2026 ANNUAL MEETING

OFFICIAL PROCEEDINGS, Volume XXVII

Scientific Session Abstracts

Scientific Session Awards

Abstracts presented at the Society's virtual scientific session will be considered for the following awards:

- The **George Peters Award** recognizes the best presentation by a breast fellow.
  In addition to a plaque, the winner receives $1,000. The winner is selected by the Society's Annual Meeting Scientific Committee.

  The award was established in 2004 by the Society to honor Dr. George N. Peters, who was instrumental in bringing together the Susan G. Komen Breast Cancer Foundation, The American Society of Breast Surgeons, the American Society of Breast Disease, and the Society of Surgical Oncology to develop educational objectives for breast fellowships. The educational objectives were first used to award Komen Interdisciplinary Breast Fellowships. Subsequently the curriculum was used for the breast fellowship credentialing process that has led to the development of a nationwide matching program for breast fellowships.

- The **Scientific Presentation Award** recognizes an outstanding presentation by a resident, fellow, or trainee. The winner of this award is also determined by the Annual Meeting Scientific Committee. In addition to a plaque, the winner receives $500.

- All presenters are eligible for the **Scientific Impact Award**. The recipient of the award, selected by audience vote, is honored with a plaque.

- The **Best Poster Award** recognizes the best poster presentation in the top poster category.
  The recipient of the award, selected by audience vote, is honored with a plaque.

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Scientific Orals Presentations I

NSM

1517 - A Prospective, Multi-Center Randomized Controlled Trial (RCT) of the da Vinci SP® Surgical System vs Open Surgery in Nipple-Sparing Mastectomy (NSM) Procedures for Patients with Breast Cancer

Katherine Kopkash[1], Mara Piltin[2], James Jakub[2], Sara Javid[3], Meghan Flanagan[3], Rebecca Aft[4], Akiko Chiba[5], Alysandra Lal[6], Ari Brooks[7], Farin Amersi[8], Nayana Dekhne[9]

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Background/Objective: Robotic nipple-sparing mastectomies (rNSM) are being performed at increasing rates worldwide, yet clinical outcomes data on the U.S. experience are lacking. This trial evaluated the safety and effectiveness of rNSM performed using the da Vinci Single Port (SP)® vs. open NSM in women in the United States (US) with early-stage breast cancer.

Methods: This study was a prospective, two-arm, multi-center randomized controlled trial (RCT) performed under the US Food and Drug Administration (FDA) Investigational Device Exemption (IDE) G220319. Surgeries were performed at 14 US sites after IRB approval by 23 surgeons who had undergone specific training in the use of the SP system, the study protocol, and the study procedures. Study patients were women with early-stage breast cancer (clinical Tis-T2 and N0), BMI <30, tumor-skin distance ≥5mm, tumors located ≥10 mm from the nipple-areolar complex (NAC), calcifications ≤5 cm for DCIS, breast size C cup or smaller, breast ptosis ≤grade 2, and candidates for unilateral or bilateral NSM procedure(s). Contralateral prophylactic NSM and neoadjuvant treatment were allowed. Immediate reconstruction was performed as one- or two-stage implant-based procedures. Patients were randomized 1:1 to rNSM or open NSM. The primary outcomes of interest were conversion from rNSM to open NSM, adverse event rates at 42 days post-operatively, and positive surgical margin (PSM) rates. The PSM was defined as ≤2mm for DCIS and "ink on tumor" for invasive cancer. Additional data was collected on operative times, final pathology results, blood loss, hospital stay, SKIN score assessment of mastectomy flap, NAC viability and patient-reported outcomes (PRO) including BREAST-Q data. Results were analyzed using Fisher's exact tests. The study concluded prior to completion of planned enrollment due to 510(k) clearance being granted by the FDA.

Results: A total of 74 patients were consented, enrolled, randomized, and had the surgery completed per protocol (37 rNSM, 37 open NSM) between 8/11/23 and 12/31/25. Many of these patients had bilateral NSM and the final number of NSM was 65 rNSM (38 therapeutic, 27 prophylactic) and 66 open NSM (38 therapeutic, 28 prophylactic). Patient and tumor characteristics were similar between the two groups (Table 1). The average time for the NSM procedure for rNSM vs. open NSM was 141.6 minutes (min) vs. 83.9 min ($p < 0.001$), and the average time for reconstruction was 79.7 min for rNSM vs. 62.5

min for open NSM (p = 0.008). No patients in the rNSM arm required a conversion to an open procedure. Serious adverse events (SAEs) at 42 days occurred in 3 rNSM pt (8.1%) and 8 open NSM patients (21.6%). Per the Data Safety Monitor (DSM), there were no device-related SAEs in the rNSM group. NAC preservation at 42 days was 100% in the rNSM patients vs. 98.5% in the open NSM group. There were 2 unplanned reoperations in the rNSM patients (5.4%) vs. 8 in the open NSM group (21.6%). The PSM rate was the same between the rNSM (6 patients, 16.2%) and open NSM groups (6 patients, 16.2%; p > 0.9). There was no statistical difference in the rate of "ink on tumor" (0 in the rNSM group, 0.0%, vs. 1 in the open NSM group, 2.7%, p>0.9) or DCIS ≤2mm from the margin (6 patients in rNSM group, 16.2%, and 5 patients in NSM group, 13.5%, p>0.9). There were no local or distant recurrences of cancer in any trial patients. There were more favorable baseline to 6-month changes in BREAST-Q scores in the rNSM group compared to open NSM in the domains of sexual well-being (-7.2 vs. -11.6, p = 0.2), satisfaction with breasts (-0.6 vs. -6.3, p = 0.3), and physical well-being chest (-9.1 vs. -16.6, p = 0.1), although none of these were statistically significant.

Conclusion: These results demonstrate that da Vinci SP® rNSM is safe and effective for patients with early-stage breast cancer with comparable outcomes to open NSM. The operative times were longer for rNSM and rNSM reconstruction, which likely reflects the early learning period for this technique. The PSM rate was similar between the groups. BREAST-Q scores suggest favorable trends in the rNSM group compared to the open NSM group. These investigators eagerly await additional long-term data from robust clinical trials to help determine the role of rNSM for breast cancer patients.

Table 1.Patient characteristics, Tumor information, and Clinical Outcomes

Characteristic	SP RCT Patients N = 26 Breasts N=46	Open RCT Patients N = 27 Breasts N=48	p-value
Age(years)			0.2
Mean (SD)	49.3 (9.19)	45.6 (11.45)	
Body Mass Index (BMI)			0.093
Mean (SD)	21.7 (2.48)	22.9 (2.95)	
Breast Cup Size			0.5
A	5/26 (19.2%)	4/27 (14.8%)	
B	17/26 (65.4%)	15/27 (55.6%)	
C	4/26 (15.4%)	8/27 (29.6%)	
Therapeutic Breasts: Cancer Type*, n (%)			
Ductal Carcinoma In-Situ	10 (37.0%)	16 (59.3%)	0.2
Invasive Ductal Carcinoma	18 (66.7%)	18 (66.7%)	0.9
Invasive Lobular Carcinoma	5 (18.5%)	1 (3.7%)	0.11
Other	3 (11.1%)	2 (7.4%)	0.7
Tumor Size* (cm)			
Mean (SD)	1.8 (1.06)	1.6 (1.22)	0.7
Closest Distance of Tumor to Skin* (mm)			0.3
Mean (SD)	13.4 (8.63)	16.5 (12.37)	
Closest Distance of Tumor to Nipple Areolar Complex (NAC)* (mm)			0.5
Mean (SD)	35.2 (19.99)	31.8 (15.57)	
History of Chemotherapy or other neoadjuvant therapies	4/26 (15.4%)	7/27 (25.9%)	0.3
Estimate Blood Loss (EBL)			0.076
Mean (SD)	55.6 (39.15)	90.6 (91.03)	
Cancer Recurrence (at 6 months)	0	0	

*Only applicable for therapeutic breasts, analysis performed at breast level.

