hereditary breast cancer. However, there is little data on the psychosocial factors associated with appropriate MRI screening in women with hereditary breast cancer. Guided by the Health Belief Model, the study examined psychosocial predictors of MRI screening, using baseline data from the K-CASCADE, an international cohort study on HBOC.

Methods: Data collected from March 2021 to April 2024, from women with breast cancer, found to have a BRCA1 or BRCA2 pathogenic variant, and had bilateral or unilateral breast cancer surgery were analyzed (n = 255). Appropriate MRI screening was operationalized as breast MRI every 6-12 months. Perceived cancer risk (PCR) (as perceived susceptibility), fear of cancer recurrence (FCR), self-efficacy, and coping style (as cues to action) were analyzed.

Result: In women partaking in appropriate MRI screening (108 out of 156, 69.2%), PCR (5.24 ± 2.22) was midpoint level and FCR (18.41 ± 5.10) and self-efficacy (70.65 ± 15.89) were greater than midpoint. FCR showed a significant negative correlation with self-efficacy (r = -.218; $p < .01$), problem-focused coping (r = -.322, $p < .01$), and emotion-focused coping (r = -.255, $p < .01$), while it showed a positive correlation with PCR (r = .357; $p < .01$).

Conclusions: Roughly 30% of women were non-adherent to appropriate MRI screening. Findings suggest that FCR merits attention for appropriate MRI screening in women with hereditary breast cancer, especially over time. Education and supportive interventions that reduce fear perception in HBOC patients are needed.

Poster Presentation

Factors Related to Perceptual Congruence of Genetic Testing Among HBOC Patients: The K-CASCADE Cohort Study

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Background: Perceptual congruence and accurate awareness of genetic testing (GT) status is crucial for HBOC patients, enabling informed health decisions and effective health management. However, little is known on characteristics of persons who may have incongruent perceptions, i.e., not aware that they had GT. This study aimed to identify factors associated with perceptual congruence of GT among HBOC index cases.

Methods: From the enrolled index cases as of Oct 2024, sensitivity analysis was done for missing values, comparing the complete response dataset (n = 209) with the dataset where imputation with median/mode was applied (n = 519). The comparison, demonstrated consistent trends with no differences in significant variables. Therefore, we proceeded with the analysis using the imputed dataset. Baseline data from the K-CASCADE cohort study (https://kcascade.kr/) including perception of shared decision making (SDM) between healthcare provider and patient, fear of cancer recurrence (FCR), knowledge of HBOC, and lifestyle and sociodemographic characteristics, were analyzed by chi-squared tests and t-tests.

Result: Out of the 519 index cases, 76 (14.6%) had incongruent perceptions. The congruent perception group had significantly higher FCR scores (4.79 ± 1.31 vs 4.37 ± 1.47, $p = .032$) and higher total HBOC knowledge scores (13.13 ± 4.31 vs 11.63 ± 4.90, $p = .006$) compared to the incongruent perception group. In addition, perception of SDM was significantly higher in the congruent perception group (5.67 ± 1.16 vs 5.13 ± 1.58, $p = .005$). However, no significant differences were observed between the two groups on other variables, including lifestyle and sociodemographic characteristics.

Conclusions: The proportion of HBOC patients with incongruent perceptions of GT is noteworthy, suggesting the need for healthcare providers to provide targeted education and counseling. Findings suggest the role of FCR and knowledge on HBOC, which can provide insights into the role of genetic risk management. Future research should also explore the various factors associated with perceptual congruence to improve understanding and intervention.

Poster Presentation

Characteristics of Mammographic Breast Features from the Korean National Breast Cancer Screening Program

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Background: We examined the distribution of breast cancer screening final assessment result and breast features detected through mammograms in a nationwide data of Korean women.

Methods: This study used data from the National Breast Cancer Screening program in 2009-2010. Data from breast cancer screening results, includes information of 1) the final assessment results of mammography, 2) mammographic breast density, and 3) presence of other mammographic features, which were evaluated based on mammograms read by radiologists. We described the distribution of final assessment result, breast density, and prevalence of other mammographic features in the total screened population, and stratified analyses according to different age groups were further conducted.

Result: Among the total screened population, 72.6% had normal assessment results, increasing with age from 66.9% in the 40-49 age group to 82.8% in those ≥70 years. Benign disease accounted for 11.3%, with the highest prevalence in the 50-59 and 60-69 age groups (12.2%). The prevalence of incomplete results decreased with age (23.1% in the youngest group to 5.7% in the oldest group). Dense breasts (BI-RADS c or d) were observed in 43.2% of women, predominantly in younger age groups. Benign calcifications were the most common mammographic feature (9.5%), followed by asymmetry (4.0%) and mass (2.0%). Women with incomplete results had the highest proportion of dense breasts (74.5%). Among women with suspicious malignancy, the most common feature was mass (54.0%), while benign calcification prevalence increased with age. Breast density correlated with assessment results, with categories a and b associated with normal findings, and categories c and d with higher rates of benign disease and malignancy suspicion.

Conclusions: The study provides statistics on mammographic assessment results, breast density, and associated features in a large population-based screening program. The findings highlight the importance of targeted screening strategies for women with higher breast density and abnormal mammographic features.

Poster Presentation

Risk of developing skin cancer after irradiation in breast cancer patients: a nationwide cohort study in South Korea

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Background: Although previous studies have reported the risk of developing skin cancer following irradiation, large-scale, long term follow-up data remains limited. Therefore, this study aims to evaluate the risk of skin cancer, including melanoma and non-melanoma, based on irradiation in the breast cancer patients in South Korea.

Methods: This retrospective nationwide cohort data was extracted from the Korean Health Insurance Review and Assessment services database from 2009 to 2012. All patients with ductal carcinoma in situ (DCIS) and invasive breast cancer were included in this study. We investigated the incidence of skin cancer in patients following irradiation and analyzed the associated risk factors.

Result: Among the 37,957 patients that were eligible for study, 11,434(30.1%) patients underwent radiotherapy, while 26,523(69.9%) patients did not. Median follow-up was 137.74 months. Before matching, 281 patients who received irradiation developed skin cancer (1.06%, 281/26,523), while 121 patients who did not receive irradiation developed skin cancer (1.06%, 121/11,434). After matching, the incidence of developing skin cancer between two groups were not different (Receiving irradiation 1.02%, 101/9,928, whereas not receiving irradiation 0.97%, 96/9,928, $p = 0.720$). Before and after matching, irradiation was not a significant risk factor for developing skin cancer ($p = 0.062$ and $p = 0.604$, respectively). Multivariable Cox proportional hazard model showed that age, lymphedema, and precancerous lesions such as mole, actinic keratosis, or Bowen's disease, were significant risk factors for developing all skin cancers.

Conclusions: According to this large real-world population cohort, contrary to our concern, there was no difference in the risk of skin cancer associated with irradiation in breast cancer patients.

Poster Presentation

A Lifelong Cascade Decision Coaching digital health service for comprehensive genetic care and hereditary cancer risk reduction: study protocol

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Background: Familial communication is essential in Hereditary Breast Ovarian Cancer syndrome (HBOC) for medical management and cancer prevention. However, 55.6% do not communicate in Korea, and opportunities for cascade genetic testing (CGT) and follow-up are lost. In addition to family communication issues, clinicians lack structural support in keeping track of family disclosure status/developments and life stages, which further limits CGT. This 4-year study seeks to create a digital health service model, i.e., the Lifelong Cascade Decision Coaching (LCDC), for clinicians caring for persons with a HBOC pathogenic variant; to enhance family disclosure and uptake of CGT. This service model seeks to establish 1) a digital health platform that streamlines status updates and offers supportive guidance for clinicians, 2) collect and integrate patient self-report responses with clinical data; and 3) train LCDC coaches in decision coaching for pilot implementation.

Methods: LCDC digital health platform [YR01-02]: Prompts for clinical discussion will be created via literature review (e.g., according to relative sex, age, life contexts). Exploratory interviews with clinicians will be conducted for needs assessment and clarification of LCDC strategies (e.g., enabling automatic pedigree-based updates of health and relative CGT status). Platform & mobile app will be developed (for patient self-report data collection). Patient self-report data parameters will be identified from the K-CASCADE study (e.g., psychosocial status, barriers to communication, perceived risk, etc.) and relevant literature. [YR01] Decision coaching [YR02]: The literature will be reviewed to identify and apply decision coaching principles and explore optimal timepoints for decision-making support. LCDC coach training will be developed.

Result: The LCDC will be piloted in two sites [YR03-04]. Outcomes will include decisional conflict, disclosure intention, CGT intention, etc.

Conclusions: This study can potentially contribute to establishing an international standard for comprehensive follow-up of HBOC patients and enhancing GT uptake of at-risk relatives.

Poster Presentation

Five-year Overall Survival and Local Recurrence Among Operable Breast Cancers in A Multiethnic, Non-subspecialized Setting in Bintulu, Sarawak from 2015-2019

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Background: This study aims to assess the surgical outcomes and trends for operable breast cancers in terms of overall survival and recurrence-free survival in a multiethnic, non-subspecialized setting in Bintulu Hospital, Sarawak, Malaysia, from 2015 to 2019.

Methods: All women who underwent any form of breast surgery (breast-conserving or mastectomy) from 2015 to 2019 were identified, and clinical records were assessed retrospectively. Stages 1 to 4 breast malignancies that require surgical resection with or without neoadjuvant or adjuvant therapy (chemotherapy, radiotherapy, hormonal therapy) were included. Survival distributions and recurrence-free distributions were analyzed using Kaplan-Meier curves.

Result: Seventy-six patients were included in this study, with an age range of 22 to 77 years. The mean age at diagnosis was 50.25 (± 11.6). Half of the women were of Iban ethnicity, followed by Melanau ethnicity (18.4%) and Chinese (14.5%). At initial presentation, the majority of women presented with a breast lump (78.9%) and were Stage 1 disease (59.2%). The most common subtype was Luminal A (57.9%), followed by Non-Luminal B (17.1%) and Basal-like subtype (17.1%). Adjuvant treatment was required by 86.8% of the women, however, 31.6% were lost to follow-up. The overall survival analysis was based on 16 deaths among 76 patients (21%). Three-year and five-year survival rates were 85.4% and 75.3% respectively. Recurrence-free survival (RFS) analysis was based on 11 recurrences amongst 76 patients. The five-year RFS rate was 84.7%. The median time taken from diagnosis to surgery was 23 days. The stage at presentation was the sole significant factor that impacted 5-year survival but not the recurrence-free survival ($p < 0.001$).

Conclusions: Over the 5 years, a trend of an increasing number of operable breast cancers was noted, particularly Stage 1 patients. Overall survival among operable breast cancers in our facility is comparable to other tertiary centers in the country regardless of its non-subspecialized setting.

Clinicopathologic Characteristics of Breast Cancer in Patients Under 40: A 10-Year Experience

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Background: While breast cancer has historically been associated with older women, a notable increase in incidence among younger populations has been observed worldwide. In the Philippines, limited studies have focused on breast cancer in women under 40 years old, highlighting the need for a comprehensive investigation into its epidemiology and management within this age group.

Methods: A descriptive review of medical records for all eligible young female breast cancer patients was conducted. Data on demographics, histopathology, disease stage, and treatment modalities were extracted. Descriptive statistics were utilized to summarize these variables, identifying patterns and correlations pertinent to this population.

Result: We analyzed 135 Filipino individuals with breast cancer, consisting of 133 females and 2 males, with a mean age of 34.6 years (range: 13-40 years). The majority were in their 30s, emphasizing the relatively young age of this population. Early stages of breast cancer were the most prevalent, with Stage IIA (n = 29, 23.8%), Stage 0 (n = 23, 18.9%), and Stage IIB (n = 19, 15.6%) being the most common. Histopathologic diagnoses were primarily invasive ductal carcinoma (n = 109, 80.1%), followed by ductal carcinoma in situ (n = 16, 11.8%) and papillary carcinoma (n = 4, 2.9%). Surgical management was predominantly modified radical mastectomy (MRM) or total mastectomy, performed in 88 individuals, while 16 underwent breast-conserving surgery.

Conclusions: This 10-year review highlights the predominance of early-stage disease, particularly Stage IIA and Stage 0, and the high prevalence of invasive ductal carcinoma in young Filipino breast cancer patients. Despite the early-stage diagnosis, the majority still underwent a mastectomy.

Trends and projections of breast cancer incidence for 2040 in Hanoi, Vietnam

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Background: Breast cancer is the most common cancer among women in Vietnam. This study provided trends in breast cancer incidence in Hanoi, Vietnam from 2012 to 2022 and projected cases and age-specific incidence rates for 2040.

Methods: Breast cancer incidence data were obtained from the Hanoi Cancer Registry and projected population data from General Statistics Office. Annual percentage changes (APCs), average annual percentage changes (AAPCs) were computed using jointpoint regression program, with adjustments made to exclude year 2021 impacted by COVID-19 to ensure the accuracy of the trends. Projections for incidence numbers and age-specific incidence rates were estimated using a Poisson regression model with linear trends.

Result: Between 2012 and 2022, a total of 16,205 breast cancer cases were recorded in Hanoi, averaging 1,350 cases per year. Incidence rates rose significantly from 2012 to 2018 (APC: 4.82%, 95% CI: 3.07-7.69) before declining sharply from 2018 to 2022 (APC: -5.23%, 95% CI: -10.25 to -2.50). The overall AAPC for 2012-2022 was 0.68% (95% CI: -0.68-1.88). Projections for 2040 estimate 3,007 cases (95% CI: 241.27-3,492.15), a 123% increase from the 2012-2022 annual average. Middle-aged women (45-54 years) are projected to maintain high incidence rates, peaking at 139/100,000 in the 45-49 age group, while older women (70-79 years) will see significant increases, exceeding 180/100,000 in the 70-74 age group.

Conclusions: Breast cancer cases are projected to more than double by 2040, driven by increased incidence in middle-aged and older women. These findings highlight the need for age-targeted strategies in the context of Vietnam's aging population.

Exploring the Molecular Subtypes of Breast Cancer Across Vietnam: Insights from a Large-Scale Study

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Background: Understanding the molecular subtypes of breast cancer is crucial for predicting prognosis and treatment strategies. However, there has never been a study evaluating the molecular classification of breast cancer in Vietnam using a large, nationwide population.

Methods: A cross-sectional study was conducted, recruiting 6,388 breast cancer patients from January to December 2022 at six major hospitals in Vietnam: National Cancer Hospital, Bach Mai Hospital, Hanoi Oncology Hospital, Cho Ray Hospital, Ho Chi Minh City Oncology Hospital, and the University Medical Center Ho Chi Minh City. The St. Gallen molecular classification system (2015) was used to identify the molecular subtypes of breast cancer.

Result: A total of 4,550 out of 6,388 BC patients had available immunohistochemistry results for analysis. The median age at diagnosis was 51.0 ± 11.5 years. Luminal A (33.6%) was the most common subtype, followed by Luminal B/Her2+ (21.4%), Luminal B/Her2- (17.2%), HER2-positive (16.0%), and triple-negative breast cancer (TNBC) (11.8%). The most frequent stage at diagnosis was stage 3 (44.6%). Molecular classification of breast cancer showed significant regional differences in Vietnam. In the northern region, Luminal A accounted for 40% of all diagnosed breast cancer cases, while TNBC was more prevalent in the southern region, with a rate of 13.7%. These molecular subtypes also exhibited significant variation across different stages of diagnosis. TNBC subtypes were found in very few cases of ductal carcinoma in situ (4/93 cases).

Conclusions: This is the first study on the molecular subtypes of breast cancer in Vietnam based on a large population. Our study highlights regional variations in these characteristics and differences across diagnostic stages, with carcinoma in situ showing very few TNBC subtypes. The results provide valuable insights for improving prevention, screening, diagnosis, and treatment of breast cancer in Vietnam, particularly in the context of breast cancer being a major public health challenge in the country.

Elucidation of novel β-catenin-driven aerobic glycolysis pathway in Triple Negative Breast Cancers

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Background: Aerobic glycolysis has emerged as a crucial regulator of cancer cell migration and metastasis in various cancers including triple-negative breast cancers (TNBCs). Characterization of molecular pathways associated with increased aerobic glycolysis in TNBCs could provide key mechanistic insights into the regulators of TNBC progression. Here, we demonstrated for the first time the theranostic potential of the β-catenin-PFKP-LDHA-MCT1 axis that drives aerobic glycolysis in TNBCs.

Methods: The β-catenin and related glycolytic proteins (PFKP, LDHA, and MCT1) were analyzed in TNBC patients (n = 98) using immunohistochemistry (IHC). Prognostic significance was assessed through Kaplan-Meier survival analysis and Cox regression. Additionally, we compared the efficacy of two β-catenin inhibitors, XAV939 and Axitinib, in suppressing β-catenin-driven aerobic glycolysis in both in vitro and in vivo TNBC models.

Result: We showed that β-catenin and its associated glycolytic proteins (PFKP, LDHA, and MCT1) are overexpressed in more than 50% of TNBC cases. Kaplan-Meier survival analysis and Cox regression revealed that elevated β-catenin expression, combined with high levels of other glycolytic proteins (β-catenin+MCT1high; β-catenin+PFKP+MCT1high; β-catenin+LDHA+MCT1high; and β-catenin+PFKP+LDHA+MCT1high), was linked to poor prognosis, highlighting the role of β-catenin-regulated aerobic glycolysis in TNBC aggressiveness. Additionally, we found that Axitinib, compared to XAV939, more effectively reduced β-catenin and glycolytic protein expression, lactate production, cell migration, invasion, and colony formation in TNBC cell lines.

Conclusions: In conclusion, this study is the first to identify a novel β-catenin-regulated aerobic glycolysis pathway in TNBC, demonstrating that Axitinib is a more effective inhibitor of this pathway, compared to XAV939.

Hematopoietic stem cells (HSCs) infiltration and its impact on patient prognosis in breast cancer following neoadjuvant chemotherapy (NAC)

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Background: Hematopoietic stem cells (HSCs), also known as blood stem cells, are self-renewable cells that can develop into all types of blood cells. They are found in bone marrow and peripheral blood. However, the clinical relevance of HSCs in the breast cancer (BC) tumor microenvironment (TME) remains unknown. The aim of this study is to elucidate the clinical significance of HSC infiltration in the TME of BC.

Methods: In silico analyses were conducted on 5,176 BC patients, including large independent cohorts; The SCAN-B and the METABRIC, as well as multiple single-cell sequenced cohorts. HSC were identified through the xCell algorithm, and patients with high HSC levels were defined as those with HSC expression above the median in each cohort.

Result: Fraction of HSCs ranged from 0.04-0.50% of all cells in BC TME by single cell transcriptome analyses. HSC infiltration was not correlated with its lineage cells, common myeloid progenitor cells and common lymphoid progenitor cells. HSC high BC enriched TGF-β signaling and angiogenesis gene sets. On the other hand, all the cell proliferation-related gene sets in Hallmark collection enriched to low HSC BC, and HSC infiltration was significantly lower in high histological grade BC. HSC high patients were significantly associated with better overall survival compared to low patients in ER+/HER2- (both $p < 0.02$), but not in TNBC. Interestingly, there was no survival difference by HSC infiltration in ER+/HER2- when NAC was used. Together with our finding that HSC in the TME markedly reduced by NAC, we cannot help but speculate that the loss of HSCs by NAC may have contributed to lose their benefit in patient prognosis.

Conclusions: This is the first report that quantified HSCs using transcriptome in TME and demonstrated that they associated inversely with cell proliferation and with better survival in ER+/HER2- BC patients. Survival benefit of HSC infiltration was lost with NAC that reduce its infiltration.

Poster Presentation

EMP2 as a Regulator of Stemness in Triple-Negative Breast Cancer

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Background: Despite advances in therapeutic agents improving treatment outcomes, triple-negative breast cancer (TNBC) still needs more specific targeted treatments. Our previous studies highlighted DEL-1 as a potential therapeutic target and biomarker for TNBC. In this study, we demonstrated EMP2 as a downstream of DEL-1 and as a regulator of stemness in TNBC.

Methods: DEL-1 expression was silenced using siRNA across multiple TNBC cell lines, followed by RNA sequencing to identify potential candidate gene groups. EMP2 was most upregulated in DEL-1 knockdown TNBC cell lines, and selected as the final candidate gene. Subsequent knockdown experiments targeting both DEL-1 and EMP2 were conducted to elucidate their roles in cellular functions. Furthermore, the expression of cancer stem cell markers, ALDH and Nanog, was evaluated after DEL-1 knockdown.

Result: DEL-1 and EMP2 expression levels were all increased in TNBC cell lines compared to normal breast cell MCF10A. RNA sequencing revealed an inverse relationship between two genes, which was substantiated by separate knockdown experiments. Knockdown of EMP2 using siRNA in MB468 and MB231 resulted in decreased cell proliferation in both groups. Colony formation assays is conducted to evaluate the survival and proliferative capacity of individual cells, demonstrated improved colony formation in EMP2 knockdown group. In addition, we investigated the expression of cancer stem cell markers ALDH and Nanog in MB231 cells and found that their expression level increased after DEL-1 knockdown.

Conclusions: This study demonstrated significant overexpression of DEL-1 and EMP2 in TNBC cell lines and revealed an inverse relationship between the two molecules. Plus, we found that EMP2 is associated with colony formation and suggest that this process occurs through the regulation of cancer stemness. In conclusion, we demonstrated that EMP2 functions down- stream of DEL-1 and act as a regulator of stemness in TNBC. Our findings suggest that EMP2 could be a promising therapeutic target for TNBC.

The diagnostic complexity of invasive lobular carcinoma; A study on CDH1 mutations, E-cadherin IHC and morphology

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Background: Invasive lobular carcinoma (ILC) exhibits distinct biological and clinical characteristics compared to invasive breast carcinoma of no special type (IBC-NST), highlighting the importance of accurate diagnosis. However, the reliability and reproducibility of diagnosing ILC based on histological evaluation and E-cadherin immunohistochemistry (IHC) remain limited. This study analyzed targeted next-generation sequencing (NGS) data from breast cancer cases, integrating E-cadherin IHC findings and morphological features to address these challenges.

Methods: We reviewed 126 consecutive breast cancer cases that underwent targeted NGS (Illumina TSO500, 16 selected CDH1 regions) between 2022 and 2024 at a single institution. Of these, 15 cases were included based on either a histological diagnosis of ILC or the presence of a CDH1 mutation.

Result: Among the 9 cases histologically diagnosed as ILC, CDH1 mutation was detected in only 1 case (Q23*), while the remaining 8 cases lacked detectable CDH1 mutation. Conversely, 6 cases with CDH1 mutations (E880K, n = 4; L630V, n = 1; R63*, n = 1) were not histologically classified as ILC (IBC-NST, n = 5; mucinous carcinoma, n = 1). E-cadherin IHC results for these 6 cases varied: intact (n = 3); loss (n = 1); aberrant (n = 1); not available (n = 1). Among the 9 ILC cases, eight demonstrated E-cadherin loss, while one showed intact E-cadherin expression despite exhibiting clear lobular morphology.

Conclusions: Even in morphologically clear ILC cases with E-cadherin loss, the detection rate of CDH1 mutations via targeted NGS was low (11.1%, 1/9). In contrast, CDH1 mutations were frequently observed in cases lacking histological features suggesting ILC (85.7%, 6/7). These findings highlight the limitations of current diagnostic methods and the need for robust diagnostic approaches for ILC.

Serial analysis of immune-related gene signature in early triple-negative breast cancer

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Background: The standard treatment in early triple-negative breast cancer (TNBC) is administration of pembrolizumab with chemotherapy, which has dramatically improved the pathologic complete response (pCR) rate and survival outcomes. There is a significant role of immune-modulating agent during treatment of TNBC, and there may be a persistent change of immune-related activity during neoadjuvant chemotherapy. In this study, we analyzed the dynamic change of immune-related gene pathway during neoadjuvant chemotherapy.

Methods: Between November 2021 to November 2022, serial whole blood was prospectively collected in 14 early TNBC patients who received neoadjuvant paclitaxel-carboplatin (PC) followed by doxorubicin-cyclophosphamide (AC) or AC followed by docetaxel. Blood was sampled before chemotherapy, after 6 weeks and 12 weeks from the enrollment date. For comparison, baseline whole blood was sampled from 3 metastatic TNBC patients. Total RNA was extracted using whole blood and analyzed using Nanostring Pancancer Immunology Panel.

Result: Total 24 samples were eligible for analysis. After 6 and 12 weeks of neoadjuvant chemotherapy, follow-up blood samples showed upregulation of immune response and immune system process compared to baseline. NK cell function, cell cycle and senescence signature showed upregulation during neoadjuvant chemotherapy. Cytotoxicity signature showed gradual increase during chemotherapy. Antigen presenting process (APC) signature activity decreased in the first 6 weeks, but showed an increase after the next 12 weeks. In contrast, T cell and B cell signature showed sharp decrease during neoadjuvant chemotherapy. Between early and metastatic TNBC patients, APC signature was underexpressed in metastatic patients when compared to early TNBC.

Conclusions: Our study suggest that there is a immune-related change during neoadjuvant chemotherapy in early TNBC. Combination of immune-modulating agent with cytotoxic chemotherapy may influence this dynamic change, and may be related to positive role of immune-modulating agent. Difference of immune-related gene signature between metastatic and early TNBC may be related to different tumor response of immune-modulating agent.

Regulation of major histocompatibility class-I gene methylation using DNA methyltransferase inhibitor and PD-L1 inhibitor in triple negative breast cancer

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Background: Despite advancements in immunotherapy, there are few studies on the effect of DNA methyltransferase (DNMT) inhibitors and immunotherapy on major histocompatibility (MHC) class-I gene methylation in triple negative breast cancer (TNBC).

Methods: The relationship between the expression of the MHC class-I gene and DNA methylation was analyzed using data from The Cancer Genome Atlas (TCGA). The expression of DNMTs and MHC class-I genes was analyzed in breast cancer tissue from TNBC patients and TNBC cell lines. DNA methylation analysis of the MHC class-I gene was performed with pyrosequencing in TNBC tissues and methylation specific PCR in TNBC cell lines. TNBC cell lines were treated with DNMT inhibitors Decitabine and Zebularine and PD-L1 inhibitor Atezolizumab, and then changes in the expression of DNMT, MHC-I gene, and methylation patterns of MHC class-I gene were analyzed.

Result: TCGA data analysis confirmed that there was an inverse correlation between DNA methylation and mRNA expression of the MHC class-I gene, but analysis in TNBC patients in this study did not show this correlation. After treatment with Decitabine, the expression of HLA-A, HLA-B, and HLA-C increased in BT-20 but decreased in BT-549 and MDA-MB-231. After Zebularine treatment, the expression of HLA-A and HLA-B were increased only in BT-549. After treating TNBC cell lines with PD-L1 inhibitor alone, the expression of the MHC class-I gene was increased in BT-549. After treatment of TNBC cell lines with a combination of Decitabine and a PD-L1 inhibitor, the expression of the HLA-A, HLA-B and HLA-C was increased in MDA-MB231.

Conclusions: The treatment responses to DNMT inhibitors and PD-L1 inhibitor were different depending on the characteristics of TNBC and the types of drugs, suggesting that the treatment target needs to be applied differently. Further study is needed to determine specific treatment targets and appropriate drugs according to the characteristics of TNBC.

Spatial analysis of tumor immune microenvironment of TNBC with different neoadjuvant chemotherapy outcomes: multiplex fluorescent immunohistochemistry

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Background: Triple-negative breast cancer (TNBC) is characterized by aggressive biological behavior and poor prognosis. However, TNBC exhibits higher immunogenicity than other breast cancer subtypes, making it more responsive to immunotherapy. Neoadjuvant chemotherapy (NAC) is the standard treatment for early high-risk TNBC; however, reliable biomarkers for predicting NAC response remain elusive. Tumor-infiltrating lymphocytes (TILs) are recognized as predictive markers of NAC response in TNBC, yet discordant cases remain, such as tumors with high TIL levels but poor response.

Methods: This study aimed to further elucidate the immune environment of TNBC by analyzing TILs, programmed death-ligand 1 expression, and tumor-stroma ratio using diagnostic tissue slides from 16 patients with TNBC treated with NAC. Multiplexed immunohistochemistry was employed to investigate immune cell composition and spatial interactions within the tumor microenvironment.

Result: Our analysis revealed significant differences in immune cell composition and distribution between patients achieving pathologic complete response (pCR) and those with residual disease (non-pCR). The pCR group exhibited significant enrichment of cluster of differentiation (CD8) + immune cells (ICs) and CD20+ ICs in both tumor and stromal regions, suggesting their critical role in mediating an effective NAC response. In contrast, non-pCR cases showed higher proportions of immunosuppressive CD4+FOXP3+ IC, particularly in the tumor region. High TIL levels were associated with pronounced B-T cell interactions, as evidenced by the significant clustering of CD20+ and CD8+ ICs near tumor cells, highlighting their cooperative role in antitumor immunity.

Conclusions: In conclusion, our findings suggest that tumoral CD8+ and CD20+ ICs are pivotal determinants of NAC response in TNBC. The enrichment of CD20+ ICs under high TIL conditions underscores the potential role of B-T cell interactions in shaping immune-mediated chemotherapy responses. These insights provide a foundation for leveraging immune-based biomarkers to stratify patients with TNBC and optimize NAC outcomes.

Mutational landscape associated with expression of PD-L1 in triple-negative breast cancer

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Background: Triple-negative breast cancer (TNBC) is an aggressive subtype of breast cancer with a poor prognosis. Neoadjuvant chemotherapy with immunotherapy has become a standard treatment in TNBC. PD-L1 expression plays a pivotal role in determining the use of immunotherapy, and genetic variants influencing PD-L1 expression warrant further investigation

Methods: Formalin-fixed paraffin-embedded (FFPE) tumor tissues from 38 TNBC patients at Pusan National University Yangsan Hospital were analyzed. PD-L1 expression was assessed via immunohistochemistry, categorizing samples as positive (≥ 1% PD-L1 expression in stromal tumor-infiltrating immune cells) or negative. Whole exome sequencing (WES) was conducted on tumor tissues, with stringent criteria applied to filter somatic variants using GATK4. Mutational profiles were analyzed with maftools, identifying co-occurring mutations and mutational signatures compared to COSMIC.

Result: Of the 38 samples, 22 were PD-L1 positive, and 16 were PD-L1 negative. Comparative mutational profiling revealed significant differences in somatic variants between groups. FAT4 and TRDN mutations were identified in PD-L1 negative group. TNFRSF10C, CACNA1A, CCDC88C, PKD1L1, CKD11A, CFAP46, and LAMA5 mutations were identified in PD-L1 positive goup.

Conclusions: This study identified genetic variants associated with PD-L1 expression in TNBC using WES, contributing to understanding the molecular underpinnings of immunotherapy response. These findings may inform future therapeutic strategies and patient stratification in TNBC.

Comprehensive Genomic Analysis of CD274 (PD-L1) Genetic Variations and Their Prognostic Implications in Breast Cancer

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Background: PD-L1 (CD274 gene) is a key immune checkpoint molecule; high expression often correlates with poor prognosis in cancers, including breast cancer. However, the genetic correlations between CD274 variations and breast cancer subtypes and their impact on patient survival remain unclear. This study comprehensively investigated the CD274 genetic landscape in breast cancer, correlating expression and alterations with clinico-pathological parameters and survival.

Methods: We analyzed publicly available data from the TCGA database, focusing on breast cancer. CD274 mRNA expression levels were assessed and correlated with clinicopathological features using appropriate statistical method. Gene Ontology (GO) and KEGG pathway analyses were performed to elucidate CD274's functional roles. Genetic alterations (mutations and copy number alterations) were analyzed using cBioPortal, and survival analysis was conducted using KMplot to assess the prognostic significance of CD274 expression. Network analysis (STRINGdb) and co-expression analysis (ProteomeHD) explored CD274's functional interactions with key genes in triple-negative breast cancer (TNBC). Finally, mutation types and frequencies were determined using COSMIC data.

Result: High CD274 mRNA expression was significantly correlated with the basal-like and HER2-enriched subtypes of breast cancer ($p < 0.01$ for both). Survival analysis revealed a hazard ratio of 1.45 for overall survival (log-rank $p = 0.003$), indicating that high CD274 expression was significantly associated with worse prognosis. Functional enrichment analysis pointed to its involvement in immune response pathways, including T cell activation and cytokine signaling. Network analysis identified key interactions with EGFR, ERBB2, and PGR, particularly pronounced in TNBC. Missense mutations constituted 60% of observed CD274 mutations, with a less frequent occurrence of frameshift deletions.

Conclusions: Our study provides comprehensive evidence supporting the significant role of CD274 in breast cancer progression and prognosis. Its association between genetic alterations and survival highlights its potential as a biomarker and therapeutic target. Further investigations are warranted to explore the clinical implications of these findings and to develop targeted therapies based on CD274 status.

Evaluation of Combined cfDNA and CA15-3 Change Rates as Predictive Biomarkers for Treatment Response in Metastatic Breast Cancer: A Prospective Study

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Background: Metastatic breast cancer is a leading cause of cancer-related mortality in women. Accurate evaluation and monitoring of treatment response are crucial for improving patient outcomes. Traditional methods, such as imaging studies and CA15-3, have limitations, including delayed assessments and low sensitivity. Cell-free DNA (cfDNA), derived from tumor cells, shows dynamic changes in response to treatment and offers a novel approach for monitoring tumor dynamics. This study evaluates the potential of cfDNA as a biomarker for treatment response in metastatic breast cancer.

Methods: From March 2022 to December 2024, a single-center prospective study was conducted on 14 patients with metastatic breast cancer. A total of 69 blood samples were collected to measure cfDNA and CA15-3 levels, with imaging studies performed to evaluate treatment responses. Biomarker change rates were analyzed to predict treatment responses (PR/SD vs. PD) and compared with imaging findings.

Result: The cfDNA and CA15-3 change rates were analyzed individually, yielding AUC values of 0.32 and 0.34, respectively, indicating limited predictive power. When combined, the model improved significantly, achieving an AUC of 0.73. This suggests that cfDNA and CA15-3 change rates complement each other in predicting treatment responses and provide a more robust approach than single-biomarker analyses.

Conclusions: The combined analysis of cfDNA and CA15-3 change rates improved predictive performance (AUC = 0.73), demonstrating potential as a complementary tool for monitoring treatment response. However, the study's small cohort and limited samples are significant constraints. Larger studies are required to validate these findings and assess their clinical utility.

Comparative Genomic and Molecular Characterization of Invasive Ductal and Lobular Breast Carcinomas Through Bioinformatics Approaches

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Background: Invasive (Infiltrating) breast carcinoma can be divided into molecular and morphologic characteristics. Invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC) are the two most common subtypes. IDC is the most prevalent subtype accounting for up to 80% and ILC is the second most common subtype accounting for up to 15%. Although IDC and ILC are well known for their distinct morphological and clinical characteristics, the underlying genetic differences are not yet fully understood. The goal of this study is to elucidate the genetic differences between IDC and ILC through an analysis of frequently mutated genes and their functional interactions.

Methods: This study analyzed the top 20 frequently mutated genes in IDC and ILC using publicly available datasets, including the Catalogue of Somatic Mutations in Cancer (COSMIC) database. The ten most frequently mutated genes for each subtype were identified and analyzed for comparison. In addition, Search Tool for the Retrieval of Interacting Genes/Proteins (STRING)-based network analysis was performed to explore protein-protein interactions and identify key candidate genes involved in breast cancer pathogenesis.

Result: This study revealed distinct mutational landscapes in IDC and ILC. In IDC, the most frequently mutated genes included PIK3CA (27.5%), TP53 (23.9%), GATA3 (8.1%), ESR1 (6.1%), LRP1B (5.3%), ZFHX3 (4.9%), KMT2C (3.3%), FBRFL1 (3.1%), FBXW7 (1.4%), and ALK (1.2%). Conversely, ILC displayed a distinct mutational profile, with CDH1 (42.4%), PIK3CA (35.3%), ERBB2 (12.6%), TP53 (7.8%), KMT2C (7.1%), TBX3 (7.1%), MAP2K4 (3.1%), PBRM1 (1.7%), and ARID1A (1.6%) being the most frequently altered genes. STRING-based pathway analysis further identified key genes with potential roles in driving the distinct tumorigenesis pathways of IDC and ILC.

Conclusions: This study highlights the distinct genetic differences between IDC and ILC, emphasizing key mutations in CDH1, PIK3CA, TP53, and ERBB2. Further investigations, including next-generation sequencing (NGS) and functional assays, are warranted to validate these findings and explore their clinical implications.

Secretory breast carcinoma: A case report and review of the literature

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Background: Secretory breast carcinoma (SBC) is very rare, accounting for less than 0.15% of all breast malignancies, so there is no consensus for optimal treatment. We report a rare case of secretory breast carcinoma with review of the literatures of its characteristics and treatment.

Methods: A 48-year-old premenopausal woman presented with a palpable lump in her right breast. She was diagnosed with secretory breast carcinoma through a core needle biopsy and underwent a partial resection of right breast with sentinel lymph node biopsy.

Result: The immuno-histochemistry (IHC) showed periodic acidSchiff (PAS) negative, D-PAS negative, and negative results for estrogen, progesteron and HER2 receptors. The tumor was negative for cytokeratins AE1/3 and partly positive for S100. Pan-TRK (EPR17341) staining was positive. The size of the tumor was 2.2 cm and three sentinel lymph nodes were free of metastases. The patient refused adjuvant radiation therapy and remains disease-free 8 months after surgery.

Conclusions: According to the 2002 World Health Organization classification of breast tumors, SBC is a rare, low-grade, translocation-associated invasive carcinoma. SBCs are slow growing tumors and generally have a good prognosis. Although the immunophenotype of SBCs was usually known as triple negativity, recent studies showed that a significant proportion of SBCs presented as ER and/or PR positivity. The reported frequency of triple-negative SBCs ranged from 38.6 to 65.4%. Curative surgery remains the primary therapeutic option, but the optimal procedures for the breast and axillary require further investigation. Generally, the tumors are triple negative, so hormonal treatment or targeted anti-HER2 therapies are not considered in most cases. Adjuvant chemotherapy is often used, especially in patients with node-positive disease. Because of characteristic translocation t (12;15) in SBC, further research for a specific balanced NTRK3 tyrosine kinase inhibitor might be a new targeted treatment of this tumor.

Phyllodes Tumour of The Breast: Clinicopathologic Analysis and Its Implication on Tumour Recurrence

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Background: Phyllodes tumours represent approximately 1% of all breast neoplasms. These fibroepithelial lesions are recognized for their unpredictable clinical behaviour. Over the past several decades, research has focused on identifying key factors associated with recurrence; However, even the resection margin has yet to be conclusively linked to its recurrence risk. The aim of this study is to identify the clinicopathological factors related to recurrence of phyllodes tumour.

Methods: The data of 63 phyllodes tumours (22 benign, 28 borderline and 12 malignant) that were surgically excised at our hospital between 2019 and 2024, were reviewed. Follow-up information including clinical radiological and pathology reports were retrieved.

Result: Majority of cases were benign phyllodes tumour. Borderline and malignant phyllodes represent 35% and 11% respectively. Mean age of diagnosis was 44-year-old. 14.5% of cases had recurrent phyllodes and majority of them were from malignant group. Two of the cases had recurred as distance metastases. Analysis of tumour margins revealed that more than half of the cases had positive margins (defined as ink on margin or margin <1 mm), with 16.2% of these cases showing recurrence. However, statistical analysis revealed no significant correlation between margin status and tumour recurrence ($p=0.407$). In contrast, the presence of necrosis showed a significant correlation with tumour recurrence ($p<0.01$), while other histological features, such as mitotic rate, infiltrative border, and degree of stromal proliferation, were not significantly associated with recurrence.

Conclusions: Surgical margin status does not appear to influence the recurrence rate in phyllodes tumours. However, the presence of necrosis is strongly associated with tumour recurrence, highlighting the need for closer monitoring and potentially more aggressive management.

Poster Presentation

Gene Expression Differences by Race and IHC Subtypes: Impact on Breast Cancer Survival Analyzed using Volcano Plots

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Background: Breast cancer (BC) is a diverse disease shaped by genetic and racial factors. Exploring gene expression across racial groups and IHC subtypes can reveal insights into tumor biology and survival. This study aimed to identify gene expression patterns linked to death in BC by race and IHC subtypes.

Methods: Clinical and RNA-Seq data from 1108 BC in the Breast Invasive Carcinoma database (TCGA) via cBioPortal were analyzed. Patients lacking RNA-Seq data were excluded. Racial groups (Asian, Black, and White) and IHC subtypes (TNBC, HER2+, and Luminal) were defined. Differential expression analysis compared deceased versus alive patients, categorizing genes as overexpressed, underexpressed, or not-significant using volcano plots. Analyses were conducted in R with DESeq2.

Result: We included 1097 BC, 6.0% were Asian, 18.1% Black, and 75.9% White. Subtypes included 4.0% HER2+, 10.6% TNBC, and 40.6% Luminal. Overall, 86.2% were alive, and 13.8% were deceased. From 19,890 genes analyzed, 17 were downregulated, and 6 were upregulated. NOS1 was elevated in White and Asians, while SPRR2E was linked to Blacks and TNBC. Asians had 1 downregulated gene (NQO1) and 62 upregulated, being the most relevant KCNA6. Black patients had 18 downregulated and 17 upregulated genes. Whites had 19 downregulated, including ALDH3A1 and MYOC, and 2 overexpressed. TNBC had 5 downregulated and 7 upregulated genes (RPH3A). HER2+ patients had 1 downregulated (KCNH2) and 19 elevated, such as PAH and C1QL2. Luminal subtype had 12 downregulated genes, including KRT1.

Conclusions: Upregulated NOS1 was linked to death in White and Asians while SPRR2E in Blacks and TNBC. Besides, for Asians downregulated NQO1 and upregulated KCNA6 were associated with death. HER2+ primarily had overexpressed genes, unlike Luminal which were underexpressed. These findings underscore the importance of incorporating germinal and somatic genes into BC management to address racial and subtype-specific expression profiles.

Poster Presentation

Unveiling Therapeutic Targets and Molecular Mechanisms in Taiwanese Breast Cancer

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Background: Breast cancer is the most prevalent cancer among women in Taiwan, with unique molecular characteristics and an earlier onset compared to Western populations. Despite advancements in treatment, there remain unmet clinical needs for personalized therapies. This study aims to integrate functional proteomics and next-generation sequencing (NGS) to uncover genetic and proteomic insights specific to Taiwanese breast cancer patients.

Methods: Our study involved 61 Taiwanese breast cancer patients, analyzed through functional proteomics and NGS techniques, including tandem mass tag (TMT) labeling, mass spectrometry, whole-exome sequencing (WES), and targeted sequencing. Genomic data were correlated with protein expression profiles to identify key molecular mechanisms. Statistical and bioinformatic analyses were applied to evaluate trans correlations between genetic alterations and proteomic changes.

Result: Among the 61 Taiwanese breast cancer cases analyzed, 29 were HR+/HER2-, 16 HR+/HER2+, 9 HR-/HER2+, and 7 HR-/HER2-. Pathogenic mutations were identified in 31% of cases, with BRCA1 (13%) and TP53 (10%) being the most prevalent. Proteogenomic analyses revealed significant correlations between five altered genes (FANCA, HRAS, PIK3CA, MAP2K1, JAK2) and the expression of 22 proteins. These findings highlight disrupted pathways, including MAPK signaling and mitochondrial functions, which may contribute to tumor progression and present potential therapeutic targets.

Conclusions: Integrating proteomics with NGS provides a comprehensive understanding of Taiwanese breast cancer at the molecular level, identifying actionable targets for precision medicine. Further validation in larger cohorts is needed to confirm these findings and enhance their clinical applicability.

MAD2 Regulation of Tumor Progression and Treatment Resistance in Triple-Negative Breast Cancer

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Background: MAD2 is a protein associated with the spindle checkpoint during the process of mitosis, playing a crucial role in the chromosome segregation process. MAD2 is overexpressed or functionally abnormal in many breast cancers, leading to abnormal cell division. However, the research on its role in drug resistance is not very clear.

Methods: We will collect clinical samples and analyze the expression levels of MAD2 in breast cancer, particularly in triple-negative breast cancer (TNBC) samples. Statistical software will be used to analyze the correlation between MAD2 expression and clinical characteristics. Additionally, we will investigate the biological properties and drug resistance of triple-negative breast cancer cell lines with high MAD2 expression. Finally, animal experiments will be conducted for further validation of these findings.

Result: In our preliminary clinical results, we found that MAD2 is highly expressed in breast cancer samples and this expression is statistically significant. Additionally, we established a stable MAD2 overexpression phenotype in triple-negative breast cancer cell lines and observed that the cell lines with high MAD2 expression exhibited enhanced growth ability.

Conclusions: Our experimental results have preliminarily confirmed that MAD2 plays an important role in breast cancer, including tumor progression and treatment resistance. We hope that our research findings can provide an effective target for future drug development.

Developing a typology of women's attitudes towards artificial intelligence (AI) use in the Australian BreastScreen program: A qualitative investigation of attitude types and perceived AI acceptance

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Background: Growing evidence supports AI's ability to enhance breast cancer screening, improving accuracy and efficiency of mammography interpretation. Several empirical studies, mostly quantitative, investigate lay women's perceptions of AI in breast screening, highlighting both positive and negative attitudes. However, there is a limitation in this approach by underappreciating the complexity involved in a range of attitudes. This presentation outlines the development of a typology of women's attitudes towards AI use in breast screening, building on Birkland's (2019) Information Computer Technology (ICT) user typology among older adults. We also explore the relationship between attitude type and levels of AI acceptance.

Methods: We conducted a combination of focus groups and one-on-one interviews with women who had participated in the BreastScreen program in Victoria, Australia. Data were analysed thematically through inductive coding.

Result: Two focus groups, eight paired interviews and four one-on-one interviews were conducted, involving 26 participants. Findings revealed four attitude types "Enthusiast", "Practicalist", "Traditionalist" and "Guardian". The reasons and motivations that placed each woman into a specific category varied based on individual lived experiences, which significantly impacted their perceived acceptance or rejection of AI. Most participants were categorised as either Enthusiasts or Practicalists, indicating a high or moderate level of AI acceptance. Enthusiasts viewed AI as an exciting and necessary progression, and Practicalists valued its practical utility as a useful tool. Both groups saw that AI represents the future, driven by recent technological advancement. Traditionalists preferred the status quo, advocating for human doctors' exclusive involvement. With a higher level of AI knowledge, Guardians advocated for a cautious approach due to social and ethical concerns with AI.

Conclusions: The typology revealed that the BreastScreen clients' attitudes towards AI are more complex and dynamics than simply positive and negative. Understanding these nuanced perspectives is essential for developing AI implementation strategies that incorporate care recipients' perspectives.

Key Stakeholder perspectives on implementation of Risk Based breast cancer Screening in Australia

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Background: Risk based breast cancer screening moves away from our current one size fits all model to a tailored approach were people would have different screening modalities and frequencies dependent on their individual risk. BreastScreen Australia, funded through federal and state health departments, facilitates biennual mammographic screening for the population and has been attributed to a significant reduction in breast cancer mortality. This project assesses what key stakeholders, defined as those in positions of management and decision making for Breast Screening in Australia, think of implementing risk based screening.

Methods: A qualitative approach was undertaken, recruiting participants through professional networks and implementation frameworks directed interview guides. The codebook was developed for thematic and content analysis of the interviews. Coding was done both deductively and inductively.

Result: 20 interviews were conducted with 21 participants. 144 initial codes consolidated into 17 final themes. Key stakeholders are supportive and optimistic about risk-based screening in principle; however several issues exist, including knowledge gaps precluding support of evidence-based implementation. Concerns about worsening inequities within screening, cost and communication with clients are major issues key stakeholders consider important to address in the planning and implementing a change to the program.

Conclusions: Key Stakeholders are supportive and optimistic about risk based screening in principle however several barriers and enablers exist. Systematic assessment of these factors are needed in planning and implementation of a change to the program.

Poster Presentation

Importance of Breast Implant Screening with Ultrasound & Checklist to Find Implant Rupture in Asymptomatic Patients

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Background: The addition of ultrasound as an alternative to MRI for initial imaging surveillance for breast implant ruptures was a major change. Information about the style of the breast implants, such as provided on patient device cards, is critical for clinical observers during the interpretation of imaging surveillance tests

Methods: Women with breast implants during August 31st, 2017 through December 31st, 2023, from a single facility were evaluated with high-resolution-ultrasound (HRUS) plus the Breast implant Checklist, which was first introduced by the Korean Society of Breast Implant Research (KoSBIR) in 2017. Retrospectively review was done.

Result: Total of 2,385 women, and 4,770 implants were studied. Median age was 36.1(±8.4), median day count from previous surgery was 2,543.6 days(±2,351.9). Patient device cards were available in 1,196(50.1%), 767(32.2%) were miss placed or not found, and 422(17.7%) said they never got one. Implant ruptures were found in 448(9.4%) patients. Seventy-four patients(16.5%) were symptomatic, and 374(83.5%) were asymptomatic at the diagnosis of implant rupture. Twelve(2,7%) patients were found with rupture less than 3 years from implantation surgery, 169(37.7%) within 3-10years, 208(46.4%) between 10-20 years, 55(12.3%) more than 20 years, and 4 were non applicable. Breast implant purposes were aesthetics 4,755(99.7%) and reconstructive 15(0.3%). HRUS findings showed different shell types; 2,413(50.6%) texture, 2,269(47.6%) smooth (including microtexture), and 88(1.8%) were unknown. Implant shapes were 1.190(24.9%) anatomical, 3,394(71.2%) round, and 186(3.0%) were unknown. Implant pocket position showed 4,402(92.28%) sub-pectoral, 367(7.7%) sub-glandular, and 1(0.02%) sub-cutaneous. Rupture was found in different types of implants; 448(9.4%) silicone, 412(8.6%) saline, 5(0.1%) dual-chamber, and 1(0.02%) hydrogel implant. The rupture scale, which determines silicone migration, showed 161(35.9%) subcapsular rupture (SCR), 196(43.8%) Intracapsular rupture (ICR), and 91(20.3%) extracapsular rupture (ECR).

Conclusions: Implant failure was increased with post-operative duration time. This study suggests that regular check-ups are necessary after breast implant surgery, even if patients are asymptomatic.

Radiomic analysis of magnetic resonance imaging for breast cancer with TP53 mutation: a single center cohort study

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Background: Radiomics is a non-invasive and cost-effective method for predicting the biological characteristics of tumors. In this study, we explored the association between radiomics features derived from magnetic resonance imaging (MRI) and genetic alterations in patients with breast cancer.

Methods: We reviewed electronic medical records of patients with breast cancer patients with available targeted next-generation sequencing data available between August 2018 and May 2021. Substraction imaging of T1-weighted sequences was utilized. The tumor area on MRI was segmented semi-automatically, based on a seeded region growing algorithm. Radiomics features were extracted using the open-source software 3D slicer with PyRadiomics extension. The association between genetic alterations and radiomics features was examined.

Result: In total, 166 patients were included in this study. Among the 50 panel genes analyzed, only TP53 mutations were significantly associated with radiomics features. Compared with TP53 wild-type tumors, TP53 mutations were associated with larger tumor size, advanced stage, negative hormonal receptor status, and HER2 positivity. Tumors with TP53 mutations exhibited higher values for Gray Level Non-Uniformity, Dependence Non-Uniformity, and Run Length Non-Uniformity, and lower values for Sphericity, Low Gray Level Emphasis, and Small Dependence Low Gray Level emphasis compared to TP53 wild-type tumors. Six radiomics features were selected to develop a composite radiomics score. Receiver operating characteristic curve analysis showed an area under the curve of 0.786 (95% confidence interval, 0.719-0.854; $p < 0.001$).

Conclusions: TP53 mutations in breast cancer can be predicted using MRI-derived radiomic analysis. Further research is needed to assess whether radiomics can help guide treatment decisions in clinical practice.

Factors Associated With Mammography Pain: A Prospective Observational Cohort Study

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Background: Mammography (MG) screening reduces breast cancer-related mortality. An annual MG surveillance is recommended for monitoring the recurrence in breast cancer patients. However, the actual MG screening rate in South Korea was 66.9% in 2021, and the MG surveillance rate among breast cancer patients decreases over time after treatment. We conducted a prospective study to examine the factors associated with MG pain, which is one of the reasons for decreased MG adherence.

Methods: From September 2023 to February 2024, participants were prospectively enrolled from the outpatient clinic of Jeonbuk National University Hospital. The study included 200 breast cancer survivors (BCS) who had undergone surgery for unilateral breast cancer and 200 participants undergoing breast cancer screening (CSP). All participants provided written informed consent before participating. After took the MG, they completed a questionnaire. Pain was assessed using the Visual Analogue Scale, and surveys were conducted using the Hospital Anxiety-Depression Scale, pain sensitivity questionnaire (PSQ) and personal factors of the participants.

Result: After excluding participants with incomplete surveys, the final enrolled participants consisted of 199 BCS and 193 CSP. The mean MG pain score was significantly higher in BCS (5.85 ± 2.61) compared to CSP (5.02 ± 2.56) ($p = 0.001$). In BCS, the pain in the operated breast was 6.82 ± 2.64, which was higher than that in CSP, whereas the pain in the contralateral breast was 4.89 ± 2.90, showing no statistical difference from CSP ($p = 0.63$). Depression scores (5.29 ± 3.23 vs. 4.28 ± 3.61) and PSQ (5.18 ± 1.92 vs. 4.70 ± 1.70) were significantly higher in BCS compared to CSP. Pearson correlation analysis revealed that among anxiety, depression, and PSQ, PSQ had the highest correlation coefficient (0.53) with MG pain.

Conclusions: MG pain demonstrated a higher correlation with PSQ compared to anxiety and depression, and among personal factors, higher BMI and alcohol consumption were identified as significant contributors to increased pain. Further research is needed to explore effective interventions and participant education strategies to reduce MG pain.

Deep Learning-Based Prediction of Breast Cancer Using Sequential Mammography: A Pilot Study

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Background: Early detection of breast cancer (BC) improves survival and quality of life. Mammography is the gold standard but requires expert interpretation. While computer-aided detection assists in image analysis, limitations remain. Artificial intelligence (AI) and deep learning offer promising solutions for BC prediction. This study aimed to develop a machine learning model to predict BC occurrence using sequential mammography screening images.

Methods: Early detection of breast cancer (BC) improves survival and quality of life. Mammography is the gold standard but requires expert interpretation. While computer-aided detection assists in image analysis, limitations remain. Artificial intelligence (AI) and deep learning offer promising solutions for BC prediction. This study aimed to develop a machine learning model to predict BC occurrence using sequential mammography screening images.

Result: The mean age was 51.4 ± 8.8 years in the case group and 56.3 ± 7.7 years in the control group ($P = 0.18$). Breast density was significantly higher in the case group ($P = 0.01$), with 27.3% having extremely dense breasts, compared to none in the control group. The median time from first mammography to diagnosis was 83.5 months. Each patient had four consecutive mammography time points, and AI models were tested to predict cancer at the fourth period using different input sequences. The AI model achieved 100% accuracy when using three prior time points and 81.8% accuracy with only two prior time points, demonstrating the importance of longitudinal mammographic data for accurate predictions. Feature cross-analysis identified breast density, asymmetry, and mass size as key predictive factors. The interaction of these features improved model performance, suggesting that deep learning can detect evolving mammographic changes associated with BC development.

Conclusions: Deep learning-based analysis of sequential mammograms can accurately predict BC occurrence. A larger dataset is needed to validate these findings and improve AI models for clinical applications.

Patient-Centered Breast Cancer Communication Using Interactive 3D MRI Visualization and Large Language Models: A Prospective Clinical Study

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Background: Breast MRI provides detailed imaging for early detection of breast cancer, but access to these images is limited. Advances in image processing and artificial intelligence now enable 3D reconstruction of MRI, promoting more patient-centered care. This study aims to utilize 3D visualization technology and large language models (LLMs) to reconstruct 3D models from breast MRI data and combine them with explanatory text from diagnostic information. Through this, we examine whether patients' understanding of their disease improves, and ultimately enhance satisfaction.

Methods: This prospective observational study conducted at Asan Medical Center, enrolling 60 breast cancer patients over six months starting in May 2024. MRI data from PACS and diagnostic information will be used to create a dynamic 3D interface displaying lesion descriptions and medical explanations for participants. Each item was rated on a scale of 1 to 5, and the total score was calculated by multiplying the response count by the score. Changes pre- and post-intervention were compared using the total scores, and statistical significance was verified using the Wilcoxon Signed-Rank Test.

Result: The study included female patients with a median age of 50.5 years, 93% of whom held a bachelor's degree or higher. Palpable lesions were present in 60%, and 65% underwent or planned to undergo lumpectomy. Multifocal lesions were observed in 52%, with MRI-ultrasound discrepancies in 35%. The 3D visualization significantly improved understanding of the examination (from 280 to 298, $p = 0.001$) and MRI (from 267 to 299, $p < 0.001$). It also reduced disease-related concerns (from 122 to 98, $p = 0.002$) and increased psychological stability (from 251 to 283, $p < 0.001$). Notably, 93% of patients would recommend 3D MRI visualization.

Conclusions: The results of this study highlight the significant impact of 3D visualization on patient outcomes. 3D visualization and generative language models can significantly enhance patient understanding and psychological well-being, fostering shared decision-making and improving patient-centered care.

AI Assessment of Mammographic Breast Density in Mongolian Screening

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Background: Breast cancer screening in developed countries is mostly based on mammography due to its accessibility. State-funded breast cancer screening in Mongolia includes bi-annual mammography for women above 40. While a quarter (25.1%) of breast cancer patients in Mongolia are diagnosed in early stages, the diagnostic accuracy of mammography varies 63- 98%. Automated tools are developed to accommodate the demands of increasing numbers and reducing radiologists against mis-interpretations.

Methods: From October 2023 to February 2024, 3350 women underwent screening mammography at the NURA screening center, and their breast density was assessed an experienced radiologist and by LUNIT AI and then assessed by experienced radiologist.

Result: After exclusion of women with breast implants, women in the lactation period and those with unregistered BMI, 3182 were included in this study. Their mean age was 48 years (range: 18-85). The mean BMI (kg/m^2) was 25.8 (ranged 14.50-48.99). Breast density was classified into grades 1, 2, 3, and 4, where is grade 1 was found in 36 (1.2%) subjects with mean age of 56.19 years, grade 2- in 1877 (59%) subjects with mean age of 52.91 years, grade 3-in 1125 (35.3%) with mean age of 41.49 years and grade 4- 144 (4.5%) subjects with mean age of 34.35, which correspond to grades A, B, C, and D of the BI-RADS classification, respectively. In the overweight subjects with BMI > 25, grade 1 was found in 7 (average age 34.35 years), grade 2 in 348 (41.49 yrs), grade 3 in 1253 (52.9 yrs), grade 4 in 35 (56.19 yrs). Mammography density based on BI-RADS was significantly inversely correlated with age (Spearman's r = -.063**, $P < 0.001$) and BMI (Spearman's r = -.123**, $P < 0.001$)

Conclusions: While automated assessment of screening mammographs allows reader-independent categorization of breast density, the identification of BI-RADS 4 in overweight and obese screening patients requires optimization of screening programs in order to better adjust for the individualized risk for breast cancer.

Poster Presentation

A Rare Case of Invasive Papillary Carcinoma of the Breast

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Background: Papillary carcinoma of the breast accounts for 0.5% of all breast cancers and 13 - 20% of papillary tumors. It is a rare malignant breast tumor typically presenting with nipple bleeding and a firm, palpable mass, most commonly in postmenopausal women.

Methods: A 68 year old postmenopausal woman presented with left breast pain, a palpable lump, and nipple bleeding. Imaging studies included breast ultrasound and mammography. Core needle biopsy followed by Modified Radical Mastectomy and histopathological analyses were performed.

Result: The physical examination revealed a non-moving, hard mass in the left breast. Imaging studies showed confluent, macrolobulated masses in the left breast with no calcifications. Core needle biopsy suggested a papillary neoplasm, while histopathological and immunohistochemical analyses confirmed encapsulated invasive papillary carcinoma of the left breast (IDC-10 C50, pT3N1aMx).

Conclusions: Invasive papillary carcinoma of the breast is a rare malignancy characterized by the absence of a myoepithelial layer. While core needle biopsy is effective for diagnosing papillary neoplasms, postoperative histopathological analysis is essential for confirming invasive papillary carcinoma. This type of cancer generally has a good prognosis and low recurrence rate.

Diagnostic Accuracy of Real-time Strain Elastography in Differentiating Benign from Malignant BI-RADS Category 4 Lesions on Ultrasonography

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Background: Breast elastography is an emerging, non-invasive imaging technique used to evaluate the stiffness of a breast lesion. Presently, there is no local study in the Philippines that has explored the potential diagnostic use of elastography and its possible utilization in affecting the decision to do biopsy. This study was conducted to evaluate the diagnostic accuracy of using real-time strain elastography among BI-RADS category 4 lesions on ultrasonography.

Methods: This is a prospective, diagnostic and ethics-approved study conducted at SLMC-QC, Philippines of 2 years duration. All female patients at least 18 years of age coming for breast biopsy at the Breast Center with sonographically visible BI-RADS 4 lesions were enrolled. Patients underwent breast ultrasound followed by elastography prior to planned needle biopsy. Breast lesions were assessed qualitatively using Elasticity Score by Tsukuba scoring and quantitatively using calculated Relative Strain Ratio. Sensitivity, specificity, PPV, NPV, and diagnostic accuracy were determined using 2 x 2 tables. ROC and AUC were generated.

Result: Total of 78 participants were enrolled. Evaluation by 2 x 2 tables revealed sen 81.8%, spec 75%, PPV 56.3%, NPV 91.3% and diagnostic accuracy 0.847 +/- 0.063 for qualitative Elasticity Score scoring in comparison to sen 95.4%, spec 87.5%, PPV 75%, NPV 98%, and diagnostic accuracy 0.952 +/- 0.037 for quantitative Relative Strain Ratio. Comparison of ROC and AUC of qualitative and quantitative breast elastography showed that there is no significant difference between their diagnostic performance in differentiating benign from malignant BI-RADS 4 lesions (*P* value = 0.134).

Conclusions: This study revealed the comparative clinical accuracy of qualitative and quantitative breast elastography in differentiating benign from malignant BI-RADS 4 lesions by ultrasonography. Due to a high NPV of both elastogram techniques, a practice-changing recommendation of avoiding mandatory biopsy among patients with BI-RADS 4 lesions with a corresponding benign elastogram findings can be implied.

Opportunistic Mammography and Ultrasonography Screening for Early Breast Cancer Detection among Filipino Women

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Background: In the Philippines, breast cancer represents 31% of cancer cases among women, yet a national screening program is lacking. Specialized breast centers instituted opportunistic screening where asymptomatic and symptomatic women would undergo screening upon the recommendation of their physician or through self-referral being aware about the importance of the early detection of breast cancer. This study investigates the effectiveness of opportunistic mammography and ultrasonography screening for early breast cancer detection among women over 40 years old, both symptomatic and asymptomatic.

Methods: A retrospective cohort review of medical records was conducted from January 2015 to December 2019 at a private hospital. A descriptive analysis of the incidence according to age, family history, tumor size, lymph node status, histopathology, BIRADS category and stage at diagnosis comparing the symptomatic and asymptomatic groups was done.

Result: A total of 12,881 women underwent opportunistic screening, with 858 receiving BIRADS 4 & 5 results. Among those, 405 women underwent biopsies, categorized into asymptomatic (90) and symptomatic (315) groups. The asymptomatic group showed a higher prevalence of benign conditions (75.56%), while 55.56% of symptomatic patients had malignancies. The overall detection rate was 1.68%. Notably, asymptomatic patients typically presented with tumors under 20 mm compared to symptomatic patients with lesions ranging from 20 to 50 mm. Ductal Carcinoma in Situ was present in 10.60% of cases, with a higher incidence in asymptomatic patients. Stage I breast cancer was observed in 35.48% of all patients, predominantly in the asymptomatic group. The sensitivity and specificity of BIRADS categorizations varied significantly between groups, with better performance in symptomatic patients.

Conclusions: The opportunistic mammography and ultrasonography screening program demonstrates a high detection rate for early breast cancer for both groups. These findings suggest that such screening could be a feasible alternative for developing countries without organized programs, especially when paired with robust public awareness initiatives.

Precision from Pixels: A Systematic Review and Bayesian Network Meta-analysis Comparing Tomosynthesis and AI-Augmented Mammography in Breast Cancer Detection

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Background: To compare the diagnostic accuracy of breast cancer detection between Digital Breast Tomosynthesis (DBT) and Artificial Intelligence (AI)-augmented Digital Mammography (DM), using DM as the common comparator in a network meta-analysis.

Methods: A comprehensive search of PubMed, Embase, Cochrane Librarywas conducted for studies from inception to 22 September 2024. Studies included comparative diagnostic metrics for DM versus AI-augmented DM or DM versus DBT. Inclusion criteria were studies reporting true positives, false positives, true negatives and false negatives, studies with incomplete data were used for the systematic review part of the study. Study quality was evaluated using the Quality Assessment of Diagnostic Accuracy Studies-C (QUADAS-C) tool. Network meta-analysis was employed to estimate and compare pooled sensitivity and specificity between DBT and AI-augmented DM.

Result: 48 studies met the inclusion criteria of which 10 studies had incomplete data and were only used for the systematic review, 38 studies consisting of 1,572,988 women were included in the network meta-analysis. 15 and 23 studies compared DM to DBT and AI-augmented DM respectively. Among these, 29 studies were published in western countries, nine in Asian countries. The pooled sensitivity of AI-augmented DM was lower than DBT (79.2%, 95% CI: 79.1%- 79.2%) versus 81.8%, 95% CI: 81.7%-81.8%), but the pooled specificity of AI was higher than DBT (90.0%, 95% CI: 89.9%-90.0%) versus 76.9%, 95% CI: 76.8%-76.9%). This suggests that while DBT may detect more cases of breast cancer (higher sensitivity), AI-augmented DM is better at avoiding false positives (higher specificity).

Conclusions: Overall, both AI-augmented and DBT demonstrated high sensitivity and specificity in the detection of breast cancer but the comparison between them reveals a trade-off between sensitivity and specificity. Ultimately, the ideal option depends on the clinical context, including the population risk profile, resources available for follow-up, and screening goals.

Contrast-Enhanced Spectral Mammography as an Adjunct to Mammography and Ultrasound in the Evaluation of Breast Lesions

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Background: Contrast-enhanced spectral mammography (CESM) is increasingly recognized as a valuable tool in the evaluation of women with dense breasts, often in conjunction with conventional mammography and ultrasound. We hypothesised that CESM would reduce the false-negative rate of mammography while minimizing the false-positive rate associated with ultrasound.

Methods: From August 2016 to October 2023, 91 patients underwent CESM in addition to standard mammography and breast ultrasound as part of their diagnostic workup for suspected breast cancer, cancer surveillance, or evaluation of indeterminate lesions. This study was conducted prospectively.

Result: CESM, mammography, and/or ultrasound detected a total of 463 lesions. Of these, 74 lesions were confirmed as cancer through biopsy. CESM identified all but one lesion, a 27-mm palpable hypoechoic mass with biopsy showing ductal carcinoma in situ. CESM additionally detected an invasive lobular carcinoma that was missed on both mammography and ultrasound. One patient with DCIS showed non-mass enhancement (NME) on CESM, which was visible as microcalcifications on mammography but lacked a corresponding sonographic finding. Among the confirmed cancers, 20 (27%) were detected on CESM and ultrasound but not on mammography, while 51 (69%) were detected across all three modalities. CESM revealed 152 enhancing masses, 101 of which were biopsied, confirming 58 cancers. Among 29 patients with NME, 19 underwent biopsy, and 15 were diagnosed with cancer. Overall, CESM demonstrated a sensitivity of 98.6%, specificity of 73.5%, positive predictive value of 60.8%, and negative predictive value of 98.7%. Benign lesions on biopsy were mainly fibroadenomas (16 biopsies) and papillomas (9 biopsies). Additionally, 21 cancers were not identified on conventional mammography (13 enhancing masses, 8 NME).

Conclusions: CESM exhibited high sensitivity for cancer detection and a high negative predictive value. It also contributed significantly to identifying cancers missed by mammography, highlighting its role as an effective adjunct in breast imaging.

Are Asian Women and Doctors Uncomfortable with Insertion of Biopsy Metallic Clips into the Breasts? Survey Results from a Single Institution in Singapore

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Background: Insertion of metallic clip markers is standard of care after vacuum-assisted breast biopsies. The clips may be left in the breast indefinitely and many patients have expressed their discomfort or even refuse clip insertions.

Methods: We conducted a survey among Singapore women to assess the extent of this fear, and to evaluate if they will be more accepting of temporary biodegradable clips instead. Women undergoing breast needle biopsies requiring post-procedural clip placement, with previous breast clip placement, and female breast care doctors (e.g. surgeons, radiologists, pathologists etc.) aged between 21-100 years were surveyed. Questions included demographics, preference between permanent metallic vs hypothetical biodegradable breast clips, and the reasons for their choice. Study was IRB approved.

Result: 162 women were interviewed between 2015-2024. 43% (n = 71) were patients undergoing breast biopsy, 45% (n = 73) had previous clip insertions, 11% (n = 18) were doctors. 56% (n = 91) preferred a biodegradable clip. 85% of these (n = 77) cited dislike of a permanent foreign body in their breast as the reason.12% (n = 11) cited concern about the long-term side effects of metallic clips. 21.6% (n = 35) had no preference and 21.6% (n = 35) preferred a metallic clip. The combined breast biopsy group was more likely to prefer a biodegradable clip (59.7%) compared to doctors (27.8%) ($p = 0.012$). Women undergoing biopsies were also more likely than those with existing clips to prefer a biodegradable clip (73.2% vs 46.6%) ($p = 0.001$).

Conclusions: A significant number of women, including some female doctors, would prefer a biodegradable clip due to their discomfort with having a permanent foreign body in their breast. This highlights the need to develop alternative, non-permanent clips to address the women's concerns and improve breast biopsy experience.

Optimal utilization of an AI diagnostic software in a mammography screening program in Switzerland

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Background: Artificial intelligence can optimize breast cancer detection within mammography screening programs (MSPs), by maximizing sensitivity, i.e., reducing the number of Interval Breast Cancer, and specificity, i.e., decreasing the recall rates without confirmed cancer case. However, current organized MSPs set threshold of AI scores (output from the AI software) arbitrarily. The goal of this study is to evaluate Profound AI® (pAI) in the screening process of an organized MSP. We aim to identify the optimal utilization of pAI in the MSP regarding its effectiveness and its influence on required resources.

Methods: In this retrospective study, we analyse all mammographies from one screening round, i.e., the years of 2022 and 2023, of the MSP "donna" in the Swiss canton of St.Gallen (approximately 27,600 mammographies) using pAI by iCAD, which will assign each mammography a case and predictive risk score. We use optimization models, such as the receiver operating characteristics curve, to find the optimal threshold for case discussion in a consensus conference. We simulate multiple AI implementation scenarios within the MSP, including AI as a substitute for one of the two radiologists and AI as a preselection tool to identify mammographies for double reading.

Result: The first results of this study are expected in early 2025 with anticipation to determine an optimal threshold when mammography should be further discussed in a consensus conference. This threshold is expected to increase the effectiveness by increasing the breast cancer detection rate. In the simulated scenarios, we expect that the workload of radiologists can be reduced significantly, thus increasing the efficiency of the MSP, without loss of effectiveness.

Conclusions: Findings from this research will impact the common practice on how to design MSPs in Switzerland and elsewhere in the future, using an optimized implementation of AI technology.

Evaluating Breast Cancer-Related Lymphedema Severity: Insights from Histopathological Analysis

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Background: Breast cancer-related lymphedema (BCRL) frequently develops following breast cancer surgery including axillary lymph node dissection (ALND), mastectomy, and sentinel node surgery. BCRL is typically classified by clinical and lymphedema severity stages. There is an ongoing evolution in BCRL classifications that incorporate histopathological data. This study aimed to evaluate the histopathological grade in BCRL patients based on lymphatic obstruction status and to determine its association with BCRL severity stage.

Methods: This was a cross-sectional study of 287 BCRL patients in Dharmais Cancer Hospital from September 2019 until March 2024. BCRL severity was categorized into mild (stage 1-2) and severe (stage 3-5) according to the arm dermal backflow (ADB) stage by indocyanine green (ICG) lymphography. The patient's lymphatic vessels were collected intraoperatively and stained with hematoxylin and eosin. Masson's trichrome staining was conducted to differentiate smooth muscle cells and collagen in the lymphatic wall. The lymphatic obstruction status was classified as low grade (0/normal, 1) and high grade (2, 3).

Result: Of the 287 patients enrolled in the study, 130 (45.3%) were classified as severe BCRL. The patient's median age is 50 (43-58) years and the mean body mass index (BMI) of 25.9 (± 5.0). The lymphatic obstruction grades from 0 to 3 respectively were 186 (64.8%), 63 (18.5%), 31 (10.8%), and 17 (5.9%). Most severe BCRL patients were classified as grade 3 (31.4%). The logistic regression model demonstrated that histopathological grades 2 and 3 (OR = 2.983; 95% CI: 1.515 - 5.874, $P = 0.002$) were significantly associated with severe BCRL.

Conclusions: This study found a significant association between histopathological grade and BCRL severity. Higher histopathological grades (2 and 3) were strongly linked to severe BCRL, suggesting that these features may be useful for BCRL diagnosis and management.

Poster Presentation

Third-look US using CT/US fusion technique for the ultrasonic detection of incidental breast masses in the chest CT

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Background: When incidental breast masses are detected in the chest CT, an evaluation of second-look US is required. However, second-look US is dependent on the skill of the operator. We investigated the usefulness of real-time virtual sonography (RVS), an image fusion technique that uses magnetic navigation to synchronously display US and CT cross-sectional images, in the ultrasonic detection of incidental breast masses in the chest CT.

Methods: Between 2019 and 2024, we studied 15 lesions that were incidentally detected in chest CT, and were difficult to evaluate on second-look US alone. Third-look US using RVS was performed using CT volume data, and needle biopsy was performed under RVS guidance for lesions that could be identified.

Result: Eleven cases were detected during evaluation of axillary lymph nodes on pretreatment, and four cases were detected during screening for other diseases. The median CT diameter was 6 mm (4-15 mm). RVS made it possible to detect 13 of 15 cases (87%). The median US diameter was 6 mm (5-10 mm). Of the 13, 77% were regular shape and 70% were circumscribed margin. The histopathological results were as follows: IDC in 2, DCIS in 3, IDP in 3, Fibroadenoma in 2, and mastopathy in 3, respectively. Using RVS made it possible to detect the lesions while ensuring objectivity and reproducibility.

Conclusions: Third-look US using image fusion technique was useful for the ultrasonic detection of incidental breast masses in the chest CT.

Real-time AI-based computer-aided detection/diagnosis (AI-CAD) for breast ultrasound: A prospective, multicenter, multinational study

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Background: To evaluate the effectiveness of a real-time artificial intelligence (AI)-based computer-aided detection/diagnosis (AI-CAD) system as a diagnostic decision support tool for breast ultrasound in a real-world clinical setting, conducted as a prospective, multicenter, and multinational study.

Methods: From May to December 2024, total of 75 patients undergoing breast ultrasound were enrolled in prospective study conducted in Korea (n = 38) and Hong Kong (n = 37). In this study, six experts operated real-time AI-CAD system (CadAI-B, BeamWorks Inc., Korea) on tablet PC connected to handheld ultrasound device during breast ultrasound examinations. Image and clinical data were collected from patients with established ground truth through follow up, biopsy, or surgery. AI-CAD system highlights suspicious areas during scanning to assist physicians in breast cancer detection and supports data-driven diagnosis by providing BI-RADS categories and malignancy scores (0-100%) when the user freezes the image.AI-CAD. Diagnostic performance of experts and real-time AI-CAD system were evaluated using area under receiver operating characteristic curve (AUC), sensitivity and specificity.

Result: The analysis included 75 patients (mean age 55 years, IQR 46-66) with 24 malignancies (32.0%), 45 benign lesions (60.0%), and 6 normal cases (8.0%). Mean breast mass size was 1.2 cm (± 1.0 cm): benign 0.8 cm (± 0.7 cm), malignant 1.8 cm (± 1.3 cm). BI-RADS category distribution was: for experts category 1 (4.0%), 2 (21.3%), 3 (24.0%), 4a (16.0%), 4b (18.7%), 4c (4.0%), 5 (12.0%); and for AI-CAD category 1 (32.0%), 2 (5.3%), 3 (9.3%), 4a (17.3%), 4b (21.3%), 4c (13.3%), 5 (1.3%). Overall diagnostic performance of experts and AI-CAD, as AUCs calculated by BI-RADS, were 0.801 and 0.751, respectively ($P = .679$). Sensitivity and specificity were 91.7% (22/24) and 68.6% (35/51) in experts and 87.5% (21/24) and 57.8% (32/51) in AI-CAD, respectively ($P = .481$).

Conclusions: In this real-world clinical setting, AI-CAD demonstrated promising performance comparable to that of experts.

Poster Presentation

Apocrine Encapsulated Papillary Carcinoma of the Male Breast with Frank Invasion: A Case Report

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Background: Encapsulated papillary carcinoma (EPC) is a rare subset of breast carcinoma, accounting for 0.5% to 2.0% of all breast cancer cases. EPC may also be associated with invasive carcinoma. Apocrine differentiation is recognized in benign, atypical and malignant breast lesions. To date, only 10 cases of apocrine EPC have been reported in the literature, none of which involve male patients.

Methods: Here, we report a case of apocrine EPC in a man, associated with apocrine invasive carcinoma components, providing evidence of the malignant potential of this entity.

Result: A 50-years-old man presented to our hospital with a progressively enlarging mass in his right breast. The mass had been palpable for three months. Ultrasonography revealed an 1.9 cm oval, circumscribed isoechoic mass with increased vascularity in the right subareolar area. A US-guided biopsy showed an atypical papillary lesion with apocrine differentiation, interpreted as at least ductal carcinoma in situ. The patient underwent right-sided breast conserving surgery with sentinel lymph node excision. Microscopically, the excised tumor displayed a thick fibrous capsule surrounding multiple papillary proliferation, composed of several layers of monotonous, heterotypic cells with fibrovascular cores. Frank invasion was observed. Most tumor cells exhibited abundant eosinophilic cytoplasm and enlarged nuclei with prominent nucleoli. Isolated tumor cells were identified in one of two sentinel lymph nodes. Immunostaining for myoepithelial cell markers, including p63 and smooth muscle myosin heavy chain, revealed an absence of myoepithelial cells within tumor. Tumor cells were negative for estrogen receptor, progesterone receptor, and human epidermal growth factor receptor 2 but positive for androgen receptor and gross cystic disease fluid protein-15. Based on these findings, the lesion was diagnosed as apocrine EPC with frank invasion of apocrine carcinoma.

Conclusions: We propose that apocrine EPC in males is likely a morphological variant of conventional EPC, sharing the same unpredictable malignant potential as non-apocrine cases.

Right Occult Neuroendocrine Breast Cancer, Left Mucinous Carcinoma, and Metastases: A Rare Case Starting with a Back Skin Lesion

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Background: Neuroendocrine breast cancer is a rare and under-recognized condition. Due to its rarity, it makes the diagnosis extremely challenging, and it is not uncommon that it leads to significant delays in both diagnosis and treatment.

Methods: A 45-year-old woman presented with a 2 cm left upper back skin lesion, initially diagnosed as a sebaceous cyst, but later identified as a metastatic neuroendocrine tumor (NET) after excision. Staging CT revealed a suspicious left adnexal mass and residual skin lesion. Subsequent surgery (TAHBSO, omentectomy, appendicectomy, and re-excision of the skin lesion) found a mature cystic teratoma in the left ovary, while mesenteric nodules were confirmed as metastatic NET. A PET-CT Ga-68 DOTATATE scan showed DOTATATE avid in right axillary lymph nodes and multiple skeletal sites. Further breast imaging (mammogram, MRI, and ultrasound) detected suspicious axillary lymphadenopathy and a 0.3 cm left breast lesion. Biopsies confirmed right axillary metastatic NET (positive for GATA 3, ER/PR, synaptophysin, Chromogranin A) and left breast mucinous carcinoma with neuroendocrine differentiation (ER/PR positive, Her-2 negative, synaptophysin positive, Chromogranin A negative). Diagnosis of Metastatic Neuroendocrine Tumor (NET) of the Right Breast with Occult Primary Carcinoma and left breast mucinous carcinoma with neuroendocrine differentiation were finally made.

Result: Multi-disciplinary team discussions (MDT) conducted with surgeons, oncologists, pathologists, and radiologists concluded this is a stage 4 disease of metastatic NET with early left breast cancer. The aim of treatment is for palliation. Palliative chemotherapy with IV etoposide/cisplatin and aromatase inhibitor with CDK 4/6 inhibitor was started since.

Conclusions: This case highlights the diagnostic complexity of neuroendocrine breast cancer, a rare and under-recognized malignancy. Dual primary breast cancer further emphasizes the need for thorough imaging, histopathological analysis, and multidisciplinary collaboration to establish an accurate diagnosis and treatment plan. This case underscores the importance of vigilance in diagnosing rare breast malignancies to optimize patient outcomes

Case Series of Male Breast Cancer in the Young and Elderly: Diagnostic and Therapeutic Insights from Both Ends of the Age Spectrum

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Background: Male breast cancer (MBC) is an uncommon condition, comprising less than 1% of all breast cancer cases and male malignancies. Despite improved awareness and advancements in diagnostic methods, MBC diagnoses remain delayed, largely due to limited awareness of the disease.

Methods: We report three cases to highlight its clinical presentation, diagnosis, and management. Case 1: A 75-year-old man with a left breast lump and bloody nipple discharge was diagnosed with invasive carcinoma (Grade 3, ER/PR-positive, HER-2-negative). Post-mastectomy, no residual malignancy or nodal involvement was noted, and adjuvant tamoxifen was initiated. Case 2: A 32-year-old man with significant comorbidities was incidentally diagnosed with a 3 × 2 cm left retroareolar invasive carcinoma (Grade 2, ER/PR-positive, HER-2-negative) during evaluation for tuberculosis and pulmonary embolism. He started neoadjuvant tamoxifen due to his unstable medical condition. Case 3: An 86-year-old man with a 2 × 1 cm right breast lump underwent right mastectomy after neoadjuvant hormonal therapy. Histopathology revealed ypT1aN0 invasive carcinoma (ER/PR-positive, HER-2-negative). These cases highlight the importance of timely diagnosis, tailored treatment, and multidisciplinary collaboration in managing MBC.

Result: Treatment for MBC is based on female breast cancer guidelines due to limited male-specific trials. Modified radical mastectomy is the standard surgical approach, with breast-conserving surgery in selective cases. Risk factors for MBC include BRCA2 mutations (10-20% of cases), BRCA1 mutations, genetic syndromes (e.g., Klinefelter syndrome, PTEN, CHEK2, and PALB2 mutations), elevated estrogen levels (from obesity, liver disease, or hormone therapy), radiation exposure, and a family history of breast cancer, in first-degree relatives.

Conclusions: Male breast cancer (MBC) is a rare but important condition with unique challenges in diagnosis and management. Case series, such as this study, help address the limited knowledge of MBC by highlighting its clinical features and treatment strategies, contributing valuable insights to guide future research and improve care for men affected by this uncommon disease.

Mammography-Guided Hook-Wire Biopsy for DCIS Diagnosis: A Case Series from Mongolia

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Background: Breast cancer is often diagnosed at advanced stages due to poor public health awareness and weak health care infrastructures, particularly in developing country. In Mongolia, only 2.5% of breast cancer cases are diagnosed as ductal carcinoma in situ (DCIS). Currently, stereotactic biopsy is not available, so mammography-guided hook-wire placement followed by wide excisional biopsy is utilized.

Methods: This study included 12 cases of breast lesions with no palpable mass identified on ultrasound. Mammography revealed amorphous microcalcifications, and AI detection confirmed the presence of suspicious lesions with an accuracy range of 88%-99% (Figure 1). The initial procedure involved the placement of a mammography-guided hook wire in the suspicious calcified area. Subsequently, an excisional biopsy was performed in the operating room, with a wider margin of 0.5-1.5 cm from the suspicious calcified area. All excised specimens were sent for express frozen section pathology and assessed for all margin clearance. A titanium clip or seed was left in the surgical bed for radiotherapy.

Result: Out of 12 cases, 8 were DCIS, and 4 were fibrocystic changes, with no complications reported post-procedure and all patients had clear margins as confirmed by pathology.

Conclusions: Mammography remains the most important tool in breast cancer screening, and its diagnostic accuracy can be further enhanced through AI integration. Early detection strategies, including the use of stereotactic biopsy for precise diagnosis, are vital in the management of breast cancer, particularly in its early stages. More research and data are needed to refine diagnostic methods and improve outcomes for patients, particularly in regions with evolving healthcare infrastructure, such as Mongolia, where early-stage breast cancer diagnoses are on the rise.

Comparative Incidence Rates and Mortality Rates in BRCA-positive Patients: A Meta-Analysis of Active Surveillance versus Risk Reduction Mastectomy

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Background: A lifetime elevated risk of breast cancer is associated with women who have a BRCA1/BRCA2 mutation. Patients may opt to undergo prophylactic surgery, known as risk reduction mastectomy (RRM), or engage in active surveillance (AS), which involves regular monitoring for potential occurrence of breast cancer, among other preventive strategies. The efficacy of RRM has been the subject of numerous studies; however, no clear survival benefit exists between RRM and AS. The objective of this investigation is to compare the incidence rate and overall survival of BRCA-positive breast cancer patients who underwent RRM and active surveillance, through available literature.

Methods: This meta-analysis was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. A search was performed in PubMed/MEDLINE, EMBASE, CINAHL, and Cochrane databases from inception to November 2024 databases using search terms: "BRCA" AND "breast cancer" AND mastectomy AND "risk reduction". The study included prospective studies on adult women aged ≥ 18 years with no previous history of cancer who tested positive for BRCA DNA. The pooled Risk Ratio and hazard ratio (HR) with corresponding 95% confidence intervals (CIs) were computed using inverse variance method for each outcome.

Result: A total of 5 studies were included: 1,549 patients underwent risk reduction surgery while 3,192 opted for active surveillance. The pooled risk ratio showed that likelihood of breast cancer (RR = 0.05, 95%CI = 0.03 to 0.08, $p < 0.00001$) and mortality (HR = 0.36, 95%CI = 0.21 to 0.60, $p < 0.0001$) were significantly reduced in risk reduction surgery population compared to active surveillance.

Conclusions: In women with a BRCA1 or BRCA2 gene mutation, risk reduction mastectomy reduces incidence of breast cancer by almost twenty times and mortality by almost three times compared to active surveillance. It is important for healthcare providers to educate patients with these gene mutations to discuss the option of risk-reduction mastectomy when making an informed decision about their breast cancer risk management.

Primary Breast Lymphoma with Synchronous Invasive Breast Carcinoma in a 75 Filipina: A Case Report

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Background: Primary breast lymphoma (PBL) is extremely rare accounting for less than 0.5% of malignant breast neoplasms, and less than 2% of extra nodal non-Hodgkin Lymphomas. Synchronous PBL and invasive breast carcinoma is even rarer with very few reported cases published to date.

Methods: This is a case of a 74-year-old nulliparous, woman who presented with a two-month history of an enlarging right breast mass. On Physical Examination she had a slightly tender palpable firm oval 6 cm mass at the 9 o clock position of her right breast with associated widening and flattening of her nipple. This corresponded to an oval equal density mass seen on mammography. Incidentally, mammography also revealed an irregular spiculated mass with increased density in the upper central right breast which on ultrasound appeared as a 1.22 x 1 cm irregular hypoechoic mass with posterior shadowing. Biopsy of the larger mass was of a round cell malignancy while that of the spiculated mass was of invasive breast carcinoma with apocrine features, ER+ PR+ HERneu negative, ki67 40-50%.

Result: The patient underwent a Modified Radical Mastectomy for curative intent. Final pathology revealed a synchronous High Grade B Cell Lymphoma and Stage I (pT1N0) Invasive breast carcinoma of no special type. A PET CT Scan done was unremarkable confirming the diagnosis of a primary breast lymphoma.

Conclusions: This case highlights the importance of considering a broad differential diagnosis in patients presenting with breast masses. Treatment with curative intent requires a multidisciplinary approach, emphasizing the need for accurate diagnosis and tailored management strategies.

Breast Cancer Presenting as Paraneoplastic Syndrome: Case Series and Review of the Literature

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Background: Paraneoplastic syndrome arising due to primary breast cancer is an uncommon entity due to aberrant immune-mediated response triggered by the underlying malignancy. Existing literature is limited, with no established evidence-based guidelines for treatment.

Methods: We present two patients who presented with neurologic manifestations of paraneoplastic syndrome due to underlying breast malignancies. Clinicopathologic features including neurologic symptoms, neuroimaging and laboratory abnormalities, breast cancer subtype and stage, subsequent treatment for both paraneoplastic syndrome and the breast cancer are reviewed.

Result: Patient A presented with vertiginous dizziness and unsteady gait, and was diagnosed with opsoclonus, an involuntary eye movement disorder commonly associated with paraneoplastic syndrome. Subsequent investigations revealed bilateral breast malignancies, of the hormone receptor negative and c-erbB2 positive subtype. The patient was treated with intravenous immunoglobulin (IVIG) for her opsoclonus with improvement in her neurological symptoms. She then underwent neoadjuvant chemotherapy and targeted therapy, followed by surgery, adjuvant radiotherapy and remains disease free on follow up. Patient B presented with unilateral foot drop, sensory loss, and acute retention of urine. Magnetic resonance imaging of her spine revealed conus medullaris syndrome, likely of inflammatory or paraneoplastic etiology. Investigations performed showed bilateral breast cancer of the hormone receptor positive and c-erbB2 negative subtype. Due to severe neurological deficit limiting her mobility, the patient was started on intravenous methylprednisolone followed by a tailing dose of oral prednisolone. She subsequently underwent definitive surgery for her bilateral cancers and has remained in remission with significant improvement in her lower limb function.

Conclusions: Breast cancer-related paraneoplastic syndrome is rare. Treatment must take into account both the immune-mediated neurologic disease and breast cancer factors. While treatment of the underlying malignancy is of paramount importance, the timing of surgery may be affected by the need for high dose steroids or IVIG therapy.

Eccrine Spiradenoma of the Breast

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Background: Eccrine spiradenoma (ES) is a rare benign tumor of the sweat glands that primarily occurs in the dermis and subcutaneous tissues. While most are located on the head, neck, and upper extremities, ES can occasionally involve the breast. Breast ES can present as a diagnostic conundrums as they can be mistaken for common benign breast lesions such as FAs, lipomas or cysts.

Methods: We present a unique case of ES of the breast in a 62-year-old woman who presented with a mobile, painful slow growing breast lump. Breast imaging revealed well circumscribed nodular opacities. Her trucut biopsy showed atypical glandular proliferation. The consensus from our breast multidisciplinary discussion was for surgical excision.

Result: Treatment of ES of the breast via surgical excision is curative. Prognosis is excellent with low risk of recurrence and malignant transformation. Microscopically, the tumour was well circumscribed and composed of two cell types: basaloid and eccrine ductal cells. The "dual-cellular-population" diagnostic of this rare tumor had solid trabecular arrangements and further immunochemistry staining positive for CK7, p40, SMA, MNF116 helped aid the diagnosis of ES. Post operatively, patient recovered with no evidence of recurrence at follow up.

Conclusions: ES of the breast is a rare but a possible differential especially if it presents with a painful breast lump. Our case underscores the importance of histological evaluation after excision to provide accurate diagnosis. Although benign, surgical excision remains the mainstay of treatment with favorable prognosis with complete excision.

A Hybrid Reconstruction: Combining Goldilocks and Lateral Intercostal Artery Perforator Flap for Post-Mastectomy Reconstruction in High-Risk Patients: A Case Report

Sia Kim, Jasmina Kevric, Sanjay Warrier

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Background: Immediate breast reconstruction is increasingly performed post-mastectomy; however, traditional methods may be unsuitable for patients with comorbidities such as obesity and diabetes. This case report presents a novel hybrid procedure combining the Lateral Intercostal Artery Perforator (LICAP) flap with a Goldilocks flap for volume replacement, offering a solution for high-risk patients.

Methods: A 72-year-old woman with poorly controlled diabetes and obesity presented with a 7 cm invasive carcinoma in the left breast. She underwent a nipple-sparing mastectomy followed by hybrid reconstruction using a LICAP flap for volume replacement and a Goldilocks lipodermal flap for added volume. Intraoperative indocyanine green (ICG) angiography was used to assess flap perfusion, and sentinel lymph node biopsy was performed via the same incision.

Result: Histopathology revealed a 60 mm grade 2 invasive carcinoma with clear margins and negative sentinel lymph nodes. The patient showed good postoperative recovery, with satisfactory cosmetic outcomes at the one-week follow-up. The surgical procedure was completed without complications, and the patient was recommended adjuvant radiotherapy and endocrine therapy.

Conclusions: The hybrid LICAP-Goldilocks flap procedure provides a viable reconstructive option for high-risk patients. Combining the LICAP flap for volume replacement and the Goldilocks technique for subcutaneous fat preservation, this approach is safe, effective, and aesthetically pleasing, making it suitable for patients who are not candidates for implant-based or autologous reconstruction.

Intraoperative Monitoring of Nipple-Areolar Perfusion in Grade 3 Ptosis Reduction Mammaplasty: Indocyanine Green-Assisted Angiography

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Background: Ischaemic complications of the nipple-areola complex (NAC) after breast reduction surgery can have serious aesthetic, functional, and psychological effects, particularly in patients with grade 3 ptosis. Indocyanine green (ICG) angiography combined with SPY imaging enables intraoperative monitoring of skin perfusion, potentially reducing ischaemic complications through real-time identification and correction.

Methods: We describe two cases of obese patients (BMI 33 and 35) with grade 3 breast ptosis who underwent bilateral reduction mammaplasty. Intravascular ICG and SPY system were employed to monitor NAC perfusion, enabling intraoperative correction of vascular compromise.

Result: The average reduction volume was 912g. In both cases, the SPY system detected inadequate NAC perfusion following pedicle inset. After further mobilisation and reducing pedicle angulation, repeat perfusion checks demonstrated marked improvement. Additionally, to address venous congestion, fenestration of the NAC was performed using heparinised saline-soaked gauze, along with negative pressure dressings. Both patients had satisfactory wound healing at two-week follow-up.

Conclusions: Patients with grade 3 ptosis and high BMI are at elevated risk for NAC ischaemia during breast reduction mammaplasty. Intraoperative monitoring using ICG and the SPY system facilitates real-time correction of pedicle positioning, optimising perfusion and preventing complications. This technique may improve both short- and long-term outcomes by reducing wound-related morbidity.

A Refined Approach to Lymphoedema Prevention: Indocyanine Green-Assisted Axillary Reverse Mapping with Lymphatic-Venous Bypass

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Background: Lymphoedema is a common complication after axillary dissection in breast cancer, affecting up to 50% of patients. It significantly impacts quality of life, potentially leading to complications such as infection, fibrosis, and limb dysfunction. This study aims to present a novel method for lymphoedema prevention by preserving lymphatic drainage pathways using lymphatic-venous bypass (LVB).

Methods: We describe a refined approach using indocyanine green (ICG)-guided axillary reverse mapping with LVB. This method is offered to patients with locally advanced breast cancer and significant axillary nodal burden. ICG is injected at three sites near the cubital fossa pre-dissection. The dye highlights sentinel lymph nodes, which are detected using the SPY imaging system. Following dissection, the lateral sentinel node is located, and the anterior vein is approximated to the ICG-labelled lymph node with a 5/0 Prolene suture, creating a tension-free lymphatic-venous bypass without microsurgery.

Result: This technique avoids the need for complex procedures and does not increase operative time. Early post-operative outcomes show no cases of lymphoedema among treated patients.

Conclusions: The ICG-assisted axillary reverse mapping with LVB is a minimally invasive, efficient method for preserving lymphatic drainage in high-risk axillary dissection. Prospective, randomised trials are required to further validate the long-term efficacy of this approach.

BQA Bi-National Breast Cancer Quality Audit: Enhancing Surgical Outcomes in Australia and New Zealand

Sia Kim, Sanjay Warrier

Chris O'Brien Lifehouse, Department of Surgery, Australia

Background: The Breast Quality Audit (BQA) is a bi-national initiative capturing 80% of all breast cancers treated in Australia and New Zealand. Established in 1998, its purpose is to centralise surgical data, track trends, develop key performance indicators (KPIs), and ensure the quality of breast cancer care through evidence-based practice and benchmarking across both countries.

Methods: The BQA collects anonymised data from over 350 surgeons and 263 hospitals, recording over 30,203 episodes in 2020-2021. Data includes patient demographics, tumour pathology, and surgical outcomes. Surgeons can compare their performance against 13 KPIs, which cover key aspects of breast cancer management. The BQA interfaces with multiple national organisations and provides a platform for surgeons to self-assess clinical performance.

Result: The updated BQA system launched in 2023, allowing participants to track their performance and compare outcomes across multiple metrics. Membership criteria currently require the management of at least 10 breast cancer cases per annum, which is under review for future increases. The audit has led to significant collaborations and publications that assess trends in breast cancer management.

Conclusions: The BQA plays a critical role in improving breast cancer outcomes through standardised data collection and monitoring. Future developments include integrating patient-reported outcomes and expanding coverage to enhance surgical quality and patient care across both nations.

Comparative Efficacy of Breast-Conserving Surgery and Mastectomy for Centrally Located Breast Cancer: A SEER Database Analysis

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Background: The oncologic safety of breast-conserving surgery (BCS) for centrally located breast cancer (CLBC) remains a topic of debate due to limited high-quality clinical evidence. This study aims to evaluate the safety of BCS in CLBC patients by comparing its efficacy with mastectomy using data from the Surveillance, Epidemiology, and End Results (SEER) database.

Methods: Data were collected from the SEER database for patients diagnosed with CLBC between 2010 and 2015. Patients were divided into two groups: those who received BCS and those who underwent mastectomy. The primary outcomes were disease-specific survival (DSS) and overall survival (OS). Propensity score matching (PSM) was performed at a 1:1 ratio based on prognostic factors including age at diagnosis, sex, histologic type, histologic grade, tumor size, number of lymph node metastases, distant metastasis status, and molecular subtype. Cox regression models were used to analyze factors influencing DSS and OS. Kaplan-Meier survival analysis was employed to compare DSS and OS between the two groups. Additionally, a validation cohort of patients who underwent BCS and mastectomy at Fudan University Shanghai Cancer Center between 2015 and 2016 was used to confirm the findings.

Result: A total of 6,843 patients who received BCS and 6,451 who underwent mastectomy from the SEER database were included. After PSM, 3,949 pairs of patients were matched with balanced covariates. Kaplan-Meier analysis showed no significant differences in 5-year DSS ($p = 0.42$) or OS ($p = 0.12$) between the BCS and mastectomy groups. However, The Kaplan-Meier analysis revealed that BCS group had a significantly higher 10-year OS compared to mastectomy ($p = 0.0039$). In the validation cohort, 221 BCS patients and 636 mastectomy patients were included, with results consistent with the SEER database, showing no significant difference in 5-year OS ($p = 0.66$).

Conclusions: BCS is a viable treatment option for CLBC patients, offering comparable oncologic outcomes to mastectomy while preserving breast appearance.

The Chinese Experience of Robotic Breast Surgery

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Background: In the quest for more invisible, smaller, and more aesthetically pleasing incisions, breast surgeons have attempted to use endoscopes for their procedures. However, there are some limitations in the visualization of the procedure and the area of movement of the endoscopic instruments, increasing the corresponding difficulty of the procedure. To address these limitations, we use the da Vinci robotic surgical platform and report initial experiences with robot breast surgery technology.

Methods: This study reports the results of more 300 cases da Vinci robot nipple sparing mastectomy immediate breast reconstruction (RNSMIBR) with gel implant or latissimus dorsi muscle flap, mastectomy for gynecomastia. In our study, we innovatively used the pectoralis major fascia instead of the latissimus dorsi flap to create a more perfect ptotic breast with perfect cosmetic results. Clinicopathologic characteristics, type of surgery, duration of surgery, and perioperative complications were collected and analyzed to determine the safety and utility of robotic applications for breast surgery. A postoperative satisfaction survey was also conducted.

Result: Although the currently available evidence is immature and the follow-up time is short, our preliminary results suggest that robotic breast surgery provides better cosmetic results and may reduce the risk of nipple necrosis.

Conclusions: The corresponding decrease in learning time as time and caseload increases necessitates offering it as a surgical option to patients and potentially a new trend in breast surgery in the future. We share how to create surgical space, robotic category options and how to prevent related skin complications that we hope will be helpful to young surgeons.

Patients' perception regarding clinical trial with lipo-filling for breast cancer management a pilot questionnaire analysis

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Background: Breast cancer treatment has evolved significantly, with lipo-filling emerging as a promising option. However, patient perceptions and willingness to participate in clinical trials involving novel treatments remain underexplored.

Methods: A cross-sectional survey was conducted involving 200 breast cancer patients from August to December 2023. The questionnaire covered demographic information, clinical history, and detailed queries on their willingness to participate in clinical trials, with a focus on randomized trials and lipo-filling procedures. Statistical analysis was performed to identify correlations between demographics, clinical backgrounds, and their willingness to participate in trials.

Result: The average age of participants was 52.6 ± 12.9, predominantly with secondary education (55.5%) and a modest income (< 1250 USG/month). A notable proportion of respondents were under breast cancer surveillance (31.5%), and had undergone lumpectomy (19.5%) and mastectomy (19.0%). The participants' willingness to participate in a clinical trial with lipofilling surgery was hypothetically asked. 57.5% (114/200) of participants were willing to participate in the trial. However, when it asked about their willingness to participate in a randomized control trial setting, only 43.0% (75/200) participants expressed their desire to participate ($p < 0.05$). Further analysis was performed to stratify the different levels of willingness among the participants. We found that education levels (below secondary school level vs above), and salary (below 15k USG annual salary vs above) were associated with an increased willingness to participate in lipofilling surgery in a clinical trial setting ($P < 0.05$). Personal history of cancer and personal history of surgery showed no significant correlation with the willingness to participate in lipofilling surgery.

Conclusions: This study reveals a encouraging level of interest among breast patients in participating in clinical trials involving lipo-filling. The educational level and income play a significant role in this willingness and help provide further insight to help improve the trial planning and execution.

Clinical study on the availability and safety of photodynamic diagnosis using 5-aminolevulinic acid during surgery for breast cancer patients

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Background: The metabolic transformation of 5-Aminolevulinic acid hydrochloride (5-ALA) within the biological system results in the generation of protoporphyrin IX, a photosensitive compound. This substance exhibits a selective affinity for tumors, manifesting red fluorescence upon excitation by blue light. Its use in breast cancer surgery could improve margin clarity and aesthetics. This pilot study assesses PDD's feasibility and safety in breast cancer using 5-ALA with mastectomy specimens.

Methods: The study cohort consisted of patients undergoing mastectomy for primary breast cancer. Patients were administered an oral dose of 20mg/kg of 5-ALA 2 to 4 hours prior to surgery. An incision was made in the excised tumor specimen, and both macroscopic and optical observations were conducted. Dermatopunch samples were acquired from areas identified as tumor-positive/negative based on macroscopic features and optically positive/negative areas, followed by pathological diagnosis. Primary endpoints encompassed diagnostic odds ratio (DOR) and safety, while secondary endpoints included sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV).

Result: Between January and August 2023, we enrolled 10 cases involving the ingestion of 5-ALA. Initial cases were non-feasible for PDD, but optical positivity was confirmed in the fourth case at 5 minutes post-excision. Subsequent six cases were observed within 2-3 minutes, with optical positivity confirmed in five cases. One case of non-feasibility for PDD was associated with lobular carcinoma. Ultimately, 33 punch biopsies were conducted on six cases. The DOR for PDD was 47.9, with a sensitivity of 92.3%, specificity of 80%, PPV of 75%, and NPV of 94.1%. In contrast, the DOR based on macroscopic findings was 31.2, with a sensitivity of 84.6%, specificity of 85%, PPV of 78.6%, and NPV of 89.5%. No 5-ALA-related adverse effects were reported.

Conclusions: The DOR highlights PDD's superior diagnostic effectiveness over macroscopic findings. Further research is needed to validate PDD's clinical application.

Margin Evaluation and Treatment Selection After Breast-Conserving Surgery in Japan and Comparison with International Practices: A Survey by the Japan Breast Cancer Society Scientific Research Group

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Background: In Japan, the 2018 Breast Cancer Practice Guidelines adopted the 2014/2016 SSO-ASTRO consensus on surgical margins in breast-conserving surgery (BCS): tumor cell exposure for invasive carcinoma and less than 2 mm for DCIS. However, its impact on treatment strategies is unclear. This study evaluated imaging, pathological assessment, and treatment selection in Japanese BCS cases to explore challenges in standardizing local therapy.

Methods: A questionnaire was sent to 470 Japan Breast Cancer Society-certified facilities, collecting data on imaging, pathology, surgery, margins, and treatment strategies.