Age Extremes

1309 - Surgical Management of Young Women with High-Risk Breast Cancer Receiving Neoadjuvant Systemic Therapy

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Background/Objective: Despite breast-conserving therapy having been found to be equivalent to mastectomy for many patients with early-stage breast cancer, mastectomy rates continue to be higher in younger women compared to older women. The impact of this more extensive breast surgery on overall survival and local recurrence in younger women is unknown, especially after neoadjuvant systemic therapy. The goal of this study was to evaluate the trends and outcomes in the surgical management of patients age ≤45 years vs >45 years enrolled in the I-SPY2 clinical trial, a multicenter neoadjuvant systemic therapy platform trial.

Methods: Clinical and pathological factors were reviewed comparing patients age ≤45 years vs >45 years with clinical stage II-III breast cancer enrolled in the I-SPY2 clinical trial from April 2010 through June 2022. All patients enrolled had tumors with high-risk MammaPrint scores. MRI functional tumor volumes (FTV) before and after neoadjuvant systemic therapy were calculated. FTV is a quantitative imaging biomarker measured on contrast-enhanced breast MRI based on the quantity of tissue within the tumor meeting enhancement thresholds. Surgical therapy was categorized as 1) breast-conserving surgery (BCS) vs mastectomy, and 2) sentinel node surgery (SN) vs axillary lymph node dissection (ALND). For associations between continuous baseline characteristics and age groups, the Wilcoxon rank-sum test was used. For associations between categorical baseline characteristics and age groups, Pearson's Chi-squared test and Fisher's exact test were used. Associations of age groups with overall survival (OS) and local recurrence-free interval (LRFI) were examined with the Kaplan-Meier method, log-rank test, and multivariate Cox proportional hazard regression models, adjusting for patient and clinical factors of tumor subtype, clinical T category, clinical nodal status, histologic grade, breast/axillary surgeries, and Residual Cancer Burden (RCB) Class.

Results: There were 1737 patients included in this study, with 698 (40.2%) age ≤45 years and 1,039 (59.8%) age >45 years. There were no significant differences in patient characteristics of self-reported race/ethnicity or tumor features such as receptor subtype (HR+HER2 negative, HER2 positive, or triple-negative), clinical tumor/nodal categories, or histologic grade by age groups. RCB class distribution after NAC was also similar between age groups. Patients age ≤45 years had greater MRI FTV before (32.88 cm3 vs 23.02 cm3, p<0.001) and after (4.60 cm3 vs 3.22 cm3, p<0.001) neoadjuvant systemic therapy. Rates of BCS were lower in those age ≤45 years than patients older than 45 years (36.8% vs 48.5%, p<0.001). There were no significant differences in extent of axillary surgery between age groups (SN: 65.0% vs 65.4%; ALND: 35.0% vs 34.6%, p=0.9). Median time to last follow-up or death was 5.24 years, with 200 OS events (≤45: 80; >45: 120) and 133 LRFI events (≤45: 58; >45: 75). On multivariate analysis,

there were no significant differences in OS or LRFI for patients aged ≤45 years undergoing breast-conserving surgery vs mastectomy for surgical management. For patients age ≤45 years, there was no significant difference in OS by breast surgery across tumor subtypes, although BCS was associated with better LRFI within the HR+HER2 negative subtype (p=0.047).

Conclusion: Young women with locoregionally advanced, high-risk breast cancer in the I-SPY2 clinical trial had higher FTV on breast MRI and lower rates of breast-conserving surgery than older women. Importantly, the extent of breast surgery did not impact overall survival or locoregional recurrence in women age ≤45 after adjusting for other clinical characteristics and response. The choice of surgical procedure in the management of breast cancer is multifactorial, but young age does not necessarily warrant mastectomy following neoadjuvant systemic therapy.

Time to Treatment

1248 - Targeted Multidisciplinary Continuous Improvement Process Reduces Time to Breast Cancer Surgery with Immediate Reconstruction

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Background/Objective: Breast surgery with immediate breast reconstruction (IBR) is associated with delays in definitive surgery potentially delaying adjuvant therapy. Prior work suggests that early referral to plastic surgery and flexibility in operative scheduling may improve timeliness. This study evaluates the effectiveness of a multiphase quality improvement (QI) initiative in reducing time to treatment (TTT) of breast cancer for patients undergoing upfront surgery with immediate reconstruction.

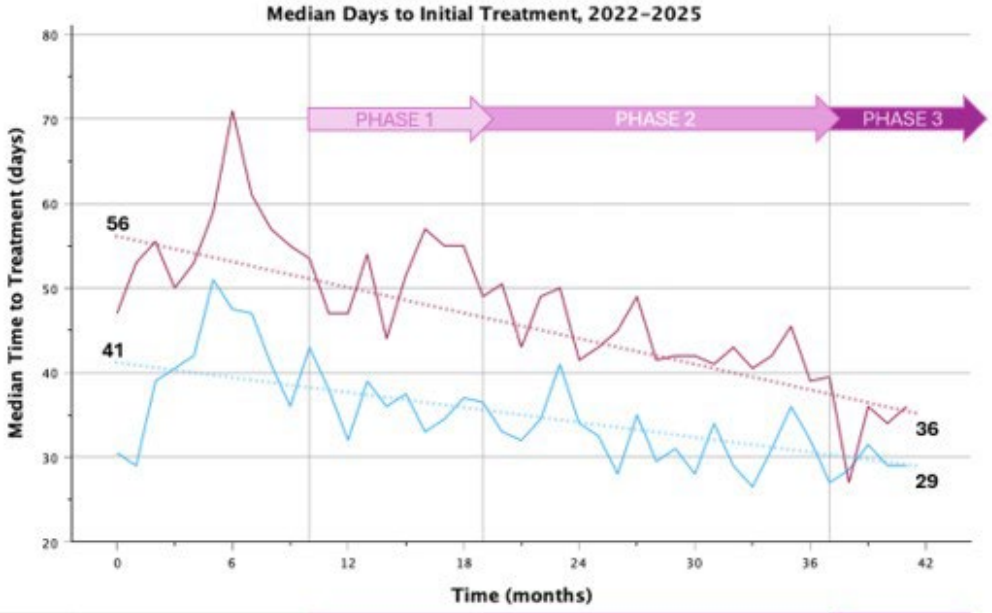
Methods: This retrospective cohort study evaluated patients with newly diagnosed breast cancer undergoing upfront surgery at a single institution between January 2022 and June 2025. Primary breast procedures included lumpectomy and mastectomy with IBR (including oncoplastic breast reduction, implant-based reconstruction, and autologous tissue reconstruction). Patients with metastatic disease, neoadjuvant therapy, or first treatment outside this institution were excluded. Data collected included patient and tumor characteristics, dates of biopsy and initial treatment, and procedure details. Time to treatment metrics were analyzed at each interval of the multiphase QI initiative, which comprised 3 phases: (1) implementation of a weekly multidisciplinary team huddle 2) implementation of a standardized communication protocol, and (3) implementation of OR alignment between breast surgery and plastic surgery. The primary outcome was median TTT at each phase. To ensure reducing TTT for patients undergoing breast surgery with IBR did not delay treatment for other patients, TTT for patients not undergoing IBR during the same period was tracked as a balancing metric.