Result: Responses were received from 262 facilities (56%), predominantly medium-sized centers performing 100 to 300 surgeries annually (58%), with 64% having 1 to 2 breast surgeons. Preoperative contrast-enhanced MRI was utilized in 97% of facilities, significantly higher than in other countries (41%). Intraoperative frozen section analysis of margins was performed in 44% of facilities, differing from Western countries (0 to 18%) and Korea (80%). Margin evaluation in postoperative pathology included numerical documentation (51%) or descriptive terms such as positive/close/negative (28%), with variability across facilities. Mapping diagrams for tumor spread visualization were used routinely in 78% of facilities, aiding residual tumor assessment and postoperative treatment planning. In cases of invasive carcinoma, 81% of facilities reported re-excision for tumor exposure, whereas only 16% did so for DCIS exposure. For DCIS, 73% opted for re-excision in extensive ductal involvement, while 60% did not re-excise for margins within 0 to 2 mm, deviating from guideline recommendations. Although 86% recognized the updated margin definitions, 77% reported no significant changes in re-excision rates, compared to reduced rates in Western countries (22% to 14%).

Conclusions: Margin evaluation and postoperative treatment selection remain inconsistent. Japan demonstrates low positive margin and re-excision rates compared to other countries, supported by advanced imaging, surgical techniques, and mapping diagram adoption. Further investigation is needed to standardize BCS practice, incorporating insights from international strategies.

Temporal Changes in Tumor Biology, Stage, and Surgical Treatment of Breast Cancer in Elderly Patients: A Single-Institution Analysis Over 11 Years

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Background: Elderly breast cancer patients are often diagnosed through palpable masses rather than screening, and their disease stage at diagnosis is relatively advanced. However, they frequently exhibit favorable biological characteristics, such as a high prevalence of hormone receptor positivity and a low prevalence of HER2 positivity. With the rising proportion of healthy elderly individuals, treatment approaches for elderly breast cancer patients may have changed over time. This study examined temporal changes in the treatment and tumor biology of breast cancer in patients aged 75 years or older at our institution.

Methods: Among 1,060 breast cancer surgeries performed at our institution from January 2014 to December 2024, cases aged 75 years or older were extracted. These were divided into two periods: early (2014-2019) and late (2020-2024). Statistical significance was determined using t-tests and chi-square tests.

Result: The proportion of surgical cases aged 75 years or older increased from 19.5% (100/513) in the early period to 24.3% (133/547) in the late period ($P = 0.018$). Subtypes showed no significant differences, but Luminal B-like cases were more frequent in the early period (38.6%) compared to the late period (25%, $P = 0.042$). Pathological stages and surgical methods, including mastectomy and breast-conserving surgery, were similar between periods. Axillary surgery was performed significantly more frequently in the late period (97.7%) than in the early period (89%, $P = 0.0472$).

Conclusions: Over the past 11 years, Luminal B-like cases were significantly more frequent in the earlier period among elderly breast cancer patients, while no significant changes were observed in other subtypes or stages. Axillary surgery was omitted more often in the earlier period, indicating a more conservative approach. As the Japanese guidelines recommend surgery for elderly patients in good health, it is essential to ensure appropriate treatment strategies that consider individual health and life expectancy, avoiding undertreatment based solely on age.

Correlation of Residual Mammographic Microcalcifications with Surgical Pathology After Neoadjuvant Chemotherapy for Primary Breast Cancer

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Background: In the preoperative imaging evaluation after neoadjuvant chemotherapy (NAC) for breast cancer (BC), calcifications on mammography (MG) often persist even after the lesion has disappeared, and the extent of surgical resection can be controversial. This study aimed to evaluate the association between clinicoradiological findings and pathological residual disease after NAC, and to determine the appropriate extent of surgical resection.

Methods: We retrospectively analyzed consecutive patients diagnosed with primary BC who underwent surgery after NAC at St. Luke's International Hospital between January 2016 and December 2020. Patients with MG calcifications before and after NAC were included. We examined the correlation between MG calcifications with MRI contrast enhancement and pathological residual disease.

Result: In a total of 106 eligible patients, 10 patients were at cStage I (9.4%), 74 were at cStage II (69.8%), and 22 were at cStage III (20.8%). Twenty-six tumors (24.5%) were hormone receptor-positive HER2-negative (HR+HER2-), 10 (9.4%) were HR-HER2-, 45 (42.5%) were HR+HER2+, and 25 (23.6%) were HR-HER2+. Post-NAC MG calcifications showed cPR in 17 patients (16.0%), cSD in 86 (81.1%) and cPD in 3 (2.8%). MRI showed cCR in 26 patients (24.5%), cPR in 77 (72.6%), cSD in 2 (1.9%) and cPD in 1 (0.9%). Nineteen of 106 patients (17.9%) achieved pCR after NAC. Sixteen of 19 patients with pCR (84.2%) showed cSD/cPD on MG calcifications. Twenty-two of 26 patients with cCR on MRI (84.6%) showed cSD/cPD on MG calcifications. And in 9 of these 22 patients (40.9%), MG calcifications overestimated the residual disease by more than 3 cm.

Conclusions: Post-NAC MG calcifications may overestimate the extent of residual disease, especially in cases where MRI shows cCR but MG calcifications show cSD or cPD. Therefore, it is suggested that removing all MG calcifications post-NAC could lead to excessive surgical resection.

Poster Presentation

Experience of using the MIPS (Medical Imaging Projection System) during sentinel lymph node biopsy for breast cancer at our hospital

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Background: Sentinel lymph node biopsy (SLNB) using a combination of radioisotope (RI) and dye is most commonly performed procedure for cN0 breast cancer patients. Recently, the Medical Imaging Projection System (MIPS), which directly projects Indocyanine Green fluorescent images onto the surgical field using projection mapping technology, has been put to practical use. We compared the MIPS to RI methods in SLNB.

Methods: We retrospectively reviewed 115 patients who underwent SLNB combined with MIPS and RI for breast cancer surgery from January 2022 to December 2024. Following the identification of SLN using MIPS, they were re-identified with the RI method. The number of SLN removed was assessed.

Result: The median age of the 115 patients was 52.0 (31-81) years. The patient characteristics between the two groups were identical, including 21 cases of ductal carcinoma in situ and 94 cases of IDC (T1: 66, T2: 26, T3: 2), of which 13 patients received preoperative chemotherapy, of which 17 patients had metastatic SLN. The mean number of SLN identified by MIPS was 1.78 (1-4), while 1.46 (0-4) ($p < 0.05$) by the RI method. The number of SLN removed by MIPS was consistent with the RI method in 81 cases (70.4%), one more in 29 cases (25.2%), and two more in 4 cases (3.5%) compared to the RI method. SLN were identifiable in 13 patients (11.3%) who received preoperative chemotherapy by MIPS and 12 patients (10.4%) by RI, and in 17 patients (14.8%) with metastatic SLN by MIPS and 17 patients (14.8%) by RI.

Conclusions: Although the mean number of SLN removed by MIPS was higher than that by the RI method, it was not clinically excessive. Regardless of the small number of patients who had preoperative chemotherapy or metastatic SLN in this study, both methods of SLNB might be useful for these populations.

Early Experience of Endoscopic-assisted versus Conventional Nipple-sparing Mastectomy for Early Breast Cancer

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Background: Nipple-sparing mastectomy (NSM) has become increasingly popular due to its superior cosmetic outcomes. Although endoscopic-assisted NSM can minimize incision size, its adoption presents challenges due to the significantly different surgical field view compared to conventional approaches. Since 2023, our institution has introduced endoscopic-assisted NSM to evaluate its feasibility and safety.

Methods: We retrospectively analyzed 30 breasts in 26 patients (including 4 bilateral cases) who underwent NSM between 2019 and December 2024, comparing endoscopic-assisted (E-NSM, n = 10) and conventional (C-NSM, n = 20) approaches. The median follow-up period was 304 days (range: 38-2070 days). The nipple-tumor distance (NTD) was measured in preoperative imaging studies.

Result: There were no significant differences between E-NSM and C-NSM in age (46.5 vs 47.5 years, $P = 0.582$) and BMI (20.4 vs 19.5 kg/m^2, $P = 0.134$). The median NTD was 25.5 mm (IQR: 16.0-31.0 mm) in E-NSM and 22.0 mm (IQR: 15.0-31.3 mm) in C-NSM ($P = 0.552$). The median operation time was significantly longer in E-NSM compared to C-NSM (220.0 vs 121.0 minutes, $P = 0.005$). Grade 3 nipple necrosis occurred in 1 case (10.0%) in E-NSM and 3 cases (15.0%) in C-NSM, showing no significant difference in complication rates ($P = 0.804$). Severe skin flap necrosis was observed in 2 cases (10.0%) in C-NSM, while no skin flap necrosis occurred in E-NSM ($P = 0.796$). During the follow-up period, one case of local recurrence was observed in C-NSM (5.0%), with no recurrence in E-NSM ($P = 1.000$).

Conclusions: Although E-NSM required longer operation time in our early experience, it demonstrated comparable safety to the conventional approach while enabling smaller incisions. Further accumulation of cases and long-term evaluation of safety and aesthetic outcomes are necessary.

Diluted indocyanine green marking in breast conserving surgery for the patients with non-palpable breast cancer

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Background: In breast conserving surgery (BCS), accurately recognizing the localization of the breast tumor is essential for improving the surgical outcome. The aim of our study was to determine whether it is possible to observe the fluorescent site of local injection of diluted indocyanine green (ICG) using near-infrared imaging system (NIR), and to underwent adequate resection in BCS for the patients with non-palpable breast cancer.

Methods: Of the 24 patients of early breast cancer treated with BCS and sentinel lymph node biopsy using ICG between November 2023 to August 2024, 6 patients (all women; mean age, 58 years) with the index tumor located outside the upper-outer quadrant were enrolled, After 0.5cc of ICG diluted 1,000 to 10,000 times was injected into 1-4 lesion around or just above the tumor under ultrasound in all patients, BCS was performed while checking the fluorescence. Clinical features, detection rates of ICG fluorescent spots, status of surgical margins, and re-operation rates were analyzed.

Result: Of the 6 patients, 5 were Stage I, one was Stage II. All cases were non-palpable tumors, the mean US size was 12 mm. The fluorescent was observed in all patients by NIR. Of the 14 total injected spots, 11 (78%) were identified as approximately 1 cm localized fluorescence spots without halation. In all patients, intraoperative additional resection was not performed because off-center was avoided without using ultrasound. The mean weight of the resected tumor was 113 g. The final pathological diagnosis was DCIS in 3 cases and invasive ductal carcinoma in 3, all of which were negative for resection margins. No re-operations were performed in all cases.

Conclusions: Although there were only a limited number of patients, it was suggested that using diluted ICG marking in determining the resection area would contribute to improving the surgical outcome of BCS for non-palpable breast cancer.

Analysis of Postoperative Complications and Risk Factors in Nipple-Sparing Mastectomy

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Background: The balance between cure and cosmetics is important for patients with early-stage breast cancer, and with the addition of insurance coverage for breast reconstruction using silicone implants, nipple-sparing mastectomy (NSM) and other procedures are being performed in an increasing number of cases.

Methods: Retrospectively examine the status of NSM patients and complication rates.

Result: 26 patients with primary breast cancer (4 patients with bilateral breast cancer) who underwent NSM at our hospital from May 2019 to December 2024. In all cases, the mammary gland below the nipple head was submitted to rapid pathology and confirmed to be free of exposed cancer. Eighteen patients (60%) underwent simultaneous breast reconstruction, and only one patient underwent reconstruction using autologous tissue (deep inferior abdominal artery perforator valve). Endoscopic techniques were introduced in 2023, and were used in 10 patients (33%). Preoperative diagnosis was negative for axillary lymph node metastasis in all patients, but 6 patients (20%) had sentinel node metastasis and underwent additional axillary dissection. Postoperative complications occurred in 4 patients (16%): skin excision due to wound and nipple necrosis in 3 patients and removal of tissue expander in 4. 4 of 5 patients had severe hematochezia of the nipple-areola skin immediately after surgery.

Conclusions: In the cases with complications, one patient had type 1 diabetes mellitus, one had preoperative chemotherapy, one had endoscopic surgery, and two had axillary dissection. In addition to these background factors, 80% of the patients had hemodynamic disturbance immediately after surgery, suggesting that the operation at the time of nipple incision and nipple subcutaneous dissection had a strong influence. As the number of risk-reducing surgeries is expected to increase in the future, more careful surgical manipulations and measures are needed to reduce the complication rate.

Comparative Outcomes of Conventional Nipple-Sparing Mastectomy vs. Single-Port Robot-Assisted Nipple-Sparing Mastectomy with Immediate Reconstruction in Breast Cancer

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Background: Robotic surgery is becoming an increasingly popular option for breast cancer surgery. However, studies comparing the characteristics of Single-Port robotic-assisted nipple-sparing mastectomy (SP RA-NSM) and conventional nipple-sparing mastectomy (CNSM) are limited. This study aimed to analyze and compare the outcomes of SP RA-NSM and CNSM.

Methods: This study conducted a comparative cross-analysis between 148 patients who underwent CNSM and 148 patients who underwent SP RA-NSM, all diagnosed with unilateral breast cancer between October 2020 and April 2024 at Asan medical center in Seoul, Republic of Korea. Propensity score matching was performed using the following covariates: age at initial operation, BMI, TNM stage, tumor size, specimen weight.

Result: Both groups had a median age of 46 years at diagnosis and pathological stages ranging from 0 to III. While CNSM primarily uses the upper outer radial incision (48.0%), SP RA-NSM predominantly utilizes the mid or anterior incision (91.9%) ($p < 0.001$). SP RA-NSM had less blood loss during surgery compared to CNSM (0-10cc: 74.3% vs. 29.7%; 11-100cc: 25.0% vs 70.3%; $p < 0.001$). Nipple ischemia was notably absent in SP RA-NSM, with no cases observed (SP RA-NSM vs. CNSM: 0.0% vs. 4.7%; $p = 0.007$). The incidence of nipple necrosis and skin necrosis was the same as in CNSM, with one case each. Seroma (requiring Hemovac re-insertion or aspiration) was reduced in SP RA-NSM compared to CNSM (8.8% vs. 14.2%; $p = 0.007$).

Conclusions: SP-RA-NSM is a safer and more favorable surgical approach that could serve as a significant alternative to CNSM.

Early experience with the Artisential Articulating Instrument in Endoscopic Nipple-Sparing Mastectomy for Breast Cancer Patients

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Background: Endoscopic Nipple-Sparing Mastectomy (E-NSM) using a single port is a minimally invasive surgical technique. However, the lack of articulation in endoscopic instruments can result in significant movement limitations. To address these constraints, this study was initiated to evaluate the use of articulated instruments, specifically "D," designed to overcome these challenges.

Methods: This retrospective study analyzed 33 patients diagnosed with breast cancer who underwent E-NSM at Korea University Ansan Hospital between April 2024 and November 2024. Among these, 10 patients (12 cases) underwent E-NSM using ArtiSential. Clinical outcomes between the two groups were statistically compared.

Result: Mean weight of the resected breast was similar in both groups, with the ArtiSential group at 346.5 ± 142.70 grams and the non-user group at 349.35 ± 133.08 grams ($p = 0.959$). Surgical time during mastectomy also showed no significant difference between the two groups, with the ArtiSential group taking 133.10 ± 54.99 minutes and the non-user group 146.78 ± 32.27 minutes ($p = 0.376$). Mean postoperative hospital stay was similar in both groups, with the ArtiSential group at 13.60 ± 3.10 days and the non-user group at 13.09 ± 3.53 days ($p = 0.680$). Additionally, mean duration of the drain placement showed no significant difference, with the ArtiSential group at 12.70 ± 3.23 days and the non-user group at 13.91 ± 4.45 days ($p = 0.389$). Lastly, the complication rates between the two groups were also similar, with 1 out of 10 patients (10%) in the ArtiSential group and 3 out of 23 patients (13.0%) in the non-user group ($p = 0.806$).

Conclusions: Endoscopic mastectomy utilizing articulated ArtiSential instruments provides significant advantages in securing nipple margins and managing anatomically challenging angled regions. A comparative analysis of postoperative clinical outcomes revealed statistically comparable results between procedures performed with and without the use of ArtiSential instruments, supporting their clinical efficacy.

Poster Presentation

Initial Experience of Robot-assisted Breast Conserving Surgery: A Multicenter Study

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Background: Robot-assisted breast-conserving surgery (BCS) has a potentially better cosmetic benefit than conventional BCS without any scarring on the breast. However, data on the feasibility and safety are limited.This study aimed to present the results of early robot-assisted BCS.

Methods: A multi-center retrospective review was conducted to identify women who underwent robot-assisted BCS 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 were collected.

Result: 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 DCIS was detected in 29 cases. Of all the patients, 75.3% and 65.3% had an ER and PR 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. The median total operation time was 133.8 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%). There were no cases of conversion to open surgery. Only one patient (0.7%) had recurrence.

Conclusions: This is the first multicenter report on robot-assisted BCS worldwide; this could be technically feasible and safe. Further comparative studies and prospective research are needed to evaluate patient satisfaction, cost-effectiveness, and surgical and oncological outcomes.

Impact of Tumor-to-Nipple Distance on Outcomes in Robotic Nipple-Sparing Mastectomy and Reconstruction

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Background: Nipple-sparing mastectomy (NSM) has become a preferred surgical option for breast cancer patients due to its oncologic safety and aesthetic benefits. Robotic NSM (RNSM) offers enhanced precision and minimally invasive access, yet its feasibility in cases with a tumor-to-nipple distance (TND) ≤ 1 cm remains unclear. This study evaluates the oncologic safety and surgical outcomes of RNSM in patients with TND ≤ 1 cm by comparing it with both RNSM in patients with TND > 1 cm and conventional NSM (CNSM) in patients with TND ≤ 1 cm.

Methods: A retrospective analysis of 1,427 patients who underwent NSM with immediate reconstruction between October 2020 and October 2023 was conducted. Propensity score matching (PSM) was applied to compare three groups: TND ≤ 1 cm, RNSM vs. TND > 1 cm, RNSM and TND ≤ 1 cm, RNSM vs. TND ≤ 1 cm, CNSM. Oncologic safety was assessed by analyzing subareolar resection margin status, while surgical outcomes included postoperative complications such as nipple-areolar complex (NAC) necrosis.

Result: After PSM, no statistically significant differences were observed in subareolar resection margin results or the incidence of adverse events between the TND ≤ 1 cm and TND > 1 cm RNSM groups. Similarly, no significant differences were found in oncologic or surgical outcomes between RNSM and CNSM in patients with TND ≤ 1 cm.

Conclusions: RNSM is a safe and feasible option for patients with TND ≤ 1 cm, achieving oncologic outcomes comparable to CNSM in patients with TND ≤ 1 cm and RNSM in patients with TND > 1 cm. These findings suggest that TND ≤ 1 cm should not be a contraindication for RNSM. Further prospective studies with long-term follow-up are necessary to validate these results.

Early oncologic outcome of robot assisted nipple sparing mastectomy compared to conventional nipple sparing mastectomy: A propensity matching analysis

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Background: Robotic nipple-sparing mastectomy (R-NSM) has been developed to reduce visible scars and improve the quality of life for women. This study aimed to evaluate the surgical and oncologic outcomes of R-NSM compared with conventional nipple-sparing mastectomy (C-NSM). Notably, the follow-up period for the R-NSM group is among the longest reported globally, providing a reliable basis for assessing the outcomes of this technique.

Methods: A retrospective analysis was performed on patients who underwent nipple-sparing mastectomy for breast cancer between 2019 and 2022. R-NSM was performed on 50 patients and C-NSM on 484. Propensity score matching (PSM) at a 1:5 ratio was used, resulting in 42 R-NSM and 182 C-NSM patients for analysis. Risk-reducing mastectomy patients (n = 7) were excluded from matching, but no recurrence or death occurred in this group. Kaplan-Meier survival curves were used to evaluate recurrence-free survival, disease-free survival, distant metastasis-free survival, and overall survival, with the Log-rank test for survival comparison.

Result: The median follow-up period for the R-NSM group was 37.2 months (range: 25.3-60.2 months), which was longer than the 28.3 months (range: 12.0-124.3 months) for the C-NSM group. In the R-NSM group, no cases of local recurrence, distant metastasis, recurrence, or death were observed. In contrast, the C-NSM group experienced 2 cases (1.1%) of local recurrence, 2 cases (1.1%) of distant metastasis, 4 cases (2.2%) of recurrence, and 1 case (0.6%) of death. Log-rank tests revealed no significant differences between the groups in LRFS ($p = 0.565$), DFS ($p = 0.412$), or DMFS ($p = 0.888$).

Conclusions: R-NSM demonstrated similar or superior oncologic outcomes compared to C-NSM, with no recurrence or death in the R-NSM group. The extended follow-up period further supports R-NSM as a safe and effective treatment option for breast cancer.

Favorable Surgical Outcomes with Surgeon-performed Intraoperative Ultrasonography-guided Wire Localization in Nonpalpable Breast Cancer Patients undergoing Breast-Conserving Surgery

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Background: As nonpalpable breast cancer cases rise, methods like wire localization, ROLL, RSL, and intraoperative ultrasonography are used to locate tumors for accurate breast-conserving surgery (BCS). Preoperative wire localization (PWL) under mammography and ultrasonography guidance has long been the gold standard. Studies show that ROLL and RSL have similar success rates to wire localization, but these are costly, require coordination with specialists, and add procedure time. They also need to be performed before surgery, which can cause patient discomfort and anxiety. BCS under surgeon-performed intraoperative ultrasonography- guided wire localization (IUWLS) may help address some of these issues. We investigated the treatment outcomes of two localization methods in patients undergoing BCS: IUWLS and PWL.

Methods: We retrospectively analyzed the medical records of 685 consecutive nonpalpable breast cancer patients who underwent BCS using IUWLS and PWL, between January 2015 and December 2022. Positive surgical margins, reexcision rates, median total resection volumes (TRV) and median optimal resection volume (ORV) were compared.

Result: Of the total cohort, 424 patients underwent BCS with IUWLS and 261 patients with PWL. The following did not differ between the IUWLS and PWL groups: positive margin status, re-excision rate, conversion rate, permanent positive margin status, reoperation rate, ORV, median TRV, and median closest tumor-free margin. Rather, median [range] widest tumor-free margin was significantly smaller in the IUWLS group (7 mm [4-11]) than in the PWL group (13mm [5-18]; $P = .002$). Median (range) calculated resection ratio (CRR) was significantly lower in the IUWLS group (1.45 [0.87-8.37]) than in the PWL group (4.65 [1.63-21.04]; $P = .01$).

Conclusions: In nonpalpable breast cancer patients undergoing BCS, IUWLS achieved equivalent oncologic outcomes in terms of surgical success, rates of positive margins, reexcision, and reoperation. However, IUWLS resulted in a smaller resection volume compared to PWL, indicating better preservation of healthy breast tissue, while avoiding PWL-induced patient discomfort.

Endoscopic Mastectomy: A Cost-effective and Time-efficient Alternative to Robotic Mastectomy with Comparable Oncologic and Safety Outcomes

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Background: This study aimed to evaluate whether endoscopic mastectomy (EM) is a cost-effective and time-efficient alternative to robotic mastectomy (RM), while maintaining comparable oncologic outcomes and safety profiles.

Methods: A total of 110 patients who underwent either robotic (29 patients) or endoscopic (81 patients) nipple-sparing mastectomy between April 2019 and November 2024 at Korea University Ansan Hospital were included in this study. The primary outcomes assessed were surgical time, costs, length of hospital stay, amount of total drainage, complication rates, and oncologic outcomes. Statistical analysis was performed to compare the differences between the two groups.

Result: There was a significant difference in both mastectomy time (RM 170.7 ± 55.2 minutes, EM 149.9 ± 40.2 minutes, $p = 0.033$) and plastic surgery time (RM 213.6 ± 110.1 minutes, EM 119.2 ± 77.9 minutes, $p < 0.001$) between the two groups, leading to a significant reduction in total operative time (RM 384.3 ± 113.0 minutes, EM 269.0 ± 89.0 minutes, $p < 0.001$). The cost of robotic mastectomy was significantly higher compared to the endoscopic approach (RM 31,338,659.0 ± 5,166,816.8 Korean Won, EM 19,486,521.5 ± 6,074,413.6 Korean Won, $p < 0.001$). No significant differences were observed between the two groups regarding length of hospital stay, complication rates, or oncologic outcomes.

Conclusions: Endoscopic mastectomy is a time-efficient and cost-effective alternative to robotic mastectomy. Both approaches demonstrated comparable oncologic outcomes and safety profiles, suggesting that endoscopic mastectomy could be a viable option for breast cancer surgery.

Technical Feasibility and Early Postoperative Complications after Nipple-sparing Mastectomy through Semi-periareolar Incision in Breast Cancer Patients

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Background: This study aimed to assess the technical feasibility of nipple-sparing mastectomy (NSM) through semi-periareolar incision in breast cancer patients looking at nipple-areolar complex (NAC) necrosis within 30 postoperative days in relation to patient-tumor-surgery parameters and dominant blood supply to NAC on breast magnetic resonance imaging (MRI).

Methods: A retrospective analysis was conducted on 46 patients with 54 breasts who underwent NSM at Severance Hospital in Seoul, Republic of Korea, from March 2020 to June 2024. A semi-periareolar incision was performed, with axillary surgery was added when necessary. Immediate reconstruction was achieved using a tissue expander or direct-to-implant insertion. Descriptive statistics were retrospectively summarized and risk factors of NAC necrosis were analyzed including whether internal mammary artery perforator (IMP) supplied to NAC or not (non-IMP) by MRI was associated.

Result: The mean patient age was 45.9 years, and 21.7% had comorbidities. Average NSM and reconstruction, mostly direct-to-implant insertion, time was 124 and 68 minutes, respectively. Mean hospitalization stay was 7 days and drains were removed after 13 days on average. Any early complications occurred in 19 (35.2%) cases including 10 (18.5%) NAC necrosis requiring reoperation. There was no implant loss. Although no statistically significant risk factors for NAC necrosis were identified, the complication rate decreased as surgical experience increased, with no cases of NAC necrosis observed in the last 10 cases. Dominant IMP was detected in 38 (70.4%) patients and revision rate was higher in non-IMP group although without statistical significance.

Conclusions: NSM through a semi-periareolar incision is technically feasible and demonstrates acceptable early complication rates, which improve as surgeons overcome the learning curve. Careful patient selection and sufficient surgical experience are prerequisites for successful surgery without early complications considering clinical and radiological risk factors of developing NAC ischemia or necrosis.

Role of an indocyanine greenhyaluronic acid mixture (LuminoMark™) in localization of robot-assisted breast conserving surgery: initial experiences

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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.

Result: 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 using.

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.

Skin thickness comparsion between 'Manual NASSM' and 'Robotic NASSM' with immediate breast reconstruction in breast cancer

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Background: Mastectomy was developed to 'Modified Radical Mastectomy', 'Breast Conserving Surgery' to 'Robotic Mastectomy'. Current Studies proved 'Robotic NASSM' can be safe and feasible for breast cancer surgery. On the other hands, debate are exist, for example, skin thickness and recurrence rate. This study aimed to investigate the relation between skin thickness between 'Manual NASSM (M-NASSM)' and 'Robotic NASSM (R-NASSM)'.

Methods: Patients underwent 'M-NASSM' and 'R-NASSM' with immediate breast reconstruction in Kosin university from Nov. 2020 to Oct. 2023 were included. We performed MRI after 6 months of surgery. Subareolar and 4 point average thickness (12h, 3h, 6h, 9h for nipple 3 cm) were collected by MRI. Thickness was measured distance from skin to layer extending vertically from skin.

Result: Forty-nine patients underwent 52 'M-NASSM'. Twelve patients (3 patients with bilateral) were exclude. Median age was 50.3 years (range: 33-66) and median follow up was 659 days (range: 237-972). Median thickness was 0.9 cm (range: 0.4-2.41) in subareolar and 0.75 cm (range: 0.15-1.79) in average 4 points. No local recurrence was found. Seventy-six patients underwent 100 'R-NASSM'. Twenty-five patients (3 patients with bilateral) were exclude. Median age was 49.9 years (range: 31-69) and median follow up was 639 days (range: 168-1225). Median thickness was 0.81 cm (range: 0.27-2.39) in subareolar and 0.72 cm (0.27-2.30) in average 4 points. 1 person was recurred in 20 months follow up and underwent operation. Skin thickness between 'M-NASSM' and 'R-NASSM' as not statistically significant (p-value = 0.155 (SA), 0.349 (average)). p-value of local recurrence was 0.452 and p-value of complication rate was 0.194.

Conclusions: Skin thickness between 'M-NASSM' and 'R-NASSM' has not statistically significant. There was no difference in local recurrence and complication rate. So 'R-NASSM' can be safe and feasible operation method. But, there still has limitations. First, Median follow up period is less than 3years. It means that we need a longer follow up period to identify the recurrence rate between two groups. Second, measure method may raise doubt about accuracy. There is no established method, and skin thickness can be vary depending on various factors (Inflammation, Edematous etc.).

Clinical outcomes in breast cancer patients undergoing direct-to-implant reconstruction after robotic nipple-sparing mastectomy using Da Vinci SP with TilePro display

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Background: Nipple-sparing mastectomy (NSM) using the da Vinci SP robotic system is a minimally invasive procedure that offers cosmetic advantages and has demonstrated favorable clinical outcomes in recent studies. As a result, both NSM and reconstruction are increasingly performed using the robotic SP system. However, during mastectomy, the lack of distinct anatomical landmarks makes it difficult for surgeons to determine the area being operated on. Although various preoperative marking techniques are employed, this study was initiated to explore the potential benefits of using the TilePro display for real-time navigation during robotic NSM.

Methods: Between October 2021 and October 2024, a total of 28 patients (29 cases) with breast cancer underwent robotic NSM (R-NSM) with direct-to-implant (DTI) reconstruction at our institution (Korea university Ansan hospital). For comparison, 36 patients (38 cases) who underwent conventional NSM (C-NSM) during the same period were analyzed. Among the robotic NSM group, 10 patients underwent surgery using the TilePro display, starting from June 2024.

Result: The mean weight of resected breast tissue was 317.66g ± 129.95 in the R-NSM group and 335.89g ± 172.11 in the C-NSM group, showing no significant difference between the two groups ($p = 0.626$). The mean mastectomy duration was significantly longer in the R-NSM group (170.22 minutes, SD ± 55.21) compared to the C-NSM group (109.13 minutes, SD ± 54.68; $p < 0.001$). A comparison between R-NSM cases with and without the use of TilePro showed no significant difference in mastectomy duration: 161.11 minutes (SD ± 57.40) with TilePro versus 189.00 minutes (SD ± 48.24) without TilePro ($p = 0.181$).

Conclusions: The use of the da Vinci SP robotic system for NSM demonstrated favorable clinical outcomes, with no significant differences in postoperative recovery metrics compared to C-NSM. Additionally, the incorporation of the TilePro display in robotic NSM provided no statistically significant improvements in surgical duration, drainage metrics, or complication rates.

Effectiveness of Breast-Conserving Surgery with Sentinel Lymph Node Biopsy under Sedation Anesthesia in Early Breast Cancer Patients

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Background: Breast-conserving surgery with sentinel lymph node biopsy (BCS with SLNB) is a standard treatment for breast cancer, typically performed under general anesthesia (GA). Sedation anesthesia (SA) has been reported to reduce surgery time, accelerate recovery, and minimize anesthesia-related complications. This study evaluates the efficacy and safety of BCS with SLNB under SA in early breast cancer patients and its potential as an alternative to GA.

Methods: A retrospective study compared 47 patients who underwent SA (SA group) and 47 patients who underwent GA (GA group) for BCS with SLNB at Chonnam National University Hwasun Hospital from January to December 2024. Surgical preparation time, surgery time, anesthesia recovery time, drain removal day, hospital day, SLNB results, tumor size, and nodal status were analyzed. Intraoperative pain, satisfaction, blood pressure, oxygen saturation, and postoperative complications were also assessed.

Result: SA reduced surgical preparation time (12.26 vs. 15.67 minutes, $p < 0.001$), surgery time (57.78 vs. 57.54 minutes, $p = 0.001$), and anesthesia recovery time (5.21 vs. 10.11 minutes, $p < 0.001$). Drain removal day (3.79 vs. 4.00 days, $p = 0.268$) and hospital day (4.62 vs. 4.55 days, $p = 0.820$) were similar between groups. The pathological tumor size was smaller in the SA group (12.3 vs. 15.7 mm, $p = 0.011$). Intraoperative pain was higher in the SA group (VAS 2.0: 34.0% vs. 10.6%, $p = 0.043$), but satisfaction levels were comparable (66.0% vs. 83.0%, $p = 0.812$). Transient blood pressure and oxygen saturation changes occurred but were promptly managed. No major complications were observed.

Conclusions: BCS with SLNB under SA offers shorter surgery and recovery times with safety and oncological outcomes comparable to GA. This approach could be a viable alternative, particularly for patients for whom GA is unsuitable.

Risk factors of recurrence in those who achieve pathologic complete response after neoadjuvant chemotherapy for breast cancer

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Background: The use of neoadjuvant chemotherapy (NAC) for patients with breast cancer has been increasing, with rising number of pathologic complete response (pCR). pCR has been associated with better prognosis; however, there are patients who still develop recurrence after achieving pCR. There are only a few studies reporting risk factors that may have influenced the recurrence in such patients, and those studies show conflicting results, especially in terms of T and N stages. In this study, we aim to investigate further on this subject.

Methods: This s a retrospective single-center study. The study reviewed data of the patients with breast cancer who received NAC followed by surgery for curative purpose between January 2009 and July 2023. Pre-NAC T stages and N stages were determined by MRI findings. pCR was defined as absence of invasive cancer in both breast and axilla, regardless of presence of carcinoma in situ.

Result: 326 patients with breast cancer received NAC followed by surgery for curative purpose; of them, 99 patients achieved pCR. The median follow-up duration was 31.7 months. 8 patients (8.1%) experienced recurrence of breast cancer; four patients developed locoregional recurrence and four patients developed distant recurrence. There were three deaths but two were unrelated to breast cancer. Age ($p = 0.712$), menopausal status ($p = 0.932$), achieving radiologic complete response ($p = 0.677$), type of surgery (0.504), pre-NAC T stage ($p = 0.188$), and pre-NAC N stage (0.075) were not significant risk factors. The use of pertuzumab in addition to trastuzumab during neoadjuvant treatment was the only factor associated with risk of recurrence in those who achieved pCR ($p = 0.039$, hazard ratio 0.069, [0.005, 0.878]) in Cox multivariate analysis.

Conclusions: This study showed that use of pertuzumab in addition to trastuzumab during neoadjuvant treatment was significantly associated with less breast cancer recurrence in those with pCR. Further studies with larger number of patient are desirable.

The Result of Therapeutic Mammaplasty with Advanced Pedicles for Centrally Located Breast Carcinoma: A Case Report

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Background: As of 2023, there have been 2.3 million breast cancer diagnosis globally, with 343 cases reported in Mongolia. As of 2024, breast cancer ranks the 4th most common cancers affecting women in Mongolia. Recent data indicate that the majority of cases in Mongolia are diagnosed at advanced stages. Unfortunately, fewer than 50% of women diagnosed with breast cancer in the country has 5 year survival rate. To enhance surgical management and improve patient outcomes, the National Cancer Center of Mongolia-Breast Center has actively implemented new techniques and approaches in breast-conserving and reconstructive surgeries.

Methods: The case of a 44-year-old woman diagnosed with centrally located carcinoma of the left breast. Initially, she underwent neoadjuvant chemotherapy Adriamycin and Cyclophosphamide 4 cycle followed by Docetaxel 4 cycle (AC4+DTX4). Additionally, we successfully treated her by adopting an oncoplastic technique, which included wide excision of the nipple-areola complex through an inverted-T wedge mammaplasty and a contralateral Wise pattern reduction was also performed for symmetrization. As well an inferior pedicle flap technique was performed to fix the deformity caused by NAC with carrying skin from the inferior pole of the breast.

Result: In the modern era, neoadjuvant systemic therapy (NST) is increasingly utilized in patients with operable tumors to downstage the primary tumor and increase eligibility for breast-conserving surgery (BCS). Ideally suited patients for downstaging are those with large unifocal tumors, in whom a decrease in tumor volume is sufficient to avoid mastectomy. While surgical downstaging in many scenarios can significantly improve quality of life, with the prime example being avoidance of ALND.

Conclusions: In Mongolia, the number of breast-conserving surgeries for breast cancer has been steadily increasing due to the improved effectiveness of systemic therapy. In this regard oncoplastic breast surgery not only enhances the aesthetic outcomes for patients but also positively impacts their quality of life.

The Use Bipolar Electrosurgical in Seroma Reduction after Mastectomy: Case Series

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Background: Postmastectomy seroma formation is common and associated with increased morbidity. Use of pressure garments, immobilization of the ipsilateral upper limb, quilting, and use of sclerosing agents have been described to decreased seroma formation. Thus far, no method has been shown to be effective. We explore the use of Bipolar electrosurgical to reduce seroma formation through improved tissue adherence and hemostasis.

Methods: We compared the degree of seroma formation in 7 patients with Bipolar applied to the post-mastectomy with 16 patients who underwent without the use of Bipolar.

Result: The amount of seroma formation (assessed by drain volume and volume of seroma fluid aspirated after drain removal) were compared between the two groups. Result: Median time to drain removal for use of the Bipolar group is 7 days; 14 days for the control group. The median drain volume for use of the Bipolar group is 110ml; 215 mL for control group. Median aspiration volume after drain reveal for use of Bipolar group is 14ml; 40.5 mL for the control group.

Conclusions: The use of Bipolar effectively reduces seroma formation. Bipolar electrosurgical have a good safety profile, are easy to use, and do not significantly increase the operative time. A follow-up prospective study of a larger scale is underway to analyze the cost and benefits of this technique.

Role of Indocyanine Green (ICG) for Sentinel Lymph Node Biopsy among Patients with Breast Malignancy at National Kidney Transplant Institute: A 4-year Retrospective Study

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Background: Indocyanine green (ICG) has emerged as an alternative tracer to radioisotope (technetium-99 [Tc-99]) for sentinel lymph node biopsy (SLNB) in breast cancer with methylene blue (MB). We evaluated the role of ICG for SLNB among biopsy proven, radiologically and clinically node negative breast cancer patients at National Kidney and Transplant institute by comparing the detection rate and agreement with MB.

Methods: This retrospective study included 21 biopsy-proven breast cancer patients with a clinically negative axilla, as determined by palpation and ultrasound, who underwent SLNB using a combination of ICG and MB between September 2021 and September 2024.

Result: A total of 81 nodes were described. The study found that ICG detected 69 nodes (81.48%) of the 81 nodes compared to MB (59.26%), with both dyes detecting 39 nodes (46.42%). The overall agreement was 53.57%, with poor-to-no agreement in patients without chemotherapy. However, agreement improved to 71.72% in patients with chemotherapy, indicating fair agreement. The kappa coefficient indicated poor-to-no agreement in patients without chemotherapy.

Conclusions: ICG demonstrated superior detection rates compared to MB, affirming its reliability as a tool for SLNB. The agreement between ICG and MB was moderate overall, but higher in patients receiving neoadjuvant chemotherapy, highlighting the better performance of dual tracer in this population. The findings suggest ICG's potential in improving nodal detection rates and reducing false negatives in neoadjuvant chemotherapy cases.

A Systematic Review and Meta-Analysis on Surgical Outcomes of Ligasure versus Conventional Methods in Axillary Lymph Node Dissection for Breast Cancer Patients

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Background: Axillary lymph node dissection (ALND) is still done for breast cancer despite trends towards limited axillary dissection. ALND leads to use of drains, outpatient aspirations, delayed wound healing and risk for infection. Ligasure is a vessel sealing device able to permanently fuse vessels without dissection or isolation. The study aims to determine Ligasure's benefits to drainage volume, seroma formation, time to drain removal, operative time and hospital stay.

Methods: Two investigators conducted an online database search for randomized controlled trials on Ligasure versus conventional ALND excluding non-cancer mastectomies, retrospective studies, single-arm studies and case reports or series. RevmanWeb was used for data analysis. Risk ratio and mean difference were used dichotomous and continuous data, respectively. Heterogeneity was assessed with Chi-square Test and Inconsistency Index. Random effects model was used if significant heterogeneity was present. Risk of Bias 2 tool was used to assess bias for the following: A) randomization process; B) deviations from intended interventions; C) missing outcome data; D) measurement of outcome; E) selection of reported result and F) overall bias.

Result: Ligasure group showed statistically significant decrease in drainage volume (n = 387 patients, 95% CI, *p*-value = < 0.00001, -185.67 [-295.38, -75.95]), decrease in time to drain removal (n = 232 patients, 95% CI, *p*-value = 0.0009, -1.77 [-2.81 vs -0.72]), and shorter hospital stay (n = 239 patients, 95% CI, *p*-value = < 0.001, -1.21 [-1.96, -0.47]). There was no significant difference in seroma formation and operative time. High risk of bias was noted in time to drain removal due to a lack of a standard criteria. Seroma formation results had high reporting bias.

Conclusions: Ligasure was efficacious to patients undergoing ALND in terms of postoperative drainage volume, time to drain removal and hospital stay. There is insufficient evidence on its benefit in seroma formation and operative time.

Impact of Surgical Margins and Multimodal Therapy on Long-Term Outcomes in Early-Stage Breast Cancer: A Prospective Cohort Analysis

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Background: Breast cancer is the most common malignancy among women worldwide, with over 2 million new cases diagnosed annually. Surgical resection, especially breast-conserving surgery (BCS), is central to curative treatment for early-stage disease. However, optimal surgical margin widths and the role of multimodal adjuvant therapies remain areas of debate, necessitating further evidence to inform clinical decision-making.

Methods: This prospective cohort study included 1,500 women diagnosed with early-stage breast cancer (T1-2, N0-1) between 2015 and 2022. Participants underwent either BCS or mastectomy, and surgical margins were categorized as "clear" (≥ 2 mm) or "close" (< 2 mm). Adjuvant therapies-chemotherapy, radiotherapy, endocrine therapy, and HER2-targeted agents were administered according to institutional protocols. The primary endpoints were 5-year local recurrence-free survival (LRFS) and overall survival (OS), analyzed using Kaplan-Meier survival curves and Cox proportional hazards models.

Result: Patients with surgical margins ≥ 2 mm had significantly better LRFS (92% vs. 84%, $p < 0.001$). The addition of multimodal adjuvant therapies improved outcomes further, with a 5-year LRFS increase of 18% ($p = 0.002$) and a 12% OS improvement ($p = 0.01$). HER2-positive tumors derived notable benefit from dual HER2-targeted therapy, while omission of radiotherapy following BCS led to a threefold increase in local recurrence ($p < 0.001$). Patients with hormone receptor-positive disease showed sustained benefits from endocrine therapy, highlighting the importance of individualized treatment plans.

Conclusions: Wider surgical margins (≥ 2 mm) and adherence to multimodal adjuvant therapy are critical to minimizing recurrence and optimizing survival in early-stage breast cancer. Tailored treatment strategies, informed by tumor biology and margin status, should be prioritized to mitigate heterogeneity in outcomes. These findings underscore the necessity of a multidisciplinary approach, integrating precision surgery with systemic therapies, to advance oncologic care standards.

Comparing outcomes of surgical approaches for T4 breast cancers should all T4 cancers be treated the same?

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Background: T4 breast cancer, characterised by direct extension to chest wall and/or skin, represents an advanced cancer stage associated with poorer outcomes. Surgical management traditionally involves a mastectomy after neoadjuvant systemic therapy. With advancements in systemic therapy, radiation, and surgical techniques, the role of breast-conserving surgery (BCS) in pT4 breast cancer warrants re-evaluation. This study compares the outcomes of patients with T4 breast cancer who underwent BCS vs mastectomy.

Methods: We conducted a retrospective cohort study of 709 women diagnosed with non-metastatic T4 breast cancer between 2012 and 2017 who underwent surgery in the SingHealth Duke-NUS Breast Centre Singapore. Treatments included BCS (n = 33), mastectomy (n = 609) and mastectomy with reconstruction (n = 67). Outcomes assessed include local and distant recurrence, disease-free survival (DFS), overall survival (OS), and breast-cancer-specific survival (BCSS).

Result: Patients who underwent BCS were associated with the best survival outcomes: 5-year DFS of 59.1% (95%CI 43.4 80.5), OS of 74.2% (95%CI 59.4 92.6), and BCSS of 77.9% (95%CI 63.7 95.2). The BCS group had the longest median DFS (91 months vs 82 months (mastectomy) vs 22 months (mastectomy with reconstruction)). Differences in DFS ($p = 0.001$) and BCSS ($p = 0.03$) were significant, but OS did not differ significantly ($p = 0.2$), between the three treatment groups. This may be attributed to a smaller median tumour size in the BCS group (4.1 cm vs 6.0 cm (mastectomy) vs 7.5 cm (mastectomy with reconstruction), $p = 0.006$), and with a larger proportion (70.4%) of luminal A tumours in the BCS group (cf 43.0% (mastectomy) and 50.9% (mastectomy with reconstruction), $p = 0.086$).

Conclusions: This study shows that BCS may offer non-inferior oncologic outcomes compared to mastectomy in selected patients with smaller tumours and favourable subtype. Although, the small number of patients who underwent BCS in this study limits the generalisability of our findings, larger numbers may help support a personalised surgical approach to our patients with locally advanced breast cancer.

Establishing a Structured Accreditation Pathway to Enhance Proficiency in Endoscopic Nipple-Sparing Mastectomy: Initial Insights from Ten Cases

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Background: This prospective cohort study at NUHS, initiated in October 2024, aimed to accelerate proficiency in endoscopic nipple-sparing mastectomy (E-NSM) through a structured accreditation pathway. Surgeons were required to meet predefined eligibility criteria, including prior experience with conventional mastectomies and accreditation in minimally invasive surgery. The program followed a progressive framework to ensure technical skill acquisition and patient safety.

Methods: The training program consisted of sequential phases, beginning with theoretical modules covering endoscopic anatomy, instrumentation, and procedural workflows. This was followed by live observations, assisting in surgeries, and performing supervised live procedures under an expert proctor. Competency was assessed using the Global Operative Assessment of Laparoscopic Skills (GOAL) tool and an NUHS checklist based on Entrustable Professional Activities (EPA), with NASA task load index scores tracked. Key clinical outcomes, such as tumor and patient factors, surgical operative duration, and complications, were evaluated. Structured debriefings and BREAST-Q questionnaires were employed to assess both professional and patient-reported outcomes.

Result: Independent competency was achieved after 10 successful cases with a 90% performance score and no significant morbidity. Descriptive statistics summarized surgeon performance, including case completion, skill scores, and patient-reported outcomes. Tumor characteristics were analyzed to assess their impact on surgeon performance, and correlation analyses evaluated relationships between training metrics and clinical outcomes. The weight of the breasts ranged from 45g - 380g, with endoscopic duration varying from 45 -110 minutes. The GOAL scores improved stepwise from 19 to 25. NASA scores ranged from 59 to 85, highlighting varying workload. EPA scores were consistently high, indicating adherence to the structured accreditation framework.

Conclusions: Higher breast weights correlated with longer endoscopic times. Cases with denser breasts (BIRADS D) required more time, reflecting greater complexity. This study highlights the potential of a structured accreditation approach in reducing the learning curve for E-NSM and ensuring surgical proficiency through a stepwise training program.

Cryotherapy as a Surgical De-Escalation Strategy in Breast Cancer: A Comprehensive Review of Techniques, Complications, and Oncological Outcomes

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Background: Advancements in breast cancer screening and treatments have shifted towards deescalating surgeries, with cryotherapy emerging as a scar-free, outpatient option suitable for elderly patients and those with comorbidities. This systematic review aims to assess the indications, techniques, complications, and outcomes for early-stage breast cancer patients undergoing cryotherapy, highlighting the variability in protocols and device availability across different countries.

Methods: The systematic review involved searching PubMed, Cochrane Library, and EMBASE databases up to August 6, 2024. The search strategy comprised a combination of text words and Medical Subject Heading (MeSH) terms, including "breast neoplasms", "Cryosurgery", and "Recurrence". Outcomes of interest were indications for cryoablation, cryoablation protocols, side effects and local recurrence rates.

Result: A total of 276 papers were found in the initial search, with 82 from PubMed, 178 from Embase and 15 from Cochrane. Majority of the studies included were from western countries such as the USA, Switzerland, Italy and Germany. Cryotherapy was commonly indicated for patients who declined surgical options and for low T stage breast tumours. The procedure was applied to tumours ranging in size from 0.5 to 4.5 cm. Standard protocols typically involve two freeze-thaw cycles using devices like the IceCure ProSense or ICEFx Cryoablation System, to achieve tumour margins of 1.0 to 2.0 cm. Skin burns are prevented with saline injection between the skin and breast tumour. Minor side effects post-cryotherapy including ecchymosis, edema, and skin pigmentation occurred in approximately 12-24%. Post-ablation local recurrence ranged from 0% to 67%, and was low at about in patients with early stage breast cancer.

Conclusions: Cryotherapy could potentially be a step forward in surgical de-escalation of breast cancer particularly for elderly patients with early-stage breast cancer or those who are at high risk and might benefit from a less aggressive treatment strategy.

Evaluation of the learning curve of endoscopic single-port nipple sparing mastectomy for breast cancer: An evaluation of 55 consecutive procedures with cumulative sum analysis

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Background: Minimally invasive breast surgery (MIBS) is gaining recognition as a technique that allows for smaller obscure scars, minimal pain and wound issues, and decreased skin and nipple-areolar complications. While the approach is gaining popularity, concerns of steep learning curve and longer operative times remain. We sought to objectively evaluate the learning curve and outcomes of the single-incision, single-port, endoscopic nipple-sparing mastectomy (E-NSM).

Methods: We analysed the outcomes of 55 consecutive cases of E-NSM for breast cancer patients in a single institution commencing July 2019. Oncological data, method of reconstruction, specimen weight, and operation times were prospectively accrued.

Result: 49 consecutive breast cancer patients underwent 55 E-NSM procedures (6 bilateral). The mean patient age was 51 years old, the mean pathologic tumor size was 3.2 cm (range 0-8.8), and mean specimen weight was 365.3g (range: 60-800). Majority of patients had early-stage cancer (11% stage 0; 24% stage I; 44% stage II). The cases were either performed by a single senior consultant as primary operator (n = 45), or by a junior consultant under the senior's guidance (n = 10, commencing from case 34). In the cumulative sum (CUSUM) analysis, operation time significantly decreased after three cases. The mean operation time was 128 min for all 55 cases. In the mature phase, the senior surgeon could complete the mastectomy in a mean time of 105 minutes (range: 49-153). The average follow up was 26.3 months. There were no events of total nipple-areolar necrosis (0%). Most cases had ideal cosmetic outcomes following breast reconstruction (36% excellent; 56% good).

Conclusions: In our institution's initial experience, the E-NSM learning curve can be mounted by a trained breast surgeon within three cases and E-NSM operative times are comparable to our expectations of conventional NSM. Fluctuations in operative time correlates well with case complexity, with mastectomy specimen weight as an adjunct determinant.

Full-Thickness Chest Wall Resection for Locally Invasive Phyllodes Tumor and Reconstructive techniques: A Systematic Review

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Background: The conventional approach to treating phyllodes tumors (PT), regardless of histological grading, has been wide local excision with negative margins. Little is known about the management of PTs invading into the chest wall. This systematic review aims to evaluate the clinical value of full-thickness chest wall resection (FTCWR) for such tumors and assess the reconstructive techniques adopted.

Methods: We performed a systematic search on PubMed, Embase, SCOPUS and Google Scholar from their inception to 10 November 2024. Primary outcomes were disease free survival (DFS) duration and recurrence rates.

Result: 18 case reports/series comprising 18 patients were reviewed, with no randomized trials available. The mean age of patients was 42.9 (range 18-65). Malignant PT was reported in 94.4% (n = 17/18), and 77.8% (n = 14/18) had a recurrent lesion. Tumor sizes ranged from > 5 cm to 38 cm. Computed Tomography (CT) was the most commonly used radiological modality for evaluation of chest wall invasion (n = 14/18, 77.8%). Resection involved three or more ribs in 77.8% (n = 14/18), sternum in 27.8% (n = 5/18), pleura in 44.4% (n = 8/18), pericardium in 5.6% (n = 1/18), diaphragm in 5.6% (n = 1/18), and lung parenchyma in 16.7% (3/18). Structures reconstructed include the ribs in two cases, the pleura in one, and the diaphragm. Most reconstructed the chest wall with both prosthetic material and soft tissue (n = 14/18, 77.8%). Median DFS was 12 months (range 1-60), with one local recurrence (5.6%) at 36 months and four distal recurrences (22.2%) within 48 months. 6 patients died, including two inpatient deaths and four from distal metastases. Respiratory and wound complications were most common, and cosmetic outcomes were consistently rated as good by surgeons or patients.

Conclusions: FTCWR promises good symptom control, DFS and oncological outcomes even in complex cases of locally invasive PT. As these cases are rare and heterogenous, further prospective case series are needed to support this.