Results: A total of 3,468 patients met inclusion criteria. Median age at diagnosis was 63 years (IQR=53,71). Diagnosis was made at the same institution (78.6%) or an outside institution (21.4%). Clinical tumor stages were Tis (17.8%), T1 (64.8%), T2 (15.7%), T3 (1.5%), and T4 (0.2%). Clinical nodal stages were N0 (95.3%), N1 (4.6%), and N2 (0.1%). Initial procedure was surgery without IBR (65.9%) and surgery with IBR (34.2%). Breast procedure was lumpectomy in 61.7% and mastectomy in 38.3%. With

implementation of the QI initiative, median TTT over the study period for the surgery without IBR declined from 41 (IQR=28,54) to 29 days (IQR=19,39) and for the surgery with IBR group from 56 (IQR=41,71) to 36 days (IQR=25.5,46.5). Percentage of patients waiting longer than 45 days for surgery declined from 40.8% to 22.7% (p<.001) in the surgery without IBR group and from 68.1% to 27.6% (p<.001) in the surgery with IBR group. Figure 1 demonstrates the phase-to-phase reduction in median TTT. Phase-to-phase analysis showed that while both groups demonstrated early, statistically significant reductions in TTT over time, only the IBR group continued to improve beyond Phase 2 (p<.001) while the no IBR group plateaued after Phase 2 (p=.253).

Conclusion: Stepwise implementation of weekly multidisciplinary huddles, standard communication and operative alignment meaningfully reduced TTT for patients with breast cancer undergoing breast surgery with IBR, while the balancing measure of TTT for breast surgery without IBR also decreased. The greatest impact occurred when OR alignment was fully adopted, highlighting the importance of system-level coordination between breast and plastic surgery.

Figure 1. Median days to initial treatment for newly diagnosed breast cancer patients at a single institution from January 2022 to June 2025.



Median Time to Treatment, days (p value*)	Pre-Intervention	Phase 1	Phase 2	Phase 3
Breast surgery with IBR	56	52 (p=.024)	43 (p<.001)	36 (p<.001)
Breast surgery without IBR	41	36 (p=.006)	32 (p<.001)	29 (p=.253)

*Kruskal-Wallis test was used to determine the statistical significance of the impact of each phase on the median time to treatment. Significance was set at p<0.05.

SLN

1145 - Impact of Axillary Surgery Omission Under SOUND, INSEMA, and Choosing Wisely Criteria on CDK4/6 Inhibitor Eligibility in HR+/HER2– Breast Cancer

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Background/Objective: Recent clinical trials have broadened the criteria for omission of sentinel lymphadenectomy (SLNB) in early-stage breast cancer. Since 2017, omission has been routine for patients ≥70 years with HR+/HER2– tumors per Choosing Wisely (CW) guidelines, and findings from the SOUND and INSEMA trials prompted recent ASCO guidelines extending eligibility to patients ≥50 years with small, low-grade tumors. Concurrently, the monarchE (abemaciclib) and NATALEE (ribociclib) trials demonstrated improved outcomes with adjuvant CDK4/6 inhibitors in high-risk disease. Because CDK4/6 eligibility depends largely on nodal status, expanding SLNB omission may unintentionally exclude some patients from these therapies. We aimed to quantify this effect and identify clinicopathologic factors predicting missed eligibility.

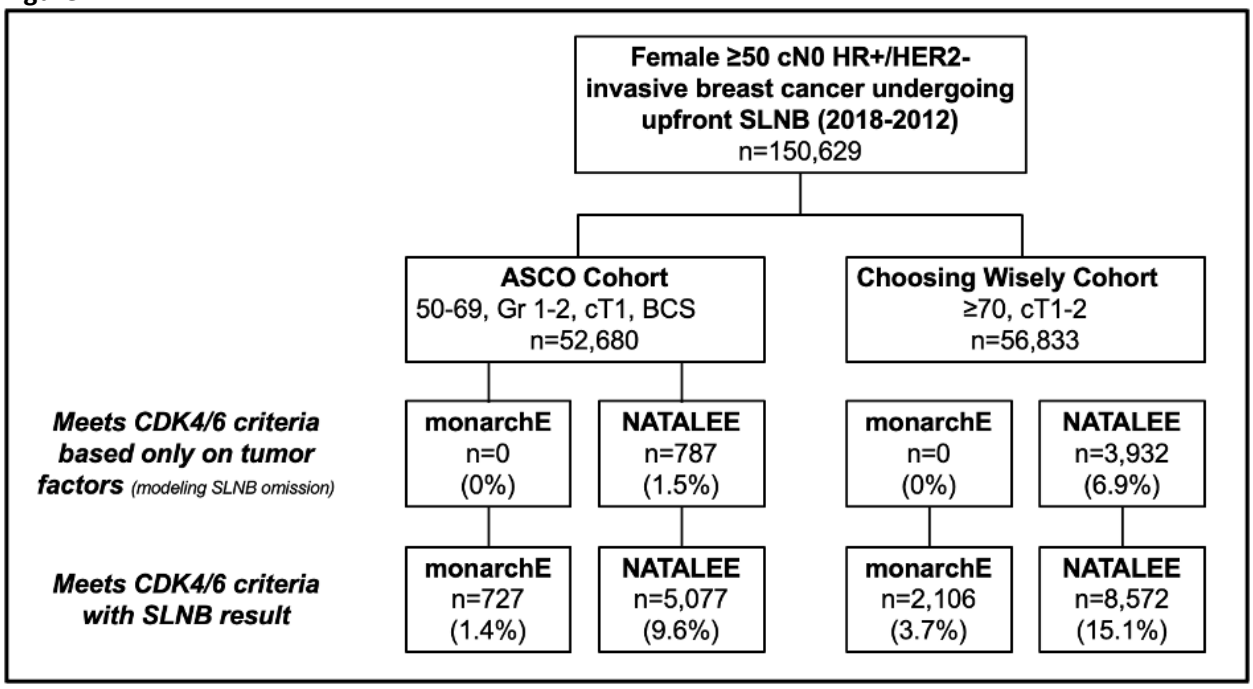
Methods: From the National Cancer Database (2018–2022), we identified women ≥50 years with HR+/HER2–, cT1–2N0M0 breast cancer who underwent upfront surgery with SLNB. Two omission-eligible cohorts were defined: ASCO (ages 50–69 with grade 1–2, cT1 tumors treated with breast-conserving surgery) and CW (≥70 with cT1–2 tumors). For each cohort, CDK4/6 inhibitor candidacy was assessed using three sets of factors: (1) tumor features alone (simulating SLNB omission), (2) SLNB, and (3) ALND findings. Multivariable logistic regression identified predictors of SLNB being the deciding factor for CDK4/6 eligibility.