Robotic Nipple Sparing Mastectomy and Axillary Clearance using a Single Multi-Arm Robotic System - It can be done

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Background: Robotic breast surgery (RBS) has gained popularity in the recent years. Despite this, experience of its use in the axilla remains limited due to the active down-staging of the axilla and the difficulty in manipulation of the multiple arms in a narrow space. Though SP systems are ideal in breast surgery, the reality is that most surgeons will only have access to multi-port robots for the foreseeable future. We aim to describe the technique of robotic axillary clearance (R-AC) using a single multi-port robot as an extension to RBS.

Methods: Literature review of all techniques of R-AC using any robotic model was performed. Dry lab modelling and simulation together with on-table trouble shooting allowed the development of a R-AC protocol. All patients undergoing RBS at our centre who required AC had R-AC using the same multi-arm Da Vinci Xi. After extraction of the mastectomy specimen, the robot was re-docked aiming at the apex of the axilla. 3 arms were triangulated with a fenestrated grasper on the left and a bipolar Maryland on the right. The axillary vein-first approach was used. The intercostobrachial nerves were identified and preserved along with the long thoracic nerve and thoracodorsal bundle.

Result: A multi-port robot was used to perform both the breast and axillary surgery. The median age and body mass index was 64 and 22.8kg/m^2 respectively. All 3 patients had N1 disease post-noeadjuvant treatment requiring clearance. None of the incisions were extended for AC. Mean R-AC docking and console time was 10 and 42 minutes respectively. There were no immediate complications and short term outcomes were comparable to conventional AC. Surgeons did not report difficulty with manipulation of the multi-arm robot as per previous authors.

Conclusions: It is ergonomically feasible, safe, economical to perform breast and axillary surgery using a multi-port robot when SP systems are not available.

Tumor-to-Nipple Distance and Nipple Preservation Rates of Robot-Assisted Nipple-Sparing Mastectomy for Breast Cancer

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Background: Nipple-sparing mastectomy (NSM) offers aesthetic and psychological benefits for breast cancer patients but requires an adequate tumor-to-nipple distance (TND) to reduce the risk of nipple recurrence. Robot-assisted NSM (R-NSM) provides precision for tissue dissection under the nipple-areolar complex (NAC). Rate of NAC preservation and local recurrence in R-NSM across different TND ranges is analyzed.

Methods: We retrospective reviewed patients undergoing R-NSM in CGMH. Patients were categorized according to TND: group A (< 1 cm), group B (between 1 to 2 cm) and group C (> 2 cm). Nipple preservation rate, postoperative nipple necrosis and incidence of local recurrences were compared.

Result: Totally173 patients underwent R-NSMs with immediate breast reconstruction. Seven patients underwent bilateral NSMs for bilateral cancer. The R-NSM numbers were 40 (22.2%) in group A, 71 (39.4%) in group B, and 69 (38.3%) in group C. No significant difference exist in tumor stage, molecular markers, and multifocality among the groups. There were 6 (3.33%) immediate nipple resections based on frozen sections and 2 (1.11%) delayed nipple excisions for positive permanent sections. The NAC preservation rate in group A, B, and C were 85%, 98.5% and 98.5% respectively ($p = 0.003$). With 26.5 months median follow-up, 2 locoregional recurrences (1.2%) were observed in group C but none occurred at the NAC. Superficial nipple necrosis with eschar were noted in 45.6 % of patients, but 98.8% spontaneously healed. The nipple necrosis rate were 37.5% in group A, 52.1% in group B, and 43.5% in group C ($p = 0.228$).

Conclusions: With case selection, surgical planning and technical expertise, R-NSM facilitates radical removal of glandular tissue beneath the NAC, and appears feasible in preserving cancer-free NAC for breast cancers with limited TND. Nipple preservation rate with TND < 1 cm was 85%, and NAC recurrence rate was extremely low. Robotic approach increases options for NSM although long term oncological outcomes await updates.

Contralateral Risk Reducing Mastectomy in Early Breast Cancer Patient with BRCA Mutations

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Background: Breast cancer (BC) is the most common cancer among women worldwide. Inherited germline mutations in BRCA1/2 are known to predispose patients to a higher risk of breast cancer in more than 60% of women. Such women are at substantially increased risk of contralateral BC and may benefit from risk reduction strategies. We describe the presentation and management of patients with unilateral BC and BRCA1 mutation.

Methods: A 38-year-old premenopausal female presented with a palpable left breast mass. She was not involved in any family history of cancer disease. Diagnostic breast MRI showed a mass measuring 3.1 x 1.1 cm and none of axillary lymphadenopathy. Biopsy demonstrated invasive ductal carcinoma (IDC) and poorly differentiation that was ER, PR, and HER2 receptor negative with a Ki-67 of 50. Genetic testing showed the positivity for a BRCA1 mutation.

Result: Due to her left BC stage 2 triple negative, she was started on neoadjuvant chemotherapy (CT) with pembrolizumab and paclitaxel plus carboplatin for 4 cycles followed by pembrolizumab and doxorubicin plus cyclophosphamide for 4 cycles. Post-treatment MRI demonstrated complete response disease. Afterwards, she underwent left skin-sparing mastectomy, left axillary sentinel lymph node biopsy, risk-reducing right nipple-sparing mastectomy and bilateral tissue expander reconstruction followed by adjuvant chemotherapy with pembrolizumab for 8 cycles. Surgical pathology revealed no evidence of IDC and all lymph nodes was negative. The patient has been discharged from hospital on December 2024 and being under surveillance.

Conclusions: The question of whether or not to perform a risk-reducing mastectomy in a BRCA BC patient will remain unanswered until prospective studies can be performed. Based on our limited experience, this surgery in patients with a BRCA mutation should be performed on a case-by-case basis through a shared decision-making process taking into consideration overall risk, family history, patient preference and quality of life.

Four-Year Institutional Experience with Targeted Axillary Dissection in Breast Cancer: Outcomes and Evolution of Surgical Practice

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Background: Targeted Axillary Dissection (TAD) has become a standard approach in breast cancer patients undergoing neoadjuvant therapy (NACT), reducing the morbidity associated with axillary lymph node dissection. This study presents a four-year institutional experience with TAD at Chris O'Brien Lifehouse, focusing on its oncologic outcomes and refinement of surgical techniques.

Methods: A retrospective review was conducted on 62 breast cancer patients who underwent TAD between 2020 and 2023. Data on patient demographics, tumor characteristics, surgical methods, and pathologic outcomes were analyzed.

Result: The median patient age was 47 years (IQR 41~57), with 53.2% being premenopausal. The most common tumor subtypes were Luminal B (29%), HER2-only (27%), and triple-negative (26%). Median tumor size was 35.1 mm, and 96.8% of patients had node-positive disease at diagnosis. Clipped nodes were successfully removed in 95.2% of cases, with scout localization demonstrating 100% accuracy versus 87% with other methods. Pathologic complete response (pCR) was achieved in 46.7% of patients, highest in HER2-only cases (35.3%). Over time, the number of dissected nodes decreased, reflecting improved localization techniques. Postoperative complications were minimal, with only 12.9% requiring seroma aspiration.

Conclusions: TAD has proven to be a safe and effective approach for axillary management in breast cancer, offering precise node localization and reduced surgical morbidity. Improved techniques, particularly scout localization, have enhanced node retrieval accuracy and treatment effect assessment. Ongoing refinements in axillary management continue to optimize outcomes while minimizing unnecessary surgical intervention.

Pathological Findings of Axillary Dissection Following Positive Sentinel Lymph Node Biopsy in Breast Cancer Patients Undergoing Upfront Mastectomy

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Background: The recently published SENOMAC and SINODAR-ONE trials offer new insights into the de-escalation of axillary surgery for node-positive early breast cancer patients, including those who underwent mastectomy. This study aims to review the pathological findings from axillary dissection following the identification of positive sentinel lymph nodes in our mastectomy patients, and to evaluate the potential impact of applying the inclusion criteria from the SENOMAC trial.

Methods: This is a retrospective study involving breast cancer patients treated at our center between January 2019 and December 2023. We included all clinically node-negative breast cancer patients who underwent mastectomy and sentinel lymph node biopsy (SLNB), followed by axillary dissection due to a positive SLN on the frozen section. Exclusion criteria included patients with neoadjuvant treatment, recurrent breast cancer, and confirmed nodal involvement prior to surgery.

Result: 132 patients met our selection criteria. The median number of SLNs retrieved was 3 (range 1-17), with a median of 1 (range 1-9) positive SLNs. Completion of axillary dissection harvested additional metastatic lymph nodes in 45 patients (34.1%). Notably, 25 patients (18.9%) experienced a higher pathological N-stage after axillary dissection compared to SLNB alone. The extracapsular extension ($p = 0.006$) and T-staging ($p = 0.002$) were identified as predictors of residual metastatic lymph nodes following SLNB. We analyzed 113 patients who met the SENOMAC criteria (clinically node-negative T1-3 tumors with 1-2 macrometastases in SLNB). 30 (26.5%) had additional positive lymph nodes, with 16 (14.2%) experiencing nodal upstaging. Higher T-staging continued to be a significant predictor of additional positive nodes ($p = 0.014$).

Conclusions: Approximately one-third of patients with a positive SLNB exhibited additional metastatic lymph nodes upon axillary dissection, with 18.9% showing higher pathological nodal staging post-procedure. Local data on the long-term oncological safety of de-escalating axillary surgery in mastectomy patients are still pending, and optimal patient selection along with subsequent adjuvant treatment remains to be determined.

Post-chemotherapy Axillary Conservation Surgery-Utility of Pre-operative Axillary Ultrasound and Intra-operative Frozen Section

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Background: The safety of axillary conservation in breast cancer patients rendered clinically axillary lymph node (ALN) negative after pre-operative systemic chemotherapy is under scrutiny. We previously validated low axillary sampling (LAS) in post-chemotherapy setting with FNR of 10%. Intraoperative frozen section (ioFS) for ALN has false negative rate (FNR) of 5% in upfront setting. We evaluated the accuracy of aUS and ioFS to identify ALN status in post-chemotherapy setting.

Methods: Non-metastatic breast cancer patients (excluding those with N3c) who are clinically ALN negative post-chemotherapy and are a part of a randomized trial, "Post-chemotherapy Axillary Conservation Surgery (PACS)" were included in this analysis. Accrual period was January2023 to April2024. LAS ioFS negative patients were randomized to undergo LAS-alone (experimental-arm) versus a complete ALND.

Result: Total of 232 patients were accrued, of which 169 were ALN negative on ioFS. 63 patients had positive ALN on ioFS and hence underwent complete ALND. Out of 169 ioFS negative patients, 88 were randomized to LAS-alone and 81 to ALND arm. The median age of the cohort was 46.5 (27-70) years. At presentation, 110 patients had locally advanced (T3/4, N2/3) and 59 early (T1/2, N0/1) breast cancer; the median cT size was 5 cm (1.3-13); 39 were cN0, 103 cN1 and 27 cN2; 42.9% were HR positive, 37.1% HER2 positive and 20% triple negative. 56% (89/159) patients had overall pathological complete response (primary and axilla both). Post-chemotherapy, pre-operative aUS was done in 192/233 patients of which 32 patients had suspicious/indeterminate nodes on aUS. On ioFS, 11 patients who were deemed node negative had positive nodes on final histology. The sensitivity of aUS and ioFS was 32 and 85%, specificity 91% and100% and FNR 27% and 6.5% respectively.

Conclusions: Post-chemotherapy axillary conservation is feasible in 70.7% (164/232) patients. With 100% specificity and 6.5% FNR, ioFS can be effectively used to assess LAS-ALN.

A Nomogram for Predicting Axillary Pathologic Complete Response in cN2-3 Breast Cancer Patients After Neoadjuvant Chemotherapy

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Background: This study aimed to predict axillary pathological complete response (pCR) in clinically N2-3 breast cancer patients treated with neoadjuvant chemotherapy (NAC).

Methods: A retrospective analysis was performed on 276 cN2-3 breast cancer patients who underwent NAC followed by breast and axillary surgery between 2016 and 2020. Imaging metrics, including lesion size and reduction ratios measured by magnetic resonance imaging (MRI) and ultrasonography (US), were analyzed alongside clinical and pathological factors. Multivariable logistic regression was performed to identify predictors of axillary pCR, and a nomogram was constructed based on the results.

Result: Axillary pCR was achieved in 49.3% of patients. Univariable analysis identified significant predictors, including post-NAC breast lesion size on MRI, post-NAC lymph node (LN) size on US and MRI, and post-NAC US-measured LN cortical thickness. Pre-NAC tumor-specific factors, including ER (estrogen receptor) status, PR (progesterone receptor) status, HER2 (human epidermal growth factor receptor 2) status, histologic grade, Ki-67 index and molecular subtype, were also associated with axillary pCR. Multivariable logistic regression analyses were performed using three models: Model 1 included imaging variables, Model 2 added tumor characteristics, and Model 3 further incorporated molecular subtype. Model 3 demonstrated the highest predictive performance (Areas under the receiver operating characteristic curve = 0.9). Subgroup analyses based on molecular subtype demonstrated strong predictive performance using Model 2 variables, highlighting the utility of tailored models for advanced nodal disease.

Conclusions: Integrating molecular subtype-specific imaging metrics and tumor characteristics enabled precise prediction of axillary pCR in cN2-3 patients, supporting more tailored surgical approaches based on individual response.

The role of 18F-fluorodeoxyglucose positron emission tomography/computed tomography in determining the omission of sentinel lymph node biopsy in breast cancer patients with cT0-2 and cN0

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Background: Sentinel lymph node biopsy (SLNB) is a standard procedure for axillary staging. However, SLNB requires additional personnel and time for histological examination and is associated with certain surgical risks. Recently 18F-fluorodeoxyglucose positron emission tomography/computed tomography (PET/CT) is widely performed prior to surgery. The primary objective was to identify the preoperatively assessable predictors of pathologic axillary lymph node metastasis (ALNM) negativity in breast cancer patients with clinical T0-2 (cT0-2) and ALNM-negative on preoperative imaging studies (cN0), in order to identify a specific patient cohort suitable for omission of SLNB. A secondary objective was to evaluate the role of preoperative PET/CT in predicting pathologic ALNM negativity.

Methods: We reviewed the records of breast cancer patients with cT0-2 and ALNM-negative on preoperative ultrasonography (US) and magnetic resonance imaging (MRI), who underwent PET/CT prior to surgery between January 2009 and June 2023. A total of 215 patients were included. Preoperatively assessable variables, including body mass index, primary tumor (PT) size on preoperative imaging studies, histologic grade, estrogen receptor, progesterone receptor, human epidermal growth factor receptor 2 and Ki-67 were analyzed to identify predictors of pathologic ALNM negativity in two groups: Group1 (ALNM-negative in preoperative US, and MRI, n = 215) and Group2 (ALNM-negative in preoperative US, MRI, and PET/CT, n = 184). The negative predictive value (NPV)s of identified predictors were compared between the two groups.

Result: PT size ≤ 15 mm was the only predictor of pathologic ALNM negativity in both Group1 ($P = 0.036$) and Group2 ($P = 0.014$). The NPV of PT size, using a cutoff value of 15 mm, was higher in Group2 (94.9%) compared to Group1 (89.0%).

Conclusions: In breast cancer patients with cT0-2 and cN0, the omission of SLNB may be considered if the PT size on preoperative imaging studies is ≤ 15 mm. Additionally, preoperative PET/CT is recommended to reduce the false-negative results.

Clinical implications of the Langer's axillary arch muscle in breast cancer patients: a study on 2,904 consecutive patients with operable breast cancer

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Background: Langer's axillary arch (LAA) is a common anatomical variant muscle in the axilla that may interfere with axillary lymph node assessment and dissection during breast cancer surgery. Despite its potential clinical significance, comprehensive studies examining its impact on surgical outcomes and survival in large patient cohorts are lacking. This study investigated the clinical impact of Langer's axillary arch on axillary evaluation and outcomes in breast cancer patients.

Methods: We retrospectively analyzed 2,904 patients (2,953 cases) who underwent axillary surgery for breast cancer at Seoul National University Hospital from 2017 to 2022. CT images were reviewed for LAA presence, and comparisons were made between LAA-positive and LAA-negative groups regarding axillary ultrasound performance, surgical outcomes, and disease-free survival.

Result: Among 2,953 patients, LAA was identified in 301 (10.2%) on CT images. Diagnostic performance of preoperative axillary ultrasound showed lower specificity in the LAA group (77.9% vs 83.6%, $p = 0.031$). After a median follow-up of 40.4 months, the 5-year disease-free survival rate was significantly lower in LAA-positive patients ($p = 0.029$). Multivariate analysis confirmed LAA as an independent predictor of worse disease-free survival (HR 2.12, 95% CI: 1.06-4.24).

Conclusions: The presence of LAA is associated with fewer retrieved lymph nodes during sentinel lymph node biopsy and independently predicts worse disease-free survival in breast cancer patients. These findings suggest that LAA should be carefully evaluated during preoperative assessment and surgical planning to optimize lymph node retrieval and patient outcomes.

Challenges in identifying sentinel lymph nodes in early breast cancer patients: Should we opt for standard axillary lymph node dissection?

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Background: Assessing the metastatic status of the axillary lymph nodes is critical in breast cancer to determine disease progression and guide treatment. Axillary lymph node dissection (ALND) is performed when sentinel lymph nodes (SLN) are undetectable, but this can lead to overtreatment and complications. This study investigated if limited ALND provides comparable outcomes to standard ALND in early-stage breast cancer patients.

Methods: Medical records of 2,461 patients were reviewed, focusing on 304 cases with undetectable SLNs. After excluding those with three or more metastatic nodes, 217 early-stage patients were analyzed. They were divided into limited ALND (L-ALND; <9 nodes removed) and standard ALND (S-ALND; ≥ 10 nodes removed) groups.

Result: The L-ALND group showed lower local recurrence (1.6% vs 3.4%) and fewer complications. Five- and ten-year recurrence-free survival rates were higher in the L-ALND group (96.0% vs 89.1% and 94.2% vs 49.5%). Factors affecting recurrence included the number of lymph nodes removed, type of surgery, P-53 mutation, and adjuvant radiation therapy. Lymphedema incidence was also lower in L-ALND (4.8% vs 10.3%).

Conclusions: Limited ALND offers outcomes comparable to standard ALND in early-stage breast cancer, reducing complications without compromising oncological outcomes.

Beyond Blue and Radioisotope: A Meta-Analysis of ICG as an Innovative Approach for Sentinel Lymph Node Detection in Early Breast Cancer

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Background: Sentinel lymph node biopsy (SLNB) is the standard procedure for assessing axillary lymph nodes in early breast cancer. Blue dye (BD) has been the standard tracer in sentinel lymph node biopsy however, its limitations prompted exploration of indocyanine green (ICG) as an alternative tracer. This meta-analysis evaluates the efficacy of different tracers and tracer combinations in detecting sentinel lymph nodes (SLNs) for early breast cancer patients.

Methods: This meta-analysis included 24 studies to compare the detection rate of ICG, BD, RI, and their combinations (ICG + BD, ICG + RI, BD + RI). Analysis was conducted using a fixed effect network analysis model, with indocyanine green as the designated reference group. Computations of effect measures and creation of graphs and plots were done using R Statistical Software.

Result: Blue dye alone had the lowest detection rate (97%, 2.71% lower than ICG, $p = 0.0019$). ICG + RI showed the highest detection rate, with a 4.7% improvement over ICG alone ($p < 0.0001$). ICG + BD also demonstrated superior performance compared to BD alone, with a 2.31% higher detection rate ($p = 0.0136$). While ICG + RI emerged as the most effective combination, differences between ICG + BD and BD + RI were statistically minimal.

Conclusions: ICG-based tracers provide additional benefits compared to BD or RI alone. The results of this meta-analysis suggest that ICG-based approaches are viable alternatives, especially in resource-constrained settings, with ICG + RI recommended as the most reliable tracer combination. Future research should further explore clinical considerations such as cost, accessibility, and ease of use to guide tracer selection in practice.

Indocyanine Green for Sentinel Lymph Node Mapping Post-Neoadjuvant Chemotherapy in Breast Cancer: A Modern Alternative to Conventional Techniques

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Background: Sentinel lymph node biopsy (SLNB) is the standard for axillary staging, and its use in post-neoadjuvant chemotherapy (NAC) patients is being explored. To reduce false-negative rates, dual-tracer mapping is recommended, though the current standardradioisotope (RI) and blue dye (BD) is limited by the specialized handling required for radioisotopes. Indocyanine green (ICG), though relatively new, is a promising modality for identification of sentinel lymph nodes, demonstrating advantages over the known standard methods. This study evaluates the efficacy of ICG alone and in combination with other tracers in sentinel lymph node mapping for breast cancer patients post neoadjuvant chemotherapy.

Methods: This comparative meta-analysis included three prospective studies in evaluating the detection rate of combinations of the three tracers in patients with breast cancer (cT1-4, cN1-2) who received NAC. Risk ratios (RRs) and confidence intervals (CIs) were calculated to determine the efficacy of each technique.

Result: ICG alone showed a similar performance to the standard BD and RI (RR 0.957, 95% CI, 0.729-1.22). When used in combination, specifically ICG + BD (RR 4.74, 95% CI, 1.13-83) and ICG + BD + RI (triple tracer) (RR 4.3, 95% CI, 1.09-136), significantly improved detection rates were observed. The above findings suggest that multimodal approaches involving ICG enhance SLN detection in post-NAC patients.

Conclusions: The addition of ICG as a tracer in SLN mapping, especially in the post-NAC setting, shows evidence of its efficacy alone or in combination with BD and RI. Integrating ICG into clinical practice may optimize SLN detection, which improves surgical precision and patient outcomes. Further studies are warranted to confirm these findings and establish standardized protocols.

Assessment of Axillary Treatment in cT1-3N0 Breast Cancer Patients Undergoing Upfront Mastectomy

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Background: There is emerging data supporting the notion that axillary radiotherapy is a safe alternative to axillary lymph node dissection (ALND) in patients with limited nodal disease and underwent upfront mastectomy. Thus for patient who are going for post mastectomy radiotherapy (PMRT), ALND could be safely omitted. We would like to evaluate the percentage of patients in our institution, with cT1-3N0 disease who underwent upfront mastectomy and were eventually found to have 1-2 lymph node positive for metastasis, had PMRT in addition to ALND.

Methods: Patients with cT1-3N0 breast cancer who has undergone upfront mastectomy and SLNB from January 2010 to December 2023 were identified from a Joint Breast Cancer Registry in Singapore. The clinicopathological features and treatment details were collected and analysed.

Result: 4030 cases of cT1-3N0 breast cancer patients who had undergone mastectomy and SLNB were identified. Median age of the patients was 59 years old. Median size of tumour was 2.1 cm (0.04-11.5 cm) with a majority of tumours being ER+ (84.1%) and Her2- (79.1%). Most patients (2847, 70.6%) had no metastasis on their SLNB. 1080 patients (26.7%) were found to have 1-2 SLN positive for metastasis on SLNB. Of these, 516 patients (47.8%) underwent ALND followed by PMRT.

Conclusions: Nearly half of the cT1-3N0 patients with 1-2 positive lymph nodes on SLNB had PMRT following ALND. Overtreatment of the axilla may be avoided if we hold off the decision for ALND until the final pathology results is available.

Early Experience with Magtrace Lymphatic Tracer for axillary staging in Singapore

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Background: Magtrace is a supraparamagnetic iron lymphatic tracer that has been well-established for sentinel node biopsy (SNB) for breast cancer, having received US FDA approval since July 2018 and NICE guidance recommendation since 2022. We describe our initial experience with the introduction of Magtrace into our routine practice.

Methods: This is a prospective study of all patients undergoing axillary SNB in a single group practice. These patients had localization using Magtrace with or without an additional lymphatic tracer: patent blue dye or Indocyanine Green (ICG). The primary outcome measures include the incidence of successful retrieval of at least 1 sentinel lymph node using Magtrace, operative time taken for the procedure and the failure of Magtrace in identifying sentinel lymph nodes that contained metastasis.

Result: A total of 102 patients during the period from Jan 2024- Dec 2024 underwent SNB during the period of the study. Thirty patients (29.4%) received neoadjuvant chemotherapy or endocrine therapy prior to surgery, of which 14 patients (13.7%) presented with cN1 disease. Ten patients (9.8%) had localization using Magtrace alone while the rest had an additional lymphatic tracer (75.5% patent blue dye and 14.7% ICG). The median number of nodes harvested was 2 (1-5 nodes). The mean operative time taken was 8 minutes (SD 6.7min). The SLNB identification rate by Magtrace was 97.1%. All identified nodes were hot. Only 45.5% were both hot and visibly brown. In the 3 patients where Magtrace did not identify any sentinel lymph node, all received neoadjuvant chemotherapy where SNB was done as part of targeted axillary dissection where 1 patient had extensive nodal metastasis.

Conclusions: This is the first study in Singapore demonstrating that introducing Magtrace was feasible and safe. The SNB identification rates were high at 97.1% and comparable to the current gold standard. The use of Magtrace in patients undergoing TAD encountered higher failure rates (21.4%).

Establishing a multi-disciplinary clinical pathway for the identification and treatment of patients with lymphoedema post axillary dissection

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Background: Upper extremity lymphedema is a complication that affects up to 15% of the patients who undergo axillary dissection as part of surgery for breast cancer, and has a lifelong effect on the quality of life of cancer survivors. However, currently there is no standard clinical pathway in which these patients are identified and hence receive the appropriate treatment by the occupational therapists and the plastics surgeons.

Methods: SingHealth Duke-NUS Breast Centre has systemised a comprehensive workflow to identify the patients who will benefit from intervention either by conservative treatment by the occupational therapists or surgical treatment by the plastics surgeons, to ensure that they receive the appropriate treatment for their symptoms.

Result: Training and education of the breast surgeons, medical and radical oncologists on the symptoms and signs that the patients present with, clinical criteria for referrals to the occupational therapists and plastic surgeons, and an update on the various surgical and non-surgical options for lymphoedema management by the plastic surgeons and the occupational therapists was done in a multi-disciplinary symposium on Lymphoedema. We also empower our patients with the use of patient information brochures, educating them of the symptoms of lymphoedema, and the various conservative or surgical treatments available. Empowerment of patients and their families with accurate information is paramount to alleviate their anxiety levels, and help patients make an informed decision regarding the treatment options, hence improving overall satisfaction.

Conclusions: A clinical pathway would be a continual resource being utilised by the surgeons/oncologists for identification and referral, and the occupational therapists and plastic surgeons for treatment. This standardizes the referral pathway across the disciplines and improves patient care.

Evaluate the outcome and feasibility of using the Da Vinci Xi system for axillary lymph node dissection in breast cancer patients

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Background: Sentinel lymph node biopsy is crucial for staging and treatment planning for breast cancer patient. Robotic-assisted surgery offers potential benefits, including smaller incisions and reduced trauma. However, the efficacy and outcome of Da Vinci Xi-assisted axillary lymph node dissection (ALND) using indocyanine green (ICG) fluorescence imaging require further investigation.

Methods: This retrospective study analyzed 40 patients who underwent robotic-assisted ALND with nipple-sparing mastectomy using the Da Vinci Xi system between July 1, 2023, and November 30, 2024. ICG fluorescence imaging was the primary method for sentinel lymph node detection. Data collected included patient demographics, pathologic stage, surgical techniques, ICG injection method, time to lymph node removal, and the number of lymph nodes harvested. Success was defined as complete lymph node dissection. The study addressed initial challenges in ICG detection by modifying the injection technique and optimal waiting time.

Result: An improved ICG injection protocol, involving subcutaneous injection and a longer waiting period, yielded successful lymph node detection in 27 of the final 40 cases. The Da Vinci Xi system facilitated precise dissection with minimal tissue damage. The mean number of lymph nodes harvested was 3.38. The study highlighted the improved visualization and precision offered by robotic-assisted ALND compared to open methods.

Conclusions: Robotic-assisted ALND using the Da Vinci Xi system and ICG fluorescence imaging is feasible but requires specialized surgical skills and adherence to a precise protocol to ensure successful lymph node detection. The use of a modified ICG injection technique resulted in significantly improved results. Further research is warranted to validate these findings and optimize the technique.

Efficacy of Sentinel Lymph Node Biopsy Without Massage in Breast Cancer - A Retrospective Cohort Compared to With Massage

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Background: Sentinel lymph node biopsy (SLNB) is the standard procedure for axillary staging in early breast cancer. While massage following dye injection has been widely practiced, its impact on identification rate and nodal metastasis detection remains unclear.

Methods: This study included primary operable breast cancer patients who underwent SLNB using isosulfan blue dye performed by a single surgeon between May 2016 and May 2021 at our institution. The SLN identification rate, the number and pathological status of harvested nodes, and the concordance rate of frozen-permanent pathology results were compared between groups with and without massage.

Result: A total of 477 patients were included, with 270 (56.6%) in the massage (M) group and 207 (43.4%) in the non-massage (NM) group. The SLN identification rate was comparable between the M group (97%, 262/270) and NM group (98.6%, 204/207, $p = 0.275$). The median number of harvested nodes was 3 [IQR 2, 5] in both groups. Positive nodes were detected in 19.3% (52/270) of patients in the M group and 20.8% (43/207) in the NM group ($p = 0.682$). The median number of positive nodes was 1 [IQR 1, 6], with no significant difference between groups. The concordance rates of frozen-permanent pathology results were similar (99.6% in the M group vs. 99.4% in the NM group, $p = 0.86$).

Conclusions: Massage during SLNB does not improve SLN identification rate. Additionally, it does not significantly impact the number of harvested or positive nodes, and frozen section analysis results, indicating that massage does not confer substantial advantage in these parameters.

BRENDA: Optimising Breast Cancer Care Through Patient-Centered Data Collection

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Background: The Breast Unit Database (BRENDA) is a prospective clinical database established at St. Vincent's Hospital Melbourne (SVHM) to capture longitudinal clinical data and Patient-Reported Outcome Measures (PROMs). The primary goal is to monitor treatment and surgical outcomes, maintain quality assurance and support future collaborative research.

Methods: BRENDA was created using REDCap, captures data for all patients undergoing breast surgery at Department of Breast Surgery, SVHM a tertiary teaching hospital in Melbourne, Australia. Informed consent is obtained from participants using an 'opt-out' approach, approved by SVHM Ethics Committee. Clinical information is collected from medical records, whilst PROMs are sent to patients electronically at predetermined time points before and after surgery, with the latter questions from International Consortium for Health Outcomes Measurement (ICHOM) and BreastQ that are treatment specific.

Result: From January 2023 to end December 2024 BRENDA has collected data from 376 patients with 315 (83.8%) having invasive disease and 61 (16.2%) having surgery for benign conditions. 70 (22.2%) patients with invasive disease underwent neoadjuvant chemotherapy, whilst 245 (77.8%) have had upfront surgery. 196 (62.2%) of breast surgeries were wide local excisions. Our total reconstruction rate for mastectomy patients is 63.2% with 76.4% of reconstructions being autologous. The database has a 100% capture rate of patients undergoing breast surgery, op-out rate of 1.6%. PROMs completion rate is 76.5% at baseline and 67.5% at 6-month post-surgery. Satisfaction with breasts as measured by BREAST-Q for patients having surgery shows significantly improved satisfaction with autologous over implant based reconstructions and improved satisfaction on the use of mammoplasties or flaps.

Conclusions: BRENDA is a powerful platform and tool for continuous improvement in breast cancer care at SVHM. It aligns with the principles of value-based-healthcare by leveraging both clinical data and patient-reported experiences. This comprehensive data collection enables our clinicians to deliver the most effective and personalised care possible for our breast cancer patients.

The Outcomes of Lymphaticovenular Anastomosis for Breast Cancer-Related Lymphedema Treatment in Indonesia

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Background: Breast cancer-related lymphedema (BCRL), a debilitating complication of breast cancer treatment, can significantly impact patients' quality of life. While conservative management options exist, lymphaticovenular anastomosis (LVA) offers a more definitive surgical approach. This study focuses on the LVA procedure performed at Dharmais Cancer Hospital, aiming to provide a comprehensive overview and highlight the potential benefits of this technique in the management of BCRL.

Methods: A retrospective cohort study was performed on BCRL patients who underwent LVA at Dharmais Cancer Hospital between December 2018 and July 2024. Clinical data, including general patient information and the outcome of LVA, were collected. The pre-and post-operative patient-reported BCRL quality of life (LeQOLis) and the amount of arm swelling based on the upper extremity lymphedema (UEL) index were compared using the Wilcoxon test.

Result: Two hundred patients experienced BCRL with a median age of 54 years and a mean body mass index of 28.2. ALND was performed in 198 (99.0%). According to the arm dermal backflow stage, there were 10 (14.1%) patients at stage I, 15 (21.1%) patients at stage II, 29 (40.8%) patients at stage III, 14 (19.7%) patients at stage IV, and 3 (4.2%) patients at stage V. There was lymphatic obstruction with grade I (19.0%), grade II (49.7%), and grade III (31.3%). After a median follow-up of 11.0 months, patients reported significantly better quality of life postoperatively versus before surgery (LeQOLiS score of 26 vs. 48; $p = 0.0001$). The postoperative UEL index was also significantly lower than preoperative ones (104.5 vs.109.6; $p = 0.001$) with an overall reduction of 4.7%.

Conclusions: LVA was associated with subjective symptoms and UEL index improvements among BCRL patients. The results of this study highlight the potential benefits of LVA as a valuable surgical option for patients seeking relief from BCRL.

Supermicrosurgery Lymphatic Reconstruction as A Secondary Prevention for Breast Cancer-Related Lymphedema: A Retrospective Cohort Study

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Background: Supermicrosurgery lymphatic reconstruction (SLR) is an emerging surgical treatment for breast cancer-related lymphedema (BCRL). While it has shown promise in the primary prevention and treatment of early-stage BCRL, its efficacy as a secondary preventive measure remains unclear. This study aimed to evaluate the effectiveness of SLR in reducing the progression of BCRL in breast cancer patients with subclinical lymphedema who presented before breast cancer surgery.

Methods: A retrospective cohort analysis was performed on BCRL patients who underwent an SLR procedure between June 2019 and September 2024 in Dharmais Hospital. The Indocyanine green (ICG) lymphography stage was used to classify the severity of BCRL. Histopathological examination was used to evaluate the lymphatic obstruction. The postoperative assessment was evaluated by the upper extremity lymphedema (UEL) index. The cut-off value for BCRL was the UEL index increase of more than 10%.

Result: Twenty-four patients were included in the study. Based on the ICG lymphography stage, there were 9 (37.5%) patients at stage I, 3 (12.5%) at stage II, 9 (37.5%) at stage III, and 3 (12.5%) at stage IV. Lymphatic obstruction was observed in 6 (25.0%) patients with grades 0,1, and 2. A mean follow-up of 12 months revealed the overall UEL index increase was 6.1%. While 11 (73.3%) patients experienced an increase in the UEL index with a median of 7.2%, 4 (26.7%) patients showed a decrease with a median of 5.4%. The ICG lymphography showed that 8 (53%) patients had improved, 1 (7%) stable, and 6 (40%) had worsening lymphedema.

Conclusions: SLR may prevent BCRL progression as described by the UEL index and ICG lymphography evaluation. Further investigation with larger samples and longer follow-up is needed.

Comparison of immediate and delayed breast reconstruction based on direct-to-implant technique after nipple sparing mastectomy (NSM): a single institute experience

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Background: The development of nipple sparing mastectomy (NSM) approach combined with immediate implant-based breast reconstruction (IBBR) for early stage breast cancer (BC) preserve the natural skin envelope including nipple-areolar complex (NAC) to able to immediately reconstruct the breast with a permanent implant without a tissue expander (TE). We retrospectively analyzed the results of NSM+IBBR and compared the outcome of patients who underwent immediate (one-stage) or delayed (two-stage) IBBR followed by standard TM or NSM.

Methods: We reviewed 116 patients who underwent a TM that included SSM or NSM followed by one- or two-stage IBBR between 2013.4 - 2023.4. 56 patients underwent a total mastectomy (TM) and 33 patients underwent an NSM followed by two-stage IBBR, and 27 patients underwent an NSM followed by one-stage IBBR.

Result: The operation times were 234.5, 247.2, and 319 min, and the mean surgical bleeding was 60.4, 88.8, and 138 mL, respectively. The complications in the three groups included infection (2.7%, 11.1%, and 6.3%), seroma/hematoma (0%, 5.6%, and 6.3%), flap necrosis (2.7%, 11.1%, and 12.5%), and loss of TE or implant (2.7%, 5.6%, and 6.3%), respectively. At the median 62-month follow-up after the NSM + IBBR, one patient was diagnosed with distant lymph node metastases at the 24-month follow-up and one patient had new primary breast cancer within the reconstructed breast at the 38-month follow-up. No loco-regional recurrence at the NAC or other distant recurrence were detected in the patients undergone regardless TM or NSM + one-stage or two-stage IBBR.

Conclusions: Our results suggested that the use of one-stage IBRR tended to increase the operating time and the amount of bleeding compared to two-stage IBRR, the complication rate was higher in cases in which an NSM is followed by IBBR. Oncological outcome showed that loco-regional recurrence is less likely at the NAC regardless of whether the patients underwent one-stage or two-stage IBBR following an NSM.

Initial Experience with the TissueDerm BCS Spacer in Breast Cancer Patients Undergoing Breast-Conserving Therapy

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Background: With the increasing incidence and early detection of breast cancer, breast-conserving surgery (BCS) has become the most common surgical approach. However, partial tissue resection can lead to contour deformities such as volume loss and breast distortion, often requiring additional surgical correction. This study evaluates the short-term outcomes of using a regenerative spacer-type implant (TissueDerm BCS Spacer) in BCS, focusing on postoperative complications, aesthetic satisfaction, and oncologic safety.

Methods: This retrospective study included 30 patients who underwent BCS followed by radiotherapy (RTx) at Severance Hospital between July 2024 and January 2025. All surgeries were performed by two breast surgeons. Medical records were reviewed to assess histologic grade, tumor-node metastasis (TNM) stage, treatment methods, and imaging studies, including CT scans and follow-up MRI. The volume of regenerated tissue was evaluated using CT and MRI at 3 and 6 months postoperatively.

Result: A total of 30 patients were analyzed, with no reported postoperative complications. Approximately 25% of patients reported feeling a palpable lump. Image-based cross-analysis showed no significant breast contour deformities. Patient satisfaction was assessed using the Breast-Q questionnaire. The implanted TissueDerm spacer was not identified as a foreign body on CT or MRI and maintained its structural integrity, providing stable volume support. In some cases, 10~20% of the internal space remained unfilled, while others exhibited fluid collection.

Conclusions: The use of the TissueDerm BCS Spacer in BCS reconstruction demonstrated favorable outcomes compared to existing techniques utilizing acellular dermal matrix (ADM). Unlike ADM, this novel device showed no seroma formation or immune-mediated reactions such as red breast syndrome. The most significant advantage of the TissueDerm BCS spacer is its predictable and consistent tissue regeneration, unlike conventional graft materials. Additionally, its ease of surgical application and minimal complications suggest superior reconstructive potential compared to other available methods.

Volume replacement correlates with breast-conserving surgery and adjuvant radiotherapy using liquid-type acellular dermal matrices in early-stage breast cancer

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Background: Although the incidence of breast cancer is steadily increasing, mortality rates have decreased significantly due to early diagnosis and improved treatment outcomes. Several reconstructive techniques have been developed to compensate for the loss of breast shape and volume after mastectomy, and reconstruction with acellular dermal matrices (ADMs) using extracellular matrix has received increasing attention. This study aimed to evaluate whether liquid-type ADMs can enhance volume replacement in patients who have undergone radiation therapy after breast-conserving surgery.

Methods: This was a retrospective study of 349 patients with early-stage breast cancer who underwent breast conservation surgery and radiation therapy, 17 of whom used liquid-type ADM during surgery, and the changes in breast volume before and after radiation therapy were measured using a radiation treatment planning tool. Statistical analysis and matching techniques were used to compare the results between the control and experimental groups.

Result: No statistically significant difference in post-radiation breast volume retention between the experimental and control groups was observed. However, the experimental group using ADM had a slightly higher volume retention rate than the control group: the control group had a mean volume loss of 99.702%, while the experimental group had a mean volume gain of 101.926%.

Conclusions: The effectiveness of liquid-type ADM in maintaining breast volume in patients who received radiation therapy after breast-conserving surgery was not statistically significant. However, volume increased in the experimental group, suggesting that ADM may positively affect breast reconstruction.

Short-Term Results of Reconstruction Using Acellular Dermal Tissue After Breast-Conserving Surgery in Breast Cancer Patients

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Background: To achieve optimal aesthetic outcomes in breast-conserving surgery (BCS), Acellular Dermal Matrix (ADM) has recently emerged as a promising option to enhance cosmetic results. Despite its growing use, there is limited research on patient satisfaction and the optimal application of ADM. This study aims to evaluate the cosmetic outcomes and identify key considerations for the use of ADM based on short-term follow-up data from breast cancer patients undergoing BCS.

Methods: This retrospective study included 45 breast cancer patients who underwent BCS at Kyung-Hee Medical Center between November 2016 and November 2024. Patients were evaluated for cosmetic outcomes, complications, and symptoms related to ADM reconstruction.

Result: Among the 45 patients, only 3 reported deformities, 20 complained of firmness, and 5 experienced localized pain. A total of 4 patients developed complications, including seroma, infection, and fat necrosis. Three types of ADM were used in this study. Gross deformation (GD) was observed in 3 cases, and radiological deformation (RD) was identified in 17 cases, occurring in patients who underwent reconstruction with either the pallet type or putty type ADM. GD was reported at 7.1% (1/14) and 8% (2/25) in the pallet and putty groups ($p > 0.05$). RD was significantly more frequent in the pallet group (71%, 10/14) compared to the putty group (28%, 7/25) ($p = 0.009$).

Conclusions: The use of ADM after BCS shows promise in reducing breast deformation with low complication rates and patient discomfort. The putty form provides superior cosmetic outcomes compared to other types. Further large-scale and long-term studies are needed to confirm these results and refine ADM application.

Early surgical outcomes of volume replacement using pulverized acellular dermal matrix after breast-conserving surgery

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Background: Breast-conserving surgery (BCS) is a widely performed procedure for early-stage breast cancer. However, postoperative volume deficits and contour deformities remain concerns. Acellular dermal matrix (ADM) is used for cosmetic purposes in partial breast reconstruction. However, studies on pulverized ADM remain limited. This study evaluates the early surgical outcomes of pulverized ADM in patients undergoing BCS for early breast cancer.

Methods: A retrospective review was conducted on 30 patients who underwent BCS with pulverized ADM insertion at single institution. Data on patient demographics, tumor characteristics, surgical details, and postoperative complications were collected.

Result: All 30 patients successfully underwent BCS with pulverized ADM insertion without major intraoperative complications. The mean weight of the resected breast tissue was 24.5g, and the average length of hospital stay was 5.1 days. Surgical site infection (SSI) occurred in 6.7% of patients (2 out of 30), and seroma was observed in 3.3% of patients (1 out of 30). No other complications were reported, and no cases required reoperation.

Conclusions: Pulverized acellular dermal matrix appears to be a safe and effective adjunct in BCS. It provides promising results in volume restoration and contour maintenance with a low complication rate. Further large-scale and long-term studies are warranted to assess patient satisfaction and oncologic safety in breast partial reconstruction.

Development and Validation of a Photogrammetry-Based Preoperative Method (BREAST-E) for Quantitative Breast Morphometric Analysis and Volume Estimation of Breast in Reconstructive Surgery

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Background: There is a critical need for reproducible, reliable, and cost-effective tools for preoperative breast surgery planning, particularly in LMICs, where access to advanced imaging systems is limited. Traditional methods lack standardization, and high-cost imaging remains inaccessible in resource-limited settings. This study addresses these challenges by developing and validating BREAST-E, a photogrammetry-based method for accurate and standardized breast volume analysis to improve preoperative planning and outcomes.

Methods: The development phase established a photogrammetry framework using 3D-printed phantom models representing four ptosis levels (no ptosis, mild, moderate, severe). Key parameters included marker counts (20, 40, 60), photo angles (10, 20, 30), and offset adjustments (-0.01, 0, +0.01). 2D images were processed into 3D models with Photomodeler, comparing estimated volumes with known volume. The clinical validation phase included 12 patients (13 breasts) undergoing mastectomy were used to validate the new methods. Estimated breast volumes were compared to mastectomy specimens across four ptosis levels. Statistical analysis (ICC, Bland-Altman, Cronbach's Alpha) confirmed accuracy, reliability, and consistency.

Result: In the development phase, photogrammetry showed strong accuracy (R = 0.899, MAE = 98.12 mL) and excellent reliability (ICC 0.995-0.9960) across ptosis levels. Bland-Altman analysis revealed minimal bias, and Cronbach's Alpha (up to 0.994) confirmed strong internal consistency. Clinical validation demonstrated robust performance (R = 0.789, MAE = 104.69 mL, mean error = -27.00 mL). No ptosis group achieved the highest reliability (ICC 0.81, Cronbach's Alpha 0.92) with minimal bias, while moderate and severe ptosis showed increased variability.

Conclusions: BREAST-E provides a reproducible, accessible, and cost-effective solution for breast volume analysis, addressing unmet needs in LMICs and supporting improved surgical planning and aesthetic outcomes worldwide.

Minimal Access Nipple Sparing Mastectomy with Pre-pectoral Direct to Implant Breast Reconstruction without Acellular Dermal Matrix or Mesh - Preliminary Results with 14 Procedures

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Background: Minimal access nipple sparing mastectomy (MA-NSM, endoscopic assisted NSM or robotic assisted NSM) with direct to implant breast reconstruction (DTIBR) is increasingly performed due to small and inconspicuous scar with improved aesthetic results. MA-NSM with pre-pectoral implant placement without acellular dermal matrix (ADM) or mesh may be a potential procedure with acceptable outcome and reduced cost. Here, we report the preliminary results of these procedures.

Methods: Patients who underwent MA-NSM with pre-pectoral DTIBR without ADM or mesh from January 2024 to September 2024 were retrospectively reviewed in a prospectively maintained database. Clinical results, complications & patient-reported outcome measurements (PROM) were analyzed and reported.

Result: A total of 12 patients underwent 14 MA-NSM with pre-pectoral DTIBR without ADM or mesh procedures were performed. The median age was 49 years old, and 84.6% were early (stage 0-II) breast cancer patients. The mean operative time was 193 ± 43 minutes. The median resected mastectomy specimen weight was 262.9 g and median reconstructed implant size 275 mL. With a median follow up of 7.2 months, there was no major complication like implant loss, and seroma formation requiring frequent aspiration was the most common adverse (42.9%) event observed. In terms of PROM, all patients were satisfied with the aesthetic results.

Conclusions: In current preliminary study, MA-NSM with pre-pectoral DTIBR without ADM or mesh is a feasible procedure with satisfactory aesthetic result. However, more cases and longer follow-up are needed to confirm its safety for widespread use.

A novel surgical technique for nipple sparing mastectomy: Air assisted minimally invasive surgery with single axillary incision

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Background: Breast cancer is the most common cancer in women and one of the leading causes of cancer-related deaths. Nipple-sparing mastectomy and breast reconstruction with silicone implants are widely applied as methods that improve the quality of life. In this study, We aimed to share our experience with a novel technique: air-assisted subcutaneous mastectomy through a single axillary incision. We also evaluated the effectiveness and safety of air-assisted nipple-sparing mastectomy.

Methods: The patient was placed supine on the operating table with the arm in abduction. A 1 cm axillary incision was made in the anterior axillary line and the lateral side of the pectoralis major muscle was reached. The lipoplasty cannula, into which a hand pump was placed, was pushed into the subcutaneous space through this incision. The hand pump was connected to the CO2 insufflator, and the breast tissue and subcutaneous area were separated as much as possible by high-pressure CO2 insufflation. Dissection of the Cooper ligament was facilitated by separating the glandular tissue from the subdermal fat layer with the help of air. Continuing the superficial dissection in an appropriate avascular plane reduced bleeding and minimized remaining breast tissue.

Result: Fifteen air-assisted mastectomies were performed in 10 patients, five of which were bilateral mastectomies. The median age was 42 years (range, 33-49). The median of the removed tissue was 275 g (range, 100-1097), and the median implant volume was 335 ccs (range, 195-615). The average operative time was 45 minutes (range, 30-65) for excision and 90 minutes (range, 60-120) for total. Postoperatively, two patients had crepitus and one patient had minimal nipple ischemia.

Conclusions: Air-assisted nipple-areola-sparing mastectomy is a safe and effective alternative technique. In air-assisted minimally invasive surgery, the operating time is shorter than in endoscopic techniques. Although our results are promising, studies with a larger number of patients are needed.

Impact of Implant Placement in Breast Reconstruction on Oncologic Outcomes: A Retrospective Cohort Study at a Single Institution

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Background: Implant-based breast reconstruction (IBBR) is a common post-mastectomy procedure, offering benefits such as shorter operative time and faster recovery by eliminating donor site morbidity. While prepectoral IBBR has demonstrated favorable aesthetic outcomes with reduced complications like prosthesis failure, animation deformity, and capsular contracture compared to subpectoral IBBR, its long-term oncologic safety remains understudied. This study aimed to evaluate the impact of implant placement (prepectoral vs. subpectoral) on oncologic outcomes in breast cancer patients.

Methods: A retrospective cohort of breast cancer patients who underwent mastectomy and IBBR between 2015 and 2021 at a single institution was studied. Oncologic outcomes were analyzed using statistical survival methods, including Chi-square test, Kaplan-Meier analysis, log-rank test, and Cox regression, based on clinicopathological factors such as TN stage, subtype, and other relevant variables. Additionally, Propensity score matching (PSM) (1:1) was applied to minimize bias and evaluate the impact of implant placement.

Result: A total of 185 patients (53 prepectoal, 132 subpectoral) were analyzed, with a median follow-up of 59 months and a median age of 47.3 years. Prior to PSM, high tumor grade was the only significant predictor of both recurrence ($p = 0.042$, OR = 2.00) and worse DFS ($p = 0.039$). Implant placement demonstrated a trend toward improved DFS for prepectoral group, but this difference was not statistically significant ($p = 0.069$). After PSM, 37 patients in each group were analyzed. Recurrence rates were 8.1% vs. 5.4% ($p = 0.724$). PSM analysis confirmed that implant placement did not significantly impact recurrence or DFS (log-rank $p = 0.684$, Cox HR = 1.14, 95% CI: 0.70-1.86, $p = 0.61$).

Conclusions: Implant placement had no significant impact on oncologic outcomes. These findings suggest that prepectoral reconstruction can be safely performed to achieve superior cosmetic results without compromising oncologic safety. Larger studies with more patients are needed to further validate these results.

Preliminary Report on Prepectoral Direct-to-Implant Reconstruction Using Synthetic Mesh (GalaFLEX) for Coverage

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Background: The proportion of direct-to-implant reconstruction in immediate nipple-sparing mastectomy has been steadily increasing. Historically, implants were predominantly placed under the pectoralis major muscle or via a dual-plane approach. However, these methods often result in high incidence of postoperative pectoralis muscle animation while associated with longer operative times and increased intraoperative bleeding. In recent years, the one-stage prepectoral approach, involving usage of acellular dermal matrix (ADM) to cover the implant has demonstrated favorable outcomes. However, the high cost of ADM and its derivation from cadaveric tissue have led to rejection by patients due to financial constraints or ethical concerns. In many Asian countries, ADM is not readily available, and synthetic materials are commonly used as alternatives. This report from Shin Kong Hospital, Taiwan, introduces the use of synthetic mesh GalaFLEX, as a substitute for ADM, sharing preliminary experiences with this innovative approach.

Methods: Between October 2024 and March 2025, our institute utilized GalaFLEX for implant coverage in patients undergoing direct-to-implant reconstruction following nipple-sparing mastectomy. The method involved securely enveloping implants with two layers of GalaFLEX mesh before placement, followed by several suture fixation steps.

Result: Postoperative outcomes were favorable, with a seroma rate of 0% and wound infection rate of 0%. Breast contour stabilized within two weeks post-surgery. Postoperative recovery was uneventful. In two initial cases, suboptimal wrapping techniques resulted in marginal rippling and a firm texture. However, subsequent modifications to the wrapping approach effectively addressed these issues, leading to improved outcomes in later patients.

Conclusions: The one-stage direct-to-implant prepectoral placement following nipple-sparing mastectomy, utilizing synthetic mesh (GalaFLEX) for implant coverage, serves as a safe and effective substitute for acellular dermal matrix (ADM) in prepectoral implant reconstruction. This approach provides a viable alternative to subpectoral implant placement, particularly for patients with thin or insufficient muscular coverage, while mitigating the drawbacks associated with subpectoral positioning.

Radiation induced hypothyroidism in locally advanced breast cancer

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Background: Breast cancer is the most common cancer in the world. Adjuvant radiation, particularly supraclavicular radiation given in locally advanced breast cancer is known to cause hypothyroidism. Hypofractionated radiation could be more thyroid suppressing than conventional radiation and this prospective cohort study was done to compare the incidences of hypothyroidism in both cohorts.

Methods: Locally advanced breast cancer patients who were treated with either conventional or hypofractionated radiation with supraclavicular portal were evaluated in this prospective cohort study. Baseline thyroid function tests were performed before radiation and every six months after radiation. Patients with normal baseline thyroid function were included in the study. Elevated thyroid-stimulating hormone and decreased free thyroxin confirms diagnosis of hypothyroidism. Conventional radiation was delivered in 50 Gy/25 fractions and 40 Gy/15 fractions was delivered in hypofractionated radiation. Radiation was planned with 3DCRT technique.

Result: 50 locally advanced breast cancer patients received adjuvant radiation between 2019 and 2022. 25 patients received conventional radiation and same number of patients received hypofractionated radiation. At median follow-up of 24 months, 6 and 7 patients developed hypothyroidism in conventional and hypofractionated radiation group respectively.

Conclusions: The incidence of radiation induced hypothyroidism was high in locally advanced breast cancer patients receiving supraclavicular radiation, particularly hypofractionated radiation. Baseline thyroid function test should be done before radiation, and 6 monthly after radiation, to detect hypothyroidism at the earliest.

Non-resective partial breast irradiation for early-stage breast cancer using proton beam therapy (Initial clinical experience: Phase I/ II study)

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Background: Proton beam therapy (PBT) allows for radiation delivery to targeted areas using decreased radiation dose to healthy surrounding tissues. We present our initial clinical experience with PBT for low risk early breast cancer without tumorectomy.

Methods: The main indications are 1)T1N0(UICC) single tumor by MRI and US, 2)no malignant calcification in MMG, 3)invasive ductal carcinoma, 4)no high lymphatic permeation 5)ER(+) PgR(+) HER2(-), 6)in women aged 40-70 years, 7)no axillary lymph node and distant metastases, 8)patients approval of this clinical trial. After confirming the histology of the tumor, a sentinel node biopsy is performed, and after determining n0, two metallic markers are inserted into the mammary gland and PBT plan is performed. The PBT is delivered 64.4 GyE/26 fractions. After PBT, examinations are performed every 3 months for 1 year, and every 6 months after 1 year, to confirm tumor reduction rate, cosmetic results, and adverse events. If the local recurrence occurs, patients have to undergo total mastectomy.

Result: Phase I started in 2015 and Phase II started in 2018. Four eligible patients were enrolled in Phase I and 17 patients were enrolled in Phase II. Except for one case of refusal to continue treatment, all 20 patients completed PBT. In phase II, 1 patient dropped out immediately after treatment, 1 patient died 5 years after irradiation due to distant metastasis, 1 patient could not go to the hospital, and 1 patient had a total mastectomy 4 years and 6 months after irradiation due to recurrence outside the irradiated area. The tumor shrinks immediately after PBT and changes in morphology 3-6 months later in US and MRI.

Conclusions: The local PBT for early-stage breast cancer without tumorectomy has demonstrated good tumor control for up to 9 years. The treatment was well tolerated in terms of adverse events and patient satisfaction was very good.

Radiation induced heart disease in Korean women after radiotherapy for breast cancer using the National Health Insurance service database

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Background: This study investigates the risk of radiation induced heart disease (RIHD) in Korean women treated with radiotherapy (RT) for breast cancer (BC) using the National Health Insurance Service database.

Methods: A retrospective cohort analysis was conducted on 68,983 BC patients treated with RT between 2009-2014 and 344,915 age-matched controls without prior coronary artery disease (CAD). CAD incidence and all-cause mortality were tracked over a mean follow-up of 11.8 years. Multivariate Cox regression models adjusted for demographic, clinical, and lifestyle factors were used to evaluate risks. Data on RT exposure, socioeconomic factors, and comorbidities were analyzed.

Result: While age did not differ between the groups, the BC with RT group showed higher body mass index (BMI) and waist circumference (WC) compared to the control group. In terms of socioeconomic and lifestyle factors, the BC with RT groups demonstrated lower proportions of low income, current smoking, and alcohol consumption, alongside a higher prevalence of regular exercise. During follow-up period, a total of 2972 (0.7%) CAD cases and 28201 (6.8%) mortality cases were reported. Compared with the control group, patients with BC who received RT exhibited a significantly lower risk of developing CAD. In the unadjusted model, the hazard ratio (HR) for CAD in the BC with RT group was 0.704 (95% confidence interval, 0.573-0.864; $P < .0001$) after adjustment for confounders such as age, BMI, and lifestyle.

Conclusions: Korean women receiving RT for BC had a lower CAD incidence. These findings highlight the dual challenges of managing cancer outcomes while mitigating long-term cardiac risks. Future research would focus on refining RT protocols and heart sparing RT technique to reduce RIHD for BC patients.

The impact of breast radiation technique on secondary lung cancer risk: An analysis of clinically delivered lung doses of various modern radiation techniques and target volumes

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Background: As the prognosis of early-stage breast cancer patients continues to improve, reducing serious long-term toxicity has become crucial. Previous publications showed that the risk of radiation-induced lung cancer is substantial. The current study aims to estimate secondary lung cancer risk associated with breast radiotherapy based on actual clinically delivered lung doses for various modern radiation techniques and target volumes.

Methods: Four cohorts consisting of Korean early-stage breast cancer patients were analyzed, treated with either stereotactic partial breast irradiation (S-PBI), 3D-conformal PBI (3D-PBI), VMAT whole breast irradiation (VMAT-WBI) or 3D-conformal WBI (3D-WBI). Using the clinically delivered mean lung dose (MLD) from CT-based dose planning, we calculated the secondary lung cancer risk using the RadRAT online calculator. To minimize bias, we repeated the analysis with standardized age, treatment year and dose schedule.

Result: A total of 1,690 patients were included. The median estimates for lifetime excess secondary lung cancer risks were 2,700, 2,510, 4,030, and 6,080 cases per 100,000 patients in the S-PBI, 3D-PBI, VMAT-WBI, and 3D-WBI cohorts, respectively. Differences between all groups were statistically significant except between S-PBI and 3D-PBI. These differences remained significant after standardizing for age, treatment year, and dose schedule. In the standardized cohort analysis, relative risks of developing lung cancer after radiation treatment were 1.80 for S-PBI, 1.73 for 3D-PBI, 2.20 for VMAT-WBI, and 2.20 for 3D-WBI, highlighting a notable difference between the PBI and WBI groups.

Conclusions: The use of adjuvant radiotherapy in early-stage breast cancer patients may approximately double the risk of developing lung cancer during the remaining lifetime in Korean patients. To decrease this risk, PBI should be preferred over WBI whenever possible, and the lowest absolute dose should be used.

Mid-Trial Dosimetric Analysis of the Korean Radiation Oncology Group 19-09 Multi-institutional Prospective Cohort Study on Breast Cancer

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Background: The Korean Radiation Oncology Group (KROG) 19-09 multi-institutional clinical trial investigates the effect of regional nodal irradiation (RNI) omission on regional recurrence rates after neoadjuvant chemotherapy followed by breast-conserving surgery, and sentinel lymph node biopsy in cT1-3N1 and ypN0 breast cancer patients. This mid-trial analysis evaluates dosimetric variations among enrolled patients.

Methods: We analyzed dose-volume histograms (DVHs) of 364 patients enrolled between December 2019 and March 2024 across eight institutions. Of these, 142 received whole breast and regional nodal irradiation (WBI+RNI), while 222 received whole breast irradiation only (WBI). DVH parameters for breast targets, regional nodal areas, and organs at risk were calculated using an AI-generated reference structure set.

Result: Significant differences were found in the median minimum dose delivered to 95% of regional nodal areas (D95%) between the WBI+RNI and WBI groups. However, a substantial number of outliers were observed in both groups. Specifically, for axillary level II (L2), level III (L3), and interpectoral lymph nodes, 19 (13%), 23 (16%), and 23 (16%) patients were outliers in D95%, respectively, in the WBI+RNI group. The corresponding figures in the WBI group were 27 (12%), 28 (13%), and 31 (14%). Notably, all 12 patients treated by one physician in the WBI+RNI group were outliers for L2, L3, and interpectoral nodes. Similarly, in the WBI group, 12 (36%), 15 (45%), and 13 (39%) of 33 patients treated by another physician were outliers for these regions.

Conclusions: In conclusion, significant dose variations were observed, indicating that comparing the WBI+RNI and WBI groups alone may not adequately assess the clinical impact of RNI omission. Therefore, the final analysis will evaluate the association between specific regional nodal doses and clinical outcomes.

Comparison of Cardiac Sparing and Lung Volume Expansion in Left Breast Cancer Radiotherapy: DIBH vs. CPAP

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Background: Deep Inspiration Breath Hold (DIBH) and Continuous Positive Airway Pressure (CPAP) are techniques used in radiation therapy for left breast cancer to reduce cardiac dose. This study compares the cardiac sparing and lung volume expansion effects of DIBH and CPAP.

Methods: We analyzed the simulation CT images of left breast cancer patients treated with either DIBH-RT or CPAP-RT, compared to CT free breathing (FB), between January 1, 2020, and January 10, 2025. Lung volume expansion was assessed in 125 patients from each treatment group. Heart sparing was assessed by measuring the minimum heart-to-target distance (MinHD) between the heart and clinical target volume (CTV) in 61 patients from each group. The percentage increase in MinHD with DIBH and CPAP, compared to FB, was also evaluated.

Result: Mean MinHD for DIBH was 4.14 cm, compared to 2.86 cm in FB ($p < 0.001$). CPAP showed a mean MinHD of 4.05 cm compared to 3.21 cm in FB ($p < 0.001$). The mean percentage increase in MinHD with DIBH (50.7%) was significantly higher than that with CPAP (30.6%, $p < 0.001$). DIBH significantly increased right lung volume (1991.6 mL vs. 1491.0 mL, $p < 0.001$) and left lung volume (1640.2 mL vs. 1179.3 mL, $p < 0.001$). CPAP increased right lung volume (1961.5 mL vs. 1598.3 mL, $p < 0.001$) and left lung volume (1627.0 mL vs. 1254.3 mL, $p < 0.001$). Lung volume expansion with DIBH was significantly greater than with CPAP. Right lung volume increased by 35.6% with DIBH compared to 23.9% with CPAP, while left lung volume increased by 42.3% with DIBH compared to 31.8% with CPAP ($p < 0.001$).

Conclusions: Both DIBH and CPAP demonstrated effective cardiac sparing and lung volume expansion. However, DIBH achieved a significantly greater increase in MinHD and superior lung volume expansion compared to CPAP.

Impact of Bra Application in Breast Cancer Radiotherapy: A Pilot Prospective Randomized Trial

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Background: This prospective, randomized clinical trial evaluated the effects of bra-wearing during radiotherapy on breast-shape reproducibility, dosimetry, and treatment toxicities in patients with breast cancer.

Methods: Thirty-eight patients with breast cancer who underwent breast-conserving surgery were randomly assigned to bra-wearing or non-wearing groups during radiotherapy. Breast-shape reproducibility was assessed using daily cone-beam computed tomography (CBCT). The primary outcome was breast-shape reproducibility, evaluated by the nipple-to-pectoral muscle distance (NPD) and mean surface distance (MSD), comparing daily CBCT to planning CT. We calculated the mean root-mean-squared error (ε), systematic error (θ), and random error (σ). Secondary outcomes included dosimetric parameters and acute/subacute toxicities.

Result: NPD ε (1.0 mm vs 3.8 mm, $P<0.001$), θ (0.6 mm vs 3.6 mm, $P<0.001$), and σ (0.8 mm vs 2.2 mm, $P<0.001$) were significantly smaller in the bra-wearing group. For larger breasts (cup sizes CD), MSD ε was significantly smaller in the bra-wearing group (1.1 mm vs. 2.1 mm, $P=0.006$), but not for smaller breasts. The absolute NPD exceeded 3 mm in 0.4% of CBCT scans in the bra-wearing group and 48.1% in the non-wearing group ($P<0.001$). Absolute MSD exceeded 3 mm in 2.1% and 10.0% of scans in the bra-wearing and non-wearing groups, respectively ($P<0.001$). No significant differences were observed in lung and heart dosimetric outcomes between groups. Grade 2 or higher toxicities were minimal in both groups.

Conclusions: The use of a bra during radiotherapy enhances breast-shape reproducibility, particularly in patients with larger breasts, without increasing treatment toxicities.

Intraoperative Radiotherapy for Breast Cancer- An Asian Cancer Centre Experience

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Background: Adjuvant radiotherapy (RT) remains the standard of care with Breast Conserving Surgery (BCS). Intraoperative radiation therapy (IORT) refers to RT that is delivered immediately to the tumor bed as a single treatment in BCS. This treatment is offered to patients who meet a set of inclusion criteria that predicts lower recurrence, compared to conventional external beam radiotherapy (EBRT) which is given as a 1- to- 4 week regime. This saves the patient time, convenience and is more enviromentally sustainable.

Methods: In this observational cohort study, we report the efficacy of IORT for early breast cancers. Our Joint Breast Cancer Registry, a prospective register of all the patients treated for breast cancer was reviewed. Patients were eligible for IORT if aged 50 years or older, clinically T stage 1 to 2 (up to 3 cm) unifocal tumors, no axillary metastasis, ER or PR positive, no previous neoadjuvant treatment and biopsy histology demonstrating invasive ductal carcinoma or other favorable subtypes. Out of 2472 cases of BCS from 2012 to 2021, 1000 cases were eligible, and 87 cases underwent IORT. Patients who underwent IORT were compared against patients who were eligible but did not undergo IORT. Mean ages were comparable between IORT group and control group (61.0 vs 61.1 years). Mean follow-up duration was longer for the IORT group compared to control group (90.3 months vs 67.9 months).

Result: Only 4 patients relapsed locally after IORT. No significant differences in ipsilateral breast cancer recurrence free surival (IBRFS) nor disease free survival (DFS) were observed. The 5 year DFS for IORT and EBRT group was 95.4% and 94.0%, HR 0.763, 95% CI 0.283 to 2.056, $p = 0.297$). The 5 year IBRFS was 95.4% and 95.1%, HR 0.933, 95% CI 0.344 to 2.532, $p = 0.446$).

Conclusions: This study demonstrates IORT is a safe alternative to EBRT in select patients.

Poster Presentation

OSMS-based deep inspiration breath-hold radiation therapy for left-sided breast cancer: Experiences from Ho Chi Minh City Oncology Hospital, Vietnam

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Background: The deep inspiration breath hold (DIBH) radiation technique is proven to effectively reduce radiation dose to the heart while maintaining an adequate dose to the target volumes, thereby mitigating cardiovascular side effects for patients with left-sided breast cancer. The Optical Surface Monitoring System (OSMS) is a precise and time-saving system that helps to apply the DIBH technique. This study aims to evaluate the effectiveness of OSMS-based DIBH radiation therapy in terms of targeted doses and evaluate the radiation time and setup errors using the OSMS system.

Methods: This prospective study was conducted from November 2023 to October 2024. Twenty left-sided breast cancer patients underwent DIBH radiotherapy using AlignRT version 5.1 software on the TrueBeam machine at Ho Chi Minh City Oncology Hospital, Vietnam. All patients received adjuvant radiotherapy with the dose of 42.56 Gy in 16 fractions, with or without a boost of 10 Gy/4 fraction to the tumor bed, using standard 3D conformal radiotherapy (3D-CRT).

Result: The DIBH treatment plan achieved targeted radiation doses of V95% = 95.20% to chest wall/breast and V95% = 98.01% to regional lymph nodes. The mean heart dose was 2.27 Gy, and the mean dose to the LAD was 15.80 Gy. The median treatment time for OSMS-based DIBH was 6.1 minutes (2.1 to 19.5 minutes). The median setup errors for DIBH radiotherapy using OSMS were 0.1 cm, 0.2 cm, and 0.1 cm for the vertical, longitudinal, and lateral directions respectively. The median rotational errors were 0.8 for pitch, 0.6 for roll, and 0.7 degrees for rotation directions.

Conclusions: The OSMS-based DIBH radiation therapy in left-sided breast cancer significantly reduces the heart dose, allows quick and accurate patient setup, and shortens treatment time.

Exploring the Impact of LOX Family Expression on Breast Cancer Prognosis and Therapeutic Outcomes

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Background: The intricacies of tumor microenvironment (TME), particularly the extracellular matrix (ECM), underscore its pivotal function in modulating tumor progression and drug resistance. Among the key regulators of ECM remodeling and homeostasisthe lysyl oxidases (LOXs) emerge as promising therapeutic targets of tumor treatment. Despite their significance, a holistic evaluation of the LOX family's genomics and clinical implications across diverse cancer types remains elusive.

Methods: This study investigated the correlation between LOX family expression and patient outcomes, drug responsiveness, and TME characteristics in a cohort of 33 tumors based on multiple databases. These findings were further validated by multiplex immunofluorescence staining in breast cancer tissues and breast cancer organoids.

Result: The databases analysis and experimental verification revealed that patients exhibiting elevated LOX family expression suffer from worse prognosis and resistance to a spectrum of antitumor therapies, encompassing chemotherapy, endocrine therapy, and targeted therapy, in contrast to counterparts with subdued LOX family expression levels. Furthermore, enrichment analysis indicated that LOX family fosters tumor progression and drug resistance.

Conclusions: This study unravels the intricate association between the LOX family and tumor progression, alongside multidrug resistance, and that it was a risk factor for many types of cancer. Within the tumor microenvironment of many cancer types, there was a close relationship between various immune cell populations and elevated levels of LOX family members.

Does male breast cancer need neoadjuvant chemotherapy? A SEER-based study

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Background: Neoadjuvant chemotherapy (NAC) is standard for many females with breast cancer. The efficacy of NAC in male breast cancer (MBC) is unclear. The aim of this study was to explore the pathologic complete response (pCR) and prognosis of NAC in MBC by tumor subtype (TS).

Methods: MBC treated with NAC between 2000 and 2020 were evaluated from The National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER). Proportions of pCR (ypT0/Tis ypN0) were compared by tumor subtype. Overall survival (OS) was estimated by Kaplan-Meier.

Result: A total of 260 MBC were included. Median time from initiation of NAC to surgery was 143 days in MBC and 148 days in FBC. Proportions of pCR in MBC and FBC by TS were: hormone receptor positive/human epidermal growth factor receptor 2 negative (HR+/HER2-): 4.9% vs 9.7%, $p = 0.01$; HR+/HER2+: 16.1% vs 33.6%, $p < 0.001$; HR- /HER2+: 44.0% vs 53.2%, $p = 0.42$; and HR-/HER2-: 21.4% vs 32.1%, $p = 0.18$, respectively. FBC had twice the odds of pCR than MBC (adjusted odds ratio, 2.0; 95% CI, 1.5-2.8; $p < 0.001$). Five-year OS for MaBC with pCR vs non-pCR was 90% vs 64.7%; $p = 0.02$. Five-year OS for FBC with pCR vs non-pCRwas 91.9% vs 75.3%; $p < 0.01$.

Conclusions: Neoadjuvant chemotherapy for male breast cancer might not necessary.

Serum TNF-α as a Predictor of Clinical Response to Anthracycline-Based Chemotherapy in Locally Advanced Breast Cancer

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Background: Breast cancer is a leading cause of morbidity and mortality in women worldwide. Locally advanced breast cancer (LABC), prevalent in Indonesia, often necessitates anthracycline-based neoadjuvant chemotherapy to reduce tumor size and improve surgical outcomes. In cancer biology, tumor necrosis factor-alpha (TNF-α) has two roles: it is both pro-tumorigenic and anti-tumorigenic. Chemotherapy resistance is thought to be influenced by elevated TNF-α levels; however, its precise function is still unknown. This study analyzed the association between serum TNF-α levels and clinical responses to anthracycline-based chemotherapy in LABC patients.

Methods: This study included 38 LABC patients who underwent anthracycline-based neoadjuvant chemotherapy (500 mg/m2 of cyclophosphamide, 50 mg/m2 of doxorubicin, and 500 mg/m2 of fluorouracil/5FU). TNF-α levels were measured using ELISA before chemotherapy and categorized as high or low based on a cutoff value of 18.93 pg/ml. Clinical responses were evaluated after three cycles of chemotherapy using RECIST 1.1 criteria. Statistical analyses included Chi-square, logistic regression, and Spearman's test with significance set at $P < 0.05$.

Result: Statistical analysis confirmed a strong inverse correlation between TNF-α levels and chemotherapy response ($r = -0.606$, $P < 0.001$). Patients with high TNF-α levels predominantly showed negative clinical responses (83.3%), while those with low TNF-α levels exhibited positive responses (75%; $P < 0.001$). Age, tumor subtype, and histological grading showed no significant association with chemotherapy outcomes.

Conclusions: TNF-α levels may be a predictive biomarker for chemotherapy resistance and have a significant correlation with the clinical response to anthracycline-based neoadjuvant chemotherapy in LABC patients. In the management of LABC, focusing on TNF-α pathways may improve results and increase therapeutic efficacy. To investigate its potential as a therapeutic target, further research is needed.

Survey on de-escalation of antiemetic receiving Trastuzumab Deruxtecan

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Background: Trastuzumab Deruxtecan (T-DXd) was classified as moderately emetogenic risk in the NCCN guidelines; however, it was changed to highly emetogenic risk (HEC) in the January 2024 edition. In our institution, we have seen patients who did not need antiemetic drugs after day 2 (steroid sparing) and did not have nausea, using only a 5-HT3 antagonist and dexamethasone (DEX) on the same day of administration as a prophylactic antiemetic.The purpose is to investigate the actual antiemetic therapy and the incidence of nausea in patients receiving T-DXd and to estimate the patient groups in whom antiemetic regimens can be reduced.

Methods: We conducted a retrospective study in breast cancer patients who started T-DXd from June 2020 to August 2024. Information on the presence and grade of nausea and the use of prophylactic antiemetics (first, second and sixth time) were collected.

Result: A total of 36 patients participated. Regarding the prescription of additional prophylactic antiemetics at the first course, 16 (44%), 14 (39%), 5 (14%) and one (3%) patients were prescribed no prescription, oral DEX only, olanzapine (OLZ) and oral DEX, or Aprepitant, OLZ and DEX respectively, and the severe nausea (Grade 2 or higher) in four patients (11%), four (11%), one (3%) and zero (0%), respectively. Of the 20 patients prescribed additional prophylactic antiemetics at the time of the first course, seven patients had deescalated prophylactic antiemetics by the time of the sixth course, and there was no grade worsening. Patients with brain metastases tended to be less likely to have declarations than those without. (14%vs44%)

Conclusions: Some patients on T-DXd can deescalate prophylactic antiemetics.

Poster Presentation

A Study of Breast Cancer Cases in Elderly Patients Over 80 Years of Age in Our Hospital

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Background: The number of elderly patients with breast cancer has increased in recent years with the growth of the elderly population, and many elderly patients over the age of 80 are being seen. Elderly patients often have comorbidities, making standard treatment difficult in many cases. We reviewed breast cancer patients over the age of 80 in our hospital.

Methods: Twenty-six patients aged 80 years or older who were diagnosed with breast cancer in our hospital between January 2014 and December 2023 were studied.

Result: The median age was 85.8 years (80-96 years). 19 (73.1%) patients were diagnosed with subjective symptoms, 4 (15.4%) were pointed out by caregivers, and 3(11.5%) were accidental discovery during follow-up of other diseases. Five patients (19.2%) had dementia and 3 (11.5%) had diabetes at the time of initial diagnosis. The subtypes were luminal type (17 cases, 65.4%), pure HER2 type (1 cases, 3.4%), luminal/HER type (2 cases, 7.7%), and basal type (6 cases, 23.1%). Stage I 6 (23.1%), stage II 15 (57.7%), stage III 4 (15.4%), and stage IV 1 (3.4%). Initial treatment consisted of surgery in 23 patients (88.5%), endocrine therapy in 2 patients (7.7%), and no treatment in 1 patient (3.4%). Twenty-three patients underwent surgery, and 3 patients did not. No major postoperative complications occurred. Postoperative adjuvant therapy included endocrine therapy and oral 5FU.

Conclusions: Patients undergoing surgery were treated considering their comorbidities, and no serious complications were observed. Postoperative adjuvant therapy was performed with oral agents with minimal side effects.

Poster Presentation

Determining the Institutional Ki-67 Cut-off Value Using Multigene Assays: A Retrospective Study

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Background: This study aimed to establish an institution-specific Ki-67 cut-off to predict high recurrence risk in HR-positive, HER2-negative early breast cancer, using multigene assays as reference tools. We evaluated whether a Ki-67 cut-off derived from Oncotype DX (ODX) results could predict high-risk MammaPrint outcomes.

Methods: This study included patients with HR-positive, HER2-negative breast cancer who underwent upfront surgery and either ODX (n = 170) or MammaPrint (n = 244) testing at XXXXX from 2020 to 2021. An optimal Ki-67 cut-off of 17.7 was determined using ROC analysis in the ODX group. This cut-off was then evaluated for its consistency in predicting high-risk recurrence in the MammaPrint group. Logistic regression was used to assess the predictive value of the Ki-67 cut-off in both groups.

Result: Ki-67 > 17.7 was found to be an independent predictor of high-risk recurrence in both groups (ODX: OR 5.17, $p = 0.002$; MammaPrint: OR 4.27, $p < 0.001$). ROC analysis demonstrated AUCs of 0.715 in the ODX group and 0.798 in the MammaPrint group, confirming the reliability of this cut-off across both cohorts. Despite significant demographic differences between the two groups, the Ki-67 cut-off showed consistent applicability in aligning recurrence risk classifications.

Conclusions: This study demonstrates the feasibility of establishing an institution-specific Ki-67 cut-off for predicting high recurrence risk in HR-positive, HER2-negative early breast cancer by using multigene assays as reference tools. The identified 17.7 cut-off provides a foundation for risk stratification within our institution though further validation with survival data is warranted.

Impact of Geriatric Assessment on Mortality Risk in Older Breast Cancer Patients: A Retrospective Analysis

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Background: With increasing life expectancy, the number of older adults diagnosed with breast cancer is rising. However, they remain underrepresented in clinical trials, making adjuvant treatment decisions challenging. The American Society of Clinical Oncology recommended that geriatric assessment (GA) should be performed on all cancer patients over 65 receiving systemic therapy. Therefore, we conducted a retrospective study to explore the potential impact of integrating GA into clinical practice.

Methods: We analyzed 94 older adults (over 65 years old) with stage 0-III breast cancer who received surgery in Inha University hospital from Jan 2010 to July 2014. From the medical records the Cancer and Aging Research Group-Breast Cancer (CARG-BC) score were calculated. Survival analyses were performed using Kaplan-Meier method and multivariate Cox regression analysis was used to estimate hazard ratio and 95% confidence interval.

Result: The median age of 94 patients was 72 years old. For median follow-up of 99 months, 15 patients had recurrence, and 8 patients died from breast cancer. 7 patients died from other cause including other malignancies and infectious disease. CARG-BC score ranged from 0-11. 79(84.1%) patients were categorized as "Low risk" and 15(15.9%) were "Medium risk" patients. In the univariate analysis "Medium risk" CARG-BC was associated with increased risk of death (HR = 3.581; 95% CI; 0.960-13.368; $p = 0.058$).

Conclusions: In this retrospective study, a high CARG-BC score was associated with increased mortality in older breast cancer patients. Further prospective studies are needed to evaluate the benefits of chemotherapy across different CARG-BC categories.

The Role of Oral Tegafur in Preventing Recurrence of Stage II-III Triple-Negative Breast Cancer

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Background: TNBC is a challenging subtype of breast cancer due to its aggressive nature and limited therapeutic targets. The risk of distant recurrence and death peaks within the first 5 years after diagnosis, making this period critical for intervention. Tegafur, an oral antimetabolite, has shown promise in reducing recurrence in other cancer subtypes. This study investigates its potential role in improving survival and reducing relapse rates in TNBC.

Methods: We conducted a retrospective study of women diagnosed with stage II-III TNBC at Intermed Hospital, Mongolia, between 2017 and 2022. All patients received neoadjuvant chemotherapy, with or without anthracycline- and taxane-based regimens (AC-T or TC). After standard chemotherapy, 15 patients were administered oral Tegafur at a dose of 400-500 mg per day, for a duration of 6-12 months. Patients were monitored for recurrence, metastasis, and treatment-related toxicity.

Result: Interim analysis revealed that oral Tegafur was associated with improved disease-free survival (DFS) compared to standard chemotherapy alone, particularly in patients who had undergone anthracycline and taxane-based treatments. No significant toxicity or adverse effects related to Tegafur were observed. During the 5 year follow-up period, no recurrence or metastasis was detected on CT imaging, and overall survival rates exceeded those reported in prior our studies on TNBC.

Conclusions: The findings suggest that oral Tegafur may improve disease-free survival and reduce recurrence in patients with stage II-III TNBC, particularly within the critical first 5 years post-diagnosis. While these initial results are promising, further studies are needed to validate the long-term efficacy and safety of Tegafur in TNBC treatment.

The Investigation of CDK4/6 Inhibitor Usage in HR-Positive, HER2-Negative Advanced/Relapsed Breast Cancer Patients at Our Institution

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Background: The combination of CDK4/6 inhibitors (CDK4/6i) and endocrine therapy is recommended as first-line treatment for Hormone (HR)-positive, HER2-negative advanced or recurrent breast cancer. However, the optimal drug combination for first-line endocrine therapy and the best subsequent treatment after discontinuation of first-line therapy remain unclear.

Methods: A retrospective observational study was conducted on patients with HR-positive, HER2-negative advanced or recurrent breast cancer who were prescribed CDK4/6i as part of first-line endocrine therapy at our facility between January 1, 2017, and September 30, 2023. Patient characteristics, treatment duration, dosage, adverse events, and outcomes were analyzed descriptively.

Result: Seventy-six patients, including two men, received CDK4/6 inhibitors. From April 2018, 61 patients were prescribed palbociclib (PAL), and from July 2019, 15 patients received abemaciclib (ABE) as first-line CDK4/6i therapy. The most common combination endocrine therapy was fulvestrant (FUL). Median treatment duration was 10 months for PAL and 6 months for ABE. Eighteen patients died due to disease progression. Among those on PAL, 10 patients discontinued due to adverse events (mainly myelosuppression, interstitial pneumonia, and liver dysfunction), while 28 stopped due to disease progression. Six patients switched to ABE, and four switched to hormone monotherapy. In patients with disease progression, 23 switched to ABE, chemotherapy, or best supportive care. Twelve of those who switched to ABE had hormone therapy adjusted before ABE initiation.

Conclusions: This study provides an overview of first-line endocrine therapy with CDK4/6 i in HR-positive, HER2-negative advanced or recurrent breast cancer. Post-first-line treatment strategies varied, with approximately 40% of PAL-treated patients transitioning to ABE. Further research is needed to clarify the optimal sequence of treatments in this patient group.

Estradiol Surge Under Tamoxifen: Does Ovarian Hyperstimulation Affect Disease-Free Survival in Premenopausal DCIS Patients?

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Background: Adjuvant endocrine therapy is a key treatment for hormone receptor-positive ductal carcinoma in situ (DCIS) following breast cancer surgery. However, in premenopausal patients, tamoxifen can stimulate ovarian estrogen production, leading to elevated estradiol levels and ovarian hyperstimulation. This raises concerns about its potential adverse impact on oncologic outcomes. This study investigates the paradoxical increase in estrogen levels in premenopausal DCIS patients receiving tamoxifen and its effect on disease-free survival (DFS).

Methods: We retrospectively analyzed premenopausal patients diagnosed with DCIS who underwent curative surgery at Korea University Guro Hospital between January 2017 and December 2023. Premenopausal status was confirmed based on menstrual history follicle-stimulating hormone (FSH) levels (< 40mIU/mL). Serum estradiol (E2) and FSH levels were monitored every 3 to 6 months after initiating tamoxifen therapy. Ovarian hyperstimulation was defined as an E2 level exceeding 400 pg/mL. The primary outcome was DFS, defined as the time from surgery to any recurrence, including loco-regional recurrence and contralateral breast cancer.

Result: A total of 138 patients were included, with 78 (56.5%) experiencing ovarian hyperstimulation. Patients in the hyperstimulation group were significantly younger than those without hyperstimulation ($p = 0.017$). Recurrence occurred in four patients in each group, with no statistically significant difference in DFS ($p = 0.266$).

Conclusions: Tamoxifen-induced ovarian hyperstimulation was not associated with a significant difference in disease-free survival between premenopausal DCIS patients. These findings suggest that elevated estradiol levels due to tamoxifen do not negatively impact oncologic outcomes in this population.

The Impact of Adjuvant Endocrine Therapy on Outcomes in Estrogen Receptor-Low Positive Breast Cancer Patients

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Background: Estrogen Receptor (ER)-low positive breast cancer, defined as ER expression of 1-10% by immunohistochemistry, is a rare subtype with molecular traits resembling ER-negative disease. While the 2020 American Society of Clinical Oncology (ASCO) guidelines recommend endocrine therapy for both ER-low and ER-high positive breast cancers, the benefit in the ER-low positive subgroup remains unclear. This study investigates the impact of adjuvant endocrine therapy on outcomes in Korean patients with ER-low positive, HER2-negative breast cancer.

Methods: This retrospective cohort study patients with ER-low positive, HER2-negative breast cancer treated at Seoul National University Hospital between 2009 and 2023. Of 266 eligible patients, 247 received adjuvant endocrine therapy and 19 did not. Propensity score matching (PSM) was performed at a 1:1 ratio based on age, tumor stage, nodal stage, and chemotherapy administration. The primary endpoints were disease-free survival (DFS) and distant metastasis-free survival (DMFS). Multivariate analysis was conducted to identify variables affecting DFS.

Result: The 5-year DFS was significantly higher in the endocrine therapy group compared to the non-endocrine therapy group (90.76% vs. 49.19%, $p = 0.00015$), and this benefit persisted after PSM ($p = 0.026$). Similarly, the 5-year DMFS was significantly improved in the endocrine therapy group both before ($p = 0.047$) and after PSM ($p = 0.022$). Multivariate analysis before PSM identified larger tumor size (HR 1.32, 95% CI 1.07-1.63, $p = 0.009$), positive lymph node status (HR 2.71, 95% CI 1.07-6.87, $p = 0.036$), and presence of lymphatic invasion (HR 3.62, 95% CI 1.67-7.85, $p = 0.001$) as prognostic factors. After PSM, adjuvant endocrine therapy independently reduced the risk of recurrence (HR 0.0075, 95% CI 0.00008-0.71, $p = 0.035$).

Conclusions: This study demonstrates that endocrine therapy significantly improves survival outcomes in patients with ER-low positive, HER2-negative breast cancer. These findings support its clinical benefit in this distinct subtype and call for larger prospective studies to validate results and ultimately optimize treatment strategies.

Abemaciclib Monotherapy in HR+/HER2- Metastatic Breast Cancer Patients: A Real-World Observational Study in Korea (MonarcKOR)

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Background: In heavily pretreated patients HR+, HER2- MBC, particularly those unable to access CDK4/6 inhibitors in earlier linesface severely limited therapeutic options, often resorting to chemotherapy in third-line or beyond. While the MONARCH 1 trial demonstrated the efficacy and safety of abemaciclib monotherapy in these later-line settings, it is not yet integrated into standard care in Korea, leaving an unmet need.

Methods: A retrospective chart review of 18 patients with MBC who treated abemaciclib monotherapy through the Named Patient Use program between April 2019 and July 2024 was conducted. The primary endpoint was Progression-Free Survival (PFS), with Overall Survival (OS) and Overall Response Rate (ORR) as secondary endpoints. Survival probabilities for PFS and OS were estimated using the Kaplan-Meier method, and 95% confidence intervals (CIs) were calculated. Adverse events and dose modifications were also assessed.

Result: In heavily pretreated patients with a median of 5 prior lines in the metastatic setting and median follow-up of 21.5 months, the median PFS was 8.18 months (95% CI: 5.1311.83), and the 6- and 12-month PFS rates were 59.87% and 27.57%, respectively. The median OS was 23.35 months (95% CI: 13.2726.40). Among 15 patients evaluated, the ORR was 40.0%, with a median DoR of 5.63 months. Common all-grade adverse event included diarrhea and nausea (44.4%) and neutropenia (27.8%). Dose modifications were required in 61.1% of patients, and 5.6% discontinued treatment due to AEs.

Conclusions: In Korean heavily pre-treated patients, real-world outcomes observed with abemaciclib monotherapy in this study appear comparable to those in MONARCH 1, with a numerically more favorable trend. These findings provide valuable initial insights into the efficacy and safety of abemaciclib in Korean patients. The small sample size necessitates cautious interpretation. Further analysis with a larger, more robust dataset is ongoing and will allow validating these results and deepen the understanding of its therapeutic impact.

The immune modulation effects of ovarian function suppression in premenopausal patients with hormone receptor-positive breast cancer

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Background: Endocrine therapy is essential in treating hormone receptor-positive (HR+) breast cancer, and premenopausal patients benefit from the addition of gonadotropin-releasing hormone agonists (GnRHa). Estrogen reduction has been shown to modulate the immune microenvironment in various animal models. This study evaluated the immune modulation effects of GnRHa in premenopausal HR+ breast cancer, using neutrophil-to-lymphocyte ratio (NLR) as an indirect marker of immune response.

Methods: We utilized the National Taiwan University Integrative Medical Database to conduct a retrospective analysis of HR+ breast cancer patients aged 18 years or older, diagnosed between January 2010 and December 2023, at National Taiwan University Hospital and National Taiwan University Cancer Center. Patients treated with GnRHa with at least three white blood cell and differential counts tests were included in the analysis. NLR values were obtained prior to and following treatment (2-week interval), and analyzed for comparison.

Result: Between January 2010 and December 2023, 4,741 HR+ breast cancer patients were newly-diagnosed and had at least three white blood cell and differential counts tests recorded in our institutions. Among them, 527 patients received GnRHa treatment. A total of 397 patients were treated with GnRHa for durations ranging from 2 months to 5 years. Of these, 330 patients remained on treatment and had available pre-treatment and post-treatment NLR data. The average pre-treatment NLR was 3.09, while post-treatment NLR averaged 2.55, reflecting a decrease of 0.54 (17% reduction). One-tailed paired t-test yielded a p-value of 0.00026. The trend of NLR changes was consistent across patients with varying durations of GnRHa treatment.

Conclusions: GnRHa treatment in premenopausal HR+ breast cancer patients results in a statistically significant reduction in NLR, indicating potential immune modulation effects. This finding suggests that GnRHa therapy may influence the immune microenvironment, which could be relevant for improving treatment outcomes in this patient population.

Evaluating the Efficacy of Dual HER2 Blockade with Neoadjuvant Chemotherapy in HER2-Positive Breast Cancer Patients: A Retrospective Study in Mongolia

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Background: Breast cancer is the most common cancer in women worldwide, accounting for 3.6% of all cancers in Mongolia and 7.1% of cancers in women. HER2-positive breast cancer, which makes up 25-30% of cases, is associated with an aggressive tumor phenotype. Combining dual HER2 blockade (trastuzumab and pertuzumab) with neoadjuvant chemotherapy (NAC) has been shown to improve pathologic complete response (pCR) rates compared to trastuzumab alone. However, data on its efficacy in Mongolia is limited. This study aims to assess the effectiveness of dual HER2 blockade with taxane-based chemotherapy in achieving pCR and its potential impact on surgical outcomes

Methods: This retrospective analysis examines data from HER2-positive breast cancer patients treated at Intermed Hospital in Ulaanbaatar, Mongolia, from 2022 to 2024. The study included patients with HER2-positive breast cancer confirmed by immunohistochemistry and/or FISH, who received neoadjuvant taxane-based chemotherapy combined with trastuzumab and pertuzumab, and completed their therapy. Data collected consisted of clinical and pathological details, imaging reports, RECIST evaluations, adverse events, and surgical outcomes.

Result: A total of 10 patients with HER2-positive breast cancer were treated with neoadjuvant chemotherapy (NAC) combined with trastuzumab and pertuzumab. The treatment outcomes, based on RECIST, revealed that 50% of patients achieved a pathologic complete response (pCR). Additionally, 40% of patients showed a partial response (PR) 1 patient (10%) had stable disease (SD). Importantly, no patients experienced progressive disease (PD).

Conclusions: Neoadjuvant chemotherapy (NAC) combined with dual HER2 blockade using trastuzumab and pertuzumab demonstrated significant efficacy in HER2-positive breast cancer, achieving a 50% pCR rate, 40% PR, and no cases of progression. These results highlight the potential of dual HER2 blockade to enhance treatment outcomes and improve long-term survival metrics. Further research with larger cohorts is recommended to confirm these findings and assess the regimen's safety and durability.

Palbociclib Following Ribociclib-Induced Hepatotoxicity: A Safe and Effective Treatment Alternative

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Background: Cyclin-dependent kinase 4/6 (CDK4/6) inhibitors have significantly advanced the treatment of hormone receptor-positive, HER2-negative metastatic breast cancer (HR+, HER2- mBC). Among these, ribociclib demonstrates robust overall survival (OS) benefits but is associated with a higher incidence of grade 3/4 drug-induced liver injury (DILI). The optimal management of ribociclib-induced hepatotoxicity remains undefined. Our study evaluates the clinical course of ribociclib-induced hepatotoxicity and explores the safety and efficacy of subsequent palbociclib therapy.

Methods: We conducted a retrospective cohort study of HR+, HER2- mBC patients treated with ribociclib between January 2018 and September 2024. Patients transitioning to palbociclib due to ribociclib-related adverse events (AEs) without disease progression were included. Data on demographics, hepatotoxicity patterns, risk factors, and treatment outcomes were collected. Statistical analyses included Fisher's exact test and Kaplan-Meier survival analysis.

Result: Among 250 patients treated with ribociclib, 26 transitioned to palbociclib due to AEs, primarily hepatotoxicity (80.7%). Ribociclib-related DILI was reversible in all cases, with ALT levels normalizing from a peak of 275 U/L (IQR: 175-500) to 32 U/L (IQR: 18-55) after treatment cessation. Transition to palbociclib occurred after a median of 23 days, with no recurrence of liver toxicity. Baseline triglycerides (TG), neutrophil-lymphocyte ratio (NLR), and hepatic steatosis were potential risk factors for hepatotoxicity. Survival outcomes remained comparable between hepatotoxicity and other toxicity groups, with an estimated median progression-free survival of 40.9 months ($P = 0.620$) and an estimated median OS of 57.9 months ($P = 0.929$).

Conclusions: Our findings demonstrate that transitioning to palbociclib after ribociclib-induced hepatotoxicity is a safe and effective strategy, maintaining treatment efficacy without recurrence of liver toxicity. The study highlights baseline TG and hepatic steatosis as potential risk factors, warranting further investigation into predictive biomarkers for hepatotoxicity. These insights provide evidence-based guidance for managing ribociclib-induced hepatotoxicity and optimizing sequential CDK4/6 inhibitor therapy.

Evaluating the real-world impact; Keynote-522 Australian experience

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Background: Triple-negative breast cancer (TNBC) is an aggressive subtype often treated with neoadjuvant therapy (NAT). The KEYNOTE-522 regimen, incorporating pembrolizumab with chemotherapy, has shown promise in improving pathologic complete response (pCR) rates. This study analyzed outcomes of 30 TNBC patients treated with the KEYNOTE-522 regimen in a real-world setting, focusing on surgical and oncologic outcomes.

Methods: A retrospective analysis was conducted on patients treated between January 2022 and February 2024. Data included demographics, tumor characteristics, genetic findings, treatment complications, and pCR rates. Immune-related adverse events (irAE) and post-operative complications within 30 days were recorded.

Result: The average age at diagnosis was 47 years, with most patients (81.5%) presenting with self-detected lesions. Average tumor size reduced from 37 mm pre-treatment to 4 mm post-treatment. Nine patients had genetic mutations, including 5 with BRCA1/2 mutations. Six patients experienced irAEs, including 3 cases of hepatitis; 2 patients with hepatitis were unable to complete NAT. Surgical outcomes included 20 breast-conserving surgeries (BCS), with 6 advanced reconstructions, and 7 mastectomies. Axillary node dissection (ALND) was performed in 7 patients, and targeted axillary dissection (TAD) in 9. pCR was achieved in 24 patients (80%). Average time to surgery post-NAT was 22 days, and the average hospital stay was 2.4 days. Complications included wound necrosis (1 patient) and chyle leak (1 patient).

Conclusions: The KEYNOTE-522 regimen demonstrated an 80% pCR rate, aligning with prior clinical trials, and supporting its efficacy in real-world TNBC treatment. Larger studies are needed to validate these findings.

Efficacy and biomarker analysis of neoadjuvant pembrolizumab plus chemotherapy for early-stage HER-2 low triple negative breast cancer in Chinese population: A real-world study

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Background: Purpose was to explore efficacy and safety of pembrolizumab in neoadjuvant therapy (NAT) for HER2-low expression triple-negative breast cancer (TNBC) in Chinese population. In addition, we want to explore potential biomarkers to predict immunotherapy efficacy for HER2-low TNBC through ctDNA testing.

Methods: Patients received 8 cycles of pembrolizumab plus chemotherapy before surgery like the KEYNOTE-522 trial. The primary endpoint was total pathological complete response (tpCR). Secondary endpoints including breast pCR (bpCR), axillary pCR (apCR), and adverse events (AEs). The ctDNA testing of HER2-low tumor was assessed as exploratory objective.

Result: From February 2023 to May 2024, 70 TNBC patients receiving NAT, with tpCR, bpCR and apCR were of 60.0%, 68.6% and 62.9%. There were 40.0% patients had HER2-low disease. Compared with HER2-zero, HER2-low had lower tpCR, bpCR and apCR (all $p < 0.05$). Grade ≥ 3 AEs were observed in 35.7% patients, with most common AE being neutropenia (35.7%). No patients experienced grade ≥ 3 immune-related AEs. If tumor regression > 50% at the 4th cycle, patient had higher probability (72.7%) of reaching pCR. We extracted ctDNA from 23 HER2-low fresh samples and performed NGS-based 225 gene panel testing. The 33 unique genes were identified, and top five highly mutated genes were TP53, ERBB2, FAM135B, PIK3CA, and EGFR. ERBB2 was more enriched in pCR group. The ctDNA positivity gradually declined during NAT, from 52.2% before treatment to 30.4% after the 4th cycle NAT (T1). Among patients who did not clear ctDNA at T1, as many as 85.7% had residual disease. For patients with ctDNA+ at baseline and cleared ctDNA at T1, 85.7% of them can achieve pCR.

Conclusions: Pembrolizumab combined with platinum-containing chemotherapy regimen showed good pCR rate and acceptable safety in Chinese population. Benefit of neoadjuvant immunotherapy for HER2-low TNBC remains limited. The ctDNA status of patients who experienced at least 4-cycle may predict the response of NAT.

Tumor Immune Microenvironment as a Predictive Marker of Neoadjuvant Pembrolizumab Combined with Chemotherapy (KEYNOTE-522 Regimen) Efficacy in Early Triple-Negative Breast Cancer

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Background: The current standard of care based on the KEYNOTE-522(KN522) trial for high-risk early triple-negative breast cancer (TNBC) is neoadjuvant pembrolizumab combined with chemotherapy. Tumor infiltrating lymphocytes (TILs) and tertiary lymphoid structures (TLS) have been identified in multiple solid tumors and are gaining attention as indicators of predictive biomarkers for immune checkpoint inhibitors (ICIs). We report on the relationship between KN522 regimen treatment efficacy and immune microenvironment.

Methods: We retrospectively analyzed cStage II-III TNBC patients diagnosed from September 2022 to March 2024 who underwent surgery following neoadjuvant treatment with KN522 regimen. We investigated the TILs and TLS in baseline biopsy samples, histological treatment effect (Strict pCR; ypT0N0, pCR; ypT0/isN0), clinical overall response rate (ORR; CR+PR), and axillary lymph node conversion rate (cN+ypN0). TILs assessment followed the International Immuno-Oncology Biomarker Working Group guidelines, with lymphocyte-predominant breast cancer (LPBC) defined as TILs occupying ≥ 50% of the area. TLS was defined as lymphoid follicles with germinal centers.

Result: A total of 66 patients were analyzed, with the median age at diagnosis was 51 (25-74) years. cStage II/III comprised 48 cases (73%)/18 cases (27%). TLS was observed in 13 cases (20%), and 19 cases (29%) were LPBC. Univariate analysis showed a mild association between TLS and TILs ($p = 0.08$). Strict pCR/pCR was achieved in 36 cases (55%)/39 cases (59%). While Strict pCR/pCR showed no significant association with TLS ($p = 0.35/0.53$), it was significantly associated with LPBC ($p = 0.0025/0.0002$). The Strict pCR rates for TLS+/LPBC+, TLS-/LPBC+, TLS+/LPBC-, TLS-/LPBC- were 83%(5/6), 85%(11/13), 57%(4/7), and 40%(16/40) respectively. The pCR rates were 83%(5/6), 100%(13/13), 57%(4/7), and 43%(17/40); ORR was 100%(6/6), 100%(13/13), 86%(6/7), and 88%(35/40); and axillary lymph node conversion rates were 100%(3/3), 86%(6/7), 60%(3/5), and 48%(11/23).

Conclusions: Cases identified as LPBC in baseline biopsy showed high response rates to KN522 regimen. The immune microenvironment profile could be a potential predictive biomarker for ICI containing treatment.

Poster Presentation

Investigation of the Association Between Anxiety and the Efficacy of Neoadjuvant Chemotherapy with ICI in Breast Cancer Patients

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Background: It is reported that psychological distress has been associated with cancer outcomes.In melanoma, pretreatment emotional distress is associated to the efficacy of neoadjuvant chemotherapy (NAC) using immune checkpoint inhibitors (ICI). We investigated the relationship between the efficacy of the KN522 regimen and the assessments conducted using the revised Edmonton Symptom Assessment System (ESAS-r).

Methods: This retrospective study included 35 patients who underwent surgery after the KN522 regimen at our hospital from July 2023 to October 2024. Patients were grouped by pathological complete response (pCR) and non-pCR. We analyzed patient backgrounds and ESAS-r scores before and after NAC using the Wilcoxon and Mann-Whitney U tests.

Result: Of the 35 cases, 18 patients (51%) achieved pCR, and 17 patients (49%) did not. The median age was 50 years in the pCR group and 54 years in the non-pCR group. Regimen modifications (interruption, dose reduction, or delay) occurred in 14 patients in the pCR group and 12 in the non-pCR group. The median total ESAS-r score before NAC was 20.5 in the pCR group and 16 in the non-pCR group ($p = 0.1895$). After NAC, the score was 15.5 in the pCR group and 14.5 in the non-pCR group ($p = 0.557$). No significant differences were observed between the two groups at any time point. Comparisons of pre- and post-NAC ESAS-r scores within each group also showed no significant differences ($p = 0.6961$, $p = 0.3840$).

Conclusions: No significant differences in ESAS-r scores were found between the pCR and non-pCR groups in patients treated with KN522. Although the pCR group showed a trend toward improvement, it was not statistically significant. Since ESAS-r evaluates various symptoms beyond anxiety, this may have affected the results. Further studies are needed to explore the association between psychological distress and treatment outcomes in breast cancer patients.

A Review of Clinical, Imaging, and Pathological Characteristics of women with Idiopathic Granulomatous Mastitis (IGM) and Assessing Predictive Factors associated with disease duration

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Background: Idiopathic granulomatous mastitis (IGM) is a rare, chronic inflammatory breast disease. Evidence suggests an autoimmune etiology, supported by its triggers and response to corticosteroids and immunomodulators. This study aims to describe clinicopathologic and imaging characteristics of IGM and assess these features as predictors of treatment failure so clinicians can tailor therapies more effectively, potentially improving patient outcomes and reducing unnecessary treatments.

Methods: This retrospective cohort study included 52 female patients aged 18 and above diagnosed and treated for IGM at NUH from May 2022 to June 2024. Clinicopathologic data, ultrasound characteristics, and treatment responses were analyzed. Categorical variables were reported with counts and continuous variables with means and standard deviations. Associations between variables and treatment failure were assessed using chi-square tests.

Result: The median age at presentation was 39 years. 80.0% presented with breast lumps. Treatment regimens included combined steroid and methotrexate (step-up therapy) in 26 cases and steroid monotherapy in 26. Median steroid dosage was 20mg/day (IQR 10-40) for 60 days (IQR 30-390), while methotrexate was 15 mg/week (IQR 7.5-13) for 52 days (IQR 53-202). For steroid-only therapy, treatment outcomes showed 57.7% achieving complete response, 26.9% partial response and 15.4% treatment failure. Those who experienced treatment failure required step-up therapy. Presence of flares (OR 16, 95%CI 3.7-110, $p < 0.05$), >4 cm mass diameter on ultrasound (OR 3.1, 95%CI 1.0-10, $p = 0.05$) and increased internal vascularity (OR 3.1, 95%CI 1.0-10, $p = 0.05$) predicted the need for immunomodulator therapy. Patients on step-up therapy are more likely to achieve complete remission (OR 1.5, 95%CI 0.080-0.83, $p < 0.05$).