Results: Among 150,629 patients identified, 73% met criteria for SLNB omission (ASCO: 52,680; CW: 56,833). Positive sentinel nodes were found in 9% of ASCO and 10% of CW patients, with only 2% in each classified as pN2–3. Among ASCO-eligible patients, 1.5% were CDK4/6 candidates based on tumor features alone; omission would fail to identify 1% meeting monarchE and 8% meeting NATALEE criteria (Figure). In the CW cohort, 7% were CDK4/6 candidates without SLNB, while omission would miss 4% and 8% meeting monarchE and NATALEE criteria, respectively. ALND was performed in 14% (1,349/9,634) of patients with 1–2 positive SLNs and 45% (287/643) with ≥3 positive SLNs, increasing CDK4/6 candidacy by only 1%. Predictors of SLNB serving as the deciding factor for CDK4/6 eligibility were similar between cohorts and included low-grade histology, cT1 tumor, Ki-67 <20%, and presence of lymphovascular invasion. Finally, using these data and the absolute 4-year invasive disease-free survival (iDFS) gains reported in NATALEE, we estimate that approximately 250–460 SLNBs would need to be performed to yield one additional patient with improved iDFS attributable to ribociclib.

Conclusion: Among patients ≥50 years meeting criteria for SLNB omission, fewer than 10% qualify for adjuvant CDK4/6 inhibitors even when SLNB is performed, indicating a low marginal oncologic benefit based on current iDFS data. Because axillary ultrasound use was not standardized or captured in the NCDB, these results may overestimate missed candidates; however, incomplete genomic testing data (available for only half of patients) may have led to undercounting ribociclib-eligible cases. Our findings highlight the need to balance the potential oncologic benefit of expanded systemic therapy eligibility

against the morbidity of axillary surgery. Given the immaturity of NATALEE data and the uncertainty surrounding the clinical relevance of missing a small subset of CDK4/6-eligible patients, our findings underscore the importance of shared decision-making when considering SLNB omission. Routine axillary surgery may not be warranted solely to identify CDK4/6 candidates, but decisions should be carefully individualized within a multidisciplinary framework.

Figure:



1095 - Increase in Non-Guideline Concordant De-Implementation of Axillary Lymph Node Dissection

Anna Louie[1], Samantha Thomas[2], Laura Rosenberger[3], Jennifer Plichta[3], Kendra Modell Parrish[1], Gayle DiLalla[1], Akiko Chiba[5], Astrid Botty van den Bruele[1], E. Shelley Hwang[1], Maggie DiNome[1], Ton Wang[4]

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Background/Objective: There has been rapid de-implementation of axillary lymph node dissection (ALND) and increased indications for ALND omission in patients with node=positive disease in both the upfront surgery (USurg) setting and after neoadjuvant chemotherapy (NAC). De-implementation, which is the science of discontinuing practices in response to new evidence, can have unintended consequences through decreasing a practice in a setting that was not intended to be de-implemented. We hypothesized that rapid ALND de-implementation may have had a spillover effect that resulted in increased rates of non-guideline concordant ALND omission over time.

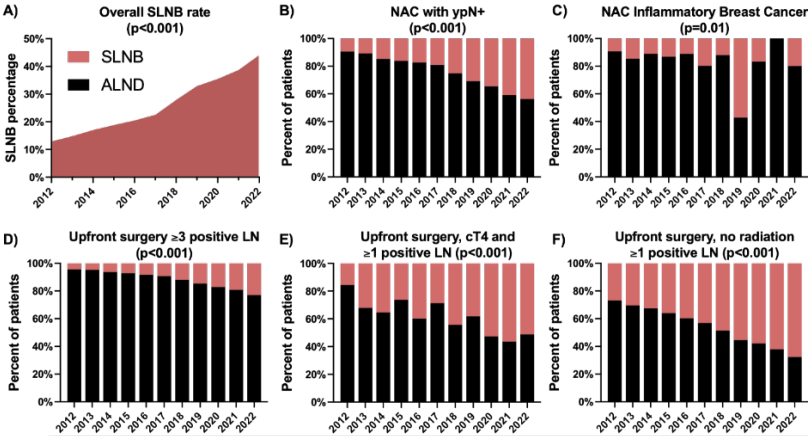
Methods: We performed an analysis of the National Cancer Database (NCDB) of patients ≥18 years with invasive breast cancer from 2012-2022 who met current NCCN guidelines for ALND. For patients who

underwent USurg, we defined indications for ALND as: 1) ≥3 positive lymph nodes (LNs), 2) cT4 tumors and ≥1 positive LNs, or 3) no adjuvant radiotherapy and ≥1 positive LNs. For patients who received NAC, indications for ALND were: 1) inflammatory breast cancer, or 2) residual nodal disease at surgery (ypN+). Patients were defined as receiving non-guideline concordant ALND omission if they received sentinel lymph node biopsy (SLNB) only. Logistic regression was used to identify factors associated with receipt of ALND vs. SLNB after adjustment for available covariates. Cox Proportional Hazards modeling was used to identify factors, including axillary surgery, associated with overall survival (OS) after adjustment for available covariates.

Results: Overall, 189,781 patients met inclusion criteria; 138734 (73.1%) with USurg, 51047 (26.9%) NAC. 44,118 (23.2%) received non-guideline concordant omission of ALND. ALND omission increased over time with only 14.3% and 9.5% of USurg and NAC patients, respectively, receiving SLNB in 2012 compared to 44.2% of USurg and 43.5% of NAC patients receiving SLNB in 2022 (Figure 1). Across all indications for ALND, we observed a significant trend towards decreasing ALND rates over time (all $p \leq 0.01$). Patients undergoing USurg with ≥1 positive LNs and no adjuvant radiotherapy had the highest rate of ALND omission (67.6% in 2022), while patients undergoing USurg with ≥3 positive LNs (23.0% in 2022) and NAC patients with inflammatory breast cancer had the lowest rates of ALND omission (20.0% in 2022). For both patients undergoing USurg and NAC, patient factors associated with higher odds of guideline-concordant ALND receipt included higher comorbidity score (Score 1 vs 0 OR 1.104, $p<0.001$), Hispanic and non-Hispanic Black compared to non-Hispanic White race and ethnicity (OR 1.07-1.115, both $p<0.01$), and lower community education level (OR 0.941, $p=0.002$). Tumor factors associated with ALND receipt included lobular histology (vs ductal, OR 1.241, $p<0.001$), higher grade (grade 3 vs grade 1, OR 1.46, $p<0.001$), higher clinical T-category (cT4 vs cT1, OR 1.683, $p<0.001$), and higher clinical N-category (cN3 vs cN1, OR 6.128, $p<0.001$). For patients receiving NAC, HR+/HER2- and triple-negative subtypes had higher odds of ALND receipt compared to HR+/HER2+ subtypes (OR 1.175-1.214, $p<0.001$). For patients receiving USurg, care at an integrated network cancer program was associated with lower odds of ALND (vs academic research program, OR 0.866, $p=0.008$). In patients with ypN+ disease after NAC, ALND receipt was associated with worse adjusted OS (vs SLNB, HR 1.15, $p<0.001$). For all other indications for ALND, type of axillary surgery was not significantly associated with OS.