Conclusions: While 60.0% achieved complete remission, over half required immunomodulators or invasive interventions. Identifying predictive factors may optimize treatment strategies for patients at risk of treatment failure.

Repurposing dicoumarol to combat the metastasis triple-negative breast cancer

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Background: Triple-negative breast cancer (TNBC), the most aggressive type of breast cancer, has an increased propensity to metastasise. However, there are very limited treatment options to combat TNBC metastasis. Dicoumarol (DIC), a clinical anticoagulant, has shown anti-cancer activity. Here, its effect on TNBC metastasis was investigated.

Methods: The effect of DIC on the metastatic ability of TNBC was determined using MDA-MB-231 and HCC1937 line cells. Cell motility was assessed by wound healing assay, and cell migration and invasion abilities were evaluated by transwell and adhesion assays. Western blotting and immunofluorescence staining were used to determine the expression of proteins. Drug affinity responsive target stability (DARTS) and cellular thermal shift assay (CETSA) were performed to investigate the binding of DIC to proteins, while co-immunoprecipitation (Co-IP) assays were used to assess ubiquitination levels and protein-protein interactions. The zebrafish and mouse xenograft models were used to investigate the effects of DIC on TNBC metastasis in vivo.

Result: DIC significantly inhibited the metastatic ability of TNBC cells. It significantly decreased the cellular protein level of TGFBRII, which was associated with increased degradation of TGFBRII. DIC facilitated the binding of PSMB9 to TGFBRII and promoted the degradation of TGFBRII in a manner independent of ubiquitination. In addition, DIC significantly inhibited TNBC metastasis in both zebrafish and mouse xenograft models.

Conclusions: DIC inhibits TNBC cell migration and invasion by suppressing the TGFβ signaling pathway mediated by the degradation of TGFBRII. Inhibition of TNBC metastasis provides a new potential indication by repurposing DIC for cancer treatment. Acknowledgments This work was supported by the Science and Technology Development Fund, Macau SAR (FDCT) (0070/2022/A2, 0081/2021/A2, 0084/2022/AMJ), the National Natural Science Foundation of China (82173848), and the Ministry of Education Frontiers Science Centre for Precision Oncology, University of Macau (FSCPO).

Chemo-Photothermal Therapy with Carfilzomib-Encapsulated TiN Nanoshells Suppressing Breast Tumor Growth and Lymphatic Metastasis

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Background: The design of nanomedicine for cancer therapy, especially the treatment of tumor metastasis has received great attention. Proteasome inhibition is accepted as a new strategy for cancer therapy. Despite being a big breakthrough in multiple myeloma therapy, carfilzomib (CFZ), a second-in-class proteasome inhibitor is still unsatisfactory for solid tumor and metastasis therapy.

Methods: In this study, hollow titanium nitride (TiN) nanoshells were synthesized as a drug carrier of CFZ. Due to an excellent photothermal conversion efficiency in the second near-infrared (NIR-II) region, TiN nanoshell-based chemo-photothermal therapy was studied in the murine 4T1 breast cancer cells.

Result: The TiN nanoshells have a strong plasmon resonance in the second biological transparent window and show a high photothermal conversion efficiency under 1064-nm laser irradiation. The TiN nanoshells have a high loading capacity of CFZ, and their intrinsic inhibitory effect on autophagy synergistically enhances the activity of CFZ. In vivo study demonstrates that TiN nanoshells readily drain into the lymph nodes, which are responsible for tumor lymphatic metastasis. The CFZ-loaded TiN nanoshell-based chemo-photothermal therapy combined with surgery offers a remarkable therapeutic outcome in greatly inhibiting further metastatic spread of breast cancer cells.

Conclusions: These findings suggest that TiN nanoshells act as an efficient carrier of CFZ for realizing enhanced outcomes for proteasome inhibitor-based cancer therapy, and this work also presents a "combined chemo-phototherapy assisted surgery" strategy, promising for future cancer treatment.

Antibody-Drug Conjugates in HER2 Non-overexpressing Metastatic Breast Cancer: A Systematic Review and Meta-analysis

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Background: Antibody-drug conjugates (ADCs) have shown superior efficacy over chemotherapy in HER2 non-overexpressing metastatic breast cancer. However, efficacy across different patient subgroups and the optimal ADC choice remains undefined.

Methods: Literature search in PubMed, Embase, Cochrane Library, and ClinicalTrials.gov was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guideline, and full paper publications up to December 31, 2024 were enrolled. Additional conference abstracts were collected for subgroup analyses. Primary outcomes were odds ratio (OR) for overall response rate (ORR), hazard ratio (HR) for progression-free survival (PFS) and overall survival (OS) when ADCs were compared to chemotherapies.

Result: Six phase III trials (N = 3,497) which consisted of three ADCs were enrolled; all showed superior efficacy of ADCs over chemotherapy. In general, higher OR for ORR was observed in hormone receptor-negative (HR-neg) patients than in hormone receptor-positive (HR-pos) patients. Among HR-pos patients, ADC efficacy in ORR (OR 3.40 vs. 2.12) and PFS (HR 0.56 vs. 0.65) was more prominent in HER2-low (immunohistochemical staining [IHC] 1+ to 2+) disease than in HER2-zero (IHC 0) disease. Conversely, among HR-neg patients, ADCs were preferentially better in HER2-zero disease (ORR OR 12.42 vs. 5.15 and PFS HR 0.38 vs. 0.45). Regardless of hormone receptor status, OS benefits remained consistent across HER2 expression levels. HER2-ADC and Trop2-ADCs provided similar benefit in PFS and OS. While HER2-ADC appeared to have superior ORR than Trop2-ADCs in HR-pos patients (OR 3.83 vs. 1.70); for HR-neg/HER2-zero patients, available data were limited to Trop2-ADC only, with outstanding results (ORR OR 12.4, PFS HR 0.38 and OS HR 0.5).

Conclusions: Differential benefit of ADCs in ORR and PFS were observed across different patient subgroup defined by hormone receptor status and HER2 expression level. In HR-pos patients, HER2 ADC had superior odds in ORR than Trop2 ADCs.

Evaluating the Efficacy of CDK4/6 Inhibitors in Combination with Endocrine Therapy for Patients with Hormone Receptor-Positive, HER2-Negative Recurrent or Metastatic Breast Cancer

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Background: Cyclin-dependent kinase 4/6 (CDK4/6) inhibitors plus standard endocrine therapy (ET) are now the strongly recommended first-line treatment for hormone receptor (HR)-positive and HER2-negative metastatic breast cancer (MBC). We aimed to evaluate the efficacy of the combination of CDK 4/6 inhibitors and endocrine therapy in patients with hormone receptor-positive, HER2-negative metastatic breast cancer in our center.

Methods: This single-center, retrospective and prospective descriptive study included patients diagnosed with recurrent metastatic breast cancer, hormone receptor-positive, HER2-negative, who were treated at Vinmec Oncology Center from January 2021 to December 2024. Patient demographics and cancer-related data were collected, along with reports of adverse events prior to each treatment cycle.

Result: This study included 16 female patients with a median age of 57 years (range: 4177) and a performance status of 0-1. The most common site of metastasis was bone (81.25%), followed by lymph nodes, liver, and lungs. Ribociclib in combination with an aromatase inhibitor was the most frequently prescribed regimen (68.75%). The follow-up period ranged from 2.6 to 46.8 months, with a median progression-free survival of 20.1 months. Treatment failure occurred in only one patient (6.25%). The overall response rate was 56.25%, all of which were partial responses, with no patients achieving a complete response. Additionally, 37.5% of patients had stable disease. Adverse events were reported in all but one patient (6.25%), with hematologic toxicities, particularly neutropenia, being the most common (75%). These hematologic toxicities were predominantly mild, with only one case of neutropenic fever. Grade 3 or 4 adverse events included neutropenia (n = 2), QT prolongation (n = 1), and rash (n = 1).

Conclusions: The combination of a CDK4/6 inhibitor with ET is safe and significantly improved PFS in hormone receptor-positive, HER2 negative patients with metastatic breast cancer.

Role of Ki-67 index in predicting adjuvant chemotherapy response in node positive luminal cancers

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Background: Being node-positive is one of the indications for adjuvant chemotherapy for breast cancers. However, its role in luminal cancers, especially in those with low proliferative index (e.g. Ki-67), is less well-established. This territory-wide cancer registry study aims to evaluate the role of adjuvant chemotherapy in node-positive breast cancers with low- and high- proliferative index.

Methods: A territory-wide breast cancer database was reviewed. The database contained prospectively maintained data of all breast cancer patients treated in Hong Kong between 1996 and 2006. Analysis of 10-year local relapse rate of node positive luminal breast cancer patients with or without adjuvant chemotherapy was performed.

Result: 3072 patients were treated for node-positive luminal breast cancer. Of which 237 were found to have low Ki-67 (< 12%), 269 had high Ki-67 index, while 59 (24.9%) patients in the low Ki-67 group did not receive adjuvant chemotherapy, 171 (72.2%) patients in the low Ki-67 group received adjuvant chemotherapy. 52 (19.3%) patients in the high Ki-67 group did not receive adjuvant chemotherapy, while 213 (79.2%) in the high Ki-67 group received chemotherapy. Background demographic characteristics between all four groups (i.e. Low KI-67 / No Chemotherapy, Low Ki-67 / Chemotherapy, High Ki-67 / No Chemotherapy, High Ki-67 / Chemotherapy) were comparable ($p > 0.05$) 10-year relapse free survival in the low Ki-67 group who received chemotherapy was 89.5%, and was 72.9% in those who did not receive adjuvant chemotherapy ($p = 0.002$). 10-year relapse free survival in the high Ki-67 group who received chemotherapy was 75.6%, and was 63.5% for those who did not receive chemotherapy.

Conclusions: Significant survival benefit is observed in node-positive breast cancers treated with adjuvant chemotherapy, irrespective of the Ki-67 level.

High Expression of Tumoral Lactate Dehydrogenase and Residual Cancer Burden are the Predictor of Poor Disease Free Survival in Patients with Locally Advanced Breast Cancer

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Background: The evaluation of prognosis in patients with locally advanced breast cancer remains a challenge, partly due to the involvement of tumor microenvironment factors. High LDHA expression causes changes in the pH of the tumor microenvironment, which is known to be associated with chemotherapy resistance and a higher Residual Cancer Burden (RCB) class, reflecting a poor prognosis in breast cancer.

Methods: We performed a retrospective cohort study on 40 LABC patients who received neoadjuvant chemotherapy and definitive mastectomy at Prof. Dr. I. G. N. G. Ngoerah Hospital Denpasar from January 2021 to December 2022. Tumoral LDHA expression was measured from the H score of immunohistochemistry examination and RCB was assessed from medical record data. A follow-up for at least two years was carried out to determine disease-free survival (DFS) and overall survival (OS). Data analysis was carried out by the Kaplan-Meier curve and Cox regression to determine the hazard ratio (HR) value.

Result: The expression of tumoral LDHA > 255 and high RCB class increased the risk of recurrence within two years by 6.7 times (CI95% 1.49-30.22; $p = 0.013$) and 3.632 times (CI95% 1.439.20; $p = 0.007$) respectively. The expression of LDHA > 255 and high RCB class has a significant relationship with decreased DFS ($p = 0.004$ and $p = 0.027$ respectively). LDHA expression was shown to have significant positive correlation with the RCB class ($r = 0.37$; $p = 0.019$). Multivariate analysis showed that RCB class, age and lymph node metastasis significantly affected the incidence of breast cancer recurrence.

Conclusions: High expression of LDHA > 255 and RCB is associated with poor DFS. These findings emphasize the importance of the role of LDHA and RCB levels in breast cancer management.

Toward personalization of HER2-targeted therapy

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Background: HER2-positive breast cancer patients have multiple options of HER2-targeted therapies. Individualized optimization of anti-HER2 therapies is a key to further improve survival. In the metastatic settings, we have shown that re-treatment of pertuzumab for patients with HER2-positive advanced breast cancer who had already been treated with pertuzumab-containing regimen improved not only progression-free survival (PFS) but also overall survival (OS) in the phase III PRECIOUS study. Discovery of biomarkers predictive of treatment benefit is crucial for personalized treatment.

Methods: We conducted a translational study with plasma circulating tumor DNA (ctDNA) at pre-treatment as well as early ctDNA changes 3 weeks after treatment initiation using ultra-deep targeted NGS with samples from PRECIOUS study.

Result: In the metastatic PRECIOUS study, tumors with no mutations in key genes of FGFR signaling were predictive of clinical benefit from pertuzumab re-treatment both for PFS ($P < 0.05$) and OS ($P < 0.05$). Tumors with mutations in those genes did not show survival benefit from pertuzumab re-treatment. Reduced ctDNA levels of ERBB2, TP53, PIK3CA and key genes of FGFR signaling after 21 days of treatment were predictive of longer mPFS.

Conclusions: The status of ctDNA was a promising biomarker for benefit of re-treatment of pertuzumab. These findings highlight the importance of molecular approach for predictive of anti-HER2 treatment response, potentially aiding personalized treatment decision.

Comparative Study of Gene Variant Alterations in Patients with Refractory Metastatic and Recurrent Breast Cancer

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Background: The clinical use of cancer gene panel testing (CGP) such as Foundation One® has been covered by societal insurance in Japan from 2019, and the CGP may offer the potential to refine therapeutic strategies for patients with refractory metastatic cancer who have completed standard treatment, and guide clinical decisions tailored to the molecular profile of the tumor. We analyzed the CGP data performed for patients with metastatic and recurrent breast cancer (mrBC) in our hospital and compared it with public databases.

Methods: We analyzed gene mutations in 42 patients with refractory mrBC who underwent CGP from 2019 to 2023 and conducted exploratory research on the morphology and characteristics of each gene mutation in these mrBC patients by comparing the CGP data at our hospital with published CGP data.

Result: The biological subtypes of mrBC patients included 8 Luminal A, 21 Luminal B, 9 Triple negative, and 4 HER2 in this study. Approximately 60% of all gene mutations were single nucleotide variant SNV. The frequency of the top two gene mutations were TP53 and PIK3CA, followed by NOTCH1, ROS1, and DNMT3A. Compared to the mutation types of our data other than the top two gene mutations were completely different from the published data. The frequency of gene mutations in TP53 and PTEN was significantly higher than known data, and the gene loci where mutations were observed were also different from the published data. A unique mutant locus that is thought to be a hotspot was identified in NOTCH1. It is suggested that several gene mutations could occur simultaneously.

Conclusions: Our results suggested that the gene variant alteration of patients with mrBC in our medical care area may differ from the published data and may have unique genomic landscape with the regional characteristics of gene mutations.

Impact of Inflammatory Biomarkers on Outcomes and Immune-Related Adverse Events in Triple-Negative Breast Cancer: Experience with the KEYNOTE-522 Regimen

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Background: Based on the results of the KEYNOTE-522 (KN522) trial, our institution has implemented this regimen in clinical practice since September 2022. We report our experience with the KN522 regimen, focusing on its association with inflammatory biomarkers.

Methods: We included patients with Stage IIA or higher triple-negative breast cancer (TNBC) who received the KN522 regimen at our institution in September 2022 and underwent surgery by October 2024. Clinical and pathological data were collected from electronic medical records. Pathological complete response (pCR) was defined as ypT0/isN0, and immune-related adverse events (irAEs) were defined as Grade 1 or higher based on CTCAE. Inflammatory biomarkers examined, which are calculated from pre-treatment data, included all lymphocyte count, neutrophil-to-lymphocyte ratio (NLR), lymphocyte-to-monocyte ratio (LMR), platelet-to-lymphocyte ratio, and prognostic nutritional index. Tumor-infiltrating lymphocytes (TILs) evaluation followed the criteria proposed by the International Immuno-Oncology Biomarker Working Group, with cases showing ≥ 30% stromal TILs classified as high.

Result: A total of 73 patients were analyzed, with a median age of 52 years (range: 25-74). Stage II and Stage III cases accounted for 55 and 18 patients, respectively. The preoperative regimen completion rate was 68.5% (50/73), and the pCR rate was 56.2% (41/73). The incidence of irAEs was 41.1% (30/73). Analysis of clinical, pathological, and inflammatory biomarkers revealed a significantly higher pCR rate in cases with high TILs before treatment ($p = 0.0297$). However, no correlation between pCR rate and inflammatory biomarkers was observed. In contrast, analysis of irAEs showed no association with TILs but revealed significantly lower NLR ($p = 0.0491$) and higher LMR ($p = 0.0360$) in patients with irAEs. No correlation was found between pCR rate and irAE incidence.

Conclusions: In TNBC patients treated preoperatively with the KN522 regimen at our institution, all cases underwent surgery, with a pCR rate of 56.2%. Local immune environment influenced pCR, whereas systemic immune status appeared to affect irAE incidence.

Prognostic Prediction in Metastatic Breast Cancer Patients

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Background: Prognostic prediction in metastatic breast cancer is crucial for treatment planning and improving quality of life (QOL). End-of-life predictions are especially important for providing appropriate support to patients and families. This study aimed to investigate the treatment course and prognostic prediction in patients who died from metastatic or recurrent breast cancer at our institution, based on treatment history from 3 and 6 months before death and the timing of Advance Care Planning (ACP).

Methods: We evaluated 23 patients who died from metastatic breast cancer between 2019 and 2024. We assessed their condition and treatment 3 and 6 months before death, and identified when end-of-life predictions were possible by retrospectively reviewing death dates. Prognostic accuracy was examined based on the timing of ACP implementation.

Result: Among the 23 patients, 5 had de novo Stage IV disease, and 18 had recurrent breast cancer. The average age at death was 51.5 years (range: 2481). Subtypes included 13 Luminal, 2 Lum-HER, 2 HER2, and 6 TNBC. ACP was performed an average of 3.4 months before death for all cases, with variations by subtype: 3.4 months (Luminal), 8 months (Lum-HER), 2.5 months (HER2), and 2.2 months (TNBC). For patients treated with more effective drugs, ACP occurred 5.8 months before death. At 3 months prior to death, 83% of patients were receiving active treatment, with the majority having a Performance Status (PS) of 0 (57%) or 1 (17%).

Conclusions: Most metastatic breast cancer patients had a PS of 0 or 1 at 3 months before death, and active treatment continued. This suggests that prognostic prediction remains challenging. However, early ACP interventions in patients treated with more effective drugs may facilitate prognostic prediction. Future efforts should focus on improving prognostic tools and creating stronger support systems for patients and families.

Title West Japan Oncology Group (WJOG) Breast Cancer Consensus Conference 2024

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Background: Breast cancer drug therapy has made remarkable progress, becoming more individualized and complex with many options. There are clinical questions (CQs) to which no right answers exist. We organized a consensus conference to discuss the treatment strategy for such controversial cases.

Methods: West Japan Oncology Group (WJOG) Breast Cancer Consensus Conference 2024 was held online in December. Three themes with six questions for the hypothetical cases were discussed. Participants voted on the six CQs before presentation and followed by discussions and second round of voting.

Result: Fifty people (39 physicians from 24 hospitals, and 11 personnels from industries) participated in the conference. The first CQ was about a maintenance therapy for patients with HER2 positive metastatic breast cancer who had achieved durable response to trastuzumab deruxtecan (T-DXd) with pertuzumab (PER). Most people (38%) voted for trastuzumab and PER before discussion, and more than half (52%) voted for T-DXd afterwards. The next CQ addressed the treatment strategy for early triple negative breast cancer (TNBC) in a vulnerable elderly patient. The proportion of votes for neoadjuvant chemotherapy increased from 37% before the discussion to 42% afterward. Regarding post-sacituzumab govitecan treatment in metastatic HER2-low, initially, 57% of the participants chose T-DXd, and after the conference, this increased to 79%.

Conclusions: Organizing the consensus meeting was a good opportunity for physicians to thoroughly think about CQ. Changes of opinion were observed in all cases to some degree, suggesting that the discussion with physicians from different specialties (surgery, medical oncology), different institutions, and different career stages could be beneficial in making decisions.

Transcriptomic analysis of breast cancer cell lines based on HER2 targeted antibody-drug conjugate responses

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Background: Antibody-drug conjugates (ADCs), such as trastuzumab deruxtecan (T-Dxd), have emerged as promising therapies for HER2-positive and HER2-low breast cancer. In our group, thirteen breast cancer cell lines were previously categorized into HER2 high-, middle-, and low-expression groups as part of our study. Cytotoxicity assays with trastuzumab emtansine (T-DM1) and T-Dxd revealed strong correlations in the high-expression group. However, such relationships were limited in the other groups, underscoring the need for additional biomarkers. In this study, we analyzed differential gene expression (DEG) to compare T-Dxd responses between response and nonresponse groups in breast cancer cell lines.

Methods: Total RNA was quantified using Quant-IT RiboGreen and assessed with TapeStation, selecting samples with RIN >7. Libraries were prepared using the Illumina TruSeq Stranded mRNA Sample Prep Kit, including mRNA purification, fragmentation, cDNA synthesis, and PCR enrichment. Library quantification and quality assessment were performed using KAPA qPCR and TapeStation. Sequencing was conducted on an Illumina NovaSeqX by Macrogen Inc. Gene Ontology (GO) enrichment analysis of differentially expressed genes (DEGs) was performed after RNA-seq.

Result: DEG analysis revealed distinct molecular signatures between ADC-response and ADC-nonresponse groups across three categories: molecular functions, biological processes, and cellular components. In Molecular Function, key terms included collagen binding, actin binding, and phospholipid binding, indicating interactions with cytoskeletal and extracellular elements. Biological Process analysis highlighted cell migration, wound healing, and cell adhesion, suggesting roles in tissue remodeling. Cellular Component analysis identified focal adhesion, cell-substrate junctions, and membrane microdomains, emphasizing structural and signaling changes. These findings suggest that ADC-nonresponse groups may utilize alternative pathways to compensate for HER2 signaling in motility and invasion.

Conclusions: The identification of additional biomarkers is essential for developing precise treatment strategies and predicting therapeutic responses. This study is expected to serve as a foundation for discovering novel biomarkers and improving predictors of treatment efficacy.

Prediction of Upstaging in DCIS: The Dominant Role of Pathological Over Imaging Risk Factors

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Background: Predicting upstaging in DCIS is critical for optimizing surgical planning. Upstaging necessitates sentinel lymph node biopsy (SLNB), which is often omitted during initial breast-conserving surgery (BCS), leading to a second operation if upstaging occurs. Accurate preoperative prediction can reduce unnecessary SLNB and two-stage operations. This study investigates whether imaging findings, including the presence of non-mass lesions on US and MRI, can contribute to predicting upstaging in DCIS.

Methods: A total of 701 patients diagnosed with DCIS and treated surgically at the National Cancer Center were included in this retrospective analysis. Among them, 501 patients had confirmed DCIS, while 200 patients experienced upstaging to invasive carcinoma. Clinicopathological variables and univariable logistic regression were analyzed to explore potential predictors of upstaging. Multivariable analysis was subsequently performed to determine independent risk factors, focusing on tumor size, comedonecrosis, PR status, and mammography findings with microcalcifications.

Result: Independent predictors of upstaging included the presence of comedonecrosis (OR = 2.122), PR-negative status (OR = 1 vs. PR-positive, OR = 0.568), tumor size > 5 cm (OR = 7.138), and microcalcifications observed on mammography (OR = 2.150, $P = 0.001$). Univariable analysis showed that US-detected non-mass lesions were significantly associated with upstaging (OR = 1, $P = 0.002$), while MRI-detected non-mass lesions were not (OR = 1, $P = 0.358$). However, neither US nor MRI findings remained significant in the multivariable model due to backward selection.

Conclusions: Although US-detected non-mass lesions showed significance in univariable analysis, this was not retained in the final multivariable model, underscoring the complexity of imaging-based prediction. This study highlights the need for further research to refine preoperative prediction models by incorporating imaging characteristics like non-mass lesions. Larger datasets and advanced imaging techniques are essential for improving predictive accuracy and guiding clinical decision-making.

The experience of contralateral risk reducing mastectomy in affected carriers of BRCA mutation in South Korea

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Background: BRCA mutation is a well-known risk factor related to breast cancer, and clinical interest increased on prophylactic operation. We want to enhance understanding of contralateral risk reducing mastectomy (RRM) in BRCA mutation carriers and occult malignancy.

Methods: Prospectively collected data of breast cancer patients who treated in single institution was retrospectively reviewed. Patients who underwent RRM with BRCA mutation from January 2010 to November 2023 were evaluated through this study. Among of the patients who underwent contralateral RRM with primary cancer diagnosis were included, and patients with occult malignancy in contralateral RRM side were reviewed additionally. Demographics and pathology of both primary breast cancer and occult malignancy were evaluated.

Result: In our institution, total 925 patients were detected as BRCA mutation carriers, and 320 patients underwent contralateral RRM with primary breast cancer operation. In this study, we reviewed 320 patients diagnosed with breast cancer and detected as BRCA mutation carriers who underwent contralateral RRM. In the overall BRCA mutation cohort, BRCA 2 mutation is more common (54.8%, 507 patients among 925 patients), whereas among patients who underwent RRM, BRCA 1 showed higher proportion (54.4%, 174 patients among 320 patients). Interestingly, compare to other previous reports, we could only find 7 (2.2%) patients to have occult malignancy in contralateral RRM side. This low incidence of occult malignancy in contralateral RRM side is different from other nations.

Conclusions: Increased utilization of screening and advancement in diagnostic technologies in South Korea leaves low chance for occult malignancy in RRM, and variety in pathologic examination methods may affected this incidence.

The impact of BRCA mutation status on oncologic outcomes in ER-positive, HER2-negative young breast cancer patients: a propensity score-matched analysis

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Background: Young breast cancer (YBC) patients with ER-positive, HER2-negative tumors often exhibit poor outcomes. This study aimed to investigate whether these outcomes are associated with a higher proportion of BRCA mutation carriers in this group and to compare oncologic outcomes according to BRCA mutation status using propensity score matching (PSM).

Methods: A retrospective cohort study was conducted on ER-positive, HER2-negative breast cancer patients aged ≤40 years who underwent curative surgery. Among them, 1025 patients underwent BRCA testing, identifying 117 BRCA mutation carriers (11.4%). Clinical, pathologic, and survival outcomes, including distant metastasis-free survival (DMFS), late DMFS, overall survival (OS), and breast cancer-specific survival (BCSS), were analyzed. PSM was performed to reduce baseline differences and minimize selection bias.

Result: BRCA mutation carriers demonstrated more aggressive tumor features, including higher histologic grade, elevated Ki-67 index, and increased nodal involvement. Even after PSM, BRCA carriers exhibited significantly worse late DMFS ($p = 0.012$, HR = 4.950). Bone was the most common first site of metastasis in BRCA carriers, whereas non-carriers more frequently showed metastasis to multiple sites. Despite worse DMFS, OS and BCSS were comparable between the groups.

Conclusions: BRCA mutation carriers among ER-positive YBC patients exhibit unique patterns of metastasis and a persistent risk of late recurrence, highlighting the need for prolonged surveillance and consideration of earlier, proactive therapeutic interventions.

Poster Presentation

Predicting locoregional recurrence in breast cancer following breast-conserving treatment using learning-based models with multi-institutional registries(Korean Radiation Oncology Group 22-06)

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Background: This study aims to develop and validate a machine learning (ML) model that incorporates radiomics features from a multi-institutional cohort to predict the risk of LRR in breast cancer patients by utilizing a single magnetic resonance imaging (MRI) sequence (T2-weighted with fat suppression) and identifying the key features

Methods: A multi-institutional cohort of 352 breast cancer patients was analyzed. To address class imbalance, various data sampling methods, including oversampling techniques, were initially explored and evaluated. Ultimately, a balanced subset was randomly selected to address class imbalance and ensure balanced representation of LRR and non-LRR cases during model development. Radiomics features, including shape, first-order statistics, and texture, were extracted from manually contoured regions of interest (ROIs). During feature extraction, the effect of MRI scan normalization on model performance was also assessed. A machine learning model was developed using feature selection techniques and principal component analysis (PCA), with logistic regression as the classifier. Domain adaptation technique was employed to improve model performance. The model's performance was evaluated using five-fold cross-validation and an independent test dataset, with calibration applied to improve the accuracy of probability estimates.

Result: The best performance was achieved when MRI scan normalization was applied, feature selection was performed using a wrapper method (Recursive Feature Elimination, RFE), and both radiomics features and clinical factors were included as inputs. Under these conditions, the model provided an average AUC of 0.757 (95% confidence interval, 0.715-0.799) for cross-validation and 0.762 for the independent test dataset.

Conclusions: In this study, a predictive model for the risk of LRR in breast cancer patients was developed by integrating radiomics features with clinical factors known to be associated with LRR risk. The findings suggest that radiomics, as a non-invasive biomarker, holds promise for enhancing personalized risk assessment when integrated with clinical factors

Impact of high lymph node burden on brain metastases in patients who achieved pathological complete response after neoadjuvant chemotherapy in HER2-positive breast cancer

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Background: Brain metastases are a significant challenge in HER2-positive advanced breast cancer, particularly in patients who achieve a pathological complete response (pCR) after neoadjuvant chemotherapy (NAC). This study explores the clinical characteristics, outcomes, and predictors of brain metastases in HER2-positive breast cancer patients with pCR after NAC. By analyzing distant metastasis-free survival (DMFS) and overall survival (OS) between pCR and non-pCR groups, this study aims to identify high-risk factors and provide insights for improving surveillance strategies.

Methods: A retrospective analysis of 1,757 patients treated between 2008 and 2022 was conducted. Patients were classified into pCR (n = 914) and non-pCR (n = 843) groups based on pathological response after NAC. Data collected included demographic, clinical, and metastasis-related parameters. Kaplan-Meier survival curves, Cox proportional hazards models, and logistic regression analyses were used to evaluate survival outcomes and identify predictors of brain metastases.

Result: Among pCR patients, brain metastases accounted for 54.2% of distant metastases, significantly affecting OS ($p < 0.001$). Median DMFS was shorter for brain metastases (13.4 months) compared to extracranial metastases (31.1 months) in the pCR group ($p = 0.005$). Non-pCR patients showed no significant DMFS difference between brain and extracranial metastases ($p = 0.88$). Positive supraclavicular node (SCN) fine needle aspiration (FNA) and clinical N3 (cN3) stage were the strongest predictors of brain metastases (SCN FNA: OR = 12.9, $p < 0.001$; cN3: OR = 12.1, $p < 0.001$). Multivariable Cox regression analysis revealed that positive SCN FNA and cN3 stage were strong predictors of reduced DMFS (SCN FNA: HR = 2.5, 95% CI: 1.3-3.6, $p < 0.001$; cN3: HR = 11.3, 95% CI: 4.9-33.0, $p < 0.001$).

Conclusions: This study highlights the challenges of brain metastases in HER2-positive pCR patients, emphasizing the need for tailored strategies and enhanced surveillance. High lymph node burden prior to NAC is a significant factor in risk assessment. Therefore, it may be advisable to recommend post-surgery surveillance with brain MRI and CNS-penetrant therapies for high-risk patients, particularly within the first 1-2 years.

Poster Presentation

Ipsilateral Breast Tumor Recurrence (IBTR) Regarding Residual Cancer Burden (RCB) in Patients Undergoing Breast-Conserving Surgery (BCS) After Neoadjuvant Chemotherapy (NAC)

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Background: The extent of residual disease after NAC can be quantified using the RCB, which is a prognostic tool for estimating survival outcomes in breast cancer patients. This study aims to know the relationship between RCB after NAC and IBTR following BCS and the location of recurrence according to quadrant.

Methods: This retrospective study included 1,001 women who underwent BCS after NAC at Asan Medical Center from 2015 to 2021. We analyzed IBTR rates and subtype over a median follow-up of 57 months. Statistical analyses included univariable Chi-squared test and multivariable analysis logistic regression to assess RCB levels and IBTR.

Result: 2.47% of the patients experienced IBTR. The 5-year IBTR cases based on RCB levels was: 2 patients in RCB-0, 4 in RCB-1, 13 in RCB-2, and 5 in RCB-3. Among the 306 patients with RCB-0, 15 experienced recurrence. Among that 15, 2 were IBTR, 2 involved lymph node recurrence, and 11 were distant. The univariable analysis showed differences in IBTR rates depending on RCB levels. We analyzed the precise locations of the primary and recurrent tumors with subtypes: 9 cases occurred in the same quadrant as the original, 17 cases occurred in a different. In the RCB-0 group, occurred in the same quadrant. The multivariable analysis confirmed a significant correlation between RCB levels and the IBTR rates. Breast cancer subtypes also influenced the risk of IBTR. Hormone receptor-positive/human epidermal growth factor receptor 2-negative patients had a significantly low risk compared to triple-negative cancers.

Conclusions: The study underscores the prognostic significance of the RCB index in predicting IBTR after BCS in breast cancer patients. In patients who underwent BCS after NAC, the RCB-0 group showed a very low IBTR, although it was not 0%. These findings highlight the need for tailored surveillance and treatment strategies based on RCB scores and breast cancer subtypes.

Clinicopathological Features and Prognostic Factors of Triple-negative Invasive Lobular Carcinoma: Comparison with TN IDC and non-TN ILC

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Background: Invasive lobular carcinoma (ILC) is the second most common histologic subtype of breast cancer, accounting for 8-14% of all breast cancer in the West and 2-4% in Korea. ILC typically occurs in older patients, presents as larger tumors, and is predominantly classified as Luminal A molecular subtype. Triple-negative (TN) breast cancer is an aggressive molecular subtype comprising 10-20% of breast cancer, is prevalent in younger patients, and has a poor prognosis. This study investigated the clinicopathological characteristics of TN ILC, where these distinct subtypes coincide.

Methods: Among 24,334 patients diagnosed with invasive breast cancer between 2001 and 2020 at Seoul National University Hospital, we analyzed 43 TN ILC patients compared with 2,454 TN IDC and 992 non-TN ILC patients. Survival and Cox regression analyses were performed using 1:2 propensity score matching (PSM) for significant covariates, including age, tumor size, lymph node status, and treatment modalities.

Result: TN ILC patients were diagnosed older than TN IDC and non-TN ILC patients (55.6 ± 11.2 vs 50.0 ± 11.5 years, $p = 0.002$; 55.6 ± 11.2 vs 51.0 ± 9.3 years, $p = 0.002$). They underwent total mastectomy more frequently than TN IDC patients (60.5% vs 33.4%, $p < 0.001$). Lymph node involvement was similar among groups (41.9% in TN ILC, 42.1% in TN IDC, and 40.0% in non-TN ILC, $p > 0.05$). In disease-free survival analysis, there were no significant differences between TN ILC and TN IDC ($p = 0.23$) or between TN ILC and non-TN ILC ($p = 0.21$). However, overall survival analyses demonstrated that TN ILC had significantly poorer survival than both TN IDC (HR 3.920, 95% CI 1.520-10.109, $p = 0.005$) and non-TN ILC (HR 4.251, 95% CI 1.433-12.605, $p = 0.009$).

Conclusions: TN ILC showed worse overall survival compared to TN IDC and non-TN ILC on PSM analyses, suggesting the need for a different therapeutic approach for TN ILC. Further analysis with a larger TN ILC cohort is warranted to better understand the rare disease phenotype.

Alternative Use of Clinicopathologic Prognostic Factors to Multigene Assays: Comparison of Clinical Risk and Ki-67 Combination with EndoPredict

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Background: Many studies have examined the relationship between prognostic factors and multigene assays; however, their use as alternatives remains insufficient. This study evaluated the concordance of the combination of clinical risk (CR) - which was determined using the modified version of Adjuvant! Online - and the Ki-67 index using EndoPredict (EP).

Methods: Retrospective data from 709 patients were analyzed. The diagnostic accuracy, including concordance, was assessed between CR and EP (EPclin risk vs. EP risk), along with the Ki-67 index (cut-off: 20%). The clinical significance was analyzed using an area under the receiver operating characteristic (ROC) curve.

Result: Significant differences were observed between CR and the Ki-67 index with respect to EPclin and EP risk. EPclin risk showed higher concordance with both CR and Ki-67 than EP risk, and CR showed higher concordance with both EPclin and EP risk than Ki-67. Differences in concordance with CR based on Ki-67 were limited; however, the negative predictive value (NPV) increased in the Ki-67 $<20\%$ group (86.9% in EPclin), whereas the positive predictive value (PPV) increased in the Ki-67 $\geq 20\%$ group (82.7% in EPclin). Improvement in PPV and NPV, as well as concordance, was observed with EPclin in 447 patients with high CR/high Ki-67 and low CR/low Ki-67. ROC analysis confirmed the clinical significance of combining CR with the Ki-67 index, as their combined area under the curve increased to 0.794, compared to 0.660 for CR and 0.742 for Ki-67 alone in EPclin risk.

Conclusions: Integrating CR with the Ki-67 index improves prognostic accuracy compared to the EP test, suggesting that this approach is a cost-effective and accurate alternative for adjuvant therapy decisions in luminal-type early breast cancer.

Alteration in estrogen receptor status in metachronous contralateral breast cancer among unilateral early breast cancer patients with BRCA 1/2 mutations

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Background: BRCA1/2 mutations are known to significantly increase the risk of contralateral breast cancer (CBC), although they are not directly linked to reduced overall survival. However, their influence on changes in estrogen receptor (ER) status between primary breast cancer and metachronous CBC remains unclear. This study investigates ER status alterations in CBC patients with BRCA1/2 mutations to provide insights into their clinical implications.

Methods: This retrospective study included patients from Samsung Medical Center, Seoul National University Hospital, and Gangnam Severance Hospital between 2004 and 2020. Patients with unilateral early breast cancer who underwent BRCA1/2 testing and developed metachronous CBC were grouped by BRCA1/2 mutation status. ER status of primary and CBC tumors was compared using Fisher's exact test and logistic regression to assess the relationship between BRCA1/2 mutations and ER alterations.

Result: Among 423 CBC patients, those with BRCA1 or BRCA2 mutations had a higher likelihood of ER-positive primary tumors transitioning to ER-negative CBC (41.9%) compared to BRCA1/2 negative patients (odds ratio [OR] 2.06, $p = 0.035$). This effect was strongest in BRCA1 mutation carriers, with 72.7% of primary ER-positive tumors becoming ER-negative in CBC (OR 7.64, $p = 0.002$). Similarly, ER-negative primary tumors were more likely to remain ER-negative in CBC among BRCA1/2 mutation carriers (77.8%, OR 4.87, $p < 0.001$) and BRCA1 mutation carriers (86.4%, OR 8.80, $p < 0.001$). These findings demonstrate a strong association between BRCA1 mutations and the development of ER-negative CBC.

Conclusions: BRCA1 mutation carriers face a significantly higher risk of developing ER-negative metachronous CBC, regardless of the ER status of their primary tumor. These findings highlight the importance of genetic counseling and risk-reducing strategies, including prophylactic mastectomy, for BRCA1 mutation carriers, which typically requires more aggressive treatments.

Poster Presentation

Prognostic Impacts of Low AMH for Young Women with Breast Cancer under 40

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Background: Anti-Mullerian hormone (AMH) is considered an indicator for assessing ovarian reserve. Menopausal status is a crucial determinant of both treatment approach and prognosis in patients with hormone receptor-positive breast cancer. While AMH has shown potential in guiding adjuvant chemotherapy decisions, its reliability remains debated. We aimed to evaluation of prognostic impact of AMH for young women under 40.

Methods: In this retrospective cohort study, we reviewed medical records of breast cancer patients under 40 treated at Asan Medical Center between December 2010 and September 2020. Patients with stage 0 to 3 breast cancer were included, and initial AMH levels were measured before treatment. AMH levels were assessed using age-specific reference values from a 2015-2021 study of healthy Korean women with normal menstrual cycles, conducted by the Department of Laboratory Medicine, Seoul Clinical Laboratories.

Result: An analysis was conducted on 539 young breast cancer patients. The median age was 32 years, and the median follow-up period was 52.4 months. Among 387 patients (71%) who received chemotherapy, 245 (45%) underwent neoadjuvant chemotherapy and 157 (29%) received adjuvant chemotherapy. Patients were stratified into low and high AMH groups based on the 20th percentile of age-specific values, with the low AMH accounting for 11.9%. The low AMH groups demonstrated significantly longer DFS ($p = 0.04$). Although not statistically significant, patients in the low AMH group who received adjuvant chemotherapy showed superior DFS compared to those in the high AMH group ($p = 0.08$).

Conclusions: Low AMH levels were associated with lower recurrence rates, even among high-risk patients who received chemotherapy. The results of this study indicate that low initial AMH levels may serve as a prognostic factor in young breast cancer patients under 40.

Predictive Value of Immunohistochemical Marker Combinations for Pathological Complete Response Following Neoadjuvant Chemotherapy in Estrogen Receptor over 10% and HER2-Negative Breast Cancer

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Background: Neoadjuvant chemotherapy (NAC) is widely used for treating locally advanced breast cancer, with pathological complete response (pCR) serving as a surrogate marker for improved long-term outcomes. While NAC demonstrates significant efficacy in triple-negative breast cancer (TNBC) and low estrogen receptor (ER ≤ 10%) breast cancers, its role in ER > 10% breast cancers remains unclear. This study aimed to assess the prognostic value of immunohistochemical (IHC) markers-PR, CK5/6, EGFR, p53, Ki-67and their combinations in predicting pCR in ER > 10%, HER2-negative breast cancer.

Methods: This retrospective cohort study included 1,254 HER2-negative breast cancer patients treated with NAC from 2008 to 2021. Patients were divided into Group A (ER ≤ 10%) and Group B (ER > 10%). Univariate and multivariate logistic regression analyses evaluated the relationship between pCR and IHC markers. To enhance predictive precision, PEC combinations (PEC-1, PEC-2, PEC-3) were defined: PEC-1 indicated positivity for one of PR proportion score (PS) 0 or 1, CK5/6, or EGFR; PEC-2 for two markers; PEC-3 for three markers.

Result: Group A exhibited a significantly higher pCR rate (35.5%) than Group B (10.2%). In Group A, Ki-67 expression (OR 5.564, $p = 0.006$) and cT (cT4 OR: 0.05, $p < 0.001$) were identified as significant predictors. In Group B, PR PS 0 or 1 (OR 2.875, $p = 0.003$), CK5/6 (OR 2.811, $p = 0.003$), and EGFR (OR 2.240, $p = 0.049$) were independent predictors. PEC-2 (OR 5.537, $p < 0.001$) and PEC-3 (OR 9.683, $p < 0.001$) were strongly associated with pCR. PEC-2&3 patients showed a pCR rate of 38.3%, and PEC-3 patients exhibited the highest rate at 47.6%, far exceeding the Group B overall rate of 10.2%.

Conclusions: This study underscores the prognostic value of specific IHC markers and PEC combinations in identifying HER2-negative breast cancer patients with ER > 10% most likely to benefit from NAC. These findings provide crucial insights for improving patient selection and advancing personalized therapeutic strategies.

Pathological complete response rate followed by neoadjuvant chemotherapy according to BRCA 1/2 mutation: A single center retrospective cohort study

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Background: Patients who have achieved pathological complete response (pCR) to neoadjuvant chemotherapy (NAC) have significantly longer overall survival and disease-free survival, especially among triple-negative breast cancer (TNBC) patients. Also, it is known that BRCA1/2 mutation carriers may show different results to NAC. We analyzed whether the rates of pCR after NAC differ between BRCA1/2 mutation carriers and non-carriers, particularly in TNBC and HR-positive HER2-negative breast cancer patients.

Methods: We retrospectively analyzed women with clinical stage I-III breast cancer who were treated with NAC followed by surgery during 2008 to 2022 at Samsung Medical Center.

Result: Four thousand seven hundred sixty seven patients were enrolled and 2,051 patients (184 (9%) BRCA1 carrier, 140(6.8%) BRCA2 carrier) were evaluable. Almost half of patient received platin (44.2%), and there were no platin usage ratio difference between BRCA mutation patients and noncarriers. Overall, BRCA1 carriers showed 41% pCR rate ($p < 0.001$, OR = 2.01, 95% CI 1.47-2.75), with 19% of BRCA2 carriers, 26% of non-carriers. In HR+/HER2- breast cancer group, 34% of BRCA1 carriers showed pCR ($p < 0.001$, OR = 5.84, 95% CI 2.90-11.8), 2.4% in BRCA2 carriers, and 8.1% in non-carriers. However, in TN group, 45% of BRCA1 carriers who received NAC showed pCR ($p = 0.007$, OR = 1.68, 95% CI 1.15-2.45), 38% in BRCA2 carriers, along with 33% of non-carrier. Additionally, Nodal pCR rate in clinical node positive patients were high in overall (65% in BRCA1 carriers, 60% in BRCA2 carriers, 84% in non-carriers), but HR+/HER2- breast cancer group showed significantly lower ($p = 0.006$, 53% in BRCA1 carriers, 28% in BRCA2 carriers, 26% in non-carriers). In a multivariable analysis, BRCA1 status and platin usage, TN and HR+/HER2- subtypes were independently associated with overall pCR.

Conclusions: BRCA1 carriers showed the highest pCR rate in overall cohort, TN group, HR+/HER2- group, and HR+/HER2+ group. Although the pCR rate for BRCA2 was not statistically significant, BRCA1/2 gene testing before NAC may help predict pCR.

Prognostic Significance of Tumor-infiltrating Lymphocytes in Hormone Receptor-positive, HER2-negative Metastatic Breast Cancer Treated with CDK4/6 Inhibitors

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Background: CDK4/6 inhibitors combined with endocrine therapy represent the standard first-line treatment for hormone receptor (HR)-positive/HER2-negative metastatic breast cancer (MBC). Tumor-infiltrating lymphocytes (TILs), as indicators of host immune response, have been explored for their predictive value. This study aims to examine the impact of tumor-infiltrating lymphocytes (TILs) on treatment outcomes with CDK4/6 inhibitors in these populations.

Methods: A retrospective study was performed on 244 HR-positive, HER2-negative MBC patients treated with CDK4/6 inhibitors (palbociclib, ribociclib) and endocrine therapy as palliative 1st line therapy at Gangnam Severance Hospital, Seoul, Korea from 2018 to 2024. Among these populations, TIL levels were evaluated in 88 patients according to the guidelines proposed by the International TIL Working Group. It was categorized as low (TILs < 10) or high TILs (TILs ≥ 10). Progression-free survival (PFS) and overall survival (OS) were compared by using Kaplan-Meier method and log-rank test.

Result: With a median follow-up of 28.6 months (range 3.9-87.1), the median patient age was 53.5 years (range 34.6-84.8). Among the patients, 55 (62.5%) received palbociclib, and 33 (37.5%) received ribociclib. Of the 88 patients analyzed, 65 (73.9%) were in low TILs and 23 (26.1%) in high TILs group. The high TILs group showed a numerically better PFS compared to the low TILs group (median PFS: not reached vs 31.3 months; 95% CI, N/A vs 19.8-42.8; $p = 0.399$). The median OS was not reached in either group, but the high TILs group showed a trend toward better survival ($p = 0.63$).

Conclusions: Higher TIL levels were associated with a trend toward improved outcomes in HR-positive, HER2-negative MBC patients treated with CDK4/6 inhibitors. However, the lack of statistical significance may be due to limitations such as the insufficient follow-up duration and relatively small sample size. Further studies with larger cohorts and extended follow-up are warranted.

Discordant Analysis in the validation of a Tennessee Nomogram for predicting Oncotype Dx results in Korean breast cancer population

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Background: Oncotype Dx (ODX) is a widely used genomic test for predicting recurrence risk and guiding adjuvant therapy decisions in breast cancer patients with hormone receptor (HR)-positive and HER2-negative disease. However, the ODX test is not accessible to all patients, leading to the development of alternative predictive tools like the Tennessee nomogram. This study aims to validate the accuracy of the Tennessee nomogram in a Korean population and identify factors contributing to discrepancies between nomogram predictions and ODX results.

Methods: We retrospectively analyzed data from 1,298 breast cancer patients treated at Severance Hospital, Seoul, South Korea, between 2013 and 2023. Patients with invasive ductal or lobular carcinoma, HR-positive, HER2-negative, and lymph node-negative disease were included. The nomogram's predictive accuracy was assessed by comparing predicted risk scores with actual ODX test results.

Result: Overall, the nomogram demonstrated an accuracy of 86.1%, with a specificity of 98.9%. The overall predictive ability, measured by the C-index, was 77.6%, slightly lower than the original Tennessee study (81%). The discordant group, where nomogram predictions did not match ODX results, was characterized by large tumor size, high histologic grade, PR negativity, and high Ki-67 levels, especially in the false-negative group

Conclusions: While the Tennessee nomogram can be a useful tool when ODX testing is unavailable, clinicians should consider ODX testing in patients with aggressive tumor characteristics to ensure optimal treatment decisions and reduce the economic burden on patients.

Subtype-Specific Effect of Body Mass Index on Breast Cancer Prognosis: A Retrospective Cohort Study

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Background: Several studies have examined obesity and breast cancer risk, but the link between body mass index (BMI) and recurrence after surgery remains unclear. The present study evaluated the effect of BMI on oncologic outcomes in breast cancer patients stratified by histological subtypes.

Methods: All patients who underwent curative surgery for breast cancer between June 2003 and November 2017 at a tertiary referral center were included. Underweight (UW), normal weight (NW), and overweight (OW) groups were defined based on the World Health Organization (WHO) classification. Histological subtypes were divided by hormone receptor status and human epidermal growth factor receptor 2 (HER2) expression level.

Result: Among 4540 patients included in the analysis, 3403 (75.0%) were luminal type, 470 (10.4%) were HER2 positive, and 651 (14.3%) were triple negative. OW group (n = 1271) was associated with older age (UW 45.3 ± 11.9 vs. NW 50.6 ± 10.8 vs. OW 56.5 ± 11.9, $P < 0.001$) and higher T stage (T2+3: UW 69 (38.1%) vs. 1164 (37.7%) vs. 581 (46.7%), $P < 0.001$). The overall recurrence rate was 10.9%, with 121 (2.7%) loco-regional recurrences and 373 (8.2%) distant metastases. Ten-year recurrence-free survival in the OW group (85.9%) showed no statistically significant difference compared to the UW group (81.9%, $P = 0.319$) or NW group (88.4%, $P = 0.077$). In subgroup analysis, OW was associated with higher recurrence in luminal type breast cancer compared to NW (NW 89.6% vs. OW 85.8%, $P = 0.030$); in the HER2 and triple negative subtypes, survival outcomes were not affected by BMI ($P = 0.735$ and $P = 0.429$, respectively).

Conclusions: The impact of body composition on breast cancer recurrence was highly dependent on hormone receptor status. In luminal type breast cancer, higher BMI was associated with higher recurrence rates. Tailored approaches for adjuvant treatment should be considered based on the patient's age, BMI, and tumor subtype.

P-STAT3 Expression in Breast Cancer: Clinical Correlations and Limitations as a Prognostic Marker

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Background: P-STAT3, an activated form of STAT3, regulates tumor growth, survival, and immune evasion. Elevated p-STAT3 expression has been reported in breast cancer, potentially influencing disease progression. However, its prognostic significance remains unclear, necessitating further investigation to clarify its clinical relevance.

Methods: After excluding de novo stage IV patients, disease-free survival (DFS) was analyzed in a cohort of 924 patients. Kaplan-Meier curves were used to evaluate DFS according to p-STAT3 positivity, and subgroup analyses were conducted based on subtypes. The association of p-STAT3 with histologic grade, ER positivity, HER2 status, and T and N staging was assessed using the Chi-square test. Additionally, scatter plots were used to evaluate the correlation between p-STAT3 expression levels, tumor size, and the number of metastatic lymph nodes.

Result: Among 924 patients with invasive carcinoma and a median follow-up of 43 months, Kaplan-Meier analysis revealed no significant difference in DFS between the p-STAT3-positive and negative groups ($p = 0.788$). Subtype-specific analyses, including hormone receptor-positive, HER2-positive, and triple-negative breast cancer (TNBC), showed no significant association between p-STAT3 expression and recurrence. In the TNBC subgroup, recurrence curves began to diverge after 40 months, but the difference was not statistically significant ($p = 0.430$), highlighting the need for extended follow-up. Scatter plot analysis showed no significant correlation between p-STAT3 expression, tumor size, or metastatic lymph nodes. Notably, p-STAT3 levels tended to increase at recurrence compared to initial levels. In neoadjuvant chemotherapy patients, p-STAT3 expression decreased following treatment relative to pre-treatment levels.

Conclusions: P-STAT3 expression was not significantly associated with recurrence in breast cancer, including subtypes. However, trends of increased p-STAT3 at recurrence and its decrease post-neoadjuvant chemotherapy suggest dynamic changes in expression. These findings indicate the need for extended follow-up and further research to elucidate p-STAT3's clinical relevance.

Association between cancer-associated fibroblast and fibrotic focus in breast cancer and its clinical significance

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Background: Tissue fibrosis, associated with cancer progression, plays a critical role in the tumor microenvironment and is known to be driven by cancer-associated fibroblasts (CAFs). This study aims to investigate the relationship between fibrotic focus, CAFs, and clinicopathological characteristics in breast cancer.