Conclusion: Non-guideline concordant ALND omission has increased over time, suggesting a possible unintended consequence of ALND de-implementation in other evidence-based scenarios. Clinicopathologic features such as grade, histology, and clinical staging have the largest effect on type of axillary surgery performed, suggesting that providers may be selectively performing ALND based on perceived oncologic risk.

Figure 1 – Rates of SLNB and ALND over time by ALND indication



*P-values represent Cochran-Armitage trend tests to determine if a monotonically increasing trend for SLNB exists over time

Scientific Oral Presentations II

Stage IV

1499 - Does Locoregional Treatment in Non-Progressive De Novo Metastatic Breast Cancer Improve Overall Survival? A Randomized Controlled Trial

Mahtab Vasigh[1], Farhad Shahi[2], Mehrzad Mirzania[2], Sadaf Alipour[2], Khatereh Mousavi[2], Bita Eslami[2], Newsha Nazarian[2], Ramesh Omranipour[2]

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Background/Objective: Less than 10% of breast cancer patients present with distant metastases at the time of diagnosis, considered de novo metastatic (dnMBC). They are deemed non-curable, and local treatment is reserved for palliative care. Retrospective studies indicate potential survival benefit of primary tumor resection in metastatic cases. Six prospective randomized trials have been published: SUBMIT and POSYTIVE trials closed early due to low accrual. MF07-01 showed that locoregional treatment (LRT) was a prognostic factor associated with better overall survival (OS). Tata Memorial study, EA2018, and JCOG, revealed that LRT did not prolong OS in dnMBC. The systemic treatments (ST) and LRT were not similar in these studies. This study hypothesized that OS would be similar between those who do not progress on ST, undergo LRT, and continue ST afterward, and those who have not progressed on ST at randomization and remain on systemic treatment alone.

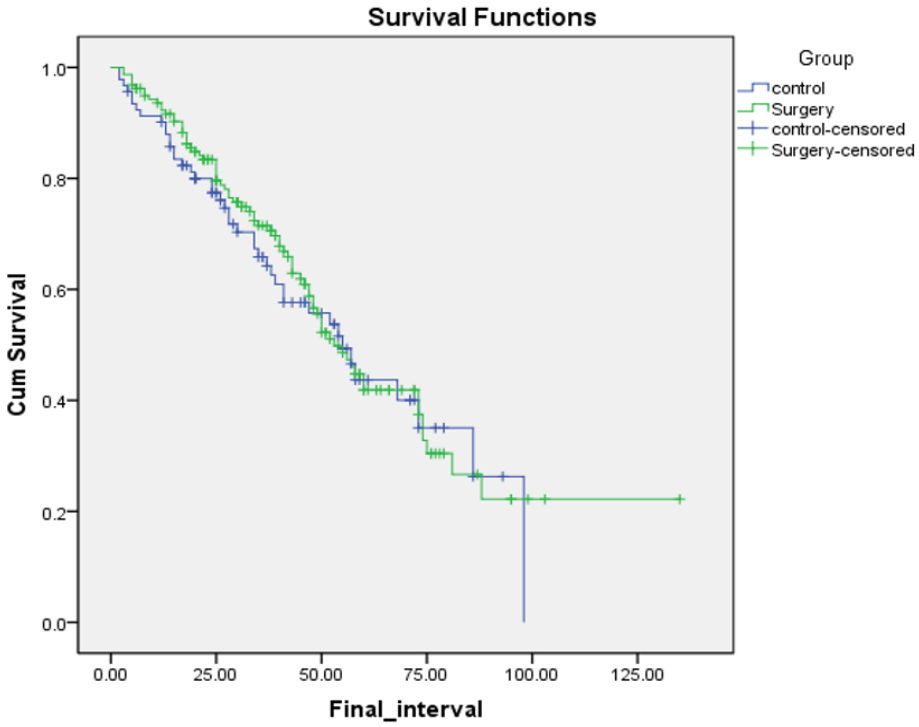
Methods: This randomized controlled clinical trial included deNovo metastatic breast cancer patients. Metastatic status was evaluated by either a positron emission tomography (PET) or a CT scan plus radionuclide bone scans before inclusion in the study, complemented by additional imaging (MRI, simple bone X-rays) as needed. The decision to biopsy the metastatic site(s) was evaluated independently for each case at the Institute Multidisciplinary Breast Tumor Board (MDT). All eligible patients received systemic therapy (ST) guided by the National Comprehensive Cancer Network (NCCN) guidelines, based on age, menopausal status, estrogen receptor (ER), progesterone receptor (PR), and HER2 status of the primary tumor. Thereafter, the patients were evaluated for the response to ST by the same modality as before ST. Those whose disease progressed under initial ST were not enrolled. Progression was defined as the development of new metastases, the growth of metastatic lesions, or local progression after three months. Patients who agreed to participate provided consent and were randomly assigned to the LRT group or the systemic treatment (Control) group. The LRT group underwent a free-margin lumpectomy or mastectomy. Sentinel lymph node biopsy was performed in clinically node-negative patients, and axillary lymph node dissection (ALND) was performed in patients with clinically involved lymph nodes or positive sentinel lymph nodes. All patients received maintenance systemic therapy thereafter and were visited every three months for a minimum of 2 years from the time of randomization. The primary endpoint was overall survival (OS). OS was defined as the time to death from randomization.

Results: 250 eligible dnMBC patients were randomly assigned to the LRT group (158 patients) or the control group (92 patients), between 2018 and 2023. The two groups did not differ significantly

regarding age (50 vs 51 years, p = 0.45), tumor size (34 vs 39 mm, p = 0.16), or laterality (left, right, or bilateral). In the LRT group, 66% were Hormone receptor–positive (HR+), 24% HER2+, and 2% triple-negative, compared with 73% HR+, 21% HER2+, and 6% triple-negative in the control group (p = 0.39). Bone-only metastasis was present in 84 patients (33.6%), whereas 166 patients (66.4%) were found to have visceral metastasis. In the LRT group, 34% had bone-only metastasis, compared with 65% in the control group (p = 0.8). The estimated median follow-up time was 55 months; 53 months (95% CI: 48.9–61.1) in the LRT group and 55 months (95% CI: 43.7–66.3) in the control group. At the time of data cutoff (two years after the last enrollment), 74 (46.8%) deaths were recorded in the LRT group, compared to 43 (46.7%) in the control group. Overall, the mortality rate was higher among patients with visceral metastasis compared to those with bone only metastases (73.5% vs. 26.5%, p = 0.03). Our results demonstrated a 2-year survival rate of 93% and a 5-year survival rate of 43% for all patients. The Cox proportional hazards model, adjusted for laterality, metastatic site, tumor subtype, and grade, did not show a significant difference between the LRT and control groups (HR: 1.62; 95% CI: 0.72–3.68; p = 0.25). However, HER2-positive tumors were associated with a higher hazard of death compared with HR+ tumors (HR 2.3; 95% CI: 1.18–4.49; p = 0.02). Lung metastasis also increased the risk of death (HR: 1.53, 95% CI: 1.04-2.26, p-value: 0.03) compared to other types of metastases.