Methods: Formalin-fixed, paraffin-embedded tissue sections from patients who underwent surgery for breast cancer were subjected to immunohistochemistry staining for fibrotic focus and CAFs markers including alpha smooth muscle actin (α-SMA), FSP-1, FAP Alpha, PDGF receptor alpha (PDGFR α) and beta (PDGFR β). Clinicopathological data including ultrasound (US) elastography were collected and analyzed for associations with fibrotic focus and CAFs presence.

Result: Analysis of the relationship between fibrotic focus in breast cancer and CAFs expression showed that α-SMA, FAP Alpha, and FSP-1 were significantly associated with fibrotic focus. Each CAFs marker showed different clinicopathological associations. Notably, α-SMA, PDGFR β, and FAP Alpha were associated with poor prognostic factors in breast cancer. In addition, PDGFR α was associated with estrogen receptor, progesterone receptor, human epidermal growth factor receptor 2 overexpression, and molecular subtype of breast cancer. Analysis of the relationship between the stiffness of the tissue confirmed by breast US elasticity imaging in breast cancer and fibrotic focus and CAFs expression showed that breast US elasticity measured by strain elastography and CAFs markers did not show a significant relationship. Among various clinicopathological characteristics, the grade of fibrotic focus, tubular formation, and lymph node ratio were related to breast ultrasound elasticity measured by stain elastography, and tumor size, lymphovascular invasion, and Bcl-2 were related to fibrotic focus.

Conclusions: The presence of fibrotic focus and CAFs are linked to more aggressive clinicopathological features in breast cancer patients. These findings underscore the potential of targeting the fibrotic tumor microenvironment as a therapeutic strategy. Further studies are needed to determine the feasibility of antifibrotic treatments for breast cancer.

Sustained prognostic impact of primary tumor characteristics on long-term (overall) survival after distant metastasis in young ER+HER2- breast cancer

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Background: Estrogen receptor (ER)+HER2- breast cancer is known to have more prolonged survival than other subtypes even after developing distant metastasis (DM). Predicting long-term survival after DM is important, especially for young patients with a long-life expectancy. This study aimed to analyze factors associated with long-term survival after DM in young ER+HER2- breast cancer (age ≤ 45).

Methods: We retrospectively collected 2,951 young ER+HER2- breast cancer patients who received primary surgery at three institutes between January 2000 and December 2011. Patients with survival data for at least 60 months after DM were analyzed. Cox proportional hazard and binary logistic models were used to identify the factors related to post-metastatic overall survival (PMOS) and those associated with short- (< 60 months) versus long- (≥ 60 months) term survival after DM.

Result: Of the 251 patients with DM, 194 had expired. The median follow-up was 113 months from primary surgery and 46 months from DM. In multivariate analysis, lymph node (LN) metastasis and histologic grade (HG) II/III of the primary tumor was identified as a risk factor of PMOS (LN metastasis: hazard ratio [HR], 1.70; 95% confidence intervals [CI], 1.192.42; $P = 0.004$; HG II/III: HR, 2.28; 95% CI, 1.064.89; $P = 0.034$). LN metastasis and HG II/III of the primary tumor was also a risk factor for short-term survival (LN metastasis: odds ratio [OR], 2.80; 95% CI, 1.445.45; $P = 0.002$; HG II/III: OR, 6.29; 95% CI, 1.53-25.95; $P = 0.011$). In addition, accompanying locoregional recurrence (LRR) (OR, 3.88; 95% CI, 1.768.58; $P = 0.001$), and metastasis at multiple sites (OR, 2.65; 95% CI, 1.474.77); $P = 0.001$) were negative indicators for long-term survival after DM.

Conclusions: This study revealed that primary tumor characteristics such as LN metastasis and HG are sustained as prognostic factors for long-term survival after DM in young ER+HER2- breast cancer. Accompanying LRR, and metastasis at multiple sites were also poor prognostic factors.

Poster Presentation

A Prospective Study Assessing Trastuzumab-Induced Cardiotoxicity in HER2-Positive Breast Cancer Patients: Insights from Intermed Hospital Oncological Department

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Background: Trastuzumab, a targeted therapy for human epidermal growth factor receptor 2 (HER2)-positive breast cancer, has demonstrated significant therapeutic benefits. However, it carries the risk of treatment-induced cardiotoxicity. This study aimed to evaluate the frequency of TIC, assess its effects on cardiac biomarkers and echocardiographic parameters in HER2-positive breast cancer patients treated at Intermed Hospital Oncological Department from 2020 to 2024.

Methods: A total of 42 HER2-positive breast cancer patients receiving trastuzumab-based therapy (treated with or without anthracycline followed by taxane and trastuzumab) was included. Patients were evaluated during the treatment period, which spanned from 2020 to 2024. Regular assessments, including echocardiograms and blood sample collection, were conducted. Left ventricular ejection fraction (LVEF), peak systolic left ventricular longitudinal myocardial strain, ultrasensitive troponin I (TNI), ultrasensitive troponin T (T), and N-terminal pro-B-type natriuretic peptide (NT pro-BNP) levels were measured.

Result: Among the patients, TIC was observed in six individuals (14.2%). One patient experienced heart failure symptoms that necessitated treatment discontinuation. Additionally, seven patients (16.6%) required second-line therapy following recurrence. The median age of the cohort was 54.7 years. LVEF decreased from 60 ± 4.1% to 56 ± 3.9% during the treatment period. Significant correlations were observed between hypertension, left ventricular longitudinal myocardial strain, Log TNI, and NT pro-BNP levels measured during treatment initiation and TIC occurrence. TIC was reversible in all of our cases.

Conclusions: This study conducted at Intermed Hospital Oncological Department highlights the frequency of TIC and associated risk factors in HER2-positive breast cancer patients receiving trastuzumab-based therapy. The observation of TIC in 14.2% of patients emphasizes the importance of cardiac monitoring during treatment. The decrease in LVEF and the assessment of cardiac biomarkers provide valuable insights into the cardiotoxic effects of trastuzumab. The identification of risk factors contributes to the prediction and prevention of TIC occurrence.

The Role of Lactate Dehydrogenase and Neutrophil-to-Lymphocyte Ratio in Survival Prognosis for Advanced Breast Cancer

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Background: Advanced breast cancer is a complex disease with varied treatment outcomes. Identifying reliable prognostic factors is essential for guiding therapy. Lactate dehydrogenase (LDH) levels and the neutrophil-to-lymphocyte ratio (NLR) are emerging as potential biomarkers. Both have shown promise in predicting outcomes in several cancers.

Methods: This retrospective study included 24 patients with advanced breast cancer treated with chemotherapy at the Thoracic Department of Intermed Hospital from 2017 to 2022. Clinical outcomes, including overall survival (OS) and progression-free survival (PFS), were evaluated. The relationship between LDH levels, NLR, and patient outcomes was analyzed using Kaplan-Meier survival curves and the log-rank test. Multivariate analysis was performed to identify independent prognostic factors.

Result: Among the 24 patients, the median age was 54.5 ± 9 years. Metastasis developed in eight patients, with a median recurrence time of 3 years. Bone metastases were present in five patients, three of whom also had lung metastases, and two exhibited skin recurrence. One patient died during the study.The median baseline NLR was 3.2 (range: 1.57.8), with 58% of patients showing elevated NLR (≥ 3.0). High LDH levels were found in 42% of patients. Both high LDH and elevated NLR were significantly associated with a higher rate of metastasis.Patients with high LDH levels had significantly shorter overall survival (median: 12 months) compared to those with low LDH levels (median: 24 months; $p = 0.03$). Elevated NLR was also associated with shorter progression-free survival (median: 8 months vs. 16 months for lower NLR; $p = 0.04$).

Conclusions: Elevated NLR and LDH levels were associated with poorer survival outcomes and increased metastasis in advanced breast cancer patients, highlighting their potential as cost-effective biomarkers, though larger studies are needed to confirm optimal cutoff values.

Cytokine Dynamics across Molecular Subtype Profiles in Peruvian Breast Cancer Patients (ProCIENCIA/PE501083045-2023 study)

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Background: Breast cancer (BC) is characterized by complex biological interactions. Our study aimed to identify the unique cytokines profiles associated with each molecular subtype.

Methods: 76 women underwent breast biopsies, measuring 48 cytokines with the Bio-Plex Pro™ assay. Cytokines with >20% missing data were excluded, and k-nearest neighbors imputed missing values. Log-transformed data were analyzed with boxplots and the Wilcoxon-Mann-Whitney test to compare BC and controls. Normalized data for heatmaps annotated with clinical characteristics and Pearson correlation were used to assess subtype-specific associations. Analyses in R (v4.3.1) used $p < 0.05$

Result: From 76 women, 66 (86.8%) had BC, categorized as Luminal (53%), HER2+ (22.7%), and TNBC (24.2%). Most cases (60.6%) were stage III/IV. Cytokines with higher concentrations in BC patients compared to controls were β-NGF ($p = 0.013$), G-CSF ($p = 0.013$), IL1RA ($p = 0.012$), IL-8 ($p = 0.018$), CTACK ($p = 0.026$), IP-10 ($p = 0.050$), MIF ($p = 0.023$), MIG ($p = 0.014$), MIP-1β ($p = 0.046$), PDGF-BB ($p = 0.0021$), SCF ($p = 0.020$), SDF-1α ($p = 0.0012$), TNF-β ($p = 0.016$), and TRAIL ($p = 0.018$). TNBC showed a distinct cytokine network with more negative correlations than other subtypes. Key negative interactions included IL-1α and MIP-1β ($r = -0.71$, $p = 0.0056$), IL-9 and IL-1α ($r = -0.70$, $p = 0.022$), and IL-1α and RANTES ($r = -0.65$, $p = 0.052$). Luminal and HER2+ showed strong positive correlations, including TNFβ-IL9 ($r = 0.96$, $p < 0.001$) and IL-1α-IL-1β ($r = 0.93$, $p < 0.001$).

Conclusions: Some cytokine concentrations, such as PDGF-BB, SDF-1α and TNF-β, were significantly higher in BC patients than in controls. TNBC showed more negative correlations, suggesting complex regulation. These findings underscore subtype-specific cytokine dynamics and their potential as biomarkers and therapeutic targets.

Poster Presentation

Machine Learning Algorithms for Survival Curve Prediction among Peruvian Breast Cancer Patients

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Background: Accurate prognostication of breast cancer patients (BCP) is essential for risk communication and clinical decision-making. Some survival prediction tools for BCP have been developed, most originate from Western countries, limiting their applicability.We aimed to develop a machine learning-based model to estimate survival probabilities among BCP.

Methods: A multicentric, analytical, longitudinal retrospective cohort study was conducted at Universidad Ricardo Palma between 2015 and 2020. The dataset included clinical, pathological, and molecular variables. Predictors with ≥20% missing data were excluded. Variables significantly associated with survival were preselected using univariate logistic regression. The dataset was randomly divided into training (70%) and test (30%) sets. Six machine learning models (logistic regression, random forests, support vector machines (SVM), k-nearest neighbors, gradient boosting, and naive Bayes) were evaluated using metrics such as accuracy, recall, F1-score, precision, specificity, and AUC-ROC. Kaplan-Meier survival analysis compared observed and simulated survival curves. We use Python libraries such as scikit-learn, pandas, lifelines and matplotlib.

Result: Among 705 patients analyzed, 18.0% were HER2 positive, 39.3% luminal A, 29.9% luminal B, and 11.0% triple-negative. Overweight and obesity were present in 81.4%. The mean overall survival was 51.1 months. Univariate logistic regression identified 10 significant predictors of survival, including Body Mass Index-BMI ($p < 0.001$), clinical stages ($p < 0.001$), and molecular subtype ($p < 0.001$). The random forest model achieved the highest predictive performance (AUC = 0.97, Accuracy = 91.4%, Recall = 94.4%, Specificity = 91.1%), followed by support vector machine (AUC = 0.96, Accuracy = 92.3%) and gradient boosting (AUC = 0.96, Accuracy = 91.9%). Kaplan-Meier analysis confirmed a strong alignment between observed and simulated survival curves ($p = 0.498$).

Conclusions: BMI, clinical stage, and molecular subtype remained critical predictors of survival among Peruvian BCP. The random forest model achieved the highest predictive performance, offering robust survival risk estimation confirmed by Kaplan-Meier analysis. Machine learning tools support improved risk stratification a predict survival.

Poster Presentation

Incidence and Factors Affecting Recurrence of Breast Cancer After Mastectomy with Immediate Breast Reconstruction in The Medical City

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Background: Breast cancer is a leading cause of cancer-related morbidity worldwide. Skin- or nipple-sparing mastectomy with immediate breast reconstruction (IBR) provides oncologic treatment with aesthetic restoration. However, recurrence risk and associated factors in these patients remain critical concerns. The objective of this study is to evaluate the clinicopathologic factors associated with recurrence following IBR after mastectomy among breast cancer patients.

Methods: The study included all adult patients who underwent skin- or nipple-sparing mastectomy with immediate breast reconstruction for a diagnosis of breast carcinoma from January 2013 to December 2021 in The Medical City. The study excluded patients who are stage IV at initial presentation, patients with inflammatory breast carcinoma, patients with histologic findings of sarcoma/angiosarcoma and phyllodes tumor, patients with synchronous bilateral breast cancer, patients with previous breast conservation surgery or lumpectomy and previous radiotherapy. Only patients with a minimum follow-up of 2 years were included in the study, unless they experienced an early recurrence occurring prior to the 2-year follow-up period.

Result: This retrospective cohort study included one hundred eighty-six (N = 186) patients who underwent skin- or nipple-sparing mastectomy with IBR for breast carcinoma at The Medical City from January 2013 to December 2021. The mean age of the cohort was 46.73 years, with a median follow-up of 67 months. Thirty-three patients experienced recurrence, primarily locoregional (10.22%). Multivariate analysis identified axillary lymph node dissection (HR 4.54, $p < 0.001$), high histologic grade (HR 2.32, $p = 0.008$), and endocrine therapy (HR 5.19, $p = 0.029$) as independent predictors of recurrence. Tumor characteristics such as extranodal extension and lymphovascular invasion were associated with recurrence on univariate analysis. Type of breast reconstruction did not influence recurrence risk ($p = 0.139$).

Conclusions: Individualized treatment strategies including tailored systemic therapies for high-risk patients may improve outcomes.

Survival of the Patients with Breast Cancer who Underwent Oncotype DX Recurrence Score® testing: Long-Term Survival Update of a Prospective Multicenter Study in Turkiye

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Background: Approximately 70% of early-stage breast cancer are hormone receptor (HR)-positive and HER2-negative. The ODx test has been widely adopted for its ability to assess the risk of recurrence in these patients. In this prospectively designed study, we aim to update the long-term survival outcomes of chemotherapy decision-making according to genomic risk score using the TAILORx cut-offs.

Methods: Ten academic centers in seven Turkish cities that routinely discuss all new cases of breast cancer at weekly multidisciplinary tumor board participated in this prospective trial. Consecutive patients with breast cancer who had pT1-3, pN0-N1mic, M0, HR-positive, and HER2-negative tumors were identified. Adjuvant treatment decisions were discussed at tumor board before and after RS® (recurrence score).

Result: The study included 165 breast cancer patients aged 26-76 (median 48) years. Totally, in 30.9% of the patients the treatment decision changed depending on the RS®. For the 41 patients, whose decision to receive chemotherapy was changed to omitting chemotherapy after RS®, there was no significant survival difference in OS, DFS, LRFS and MFS compared to the 51 patients who received chemotherapy ($p=0.106$, $p=0.595$, $p=0.511$, and $p=0.341$ respectively). Furthermore, no significant survival difference was detected in terms of overall survival (OS), disease-free survival, loco-regional recurrence-free survival, and metastasis-free survival (MFS) when those 41 patients were compared with 63 patients who did not receive chemotherapy before and after RS® ($p=1$, $p=0.622$, $p=0.697$, and $p=0.681$ respectively). Lower RS® was significantly associated with better OS and MFS. These results were more significant for patients under 50 years of age.

Conclusions: In conclusion, the RS® significantly influences treatment decisions and serves as a valuable prognostic tool in HR+ HER2-negative early-stage breast cancer patients. This study adds to the growing evidence supporting the integration of genomic testing into routine clinical decision-making, promoting tailored treatment strategies that enhance patient outcomes while minimizing harm.

Poster Presentation

Predictive value of contrast enhanced spectral mammography and mammotomy of clipped tumour in determining pathological complete response following neoadjuvant chemotherapy

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Background: Breast cancer is the most common cancer in women globally. Neoadjuvant chemotherapy (NAC) is a well-established treatment, with pathologic complete response (pCR) after NAC recognized as a strong prognostic factor for improved disease-free survival (DFS) and overall survival (OS). Ongoing studies explore whether predicted pCR patients can avoid surgery. Our study evaluates the predictive value of contrast-enhanced spectral mammography (CESM) and mammotome biopsy of clipped tumors in forecasting pCR after NAC, offering insights into personalized breast cancer management.

Methods: Between November 2019 and September 2023, 38 breast cancer patients receiving neoadjuvant chemotherapy were prospectively evaluated. Each underwent CESM before and after chemotherapy to assess tumor characteristics. Intraoperative vacuum-assisted biopsy (VAB) was also performed prior to tumor resection to evaluate histopathological response. This multimodal approach aimed to improve the accuracy of predicting treatment outcomes and guide personalized management.

Result: We prospectively reviewed 38 patients, 94.7% (36/38) of whom had dense breasts on mammogram. Despite this, 97.4% (37/38) of tumors were detected with CESM showing intense enhancement before NAC. All tumors showed reduced enhancement post-NAC. Of the patients, 28.9% (11/38) achieved a PCR. Regardless of PCR status, NAC patients may exhibit complete resolution of tumor enhancement on CESM, though those with PCR were more likely to show this. Among non-PCR cases, 18.5% (5/27) had no remaining enhancement post-NAC, compared to 54.5% (6/11) in the PCR group. Correlating mammotome-guided biopsy of clipped tumors with final histology, 80.5% (29/36) showed concordance between the biopsy and resected tumor specimen.

Conclusions: Mammotome-guided biopsy of clipped tumors shows strong predictive value for determining pCR after NAC. This could impact breast cancer management, as many patients may avoid surgery-related morbidity. Future studies should explore: i) whether increased expertise improves mammotome technique and accuracy, and ii) the potential role of artificial intelligence in enhancing CESM's predictive value.

Predictive Variables of Neoadjuvant Therapy-associated Pathological Complete Response in Breast Cancer Patients Eligible for Surgical De-escalation

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Background: Neoadjuvant chemotherapy (NACT) allows breast conservation among patients who have large tumors that are only suitable for mastectomy. Its success however varies, based on patient and tumor factors. This study aims to predict inadequate tumor response to NACT using machine learning models.

Methods: 151 women who underwent NACT for breast cancer (cT1-4, N0-3, M0) diagnosed between May 2022 - May 2024 were included. Key variables included patient demographics, tumor characteristics, imaging findings on ultrasound, mammogram, CT scans and details of the treatment regimens. Machine learning algorithms were trained using this dataset, using 3-fold cross validation for evaluation. Performance was measured by metrics including accuracy, F1 score, and area under the receiver operating characteristic curve (AUC).

Result: 28% achieved complete pathologic response following the Recist criteria. Mean tumor size significantly reduced after NACT ($p = 0.001$), with increased lumpectomy rate among those who achieved pCR. Using logistic regression model, traditional predictors yielded 75% accuracy with an F1 score of 0.5, with an AUC of 0.70. Similar results were observed even with the addition of novel predictors such as laboratory values and imaging features. Features related to positive prediction include high ER and PR percentage, HER2 positivity, anthracyline, cyclophosphamide, carboplatin treatment, and her 2 blockade. Meanwhile, presence of calcification in mammogram also predicts good response.

Conclusions: While this model aids in recognizing patients who may have limited response to NACT, current performance remains suboptimal, highlighting the need for better integration methods, and exploration of more novel predictors.

B3 Breast Lesions: radiological significance and risk factors for malignant upgrade

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Background: High-risk breast lesions or B3 lesions comprise of different pathologies, with varying risks of upgrade to malignancy. In this study, we examined the rate of malignant upgrade among high-risk breast lesions detected on ultrasound and mammogram and evaluated for predictors of cancer.

Methods: A retrospective review was done on 489 women, who presented at our unit from 1st January 2016 to 31st June 2023. Frequency of finding a cancer at surgery (malignant upgrade) was documented. We compared clinical presentation, radiological features, biopsy technique and histology of the biopsy. Correlation analyses were performed using either the Chi-squared test or Fisher's exact test.

Result: There were 545 high-risk lesions, of which 95 (17.4%) lesions upgraded to cancer at the time of surgery. Of all the 545 high-risk lesions, 223 (41%) were only seen on mammogram, 214 (39.3%) lesions were only seen on ultrasound and 108 (19.8%) lesions were seen on both mammogram and ultrasound. Of the 95 lesions that had a malignant upgrade, 69 (72.6%) lesions were Atypical Ductal Hyperplasia (ADH). Presence of microcalcifications on mammography were risk factors for malignant upgrade. There was no difference in the number of cores taken and needle gauge used during biopsy between lesions that had a malignant upgrade and did not upgrade.

Conclusions: Overall incidence of a malignant upgrade to cancer in high-risk lesions was 17.4%. Majority of the lesions were seen only on mammogram. Patients with histologically confirmed ADH have an increased risk of a malignant upgrade at a later time.

Supervised Machine Learning for Predicting Pathologic Complete Response in the Axilla of Breast Cancer Patients Undergoing Neoadjuvant Chemotherapy

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Background: Neoadjuvant chemotherapy (NAC) is used to downstage node-positive breast cancer patients, potentially avoiding axillary lymph node dissection (ALND). However, not all patients benefit from NAC. This study aims to develop machine learning (ML) models to predict suboptimal NAC response in the axilla.

Methods: A cohort of 126 women with preoperative node-positive breast cancer who received NACT between May 1, 2022, and May 1, 2024 were analysed. Patient demographics, tumor characteristics, imaging findings, and treatment regimen details were assessed. Widely used supervised ML algorithms such as logistic regression, support vector machines, and random forests (LightGBM, XGBoost) were trained using this data. Model evaluation was conducted using cross-validation techniques, and performance was measured by metrics including accuracy, and area under the receiver operating characteristic curve (AUC).

Result: 38% achieved pathological complete response (pCR) in the axilla, allowing de-escalation from axillary clearance to sentinel node biopsy. A Random Forest classifier emerged as the best model, achieving an accuracy of 80% with an AUC of 0.90. The most important features related to pCR prediction are body mass index (BMI), neutrophil-leukocyte ratio, estrogen receptor (ER) positivity, tumor size, albumin level, cyclophosphamide treatment, human epidermal growth factor receptor 2 (HER2) positivity, and double HER2 blockade.

Conclusions: This model can help identify patients who may benefit less from NAC, allowing for alternative treatment strategies like upfront surgery and personalised adjuvant therapy. However, further validation is needed to assess generalizability.

The Prognosis of Luminal pT1-2N1miM0 in Chang Gung Experience: Should the size or luminal A/B matter in this group?

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Background: We use clinical parameters to judge the administration of adjuvant chemotherapy in Taiwan, because gene expression assay is not reimbursed. Lymph node metastasis is an independent prognostic factor. However, there is controversial that how to treatment patients with small tumor but micrometastases. In National Comprehensive Cancer Network (NCCN) guideline, the algorithm of adjuvant chemotherapy classified pT1N1miM0 with pT1N0, while the pT2N1mi is considered as pT2N1. In ESMO guideline, micrometastases in treatment-naive axillary lymph nodes (ALNs) are prognostically equivalent to N0 disease. In this analysis, we are going to see whether tumor size or luminal A/B subtype influence the prognosis.

Methods: We retrospectively analyzed patients registered at the Breast Cancer Databank of Linkou Chang Gung Memorial Hospital between 2013 and 2018. Patients with estrogen receptor (ER)-or progesterone receptor (PR)-positive and HER2-negative early breast cancer of which pT1-2N1mi after the primary surgery were reviewed. Neoadjuvant chemotherapy was not allowed. Adjuvant chemotherapy, radiotherapy and endocrine therapy were indicated according to the guideline of this institute. The data was retrieved via primary chart review.

Result: There are 114 patients diagnosed with pT1-2N1mi, ER- or PR-positive, HER2-negative EBC identified in the Breast Cancer Databank of the institute in 2013-2018. Median follow-up is 107 months. Median age was 55.1 years. 81.4% patients received adjuvant chemotherapy. Ten of the 114 patients encountered distant metastasis in the follow-up period. In the log-rank test, no significant difference of distant metastases between the luminal A and B subtype (Luminal A: n = 80, 7.5% distant metastases Luminal B: n = 34, 11.8% distant mets; $p = 0.315$). The median time to distant metastasis is 79.9 months in luminal A and 57.8 months in luminal B. The size (pT1: n = 46 vs. pT2: n = 68) is not a significant prognostic factor neither ($p = 0.79$ in log-rank test).

Conclusions: Neither tumor size nor luminal A/B subtype could be determinant factors for adjuvant chemotherapy in patients with pT1-2N1mi luminal early breast cancer.

Poster Presentation

Identification of poor prognostic group in pCR patients after neoadjuvant therapy to optimize clinical surveillance and adjuvant therapy

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Background: Neoadjuvant chemotherapy (NACT) can efficiently downstage locally advanced breast cancer (BC) and achieve a pathologic complete response (pCR), especially in HER2-enriched and triple-negative subtypes. The residual cancer burden (RCB) score reflects the response to chemotherapy after NACT and predicts survival. Some patients still had recurrence or metastatic disease even after previous previous pCR to neoadjuvant therapy. Previous studies showed that residual DCIS in patients who experienced complete eradication of invasive cancer in the breast and lymph nodes did not adversely affect survival or the local recurrence rate. Our retrospective analysis revealed that residual neoplastic tissue within the breast and lymph nodes might harbor a significant risk of local recurrence or subsequent metastasis with undetermined immune mechanisms.

Methods: Nine tumor samples (high-grade ypTisN0M0 or ypT1abN0M0 with relapse, retrospective), and 7 control samples (ypTisN0M0 or RCB I-II without relapse) were collected and analyzed by ACT-TME. Pre-treatment samples were also acquired to compare the change of specific gene expressions between the relapse and non-relapse groups.

Result: Five genes in the high-grade ypTisN0M0/ypT1abN0M0 samples were found to be significantly elevated (IL-10, LRRC42, EZH2, TNFSF14, GZMB) in the clinical relapsed patients compared to those without relapse. Comparing the pre-treatment and post-treatment gene expression, IL-10, GZMB, TNFSF14, CD55, IL-15, and IDO1 were differentially expressed.

Conclusions: Residual DCIS with certain immune dysregulation in patients who experience a complete eradication of invasive cancer in the breast and lymph nodes may adversely affect survival or the local recurrence rate. Breast cancer patients who had residual high-risk DCIS after pCR may require appropriate escalation adjuvant therapy instead of treatment de-escalation. A larger study cohort with in-vitro validation experiment is required to validate the markers identified as high-risk immune profiles.

Association between IHC4 score and Prosigna Risk of Recurrence score for hormonal receptor-positive early breast cancer: A single-center study in Thailand

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Background: Prognostic tools have been developed to aid decision making for adjuvant chemotherapy in breast cancer with hormone receptor (HR) positive and HER2 negative. The IHC4 score is a prognostic tool which combines immunohistochemical staining of ER, PR, HER2 and Ki67, whereas Prosigna test is a prognostic assay based on gene-expression profiles providing tumor subtypes and risk of recurrence (ROR) score. This study aimed to assess the correlation between IHC4 and ROR score as well as to identify the discordant group.

Methods: This retrospective study recruited stage I-II breast cancer patients with HR positive, HER2 negative and 0-3 nodes positive, who underwent Prosigna tests from 2017 to 2021 at the Queen Sirikit Centre for Breast Cancer. The relationship between the IHC4 and ROR score were evaluated with Spearman's Rank correlation. The ability of IHC4 model was assessed by ROC analysis.

Result: This study enrolled a total of 155 women. The correlation between IHC4 and ROR score was 0.502 ($p < 0.001$). There was a significant difference in IHC4 score among each ROR risk groups: -40.54 in low, -14.88 in intermediate and -0.58 in high ROR ($p < 0.001$). The area under ROC curve for intermediate to high ROR identification in the IHC4 score was 0.785 ($p < 0.001$). In 10 patients with luminal-A like and negative node who received chemotherapy due to high ROR score, the mean ER, PR and Ki-67 in this discordant group were 94.4%, 55.9% and 15%, respectively. The mean IHC4 score in such group was -19.22 (-68.18 to 29.36).

Conclusions: The IHC4 score demonstrated moderate correlation with ROR score and seemed to be a potential tool to distinguish intermediate to high ROR group. However, patients with low to intermediate IHC4 score could result in discordance between IHC4 and ROR score, where the decision making for chemotherapy may be affected. Prosigna assay should be strongly considered in this population.

Evaluating the factors that cause Intraductal Papillomas to improve upgrade predictors

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Background: Currently, when intraductal papillomas (IDP) with atypical features are diagnosed at biopsy, complete surgical resection is recommended because of their malignant potential. However, this recommendation for benign papillomas without atypia remains controversial.

Methods: This retrospective study included female patients with IDP diagnosed on core needle biopsy (CNB) between the 1st of January 2018 to the 31st of December 2023. Clinical, radiological, and histopathologic results were extracted from electronic medical records, and factors associated with the final pathology result of invasive and non-invasive carcinoma were analysed with multivariable logistic regression.

Result: The study included 136 IDP lesions in 129 women; 13 lesions with atypical features and 123 lesions without atypical features which underwent surgical excision 54 lesions. BIRADS results from mammograms and ultrasounds were in categories 4B, 4C and 5 and had calcification in imaging were associated with IDP with atypical features significantly more than IDP without atypical features (*p*-value 0.010, 0.022). Overall, all women with surgical excision of IDP with atypical features (12/54, 22.22%), 6 lesions had Ductal carcinoma in situ (DCIS) (6/12, 50.00%, *p*-value 0.016), and 1 lesion had Invasive ductal carcinoma (IDC) (1/12; 8.33%, *p*-value 0.537). This gives an upgrade rate to malignancy of 58.33% (7/12), which is more than the upgrade rate of 19.04% (8/42) for IDP without atypical features. Finally, multivariatable logistic regression of the factors that cause IDP showed none resulted in a statistically significant increase in the upgrade to malignancy.

Conclusions: IDP with atypical features do have a higher malignancy potential than IDP without atypical features. Therefore, if atypical featured is not observed, routine surgical excision may not be necessary. Moreover, there are no specific factors that cause IDP that also result in an increase in upgrade of IDP to malignancy

Predictive and Prognostic Value of Tumor-infiltrating Lymphocytes in Triple-Negative Breast Cancer: Insights from a Vietnamese Cohort

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Background: The clinical validity of tumor-infiltrating lymphocytes (TILs) has been extensively investigated in triple-negative breast cancer (TNBC). However, a universal cut-off to distinguish between high-TILs and low-TILs groups remains undefined and is considered to be population-specific. This study aimed to identify the optimal cut-off value of TILs to predict the response to neoadjuvant chemotherapy (NAC) in a Vietnamese TNBC cohort.

Methods: We retrospectively analyzed 108 biopsy specimens from TNBC patients treated with NAC in Ho Chi Minh City Oncology Hospital between January 2022 and May 2024. Receiver operating characteristic (ROC) curve analysis was used to determine the optimal TILs cut-off for predicting pathological complete response (pCR). Univariate and multivariate analyses were used to assess factors associated with pCR rate and event-free survival (EFS).

Result: A 15% TILs cut-off stratifies the cohort into high- and low-TILs groups, with significantly different pCR rates (50.9% versus 11.3%, $p < 0.001$). TILs (odds ratio [OR] = 8.1, $p < 0.001$) and tumor stage (OR = 3.67, $p = 0.031$) are independent predictive factors for pCR. The high-TILs group demonstrated a 28.2% improvement in 2-year EFS compared to the low-TILs group. Importantly, the survival benefit in high-TILs group still remains better even in patients with residual disease. TILs (hazard ratio [HR] = 0.4, $p = 0.02$) and pCR status (HR = 0.08, $p = 0.016$) are independent prognostic factors for EFS.

Conclusions: A 15% cut-off may be optimal for predicting pCR in Vietnamese TNBC patients. High-TILs levels are also associated with better EFS, regardless of pCR status.

Fertility Preservation Practices Among Australian Breast Surgeons: Insights into Awareness, Engagement, and Access

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Background: With breast cancer increasingly diagnosed in younger women, fertility preservation is a crucial aspect of their care. This study examines the extent to which Australian breast surgeons discuss and facilitate fertility preservation for young patients undergoing treatment.

Methods: A national survey of 24 Australian breast surgeons collected data on demographics, practice settings, and involvement in fertility discussions and referrals.

Result: The survey revealed a predominantly female workforce (91.7%), with most respondents aged 35~44 years (62.5%). The majority practiced in metropolitan areas (83.3%), particularly in Queensland (33.3%) and New South Wales (29.2%). Hospital-based practice was most common (50%), followed by a mix of hospital and private practice (29.2%). Fertility discussions were routinely held, with 83.3% of surgeons reporting they "always" or "usually" discuss fertility preservation. Similarly, 79.2% reported "always" or "usually" referring patients to fertility specialists. However, only 62.5% had access to fertility preservation facilities, with limited availability noted in the Northern Territory and Western Australia (4.2% each). Statistical analysis showed no significant association between surgeon demographics, practice type, or location, and their engagement in fertility discussions or referrals.

Conclusions: Australian breast surgeons demonstrate a strong commitment to fertility preservation, with high rates of discussion and referral. However, geographic disparities in access to fertility services persist, particularly in underserved regions. Addressing these gaps is essential to ensure equitable fertility care for young breast cancer patients nationwide.

Retrospective Single-Center Study on Male Breast Cancer

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Background: This study aims to explore the clinical characteristics, treatment status, and patient-reported outcomes (PROs) of male breast cancer patients through a retrospective single-center analysis, providing a scientific basis for the prevention, diagnosis, and treatment of male breast cancer.

Methods: Male breast cancer patients admitted to The First Affiliated Hospital of Zhejiang University from January 2020 to June 2024 were selected as the study subjects. Clinical data of the patients, including initial symptoms, clinical characteristics, pathological classification, treatment modalities, and prognosis, were collected through a case retrieval system and statistically analyzed.

Result: A total of 59 male breast cancer patients were included, with a median onset age of 68 years (range: 28-92 years). At the initial diagnosis, 89.8% of the patients presented with breast lumps, followed by axillary lumps in 11.9% and nipple discharge in 6.8%. At the first visit, 92.3% of the patients had no distant metastasis. 29.1% were Luminal A, 61.9% were Luminal B, 7% were HER2-positive, and 2% were triple-negative breast cancer. The most common histological type was infiltrating ductal carcinoma (79.7%). Among them, 54 patients were followed up for a median duration of 63.3 months. 46.3% of the patients received adjuvant chemotherapy and endocrine therapy, while 35.2% received only adjuvant endocrine therapy, 13% discontinued treatment due to poor compliance. During the follow-up period, 9.3% of the patients who were diagnosed early experienced postoperative recurrence. A QLQ-C30 questionnaire survey was conducted six months after the initial diagnosis, and 22% of the patients reported an impact on their quality of life.

Conclusions: Male breast cancer is a rare malignant tumor, and its clinical characteristics, treatment, and prognosis differ from those of female breast cancer. Treatment compliance is poorer than that of female patients, and treatment regimens mostly refer to female. The impact on quality of life after a breast cancer diagnosis is significant.

Effectiveness of Scalp-Cooling System for the Prevention of Chemotherapy-induced Hair Loss among 40 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 silicon cap system (Cellguard) and to apply it to more than 900 breast cancer patients in my breast clinic. 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: 40 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. 26 patients were treated using Cellguard and 14 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 26 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. 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. This device is simple to use and enables continuous and stable maintenance of temperature on the scalp. Not only does Cellguard system promote QOL of patients as a safe tool for hair loss prevention in cancer treatment, but it may contribute to better treatment as well.

Effectiveness of Post-Discharge Management Program for Breast Cancer Patient based on Smart Cancer Care 2.0 using Patient Reported Outcome

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Background: In Korea, a "Smart Cancer Care" platform that utilizes patient reported outcomes has been developed to manage treatment side effects of cancer patients and resolve various unmet needs. In this study, we applied a cancer patient post-discharge management program based on Smart Cancer Care 2.0 to breast cancer patients and evaluated its effectiveness.

Methods: Breast cancer patients receiving various treatments such as surgery, radiation therapy, and chemotherapy were randomly assigned to a group that received a cancer patient post-discharge management program (group A) and a group that did not (group B). The cancer patient post-discharge management program monitored and managed various treatment side effects that cancer patients may experience, and even provided information on cancer rehabilitation and health behavior improvement. After applying the program in group A for 3 months, breast cancer patients in both groups were followed up for up to 6 months to evaluate and compare health-related quality of life, unexpected visits to medical institutions, etc.

Result: As of December 2023, a total of 190 breast cancer patients were registered, and 169 breast cancer patients were preliminary analyzed in this study. As a result of comparing health-related quality of life measured by the EORTC QLQ-C30, no difference in average scores between groups A and B was confirmed at 1 month (Group A: 65.4, Group B: 65.2) (Figure 1). However, the difference in scores at 3 months was statistically significant (Group A: 73.8 points, Group B: 64.7 points, p-value: 0.017). Furthermore, even at 6 months, the difference in scores was statistically significant (Group A: 75.7 points, Group B: 64.6 points, p-value: 0.027).

Conclusions: The cancer patient post-discharge management program based on Smart Cancer Care 2.0 was estimated to be effective in improving the health-related quality of life of breast cancer patients.

Poster Presentation

Feasibility and Preliminary Efficacy of an Artificial Intelligence-Based Cancer Survivorship Care Plan Service Delivered Via Digital Platforms: A Single-Arm Prospective Pilot Study

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Background: The purpose of this study was to evaluate the feasibility and preliminary efficacy of an artificial intelligence (AI)-based survivorship care plan (SCP) service delivered via digital platforms (QOL+ intervention) among breast cancer survivors.

Methods: A single-arm prospective pilot study was conducted among post-treatment breast cancer survivors in South Korea. The QOL+ intervention comprised three components: (1) collecting electronic patient-reported outcomes (ePRO) data from cancer survivors via the QOL+ app prior to outpatient visits, (2) generating AI-based SCPs on the day of scheduled visits, and (3) reviewing SCP summary sheets and providing tailored counseling. Feasibility was assessed through (1) study participation rates, (2) QOL+ platform access rates, (3) intervention completion rates covering engagement with both the digital platform (mobile app) and face-to-face counseling and (4) participant satisfaction with the intervention. Efficacy was assessed by measuring patient-provider interaction and patient activation as primary outcomes, and cancer survivors' self-efficacy and quality of life as secondary outcomes. Measurements were taken before and one week after the QOL+ intervention.

Result: Of the 54 eligible participants, 38 enrolled in the study, resulting in a participation rate of 70.4%. The pilot study completion rate was 89.5% (34/38). Among the 34 completers, 30 women (88.2%) successfully accessed the QOL+ app independently. Additionally, 32 participants (94.1%) attended SCP counseling sessions at the hospital. Most participants (88.2%) reported being satisfied or very satisfied with the QOL+ intervention. Patient activation showed a borderline significant increase ($p = 0.051$), while self-efficacy ($p = 0.040$) and quality of life ($p = 0.010$) significantly improved.

Conclusions: The AI-based SCP delivered via the digital QOL+ platform was both feasible and preliminarily effective for post-treatment breast cancer survivors in South Korea. Future studies with larger sample sizes are needed to validate these findings in randomized controlled trials.

Decision-making for Contralateral Prophylactic Mastectomy in Korea: A Qualitative Study of Patients' Unmet Needs and Healthcare Providers' Perspectives

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Background: The rate of contralateral prophylactic mastectomy (CPM) has been increase among BRCA 1 or 2 mutation carrier breast cancer patients. However, decision to perform CPM remains complex, involving various risks and benefits, requiring consideration of patients' need for comprehensive support. This study explored patients' unmet needs during CPM decision-making and healthcare providers' (HCPs) perspectives.

Methods: Semi-structured interviews were conducted with 17 breast cancer patients with BRCA variants and 10 HCPs (7 breast surgeons, 3 advanced nurse practitioners) between August and September 2024. Thematic analysis was conducted based on Charles's treatment decision-making model.

Result: Three themes emerged across decision-making stages for both patients and HCPs. Based on the treatment decision-making model, during information exchange, patients needed reliable information and guidance, while HCPs showed reluctance in counseling due to limited evidence for CPM, patients' negative perception of CPM, and limited time for consultation. During deliberation, patients reported that sufficient consultation and trust and empathy by HCPs were important, whereas HCPs struggled with resource constraints (time, staff, and space) that hindered comprehensive support. In the decision stage, patients showed varying preferences for decision-making roles, from autonomous to physician-led decisions, whereas HCPs maintained neutrality, recognizing patients as primary decision-makers, creating a mismatch in expectations for decision-making roles.

Conclusions: This study highlights gaps between patients' and HCPs' expectations regarding information, support, and decision-making roles, recommending implementing a shared decision-making approach supported by insurance reimbursement that facilitates exchange of information, preferences, and guidance. Additionally, providing resources and standardized materials can enhance support for the decision marking process of CPM.

Gender disparities in incidence of psychological disorder among breast cancer patients: a national cohort study

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Background: Male breast cancer (MBC) is rare. MBC features similar characteristics as female breast cancer, often resembling postmenopausal breast cancer. However, there are notable differences between male and female breast cancer particularly regarding gender and age, which can have distinct psychological impacts on male patients. In this study, we investigated whether the psychological distress experienced upon a diagnosis of breast cancer differs between men and women.

Methods: Data were obtained from the National Health Insurance claims database of the Health Insurance Review and Assessment Service in South Korea. The study focused on the three most common psychological disorders: sleep disorders, anxiety disorders, and depression. Diagnosis confirmation relied on diagnostic codes based on the International Classification of Diseases, 10th revision. Propensity score matching was employed in a 1:1 ratio, and adjustment variables included age, endocrine therapy, chemotherapy, HER2-targeted treatment, and Charlson Comorbidity Index score.

Result: After excluding patients with previous psychological disorders, there were a total 75,936 patients, and 281 (0.4%) male patients. Male patients were diagnosed at an older, had a higher prevalence of hormone receptor-positive disease, higher comorbidities, and lower rates of anxiety disorders, while sleep disorders and depressive disorders showed similar incidences. The Cox proportional hazard regression model exhibited that being female was a risk factor for anxiety disorder (after matching, multivariable, HR 1.498, 95% CI 1.057-2.123, $p = 0.0232$). However, gender did not significantly influence the development of sleep or depressive disorders, despite these conditions typically having a higher incidence in females. During the acute phase shortly after diagnosis, women tended to have more distress seen on the cumulative incidence curves.

Conclusions: MBC patients experienced similar levels of psychological distress related to sleep and depression disorders as female patients. This suggests that both genders require equal support system and psychological care to maintain mental well-being after being diagnosed with breast cancer.

EmPowerIng Breast Cancer Survivors (EPiCS) - Assessing Self-efficacy in Breast Cancer Survivors and the role of a Decision Aid

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Background: Overutilization of oncology services post-cancer treatment strains tertiary care resources, prompting the development of models engaging primary-care providers. However, these transitions to primary-care are hindered by low self-efficacy - survivors' confidence in managing their health and making informed care decisions. To address this, we developed a decision aid (DA) to guide survivors in selecting follow-up care models. This study aims to assess self-efficacy levels among breast cancer survivors (BCS)and evaluate the DA's impact on their decision-making process.

Methods: This pre-post study recruited breast-cancer survivors from the National Cancer Centre Singapore between 2023 and 2024. Demographic and clinical data were collected at baseline, stratifying BCS into early (1-5years post-diagnosis) and long-term (>5years post-diagnosis). Outcomes were assessed at baseline and 2-4 weeks after exposure to the DA: 1) decision-making self-efficacy (Decision Self-Efficacy Scale); 2) behavioural self-efficacy (cancer behavioural index;CBI-B) and survivor self-efficacy (breast-cancer survivor self-efficacy scale;BCSES); and 3) perceived knowledge about cancer (investigator-designed questionnaire). Descriptive statistics and paired t-test were used to compare changes in outcomes pre- and post-DA exposure.

Result: A study of 57 BCS (27 early and 30 long-term) using a decision aid (DA) showed pre-post changes in knowledge, self-efficacy, and care plan preferences. Both groups demonstrated improved survivorship knowledge, with early survivors' mean scores increasing from 34 to 38.19, and long-term survivors' from 32 to 37.47. Self-efficacy in decision-making improved for early survivors (from 27.9 to 30), but remained relatively unchanged for long-term survivors (from 26.6 to 26.17). Both groups experienced a decline in self-efficacy regarding behaviour, with long-term survivors showing a more drastic decrease.

Conclusions: The study demonstrates that a decision aid (DA) improved knowledge and decision-making in early breast cancer survivors, The DA is a valuable tool for educating and supporting BCS in making informed follow-up care decisions. But additional strategies are necessary to enhance their confidence in self-management during survivorship.

Decreasing Caregiver Burden among Family Caregivers of Cancer Patients: A Systematic Review and Meta-Analysis

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Background: As the treatment of patients with breast cancer is shifting towards outpatient care, family caregivers are expected to engage in tasks that aim to provide emotional and physical care. However, the chronicity and intensity of family caregiving in the context of (breast) cancer may result in increased burden experienced by family caregivers. A significant number of non-pharmacological interventions (NPIs) were designed to decrease caregiver burden. The increase in communication technology signified a shift in intervention delivery formats from face-to-face clinic-based approaches to remote technologies. This systematic review and meta-analysis compared the efficacy of NPIs aiming to decrease caregiver burden, delivered face-to-face vs. remotely.

Methods: We searched four major databases for randomized controlled trials (RCTs) testing NPIs targeting both patients with breast cancer (and other solid tumors) and their caregivers. Two reviewers independently screened 8,277 studies by title/abstract and 563 full texts. Data were assessed for Risk of Bias and synthesized with standard meta-analytic methods. Effect sizes were based on random-effects and Hedges' g unbiased approach.

Result: Data from 33 RCTs with a total number of 2,878 patients (12.58% breast cancer) were included in this meta-analysis. Our sample showed that all included NPIs significantly reduced caregiver burden compared to the control group at follow-up (g = 0.06, 95% CI [0.01,0.12]). The face-to-face NPIs (20 RCTs) showed a significant decrease in caregiver burden compared to the control group (g = 0.07, 95% CI [0.01, 0.13]). However, the remotely delivered NPIs (13 RCTs), did not significantly decrease caregiver burden (g = 0.04, 95% CI [-0.02, 0.11]).

Conclusions: Overall, NPIs were effective in improving caregiver burden. However, further research for remotely delivered NPIs are needed to improve their efficacy, as they are an accessible and cost-efficient alternative to face-to-face NPIs to support family caregivers.

Psychosocial Interventions for Family Caregivers and Their Impact on Patients with Cancer: A Systematic Review and Meta-Analysis

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Background: Patients with breast cancer experience a wide range of debilitating symptoms, which can lead to significant psychological distress and low quality of life. Due to a shift towards outpatient treatment, patients increasingly depend on their family caregivers. Family caregivers may experience high burden, which can affect patients' well-being. Numerous psychosocial interventions have been designed to decrease caregiver burden. But to what extent these interventions might have an indirect effect on patients, has yet to be investigated.

Methods: Four databases have been searched to identify any randomized controlled trials (RCTs) targeting family caregivers, but assessing patient outcomes as well. Study titles (n = 8277) and full texts (n = 563) were independently screened by two different reviewers and then assessed for risk of bias. Effect sizes were calculated in Hedges' g.

Result: The meta-analysis included 9 RCTs, with an overall sample size of 1'039 patients, (322 patients with breast cancer), and 1'070 family caregivers. Effects were separated into short-term and long-term. Due to a high heterogeneity between the studies (Q = 334, df = 184, $p < 0.001$; I2 = 45%), a random-effects model was used. Meta-analysis showed, that there was no significant decrease in depression, anxiety, distress, and no improvement in marital-satisfaction both for family caregivers and for patients with cancer. However, there was a long-term improvement in physical well-being in both patients: (g = 0.46, 95% CI [0.07, 0.71]) and caregivers: (g = 0.46, 95% CI [0.07, 0.84]).

Conclusions: Findings support that psychoeducational interventions that target family caregivers may have an indirect, beneficial effect for patients with cancer. However, due to the small number and high heterogeneity among studies, results should be interpreted with caution. More studies targeting family caregivers, but also reporting patient outcomes, should be conducted.

Poster Presentation

Exploring Family Caregiver Vulnerabilities: Predictors of Anxiety and Depression based on Meta-Regression Analyses

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Background: Caregivers of patients with cancer often experience psychological distress, including increased levels of anxiety and depression, as a result of the patient's diagnosis and their caregiving responsibilities. This study aimed to explore how caregiver demographics (i.e., sex, relationship type to the patient, cancer type and stage of the patient) influence these psychological outcomes.

Methods: Meta-regression analyses using a mixed-effects model was conducted with data from 23 randomized controlled trials (RCTs) to investigate these relationships. Anxiety and depression levels were assessed with Hospital Anxiety and Depression Scale (HADS).

Result: Among the overall number of patients (n = 2932), 16% were diagnosed with breast cancer. Among overall caregivers (n = 2932), the majority (62%, n = 1818) were female. Male caregivers (38%, n = 1114) reported significantly higher levels of anxiety (estimate = 11.77, $p < 0.001$) compared to female caregivers (estimate = -5.48, $p < 0.001$). Spouses (n = 2170, 74%) experienced the highest levels of anxiety (estimate = 10.03, $p < 0.001$) and depression (estimate = 7.77, $p < 0.001$) compared to caregivers in different types of relationships. Caregivers (n = 645, 22%) of stage 1-3 cancer patients experience higher anxiety but lower depression compared to caregivers (n = 2287, 78%) of patients with stage IV cancer.

Conclusions: Findings underline the need for tailored interventions to support the mental health of caregivers and to ensure they receive appropriate care based on their unmet needs. Especially caregivers of patients with breast cancer could benefit from these findings.

Poster Presentation

Exploring the medical process and care experience of male breast cancer patients from a gender perspective

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Background: This study explores the medical experiences and health care behaviors of male breast cancer patients in Taiwan, focusing on the influence of gender roles to medical management and health care.

Methods: Through in-depth interviews with four male patients, the research identifies four key issues: delayed medical attention, conflicted compliance with medical authority, prioritization of work, and lack of breast cancer knowledge.

Result: The findings reveal that male patients' health care behaviors are complexly influenced by gender role expectations, power relations, personal factors, and situational determinants. The study recommends that healthcare providers and community services enhance gender sensitivity and design more inclusive services to meet the unique needs of male breast cancer patients.

Conclusions: It emphasizes the importance of public education to raise awareness and support for this group. This research provides valuable insights for improving the medical experiences of male breast cancer patients and developing a more comprehensive, gender-friendly breast cancer care system.

Baseline Bone Mineral Density and Bone Metabolism Markers in Hormone Receptor-Positive Breast Cancer Patients Undergoing Aromatase Inhibitor Treatment

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Background: Aromatase inhibitors (AIs) are widely used in hormone receptor-positive breast cancer but are associated with decreased bone mineral density (BMD) and increased fracture risk. This study aims to evaluate baseline bone health and metabolism markers in patients enrolled in a prospective trial investigating the effects of KEFPEP®, a health supplement, on bone metabolism during AI treatment.

Methods: This ongoing double-blind, randomized, placebo-controlled study involves women with hormone receptor-positive breast cancer initiating AI therapy. Baseline assessments include dual-energy X-ray absorptiometry (DEXA) and serum biochemical markers of bone metabolism, such as calcium, iPTH, TSH, osteocalcin, total P1NP, and β-CTX. Participants with T-scores ≤ -3.0 were referred for osteoporosis treatment, while those with T-scores > -3.0 were included in further analysis.

Result: A total of 142 participants were enrolled, and 141 underwent DEXA. Mean lumbar spine T-score was -1.07 ± 1.08, and mean trabecular bone score (TBS) was 1.32 ± 0.11. Serum biochemical markers exhibited significant variability, with mean β-CTX at 0.63 ± 0.22 ng/mL and mean osteocalcin at 21.18 ± 9.68 ng/mL. Of the participants, 18.4% required osteoporosis treatment.

Conclusions: Baseline data highlight significant variability in BMD and bone metabolism among patients starting AI therapy. Early assessment using DEXA and biochemical markers is crucial for identifying patients at high risk of bone health deterioration, emphasizing the need for timely intervention.

Evaluating Trends in Fertility Counseling Among Reproductive-Age Patients with Breast Cancer

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Background: The incidence of breast cancer among young women is increasing. As advancements in therapies continue to improve survival, infertility remains a concern for young patients. Despite this, the provision of fertility preservation remains suboptimal. This study aimed to evaluate the practice of oncofertility counseling and referral patterns at our institution.