Conclusion: LRT for the primary site did not improve OS in dnMBC, who did not progress under ST. Visceral metastasis, compared to bone-only metastasis, lung metastasis, and HER2 positivity, increased the risk of death in dnMBC patients. We sought to address limitations of previous trials and avoid them in our study design. In the Tata Memorial study, ST was not continued after randomization, so OS was 20.5% in the ST and 19.2% in the LRT group at 5-year follow-up. Besides, HER2+ patients did not receive anti -HER2, and ER+ patients rarely received endocrine therapy. The Turkish MF07/01 trial showed a 34% reduction in hazards of death in the ST + LRT group compared with ST alone, but unlike our study, they did not initiate ST before LRT. EA2018 and the JCOG trial revealed that LRT did not prolong OS. The estimated median survival of our patient was 54 months, similar to EA2018, but higher than Tata Memorial (20 m) and MF07 (36 m), and lower than JCOG 1017 (69 m). Considering the dates of each trial, it seems that improvements in ST have led to better recent outcomes. The EA2018 subgroup analysis did not show better OS in HR+ or HER2+ patients after early LRT, whereas the JCOG study showed improved OS with LRT in premenopausal HR+ tumors. We found the worst outcome in HER2+ tumors. This can be explained by the limited access to dual anti-HER2 therapy for the majority of our patients. JCOG showed a survival advantage with LRT in those with a single organ metastasis. We found that bone-only metastases had a better OS, and those with lung metastases had poorer OS. The difference in OS between the two arms in the JCOG 1017 trial increased over the last year of the study. A 10-year follow-up of the MF07-01 trial showed a median survival of 46 months for LRT, compared to 35 months for the ST (HR=0.71). These findings suggest a late benefit of LRT, and further investigations with longer follow-up are warranted.

Figure:



Other

1324 - Impact of Omission of Sentinel Lymph Node Surgery on Radiation Treatment in Patients Age 50 and Older with Breast Cancer Treated with Lumpectomy: A Single-Institution Retrospective Review

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Background/Objective: With recent trials, including SOUND and INSEMA, showing the safety of omission of sentinel lymph node (SLN) surgery in select patients undergoing breast-conserving therapy, SLN surgery is being omitted in practice for some patients over the age of 50 with early stage (T1-T2), clinically node negative, hormone receptor positive, HER2 negative breast cancer. However, most patients in these trials received whole-breast radiotherapy (WBI). The impact of SLN omission on radiation (RT) warrants evaluation, since de-escalation of surgery could unintentionally influence radiotherapy patterns towards WBI. We sought to determine trends in use of SLN surgery and RT and the impact of omission of SLN surgery on RT. Additionally we sought to evaluate (1) in patients 50-69 whether SLN omission is associated with greater use of WBI and lower use of PBI, and (2) in patients 70 or older whether SLN omission affects RT omission.

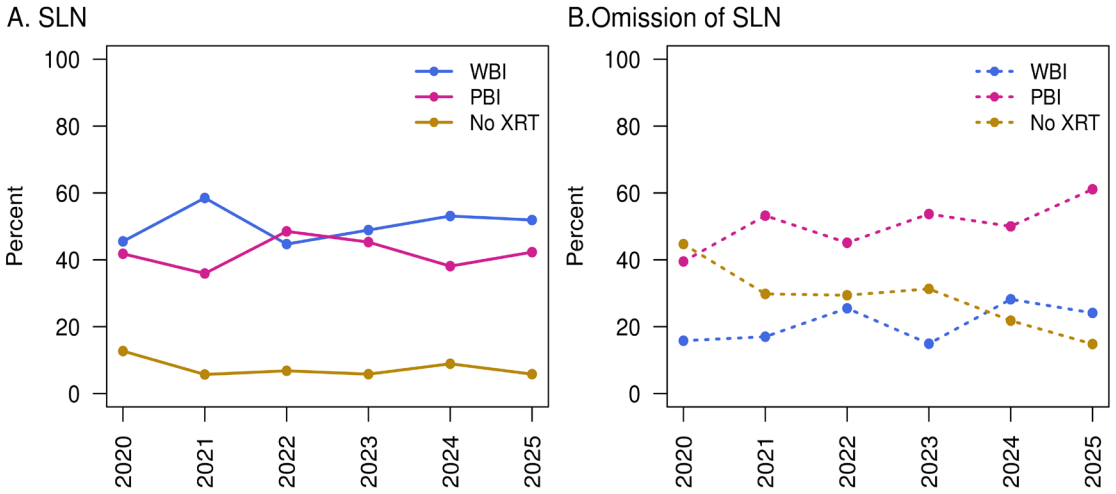
Methods: With IRB approval, we conducted a retrospective review of women age 50 and older

diagnosed with cT1/cT2 ER+/HER2- breast cancer treated with breast-conserving surgery (BCS) between 1/1/2020-8/1/2025 at a single institution. Patients who underwent neoadjuvant chemotherapy were excluded. SLN surgery trends along with use of RT were evaluated with Cochran-Armitage trend tests. Type of RT was categorized into no radiation, PBI and WBI.

Results: We identified 1,016 breast cancers among 999 women diagnosed with cT1/cT2 ER+/HER2- disease that underwent BCS. SLN surgery was performed in 66.8% while 33.2% had omission of SLN surgery. SLN surgery significantly decreased from 74.5% in 2020 to 49.1% in 2025, p<0.001. Those who underwent SLN surgery were younger (64 vs 76, p<0.001), more commonly cT2 (19.2% vs 6.5%, p<0.001), higher grade (59.9% vs 48.5%, p=0.001), and more likely to undergo RT (92.5% vs 72.5%, p<0.001). Among those who did not undergo SLN surgery, PBI was most common at 51.0%, followed by no RT in 27.5% and WBI in 21.5%. Rates of PBI among this group increased from 39.5% in 2020 to 61.1% in 2025 (p=0.10) while WBI had a minimal increase (15.8% to 24.1%, p=0.17). Among those who underwent SLN surgery, 90.9% were pN0. Both PBI and WBI administration had similar rates (~46%) in this group. 95.2% of those who were pN+ underwent WBI. Within the SLN surgery groups, PBI and WBI rates remained stable over time (p=0.73 and p=0.85). Overall, in patients with omission of SLN surgery (compared to those with SLN surgery), rate of WBI was lower (21.5% vs 50.9%, p<0.001), rate of PBI was higher (51.0% vs 41.6%, p=0.004) and omission of RT was higher (27.5% vs 7.5%, p<0.001). Among patients aged 50-69 years, RT was omitted in 11.1% of patients with omission of SLN surgery compared to 5.8% of the SLN surgery group (p=0.19). Those with omission of SLN surgery who underwent RT were more likely to undergo PBI (75.0%) compared to WBI (25.0%). In those who had SLN surgery, WBI was more utilized compared to PBI (52.7% vs 47.3%). Patients aged 70+ who had omission of SLN surgery were more likely to have PBI (48.6%) or omission (30%) of RT compared to WBI (21.4%). Whereas those who had SLN surgery were more likely to receive WBI (56.3%) vs PBI (28.9%) or omission of RT (14.8%).

Conclusion: With increased adoption of omission of SLN surgery from 2020 to 2025, rates of RT treatment and use of WBI did not increase. In fact, patients who had omission of SLN surgery were more likely to have PBI or omission of radiation compared with those who underwent SLN surgery. With multidisciplinary coordinated care de-escalation of axillary surgery, did not hinder de-escalated approaches to radiotherapy in well suited patients. In selected, low-risk patients, we are successfully de-escalating both axillary surgery and radiation.

Figure:



SLN/NAC

1115 - Prospective Clinical Trial on Expanding the Eligibility Criteria for Targeted Axillary Dissection After Neoadjuvant Systemic Therapy in Breast Cancers with Advanced Nodal Disease

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Background/Objective: Targeted axillary dissection (TAD) is an established axillary staging method for breast cancer patients with low nodal disease following neoadjuvant chemotherapy (NAC). Patients who achieve axillary pathological complete response (pCR) are spared from axillary dissection (AD) and its associated morbidities. Current evidence on TAD has been centered around clinically N1 patients with fewer than three metastatic nodes. For patients with a higher nodal burden, the gold standard of re-staging the axilla continues to be AD, despite the observation of similarly high axillary pCR rates after modern NAC protocols. This study hypothesizes that TAD is non-inferior to conventional AD in terms of nodal staging in breast cancer patients with advanced nodal disease. Our aim is to evaluate the diagnostic accuracy of TAD after NAC, with a focus on patients presenting with a higher nodal burden.

Methods: Patients diagnosed with invasive ductal or lobular carcinoma with higher nodal burden planned for NAC followed by curative surgery are eligible. Higher nodal burden is defined as more than three metastatic nodes up to clinically N3 stage in this study. Marking of the metastatic node is performed before the start of systemic treatment. Patients with good response after NAC will undergo TAD followed by AD in the same surgery. Pathological results of both procedures are compared. The primary outcome is the false negative rate (FNR) of TAD. Secondary outcomes include clipped node detection rate, concordance between the clipped node and sentinel nodes, and axillary pCR rates.

Results: A total of 55 patients were recruited and analyzed prospectively since February 2023. 7 patients were withdrawn during the study period, resulting in 48 patients receiving the study procedure after NAC. The overall technical success rate of TAD is 95.8% (46 of 48 patients) with a clipped node detection rate of 100% and sentinel node detection rate of 95.8%. Amongst those with successful TAD, the median number of sentinel nodes retrieved was 3 (range, 1-9). The clipped node was identified as an additional sentinel node in 64.6% of patients. The median time taken to perform TAD was 25 minutes (range, 10-80). Axillary pCR was achieved in 52.2% patients (24 of 46 patients). In the remaining patients who did not achieve axillary pCR, TAD demonstrated a FNR of 0%. Metastatic nodes were detected in only the clipped node in 54.5% patients, only the sentinel node in 22.7% patients, and found in both the clipped and sentinel nodes in 22.7% patients.

Conclusion: In this study involving patients with clinically N1 (more than 3 metastatic nodes), N2, and N3 patients, the 0% FNR indicates that TAD is a highly accurate method for detecting residual axillary disease in patients with a significant nodal burden. Our findings reveal that the metastatic nodes may be identified within only the clipped nodes or only the sentinel nodes, underscoring the importance of performing both components of TAD. We recommend the removal of at least three nodes during TAD, in alignment with the current NCCN guidelines. With more than 50% of patients achieving axillary pCR, there is potential to expand the eligibility criteria of TAD to include these patients and ultimately spare them from formal AD even in the context of higher nodal burden breast cancers.

1078 - Lymphovascular Invasion in SOUND-eligible Breast Cancer: Implications for Occult Axillary Nodal Metastasis

Thomas Amburn[1], Matthew Sporn[1], Caitlin Marsh[1], Acacia Sharma[1], Jiaqi Wu[1], Charles DiMaggio[1], Likolani Arthurs[1], Deborah Axelrod[1], Freya Schnabel[1], Mary Gemignani[1]

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Background/Objective: The SOUND randomized control trial demonstrated that omitting sentinel lymph node biopsy (SLNB) in clinical T1N0 breast cancer with normal pre-operative axillary ultrasound (AxUS) is noninferior to performing SLNB. Despite lymphovascular invasion (LVI) being an important predictor of regional and distant metastasis, the rate of nodal upstaging in SOUND-eligible (cT1N0) breast cancer with LVI remains unknown. This study aims to evaluate the association of pathologic-confirmed LVI with occult axillary nodal metastasis (pN+) among SOUND-eligible breast cancer patients.

Methods: IRB approved retrospective review of institutional prospective database was performed to identify patients with cT1N0 breast cancer from 2011-2025 who underwent upfront surgery with lymph node surgery. Inclusion criteria included pre-operative breast biopsy identifying a primary invasive carcinoma and normal pre-operative AxUS. Patients who underwent neoadjuvant therapy were excluded. Both macro- and micrometastasis were included as pathologic nodal metastasis. Clinicopathologic variables were collected. Pearson's chi-square test, unpaired t-test and logistic regression were used to analyze the cohort.

Results: We identified 716 patients with cT1N0 breast cancer, of whom 416 (58.1%) met the inclusion criteria with a total of 421 cases of invasive breast cancers (5 patients with bilateral breast tumors). Axillary nodal metastasis (pN+) occurred in 14.3% (n=60) of breast cancer cases. Of those with pN+, 58.3% (n=35) had pathologic-confirmed LVI. All patients with extensive nodal disease (pN2-3) (n=7, 1.6%) had LVI. Presence of LVI was significantly associated with pN+ (47.3%, n=35) compared to absence of LVI (7.2%, n=25) (OR 11.6; 95%CI 6.27, 21.3; p<0.0001). The diagnostic value of LVI to predict pN+ was as follows: sensitivity 58.3% (95% CI 44.9%, 70.9%), specificity 89.2% (95% CI 85.5%, 92.2%), PPV 47.3% (95% CI 38.4%, 56.4%), and NPV 92.8% (95% CI 90.5%, 94.6%). On multivariate analysis, LVI (OR 10.6; 95% CI 5.72, 19.84; p<0.0001) and pathologic tumor size (OR 2.37; 95%CI 1.00, 5.40; p=0.044) were independently associated with axillary nodal metastasis (Table1).

Conclusion: Pathologic-confirmed LVI was present in nearly half of SOUND-eligible breast cancer patients with axillary nodal metastasis and all patients with extensive nodal metastasis (pN2-3). Among identified high-risk features, LVI was independently associated with axillary nodal upstaging. Presence of LVI is an adverse pathologic finding and may play a role in patient selection for the application of SOUND-criteria and whether omission of sentinel node biopsy is warranted.

Table. Clinicopathologic characteristics of entire cohort and categorized by presence of lymphovascular invasion.