Methods: A retrospective analysis was performed of women ≤40 years who were treated for breast cancer from 2014-2023 at a single institution. Patient demographics, tumor and treatment characteristics, occurrence of oncofertility counseling (OC), referral to a reproductive endocrinologist (REI), and subsequent childbearing were evaluated.

Result: Of 161 patients, 81 (50.3%) received OC while 80 (49.7%) did not. Of those who received OC, 97.5% were counseled by their oncologist vs. 23.1% by their surgeon. Only 1 patient (1.2%) received OC exclusively by her surgeon. Twenty-six out of 81 women (32.1%) who received OC were referred to an REI specialist, and 8 (30.8%) women achieved childbearing. Patients who received OC were younger (35 vs 38 years, $p < 0.001$) and nulliparous (45.7% vs 18.8%, $p < 0.001$). While 71.2% of nulliparous patients received OC, only 40.1% of patients with children received OC ($p < 0.001$). Patients with >cT2 and nodal disease were more likely to receive OC (both $p < 0.05$), as were those who received neoadjuvant chemotherapy (74.1% vs 43.8%, $p < 0.001$) or involved in a clinical trial (30.9% vs 8.8%, $p = 0.01$). There was no difference in OC between patients receiving adjuvant chemotherapy or endocrine therapy ($p > 0.05$).

Conclusions: The current provision of OC is disproportionately provided by medical oncology to younger, nulliparous patients in the setting of neoadjuvant chemotherapy. The role of surgeons in the early care of patients offers an underutilized opportunity for OC and early referral to REI. Efforts should thus be made for all healthcare providers to be prepared to discuss fertility preservation to maximize patient support and access to oncofertility.

The Impact of Objectified Body Consciousness and Self-Esteem on Body Image Among Women with Breast Cancer: The Mediating Effect of Body Acceptance

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Background: Women with breast cancer experience physical changes due to the disease and treatment, which directly impact their body image. Body acceptance has been identified as a key mediator in this process, as the extent to which individuals accept these bodily changes plays a critical role in shaping their body image. This study examines the mediating effect of body acceptance in the relationship between objectified body consciousness, self-esteem, and body image in women with breast cancer.

Methods: A cross-sectional online survey was conducted in September 2023 with 258 women who underwent breast cancer surgery. Measures included objectified body consciousness, self-esteem, body acceptance, and body image. Data were analyzed using descriptive statistics, one-way ANOVA, Pearson's correlation, and hierarchical regression. Mediation effects were assessed using the Baron & Kenny method, with the Sobel test providing additional validation.

Result: Regression analyses indicated that self-esteem ($\beta = -.41$, $p < .001$) and objectified body consciousness ($\beta = .56$, $p < .001$) significantly predicted body image. Body acceptance ($\beta = -.50$, $p < .001$) partially mediated these relationships, with self-esteem ($\beta = -.21$, $p < .001$) and objectified body consciousness ($\beta = .30$, $p < .001$) remaining significant. The final model explained 84.4% of the variance in body image. Sobel test results confirmed the mediation effect (self-esteem: $z = -13.64$, $p < .001$; objectified body consciousness: $z = -16.32$, $p < .001$).

Conclusions: These findings underscore the significance of body acceptance in forming body image among women with breast cancer. Enhancing body acceptance can mitigate the negative effects of objectified body consciousness and low self-esteem on body image. Integrating psychological interventions that promote body acceptance into supportive care programs can effectively improve body image outcomes in this population.

Poster Presentation

Metaverse vs. Traditional Simulation: A Mixed-Methods Approach to Analyzing Student Satisfaction, Confidence, and Learning Flow in Breast Cancer Nursing Education

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Background: This study compared the effects of metaverse simulation and traditional simulation on nursing students' satisfaction, confidence, and learning flow in breast cancer nursing education. While traditional simulation has been a cornerstone of nursing education, the emergence of metaverse technology offers new possibilities for immersive and engaging learning experiences.

Methods: A mixed-methods experimental design with a posttest-only control group design was employed. Data were collected from May to July 2024. Participants were nursing students randomly assigned to either a metaverse simulation group (n = 34) or a traditional simulation group (n = 32). Quantitative data on satisfaction, confidence, and learning flow were collected using questionnaires. Qualitative data were gathered through focus group interviews to explore students' experiences with the simulation methods.

Result: The quantitative analysis revealed that the traditional simulation group reported significantly higher levels of satisfaction (M = 4.89), confidence (M = 4.8), and flow (M = 4.32) compared to the metaverse simulation group (M = 4.36, M = 4.24, M = 3.85, respectively; $p < .05$). However, the qualitative analysis provided essential insights into the unique advantages of metaverse simulation. Students in the metaverse simulation group highlighted the immersive and engaging nature of the experience, which fostered a sense of presence, realism, and active learning. They reported feeling more comfortable practicing skills and making mistakes in the virtual environment, which could contribute to long-term skill development and knowledge retention. These data underscores the potential of metaverse simulation in nursing education and the need for further exploration.

Conclusions: While the traditional simulation group reported higher satisfaction, confidence, and learning flow scores, this study emphasizes the need for further research to fully understand and optimize the potential of metaverse simulation in breast cancer nursing education. This ongoing research not only presents an exciting opportunity for the field to evolve and improve but also engages the audience in the future of nursing education.

The Relationship Between Decision Regret, Quality of Life, and Mindfulness in Early-Stage Breast Cancer Survivors

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Background: The shared decision-making empowers breast cancer patients' autonomy in joining treatment decision. However, unexpected side effects or unsatisfactory outcomes can lead to decision regret. This study examines decision regret levels and its relationship with quality of life, mindfulness and self-compassion among early-stage breast cancer patients in post-treatment survivorship.

Methods: A cross-sectional study was conducted from March 2021 to March 2022. Eligible early-stage breast cancer patients who had completed treatments within the past 36 months were recruited from a medical center and a regional hospital. Participants completed the Decision Regret Scale, Mindful Awareness Attention Scale, Self-Compassion Scale, and the EORTC QLQ-C30 and QLQ-BR45 to assess QOL.

Result: Among the 138 participants, 17.39% reported no regret, 55.80% expressed mild regret, and 26.81% reported moderate to strong regret. Decision regret differed significantly based on the congruence between patients' preferred and actual decision-making roles. Multiple regression analysis showed that, after controlling for covariates, lower decision regret was associated with higher EORTC QLQ-C30 and QLQ-BR45 function scores. Mindfulness awareness significantly mediated the relationship between decision regret and QOL, while self-compassion was not identified as a mediator.

Conclusions: Most breast cancer survivors experienced mild or moderate decision regret. Decision regret influences survivors' general and breast specific functions. Mindfulness awareness mediating the relationship between decision regret and QOL demonstrates that mindfulness could reduce the impact of regret on QOL. These findings emphasize the potential benefits of mindfulness-based interventions in helping patients manage decision regret and enhance their QOL.

Poster Presentation

Malignant Risk Assessment in South Korea of Atypical Breast Hyperplasia

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Background: Atypical hyperplasia is a high-risk lesion of the breast. It requires examination of the entire tissue sample due to the potential for upgrading to malignancy following initial tissue analysis, such as core needle biopsy. This study aimed to investigate factors related to the upgrade malignancy of atypical hyperplasia at multi-institutional academic hospitals in Asia.

Methods: A retrospective review of 589 patients initially diagnosed with atypical breast hyperplasia between January 2000 and December 2022 at five academic hospitals in South Korea was conducted. After excluding patients with prior or concurrent breast cancer (n = 249), 340 patients were analyzed. Clinical, radiological (BI-RADS), and pathological characteristics were evaluated, and biopsy methods were compared (14-gauge core needle vs. 8/11-gauge vacuum-assisted biopsy). Upgrade rates to malignancy and associated risk factors were assessed using Cox proportional hazard regression.

Result: The overall upgrade rate was 37.6% (128/340), with 28.8% (98/340) upgrading to in situ carcinoma and 8.8% (30/340) to invasive cancer. Multivariate analysis identified higher BI-RADS category (≥ 4b; HR = 2.629, 95% CI: 1.587-4.356, $p < 0.001$) and older age (≥ 50 years; HR = 1.695, 95% CI: 1.064-2.701, $p < 0.001$) as independent predictors of upgrade. CNB showed higher false negative rate compared to VAB (45.4% vs 20.0%, $p < 0.001$) but we excluded this variable from multivariate analysis. Lesion size (HR = 1.097, 95% CI: 0.989-1.217, $p = 0.081$) and multifocal atypia (HR = 0.660, 95% CI: 0.283-1.539, $p = 0.333$) were not significantly associated with upgrade risk.

Conclusions: The higher BI-RADS category and older age were significant predictors of upgrade to malignancy in patients with atypical hyperplasia. Neither lesion size nor multifocal atypia showed significant association with upgrade risk. These findings may contribute to the development of diagnostic strategies for patients with atypical hyperplasia, particularly in Asian populations, also expected to be validated in a larger cohort as part of an ongoing nationwide initiative.

Poster Presentation

DeepSeek R1 Outperforms Leading Large Language Models with Perfect Accuracy in Breast Cancer Knowledge Assessment

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Background: Large language models (LLMs) are increasingly explored in medicine for tasks such as clinical decision support and medical education. DeepSeek, a state-of-the-art LLM series, is designed to enhance reasoning and domain-specific knowledge integration. Building on its predecessor DeepSeek V3, the upgraded R1 model incorporates advanced architectures for multi-step reasoning and contextual analysis, addressing limitations in handling complex clinical scenarios. This study evaluates DeepSeek's performance against established LLMs (GPT-4, GPT-3.5, Google Gemini) using standardized breast cancer questions.

Methods: Sixty breast cancer multiple-choice questions-mirroring prior research-were administered to DeepSeek V3 and R1. Topics included treatment, diagnostics, imaging, and pathology. Response accuracy and reasoning processes (e.g., time, intermediate analysis length) were analyzed. Comparisons were drawn against published results for GPT-4, GPT-3.5, and Google Gemini.

Result: DeepSeek R1 achieved 100% accuracy (60/60), outperforming GPT-4 (95%), GPT-3.5 (90%), and Gemini (80%). DeepSeek V3 scored 96.7% (58/60), surpassing GPT-4. For complex questions, R1 demonstrated iterative reasoning, with analysis durations up to 365 seconds and extended intermediate sequences (1,840 characters). Both models maintained consistency across question sources (public vs. clinician-curated) and domains, excelling in pathology and imaging interpretation.

Conclusions: The findings highlight DeepSeek's significant potential in answering intricate breast cancer questions, surpassing the performance of previously studied LLMs. This study underscores the viability of AI-driven tools in enhancing medical knowledge and could pave the way for future advancements in patient care and educational support for healthcare professionals.

Comparison of Large Language Model-Processed Unstructured Clinical Data versus Manual Physician Review in Breast Cancer

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Background: Recent advancements in Large Language Models (LLMs) have shown promise in automating clinical data extraction; however, their feasibility compared to traditional physician reviews remains understudied in complex areas such as breast cancer.

Methods: We conducted a retrospective comparison of breast cancer cases from five academic hospitals in 2019, comparing manual physician review (n = 1,366) versus LLM-based processing using Claude 3.5 Sonnet (n = 1,734). We evaluated 89 clinical variables, assessing concordance using Cohen's kappa coefficient for categorical variables and Intraclass Correlation Coefficient (ICC) for continuous variables. Results were validated against the Korean Breast Cancer Society 2019 national registry data.

Result: Both groups showed comparable performance in hormone receptor documentation (> 90%) and surgical procedure distribution (manual vs. LLM in partial mastectomy: 63.5% vs. 63.9%). The LLM group demonstrated higher completion rates for lymph node assessment (78.5% vs. 91.2%) but more missing values in staging (3.1% vs. 12.2%). While ICC analysis showed low agreement for continuous variables, the LLM group's stage distribution aligned better with national registry data. The LLM achieved 90.8% accuracy in validation analysis (817/900 factors), meeting the predetermined threshold of 90%, and captured more survival events (11 vs. 41) with significant outcome differences (HR = 2.917, 95% CI: 1.496-5.688, $p = 0.002$).

Conclusions: LLM-based processing demonstrated comparable effectiveness to manual physician review in organizing breast cancer clinical data, with advantages in certain areas despite some limitations in stage assessment. These findings support the potential role of LLMs in clinical data processing while highlighting areas for improvement.

Retrieval-Augmented Generation in Breast Cancer Domain with Large Language Models

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Background: Breast cancer guidelines vary considerably across countries and are frequently updated, posing challenges for large language models (LLMs) to provide accurate and up-to-date answers. Fine-tuning LLMs for dynamic, domain-specific knowledge is costly and time-intensive, limiting the frequency of updates. This creates obstacles for physicians seeking timely and reliable information from LLMs, particularly when answering patient-specific queries. Moreover, the use of closed LLMs, such as GPT models, raises issues of API costs and data security.

Methods: To address these issues, we implement a Retrieval-Augmented Generation (RAG) pipeline tailored to breast cancer domain. We collect data regarding breast cancer from the American Society of Clinical Oncology (ASCO), extract content in HTML, transform it into a structured database, and apply effective chunking strategies to process the content. Using this pipeline, users can not only get detailed explanation on various topics but also access the cited document real-time.

Result: We evaluate five LLMs of various sizesGPT-4-turbo, GPT-3.5-turbo, QWEN2.5 (14B), Llama3 (7B), and OpenBioLLM (7B)for baseline configurations. For QWEN2.5 and Llama3, we implement a Retrieval-Augmented Generation (RAG) pipeline with ASCO guidelines to assess the impact of retrieval-based enhancements. Among the 7 tested setups, QWEN2.5 with our RAG pipeline demonstrates a standout performance comparable to GPT-4-turbo in terms of fluency, relevance, consistency and coherence. This result highlights the potential of using RAG pipelines to elevate smaller LLMs for high-quality, domain-specific information retrieval.

Conclusions: This study demonstrates that a well-designed RAG pipeline combined with optimized chunking methods enables small LLMs to deliver high-quality, domain-specific question-answering systems. This approach is cost-efficient, secure, and eliminates the need for fine-tuning LLMs or relying on closed LLM APIs, offering a scalable solution for clinical decision support in the breast cancer domain.

Interesting Surgical Experiences about Patients with Accessory Breasts

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Background: Accessory breasts occur in 2~6% of the female population and their spectrum of the disorder ranges between a small single lesion and a fully developed multiple lesions. They are often asymptomatic but require treatment when symptomatic or if they deteriorate the quality of life. There are some interesting surgical cases about patients with accessory breasts.

Methods: (case 1) A 41 years old woman was admitted to the hospital with complaints of axillary protrusion and huge breasts. She had two birth experience, her back pain and whole body discomfort due to large breasts. We underwent accessory breast excision and reduction mammoplasty using liposuction through the mini-incision due to her susceptibility of scarring. (case 2) A 30 years old woman was admitted to the hospital with complaints of multiple axillary protrusion. She was single, and had pain every menstrual cycle. We underwent accessory breast excision with redundant skin resection.

Result: (case 1) 600cc liposuction per one breast was performed for reduction mammoplasty. 47g of the right axillary accessory breast and 42g of the left axillary accessory breast was removed. 620cc liposuction was performed for both accessory fatty accumulations. A compression garment was applied for 2 weeks. (case 2). 170g of the right axillary accessory breast and 97g of the left axillary accessory breast was removed. 600cc liposuction was performed for both accessory fatty accumulations. A compression garment was applied for 2 weeks. At the 4-weeks follow-up, Two patients were satisfied with the axillary body line and breast reduction because of disappearing protrusion and back pain.

Conclusions: Accessory breast excision with liposuction must be effective due to ease of the procedure, faster recovery time and minimal scarring. However, appropriate surgical changes according to individual patient circumstances are very important for postoperative outcomes.

Asian Breast Surgery Forum: Advancing Collaborative Learning in Breast Surgery Across Borders

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Background: The Asian Breast Surgery Forum (ABSF), led by the Faculty of Medicine, Universiti Malaya, Malaysia, advances multidisciplinary collaboration in breast surgery across Asia. Utilizing the ECHO model, established in 2003 by Dr. Arora, ABSF fosters virtual case-based learning and skill-building to democratize access to specialty care. ABSF has united diverse participants, including breast surgeons, breast and endocrine surgeons, general surgeons, plastic surgeons, radiologists, pathologists, and medical students from across Asia, with a shared goal of advancing expertise in breast health through "All Teach, All Learn" principles and innovative knowledge-sharing platforms. ABSF strives to unite and standardize breast surgeons across Asia, enhancing mentorship, collaboration, and knowledge exchange. Through the iECHO platform, the forum delivers structured programs to enhance clinical expertise, promote interdisciplinary dialogue, and improve regional breast cancer management.

Methods: With Malaysia as its hub, ABSF engages experts from India, Thailand, Japan, South Korea, Taiwan, Singapore, China, and Vietnam. The forum employs pre- and post-session surveys to assess participant engagement and learning outcomes, alongside feedback forms to identify key areas for improvement. Sessions are designed to cover a range of topics, including emerging breast oncoplastic, advanced breast surgical techniques, case-based learning, and personal experiences shared by experts. Session recordings and supplemental materials are made accessible for continuous education.

Result: Between 2023 and 2024, ABSF conducted 13 sessions, connecting 273 participants from 61 cities across 24 countries. The program achieved a 100% satisfaction rate and a Net Promoter Score of 68. Participants reported significant improvement in knowledge and confidence, with sessions catalyzing advancements in regional surgical practices and collaboration among experts.

Conclusions: ABSF has established a collaborative, inclusive educational model that enhances breast surgery standards across Asia. By continually evolving through participant feedback and integrating cutting-edge techniques, ABSF serves as a blueprint for leveraging digital platforms to foster interdisciplinary learning and improve healthcare outcomes globally.

A case of breast sparganosis: with an emphasis ultrasonographic findings and history taking

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Background: Sparganosis of breast is a neglected parasitic infection, due to its relatively rare occurrence. Sparganosis of breast accounts for less than 6% of all sparganosis infection with a few cases reported in literature. Often diagnosis is challenging because of non-specific symptoms and inconsistent radiological findings. Herein, we highlight a case of bilateral breast sparganosis which mimicked breast cancer on screening mammography.

Methods: A 63-year-old female noticed a palpable mass in her breast two weeks ago. On ultrasonography, an ovoid hypo-echogenic mass sizing 2 cm cm with lobulated contour was located at 1H of right breast. In the left breast, several hypoechoic masses were seen at 2-5H in the fat layer, sizing from 0.5 cm to 2 cm. Notably, she was a North Korean defector. Thorough history taking revealed that she ingested snake and frog meat and contaminated water. No additional infection was suspected in the other parts of her body.

Result: Surgical removal of sparganosis was done under general anesthesia on patient request. Sonography-guided marking was done over the infected area and 2 cm stab incisions were made on the lesion. Approximately half of cases contained more than 2 worms in one cavity. The worms were removed completely without division to prevent recurrence. Final histopathological examination confirmed the diagnosis of sparganosis. Worm length ranged from 2-6 centimeters. Postoperatively, the patient recovered without any complications and remains healthy at postop 4 months. Although the longevity is thought to be less than 1year, regular-6 month follow up was recommended.

Conclusions: Sparganosis of breast are rare in incidence. However, their characteristic sonographic findings, information on nationality and food intake, may aid the diagnosis. As surgical removal is mandatory to prevent systemic spread and recurrence, clinicians should recognize the possibility of this diagnosis when an abnormal subcutaneous breast mass is presented.

Enigma in Managing the Spectrum of Phyllodes Tumour

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Background: Phyllodes tumours are well-established in the medical literature, though their rarity as breast tumours continues to be acknowledged. Its unpredictable behaviour, combined with the uncertain efficacy of systemic chemotherapy, further complicate therapeutic decision-making. Tumour recurrence is common among malignant phyllodes but transformation to higher grade tumour in recurrence case is rare

Methods: Case Report

Result: We present two cases of phyllodes tumours with distinct behaviours, yet both resulting in similar morbidity outcomes for the patients. Despite adhering to established treatment protocols, including surgical excision, radiotherapy, and appropriately scheduled clinical surveillance, the disease continues to advance beyond our control. One case of a young lady, involved multiple local recurrences (six times), with each recurrence transforming to a higher grade. The other case, initially diagnosed as a borderline phyllodes tumour, later recurred as distant metastases (lungs) of a malignant phyllodes, despite no evidence of recurrence at the primary site after years of remission. Notably, surveillance mammograms and ultrasounds showed no indications of recurrence. Those two cases were studied focusing on the pathology report with its immunohistochemistry staining results.

Conclusions: Through this case report and literature review, it provide insights and guidance for future research in identifying the factors for multiple recurrence and malignant transformation of phyllodes tumour.

Small Girl, Big Problems - A case report on giant juvenile fibroadenoma

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Background: Breast masses are rare among the pediatric population and would most often be benign fibroepithelial lesions. Among these, the giant juvenile fibroadenoma is a rare type with less than ninety cases reported in literature. This is the case of a 10-year-old female from Quezon City, Philippines, who presented with a chief complaint of a mass in the left breast. The said mass was first noted seven months prior to consult, rapidly expanding, not associated with systemic symptoms. On physical examination, the patient was noted to have a firm, moveable mass, measuring 12 × 12 cm, almost occupying the whole left breast and stretching out the nipple-areolar complex and hyperpigmentation of the overlying skin. An ultrasound and biopsy revealed a BIRADS 3 mass with histopathologic features of a juvenile fibroadenoma.

Methods: The patient was brought to the operating room and under general endotracheal anesthesia, the team proceeded with the surgery via an inframammary incision. Intraoperatively, there was note of a 10 × 8 cm doughy to firm breast mass abutting the skin, displacing normal mammary tissue superiorly. A Jackson-Pratt drain was placed and primary closure of the skin was done.

Result: The specimen was sent for histopathologic examination and it turned out to be consistent with a giant juvenile fibroadenoma. The patient had an unremarkable postoperative course and was sent home well 2 days after the surgery. The surgeons were able to preserve the patient's nipple-areolar complex. The patient was advised for possible reconstruction later during her adult years, should she desire it.

Conclusions: The giant juvenile fibroadenoma is a rare disease entity that may be mistaken for a malignant process. However, benign lesions remain to be the predominant type of breast mass in the pediatric population. A more conservative approach is favorable in these cases as going for a radical approach could cause more distress on the young patient.

Synchronous Breast Carcinoma and Tuberculosis Infection mimicking Advanced Breast Cancer

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Background: Breast tuberculosis (TB) is a rare presentation of extrapulmonary TB even in endemic locations such as the Philippines. Oftentimes breast TB may mimic breast carcinoma due to clinical presentation of a breast mass and associated adenopathy with corresponding suspicious findings on breast imaging. Even more rare is for breast TB to occur synchronously with malignancy leading to dilemmas in diagnosis, staging and management.

Methods: A 44-year-old female presented with a one month history of a palpable right breast mass and on examination was likewise noted to have a palpable enlarged 3.5 cm right axillary lymph node as well as swelling on her right supraclavicular area. Ultrasound guided core needle biopsy confirmed her to have a cT1 Luminal A Invasive Carcinoma with a concurrent adjacent TB mastitis and axillary adenopathy. CT scan of the neck and chest revealed pathologic appearing mediastinal lymph nodes, level IVa and Va cervical nodes and subcentimeter pulmonary nodules.

Result: Patient was started on antikoch's therapy and consensus was to proceed with surgical management to appropriately stage her right breast cancer. Modified Radical Mastectomy done confirmed her to have Stage I (pT1N0) Invasive carcinoma of no special type. All 20 axillary lymph nodes harvested were negative for malignancy with 18 lymph nodes with chronic granulomatous inflammation. She received Tamoxifen and Goserelin as adjuvant therapy for her breast cancer and repeat scans after completion of 6 months anti Koch's therapy showed overall regression of the cervicothoracic lymphadenopathy as well as the pulmonary nodules.

Conclusions: TB infection may mimic malignancy and appropriate histologic evaluation is warranted. Care must be taken in the management of patients with a breast malignancy and adenopathy with imaging findings worrisome for metastases in the context of a concurrent tuberculous infectious process. Multidisciplinary approach to management helps to avoid over staging and potentially denying treatment with curative intent.

Primary Neuroendocrine Tumor of the Breast: A Rare Case

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Background: Primary neuroendocrine tumors (NET) predominantly affect postmenopausal women. This case study focused on a 54-year-old woman who presented with a painless right breast lump. While the lump exhibited estrogen and progesterone receptor positivity, it lacked human epidermal growth factor receptor 2 expression. Further evaluation revealed positivity for the neuroendocrine markers chromogranin-A, and synaptophysin. It also revealed a 3% positive Ki-67 proliferation index. Treatment for neuroendocrine breast cancer (NEBC) mirrors that of standard invasive breast cancer: breast conservation or mastectomy combined with sentinel lymph node biopsy or axillary dissection. The patient underwent a right mastectomy with sentinel lymph node biopsy, followed by hormonal therapy based on her tumor's immunohistochemical profile. Due to the low incidence and limited research on primary NETs, their exact origin remains shrouded in mystery. Accurate diagnosis, specific treatment options, and long-term prognosis remain significant challenges in managing this rare form of breast cancer.

Methods: The patient was given options of either breast conservation therapy and radiation after or outright total mastectomy with sentinel lymph node biopsy. She opted to undergo a total mastectomy and sentinel lymph node biopsy.

Result: Immunohistochemical staining showed positivity for synaptophysin and chromogranin which confirms the initial diagnosis. Additionally, it tested positive for ER and PR hormone receptors and negative HER-2. Proliferative index by Ki-67 was low at 3%.

Conclusions: Breast tumors with neuroendocrine differentiation represent a rare and heterogeneous group, often sharing histological features with invasive breast cancers. Currently, there is lack of specific criteria for its definition and limited evidence to guide specific treatment strategies for breast cancers with neuroendocrine differentiation. Further research is essential to define and categorize this tumor group and establish effective management approaches. This case contributes valuable insights to the limited literature on NENs of the breast, emphasizing the importance of individualized treatment in achieving a favorable outcome.

From Healing Rays to Harmful Ways: A Rare Case of Radiation Induced Sarcoma After Breast Cancer

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Background: Radiation therapy plays a crucial role in the treatment of primary breast cancer, specially with the rise of breast conserving surgery. One of the notable sequelae is radiation induced sarcoma, a rare secondary malignancy associated with poor prognosis, with a 10-year incidence of approximately 0.2%. Due to its rarity, there are no prospective trials available to determine the standard of care. We present a case of post-radiation sarcoma developing 15 years after initial breast cancer treatment.

Methods: 62-year old Filipino female sought consult for a 4×4 cm hematoma-like lesion on the chest, over the area of previous incision site. 15 years prior, she underwent modified radical mastectomy, 6 cycles of chemotherapy, and 30 sessions of radiation therapy for Invasive Ductal Carcinoma Left stage IIIA (pT2N2M0). Core needle biopsy results showed a spindle cell neoplasm with vascular differentiation with strong diffuse staining on CD31+.

Result: Patient underwent wide excision of tumor with 2 cm margins. On frozen section, mass had positive margins on the base. Rib resection was necessary to achieve R0 resection, however the patient was not prepared for an extensive procedure and relatives did not consent hence clip placement was done and thoracoabdominal flap for skin closure. Postoperatively, patient and relatives were appraised and agreed to undergo chest wall resection after recuperation. 1 month after initial surgery, patient underwent resection of 3rd-5th rib with wedge resection of the left upper lung lobe. Subsequently, a chest wall reconstruction with plates and screws was done and thoracodorsal flap for skin closure.

Conclusions: Existing systematic reviews showed that complete surgical excision, particularly R0 resection had significantly better survival rate. Since surgery remains to be the most effective treatment, we realize the importance of high index of suspicion of chest wall involvement and recommend that risks and benefits of radical surgery be explained preoperatively to all patients.

Recurrent Infections from Adult Onset Lymphatic Malformation: A Management Conundrum

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Background: Lymphatic malformation of the breast is a rare condition that may pose as a diagnostic dilemma and result in debilitating outcomes for the affected patient.

Methods: We present a case of adult-onset lymphatic malformation of the breast complicated by recurrent infections, that posed a clinical conundrum.

Result: 33-year-old female from Papua New Guinea, previously well, no family history of cancer, first presented with a 6-year history of persistent left breast skin nodules and recurrent infections. She was previously evaluated and treated overseas with multiple investigations and procedures including incision and drainage of left breast in 2017 and excision biopsy of left axillary nodes in 2018. However, all results were indeterminate, showing mainly inflammatory infiltrates with no infective cause. Of note, patient underwent excision of left chest wall lump at 7 years old. She presented to our center with warty saccular compressible nodules, clear frogspawn-like vesicles over left breast including areola, left chest wall and upper inner arm, with a 8 cm inferior chest wall scar. She was reviewed by a multidisciplinary vascular malformation team and MRI breast showed no evidence of breast cancer with possible lymphangiectasia. Targeted ultrasound showed no evidence of lymphatic or venous malformation. She underwent excision biopsy of left breast cutaneous nodule and histology returned as lymphangiomatous proliferation of superficial dermal lymphatic vessels with a PIK3CA mutation. Lymphoscintigraphy demonstrated absent lymphatic channels in the left breast. Patient was counseled on management options including conservative management with wrapping, symptomatic treatments to remove cutaneous nodules, breast reduction, lymphaticovenous anastomosis and medical management with sirolimus. Patient eventually decided on medical management with sirolimus. There are currently no studies that have described a breast lymphatic malformation with PIK3CA Exon 10.c.1636C > Ap (Gln546Lys) mutation.

Conclusions: Adult-onset breast lymphatic malformation is extremely rare. Multimodality and multidisciplinary approach may be required to aid in the diagnosis and management of this condition.

Breast cancer masquerading as siliconoma

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Background: Free injections of foreign material such as liquid silicone, oil, paraffin and gels to the breast for augmentation purposes have been prohibited in many countries but late complications are still seen. These complications can range from swelling to pain and breast lumps.

Methods: We report a case of delayed diagnosis of cancer due to the presence of multiple silicone granulomata in a 49 year old lady with a history of free silicone injections almost thirty years ago. She first noticed a concerning 3 cm breast lump 3 years ago where biopsy showed chronic histiocytic inflammation. Over time, the lump got larger and more painful. She underwent excision biopsy of the now 8 cm lump which turned out to be invasive breast carcinoma ER/PR negative, cerB2 positive.

Result: She underwent completion nipple sparing mastectomy with reconstruction with free deep inferior epigastric perforator (DIEP) flap. Histology revealed no residual carcinoma. She underwent adjuvant chemotherapy, targeted therapy and radiotherapy and has remained well 2 years after her surgery. She continues to be screened for cancer annually with a MRI for her contralateral breast.

Conclusions: There is much difficulty in differentiating between silicone granulomata and concerning breast lumps. This begins from clinical palpation to conventional imaging and finally pathology assessment. This can result in a delay in diagnosis. Care providers require vigilance in the treatment of patients with previous free silicone injection as conventional imaging modalities would be non-diagnostic. Besides considering MRI, one should also have a low threshold to get histological diagnosis to ensure cancer is not missed. There is no management consensus in these patients with silicone injections for prophylactic mastectomy. Despite extensive inflammation in the normal tissue planes caused by the silicone granuloma, we were able to perform successful immediate reconstruction with autologous free DIEP flap after nipple sparing mastectomy.

The significance of breast uptake in I-131 imaging: a case report and literature review

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Background: Radioiodine uptake in the breast among thyroid cancer patients has been reported. Cases range from physiological uptake in lactating breasts to malignancies, including co-existing cancer or metastasis.

Methods: We present a unique case of incidental focal breast uptake detected through iodine-131(I-131) imaging, where further imaging identified multiple lesions, not visualized by the scan.

Result: A 44-year-old woman with papillary thyroid carcinoma underwent thyroidectomy and radioiodine treatment. Her history included autoimmune thyroiditis and significant radiation exposure. Postoperative pathology confirmed stage pT1aN0 thyroid papillary carcinoma. A follow-up I-131 SPECT scan revealed focal uptake in the right breast, raising concerns for ectopic thyroid tissue or malignancy. Breast MRI further identified additional two BI-RADS 4A lesions at right breast and one BI-RADS 4A lesion at left breast. Biopsies confirmed all of the right breast lesions as fibroadenomas, including the increased I-131 uptake lesion, and lobular carcinoma in situ (LCIS) in the left. The patient underwent breast-conserving surgery and sentinel lymph node biopsy, with pathology confirming LCIS (pTisN0). She started on Tamoxifen afterwards.

Conclusions: Radioiodine scans are critical for detecting thyroid malignancy but can show uptake in non-thyroidal tissue expressing sodium symporters (NIS), such as the breast. Physiological uptake is common in lactating women, while focal uptake in non-lactating women warrants further investigation. Rarely, uptake indicates malignancy. In this case, radioiodine imaging highlighted one benign lesion but missed the LCIS, emphasizing the need for complementary imaging modalities in this group of patients.

The Optimal Timing for Surgical Intervention in Breast Tuberculosis-Case Series

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Background: Breast tuberculosis is a rare ectopic tuberculous infection, primarily affecting women of reproductive age, and is more prevalent in developing countries. The clinical and radiological presentation of tuberculous mastitis often mimics breast infection, benign tumors, and malignancies frequently leading to misdiagnosis. This article aims to report the author's experience and discusses the therapeutic management modalities we used.

Methods: This was a retrospective study conducted in the surgical department of Moh. Saleh Hospital and AR Rozy Hospital, Probolinggo City, for 4 years.

Result: During 2020 to 2024 at our institution, 24 patients with breast tuberculosis cases confirmed by clinical, radiological and histopathological examinations were found. All patients were female with an average age of 35 years. Breast examination revealed 8 patients with reddish lumps without ulcers, 10 patients with complaints of lumps with ulcers or pus fistulas in the breast and 6 patients with breast lumps resembling early stage breast cancer. Enlarged lymph nodes in the ipsilateral axilla were found in 12 patients and 2 of our patients were detected with pulmonary tuberculosis. Surgical interventions performed for diagnosis; 14 patients underwent debridement and biopsy, while 4 patients underwent lumpectomy, the rest detected with FNAB. All of them received anti-tuberculosis therapy. In the 20 patients who only underwent debridement and anti-tuberculosis treatment, 5 patients had recurrent abscesses and 1 patient complained of a painful persistent breast lump. Of the recurrent cases, 3 underwent re-debridement, 2 segmental mastectomies and 1 total mastectomy due to large and painful ulcerative lesions. The median follow-up period was 25 months (5-48 months).

Conclusions: Surgical intervention in breast tuberculosis has an important role to diagnosis and therapy. In cases with recurrent infections or persistent painful lumps, segmental mastectomy provided better therapeutic outcomes. Total mastectomy needs to be considered for locally advanced disease with painful large ulcerative lesion.

Comparison of Distant Metastasis Sites in Early and Late Recurrence of Hormone Receptor-Positive/HER2-Negative Breast Cancer Patients Under 45 Years Old: A Retrospective Multicenter Study

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Background: Distant metastasis is a major concern in young breast cancer patients. This study examines whether distant metastasis (DM) sites differ between early (≤60 months) and late (>60 months) recurrence in hormone receptor-positive, HER2-negative breast cancer patients under 45 years old.

Methods: We retrospectively analyzed 329 young patients (age ≤45) with ER-positive/HER2-negative breast cancer who developed DM and underwent primary surgery at three institutions (2000-2011). Eligible patients received endocrine therapy for ≥24 months or until DM. Those who had undergone neoadjuvant chemotherapy were excluded. Patients were classified into early (≤60 months) and late (>60 months) DM groups. DM site distribution was compared using chi-square or Fisher's exact test, and logistic regression identified factors associated with metastasis site differences.

Result: The median age was 39.0 years (IQR: 35.0-42.0), and the median follow-up duration was 117.1 months (IQR: 75.3-155.2) in this study. DM sites included bone (37.2% vs. 30.1%), lung (11.5% vs. 20.2%), liver (6.4% vs. 5.8%), brain (1.3% vs. 1.2%), and multiple organs (39.7% vs. 34.1%) in early and late recurrence groups. There was no significant difference in DM site distribution ($p=0.102$). Visceral metastasis occurred in 32.1% of early and 22.5% of late DM cases ($p=0.070$). Bone metastasis, including multiple metastases with bone involvement, was more frequent in early (71.8%) than late recurrence (56.6%) ($p=0.006$). Logistic regression did not identify significant predictors of visceral or bone metastasis.

Conclusions: In ER-positive/HER2-negative breast cancer patients under 45, DM site distribution was largely similar between early and late recurrence. Bone metastasis was the most common site in both groups. These findings underscore the importance of surveillance strategies addressing the high likelihood of bone metastasis, particularly in DM high-risk patients, regardless of recurrence timing. regardless of recurrence timing.

Development and Pilot Testing of an E-Learning Platform for Breast Cancer Management in Rural Malaysia

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Background: Patients in the Malaysian rural community often present with advanced stage of breast cancer, posing significant challenges for healthcare providers. This exacerbates the disparity in healthcare delivery and quality between urban and rural regions. E-learning platforms have been shown to effectively overcome barriers of in-person education. An e-learning platform contextualised to the Malaysian sociodemographic offers a solution to disseminate knowledge and advice from experts in the field to support healthcare providers nationwide. The study aimed to develop an e-learning module on breast cancer management using the Genially platform and pilot tested the feasibility and effectiveness through expert validation of the module's design and relevance. It assessed healthcare practitioners' attitudes, knowledge, and confidence in managing breast cancer cases, with potential for addressing disparities in resource-limited settings.

Methods: Breast surgeons with adequate clinical experience were recruited via purposive sampling and provided feedback on the e-learning module. Participants completed the pre-module questionnaires, e-learning modules and post-module questionnaires, evaluating their knowledge, attitudes, and beliefs.

Result: Ten surgeons with 13-14 years of clinical experience participated in this pilot study. Objective improvement in knowledge and attitudes were observed. Participants demonstrated improvement in case management knowledge and three participants had reduced perceived difficulty in managing breast cancer cases after engaging with the e-learning modules. Usability feedback was favourable, highlighting its accessible design and relevance to clinical practice. All participants expressed satisfaction with the module's length and were willing to recommend it to others.

Conclusions: This pilot study successfully validated the e-learning module's design and usability through expert feedback, supporting its potential as a scalable tool for improving healthcare delivery in rural Malaysia, suggesting readiness for testing in real-world rural settings. The modules design offers a framework for addressing global healthcare inequities in resource-limited settings. Future studies should expand participant diversity and assess long-term outcomes to confirm its broader applicability.

Regrets of Japanese women with BRCA1/2 pathogenic variants who have undergone contralateral risk-reducing mastectomy: A short-term prospective study

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Background: Undergoing contralateral risk-reducing mastectomy (CRRM) is generally not a simple decision to make. In Japan, the number of people wanting to undergo CRRM has been increasing since its eligibility for insurance coverage in 2020. However, the insight into whether Japanese women with BRCA1/2 pathogenic variants have any post-CRRM regrets remains unclear.

Methods: Among women who underwent breast cancer surgery for the first time at our hospital between September 2021 and November 2024, those who carries BRCA1/2 pathogenic variants identified preoperatively and who underwent CRRM simultaneously with breast cancer surgery were included. The participants completed the Decision Regret Scale (DRS) at two time points: 1 and 6 months postoperatively (T1 and T2, respectively).

Result: Twenty-two participants responded to all questionnaires. The total DRS score did not significantly differ between T1 and T2 (median score: 15.0 and 12.5, respectively). When comparing T1 and T2 for each question, results showed a significant increase in agreement with the question "I would go for the same choice if I had to do it over again" ($P < .05$), a decreasing trend in agreement with "I regret the choice that was made," and an increasing trend in agreement with "The decision was a wise one" ($P < .10$).

Conclusions: Overall, participants did not have high levels of regret for either T1 or T2. Results suggest that after CRRM, regret gradually decreases over time and that people become more confident in their own choices. This study is the first to investigate the regrets of Japanese women with BRCA1/2 pathogenic variants who have undergone CRRM. Given that this research is a short-term, single-center study with a small sample size, more cases need to be accumulated, and the long-term effects need to be evaluated further.

Association of Long-term Oncologic Prognosis With Internal Mammary Sentinel Lymph Node Biopsy In Breast Cancer Patients

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Background: Internal mammary sentinel lymph node biopsy (IMSLNB) is a minimally invasive diagnostic technique for regional lymph nodes, which can provide accurate lymph node staging and guide adjuvant treatment decisions. However, its impact on prognosis is still unclear, leading to ongoing controversy in clinical application. This study aims to investigate the long-term prognostic outcomes of IMSLNB in early-stage breast cancer.

Methods: A retrospective analysis of 7949 patients (2016-2021) was conducted. After matching, patients were divided into IMSLNB and no-IMSLNB groups. The prognostic outcomes of the two groups were compared. The primary endpoint was DFS, and the secondary endpoints were OS, RRFS, LRFS, and DMFS.

Result: 990 patients were analyzed (330 IMSLNB, 660 no-IMSLNB). In the IMSLNB group, 54 patients were found to have IMSLN metastasis, with a metastasis rate of 16.4%; among them, 47 had axillary lymph node (ALN) metastasis and 7 had only IMSLN metastasis. With a median follow-up of 41 months, the 3-year DFS (98.4% vs 94.2%, $P = 0.007$) and 5-year DFS (92.5% vs 87.3%, $P = 0.011$) in the IMSLNB group were significantly higher than those in the no-IMSLNB group. However, there was no statistically significant difference in 3-year OS ($P = 0.338$) and 5-year OS ($P = 0.392$) between the two groups. The 3-year RRFS in the IMSLNB group was significantly higher than that in the no-IMSLNB group (99.09% vs 97.73%, $P = 0.048$), but there was no statistically significant difference in 3-year LRFS ($P = 0.130$) and DMFS ($P = 0.82$) between the two groups. Subgroup analysis revealed benefits for patients with certain characteristics (age ≤ 50, premenopausal, BMI ≤ 24, LVI, lateral tumor location, positive ALN).

Conclusions: IMSLNB can provide more accurate regional lymph node staging for early-stage breast cancer, optimize adjuvant radiotherapy strategies, thereby improving patients' RRFS and DFS. It can be widely promoted as a minimally invasive staging technique for regional lymph nodes.

BreastGuard - A Kirigami-based Fixture for Handling of Breast Specimens

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Background: Accurate intra-operative radiological assessment of lumpectomy margins improves rates of complete excision. However, current practices in specimen handling and transport can lead to inaccuracies in margin assessment and safety risks, such as hookwire-related injuries.

Methods: A specimen holder (BreastGuard) was devised to secure lumpectomy specimens in their in-vivo orientation for safe transport to the mammography suite and without further specimen manipulation. A prospective trial with 55 patients evaluated the device's performance in comparison to conventional specimen handling methods. Women undergoing hookwire-guided lumpectomy for both diagnostic and therapeutic intent were included. Specimens were mounted within the holder intra-operatively. Radiographic images of the specimens were taken with and without the holder. Margins were assessed by 2 independent radiologists. Decision for re-excision was based on images taken without the specimen holder. Qualitative user feedback was collected.

Result: 15 excisions were performed for biopsy-proven invasive carcinoma. 40 excisions were for evaluation of high-risk breast lesions. The median tumour size on imaging was 10.0 mm (IQR 14.3 mm). No high-risk lesions were upgraded on histological evaluation. 9 cases required reoperation due to focal involvement of margins by invasive carcinoma or DCIS. A statistically significant difference was observed for medial ($p = 0.041$) and lateral ($p = 0.028$) margins with and without the holder, but not for superior and inferior margins. The median difference between conventional and specimen holder margins was -0.93 mm (IQR 2.18 mm) and -1.18 mm (IQR 2.35 mm) for medial and lateral margins respectively, likely due to specimen elongation. No hookwire-related injuries occurred. Qualitative user feedback was positive, citing effectiveness in specimen handling and minimising specimen rotation.

Conclusions: BreastGuard demonstrates potential for improving the standardisation of specimen handling, transport and imaging. Refinements are required to minimise specimen distortion.

A clinical study based on NCC-BC-A scale to assess the difference between Chinese male and female breast cancer patients

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Background: Patient-reported outcome (PRO) is considered the gold standard for directly collecting data in areas such as quality of life, treatment preferences, and nursing satisfaction. The existing breast cancer PRO scales were developed and validated by western countries. It may not be possible to fully capture the actual situation of patients in China. NCC-BC-A (China advanced breast cancer PROs) is the first PRO scale tailored for Chinese breast cancer patients. This can provide more individualized and accurate medical services for Chinese patients.

Methods: This study included 100 breast cancer patients (50 males and 50 females) who received treatment in the First Affiliated Hospital, Zhejiang University School of Medicine and Tongde Hospital of Zhejiang Province from January 2023 to December 2024. Collected patients' NCC-BC-A scale results through offline interviews or phone interviews.

Result: Finally, we included 94 eligible cases, including 48 males and 46 females.In terms of physiological dimensions, fatigue, decreased appetite and difficulty falling asleep are the top three discomfort symptoms, regardless of gender.In terms of psychological dimension, female patients have stronger confidence in treatment (95.7% female, 89.6% male), while male patients are more likely to feel a sense of achievement in household chores (78.3% female, 87.5% male). In terms of social dimension, almost all female patients believe that the disease has had a certain impact on their social relationships, while male patients are even less affected (97.8% female, 54.2%male). In terms of treatment, male patients have fewer treatment side effects compared to female patients (63.0% female, 41.7% male). In other dimensions, male patients experience less economic pressure from illness compared to female patients (65.2% female, 79.2% male). In terms of overall self-evaluation, male patients are more satisfied with their current treatment status (73.9% female, 83.3% male).

Conclusions: Male and female patients with breast cancer have different PRO results. Specifically, women have better treatment compliance and confidence, while men have poorer compliance. About one-third of patients experience relief from symptoms such as fatigue and sleep disorders after receiving herbal treatment.

Introduction of Results Implemented in Clinical Practice, Assessment for Frozen Section Supported by Mammography in Breast Conserving Surgery Tissue

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Background: Breast cancer care involves a multidisciplinary team that tailors treatment based on tumor characteristics, such as stage, location, size, subtype, and metastatic status. Over time, breast-conserving surgery (BCS) has gained prominence for preserving both the organ and quality of life. The National Cancer Center (NCC) introduced BCS in 2005, and continued to develop successfully, accounting for 5% of all mastectomy surgeries in 2021, 36% in 2022, 40% in 2023, and 76% by 2024. Accurate assessment of surgical margins through techniques like frozen section analysis, supported by mammography, is essential to minimize reoperation rates and improve surgical outcomes.

Methods: In this study, BCS performed at the NCC in the second half of 2024 was supported by mammography and evaluation using frozen section according to SSO-ASTRO and NCCN guidelines, incorporating the experience gained at the Department of Pathology, KUGH. The surgical margins, sentinel nodes, and level 1 and 2 nodes were examined. A comparison was made between traditional palpation and mammography-supported frozen section methods.

Result: A comparison, histopathological results in 29 cases using frozen section of traditional palpation method between and histopathological results in 89 cases applied frozen section-supported by mammography. When analyzing each parameter between the two methods, the p-value was resulting in statistical significance ($p = < 0.0001$). However, when frozen section-supported by mammography with its histopathological results suggesting no significant difference ($p = 0.9292$). These findings indicate that our study holds statistical significance.

Conclusions: Combining frozen section analysis with mammography during BCS provides more accurate evaluations of tumor status, surrounding structures, lymph nodes, and surgical margins. This approach reduces reoperation rates, minimizes treatment mistakes, and enhances the precision of surgery, supporting better outcomes in breast cancer care. The integration of radiological techniques into surgical practice plays a vital role in improving the quality and reliability of surgical decisions.

Paediatric Malignant Breast Tumors: A Case Series of 3 Rare Breast Cancers with Varied Outcome from a Tertiary Cancer Centre India

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Background: Paediatric breast cancer is an exceptionally rare entity, with limited cases documented in medical literature. This case series presents three paediatric patients diagnosed with breast cancer, including one case of secretory carcinoma and two cases of rhabdomyosarcoma.

Methods: 3 patients of breast cancer in paediatric surgical oncology unit of a tertiary cancer centre were identified in the period between 2011 to 2024. The oncological outcomes were studied, and a review of literature was done.

Result: The youngest patient, diagnosed with secretory carcinoma and 2 year 7 months of age, underwent surgical resection in the form of mastectomy and axillary lymph node clearance. Axillary lymph node (ALN) metastasis (1 out of 11), oestrogen receptor (ER) positivity and the characteristic ETV6-NTRK3 fusion gene expression were found, and she was managed adjuvant tamoxifen and targeted agent Larotrectinib. Chemoradiotherapy was avoided considering the age and doubtful benefit. Patient is currently disease free at 6 years of age and is on regular follow up. The second patient, diagnosed with non-metastatic alveolar rhabdomyosarcoma at 11 years of age, received a combination of Neoadjuvant chemotherapy, surgery, chemotherapy, and radiation therapy with boost. ALN positivity (3 out of 8). Patient is disease free at 14 years of follow up. Another 13-year girl presented with right breast and had cervical nodes, lung nodules, bone and bone marrow metastasis on metastatic work-up. The biopsy revealed alveolar rhabdomyosarcoma. Patient was offered palliative systemic therapy but was lost to follow up after initiation of the therapy.

Conclusions: This case series underscores the importance of early diagnosis and multidisciplinary treatment approaches in achieving positive outcomes in these rare paediatric cancer patients. Further research is needed to better understand the unique challenges and optimal management strategies for this rare condition.

What to Do First for Clinically Node-Positive HR+HER2- Breast Cancer? Insights from a Survey Study by the Asian Breast Cancer Network (ABCN)

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Background: Clinical decision-making for hormone receptor-positive, HER2-negative (HR+HER2-) breast cancer with clinically node-positive disease varies significantly across clinicians and regions. This study aimed to identify consensus patterns and factors influencing treatment preferences through a survey conducted by the Asian Breast Cancer Network (ABCN).

Methods: An international survey targeting breast cancer experts was conducted in two phases: November 2023 and April 2024. Participants were presented with 18 hypothetical scenarios of clinically node-positive HR+HER2- breast cancer, varying by tumor size, lymph node (LN) involvement, grade, and patient age. Respondents selected one of four initial treatment options: upfront surgery, neoadjuvant chemotherapy, multigene assay, or others. Consensus was defined as ≥60% agreement. Factors associated with non-consensus scenarios were analyzed using univariate analysis and multivariate logistic regression.

Result: A total of 189 responses were analyzed after exclusions. Consensus was achieved in all scenarios for patients aged 65 but was less consistent for peri-menopausal (49 years old) and pre-menopausal (34 years old) patients. On multivariate analysis, scenarios with intermediate tumor sizes (2.5 cm + NML, 1 LN), significant factors included affiliation, nationality, and clinical experience. For smaller tumors with aggressive characteristics (1.5 cm, 1 LN, G III, 40%), clinicians from other Asian countries and medical oncologists showed a preference for upfront surgery.

Conclusions: This survey highlights substantial variability in treatment preferences for HR+HER2- breast cancer with clinically node-positive disease, influenced by clinician demographics and institutional factors. Enhanced access to diagnostic tools, such as multigene assays, may reduce variability and improve consensus in clinical decision-making.

First Global Chinese Breast Cancer Survivorship Consensus Initiatives with Changing Unmet Needs after the COVID Challenges

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Background: Breast cancer (BC), the most common female cancer, is becoming a chronic illness for women. Yet, there is limited attention to the survivorship unmet needs, and much less is focused on the Chinese population.

Methods: Breast oncology specialists at the Hong Kong Breast Oncology Group (HKBOG) invited members of the Global Chinese Breast Cancer Organizations Alliance (GCBCOA), who are Chinese BC survivorship support groups across 5 continents, to form the first Global Chinese BC Survivorship Consensus at their 8th biennial meeting held in Hong Kong in October, 2021. Prior to this, focused group interviews were performed for early versus advanced BC survivors, and survivors within versus beyond 5 years of complete remission. Consensus statements on 1) Education and BC care unmet needs at the time of diagnosis and treatment, 2) Communication unmet needs, 3) Long-term Physical and Psychosocial care, 4) Survivorship Specific Unmet Needs and 5) Unmet needs for Formal & Informal Carers were discussed at the meeting physically and online with representatives globally. This was repeated for the 2nd run in October, 2023 with review of the statements and adding 2 new sections: 1) Integrative Medicine for BC Survivors and 2) Emerging New Unmet Needs post-COVID 19 with discussion and real time voting of the statements.

Result: Between the first and second consensus discussion after the COVID-19 era, there is an increase in awareness of better communication and holistic care for BC survivors, but still unmet needs for patient empowerment and engagement in treatment and secondary prevention. There is also increased awareness for long-term physical and psychosocial care with Chinese BC survivors more open to discuss intimacy and inner needs such as sexual dysfunction.

Conclusions: We need further consolidation among professional bodies and collaboration with patient advocates, and better structured oncology training and survivorship programs for better Chinese BC Care and Research.

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