Clinical*	**Total**	**LVI present**	**LVI absent**	**p value****
Patients	**416**	**71**	**345**	
Mean age (years)(IQR)	59.5 (50.8, 68.8)	57.3 (46.5, 68.4)	59.9 (51.4, 68.8)	0.10
Pre-menopause	96 (23.1)	23 (32.4)	73 (21.2)	0.043
Race/ethnicity				
Asian	34 (8.2)	12 (16.9)	22 (8.9)	0.011
Black/African-descent	60 (14.4)	5 (7.0)	55 (15.9)	
Other/not reported	24 (5.8)	6 (8.5)	18 (5.2)	
Other-Hispanic/Latinx	42 (10.1)	5 (7.0)	37 (10.7)	
White/Caucasian	256 (61.5)	43 (60.6)	213 (61.7)	
Tumors	**421**	**74**	**347**	
Mean tumor size (IQR)(cm)	1.23 (0.70, 1.79(	1.50 (1.00, 1.90)	1.17 (0.70, 1.55)	0.0003
Mean positive node (range)	0.27 (0, 10)	1.14 (0, 10)	0.089 (0, 3)	<0.0001
P stage I	341	38 (51.3)	303 (87.3)	<0.0001
P stage 2	73	18 (24.3)	55 (15.9)	
P stage 3	7	7 (9.5)	0	
pT 1	381	60 (81.1)	321 (92.5)	0.0033
pT 2	40	14 (18.9)	26 (7.5)	
pN 0	361	39 (52.7)	322 (92.8)	<0.0001
pN+	60	35 (47.3)	25 (7.2)	
1	53	28 (37.8)	25 (7.2)	<0.0001
2	7	6 (8.1)	0	
3	1	1 (1.4)	0	
Invasive ductal	364	70 (94.6)	294 (84.7)	0.076
Invasive lobular	34	2 (2.7)	32 (9.2)	
Invasive other	23	2 (2.7)	21 (6.1)	
Grade 1	62	3 (4.1)	59 (17.0)	0.0058
Grade 2	228	40 (54.1)	188 (54.2)	
Grade 3	131	31 (41.9)	100 (28.8)	
HR+/HER2-	341	59 (79.7)	282 (81.3)	0.14
HR+/HER2+	34	10 (13.5)	24 (6.9)	
HR-/HER2+	8	2 (2.7)	6 (1.7)	
HR-/HER2-	38	3 (4.1)	35 (4.7)	
Elevated Ki-67	184 (44.2)	36 (48.6)	148 (42.7)	0.35
*Variables included in MVA for pN+: pre-menopause, race/ethnicity, tumor size (pT), histologic type, histologic grade, hormone receptors, elevated Ki-67, lymphovascular invasion				
**Pearson's Chi-squared test; Unpaired T-test				

1055 - Clinical Impact and Outcomes of Neoadjuvant Systemic Therapy for Invasive Lobular Carcinoma: Report from the Largest Single Institutional Analysis

Genevieve Fasano[1], Jason Mouabbi[1], Helen Johnson[1], Heather Lin[1], Kerollos Wanis[1], Susie Sun[1], Anthony Lucci[1], Vicente Valero[1], Melissa Mitchell[1], Yu Shen[1], Kelly Hunt[1], Henry Kuerer[1]

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Background/Objective: The incidence of invasive lobular carcinoma (ILC) has increased in recent years, particularly in localized and regional stage categories. Observational studies regarding therapeutic response of ILC to neoadjuvant systemic therapy (NST) suggest that ILC is less favorable compared to invasive ductal carcinoma. Additionally, the prognostic impact of pathologic complete response (pCR) in ILC has been called into question. The purpose of this study was to characterize the response of ILC to NST, including both neoadjuvant chemotherapy (NAC) and neoadjuvant endocrine therapy (NET).

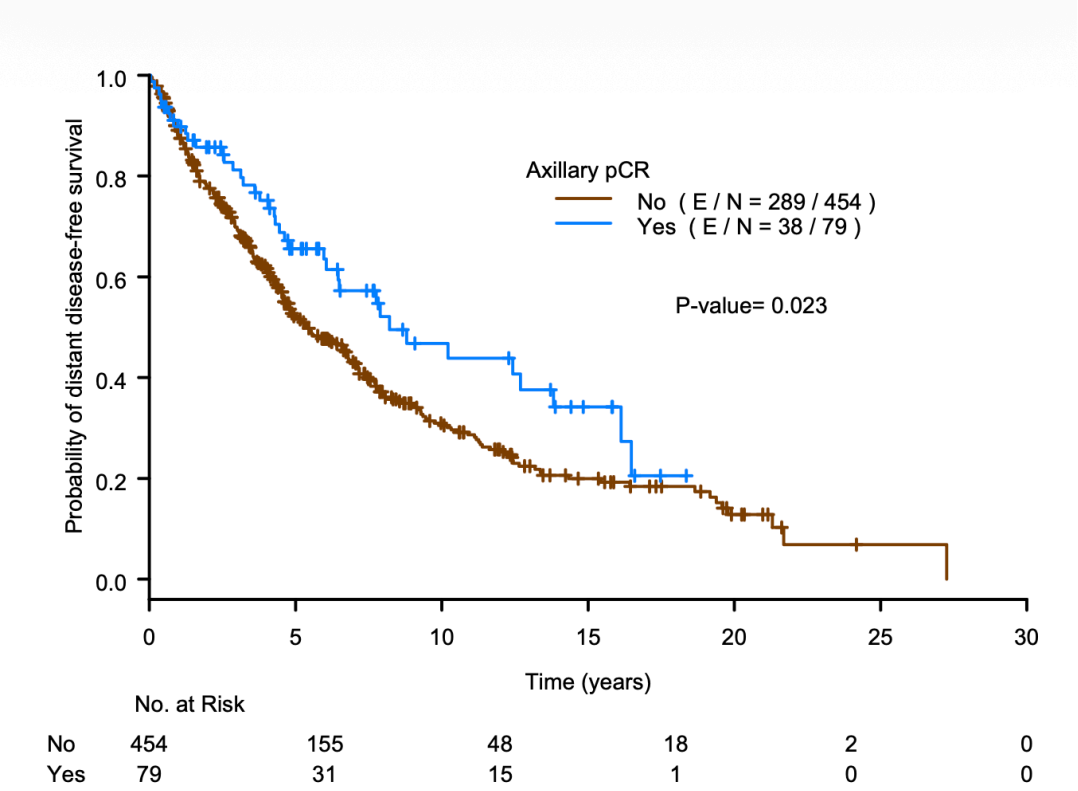
Methods: A prospectively maintained institutional database was utilized to identify patients diagnosed with non-metastatic classic ILC who received neoadjuvant systemic therapy (NAC and NET), underwent surgery, and had at least one year of follow-up. Clinicopathologic characteristics, distant recurrence-free survival (DRFS), and overall survival (OS) were compared for patients with and without a breast and axillary nodal pCR. Survival outcomes were evaluated using Kaplan-Meier analyses.

Results: Among patients diagnosed with non-metastatic ILC from 1991 to 2023, 853 were included in the analysis; 715 received NAC and 138 received NET. Most patients had large primary and nodal metastases (85% cT2-T4 tumors; 63% with biopsy-proven nodal metastasis). Most patients had luminal subtype tumors (85.7%), with 9.9% having HER2+ disease, and 4.4% triple-negative tumors. The overall mastectomy rate was 81.8%, and 78.2% of patients had axillary lymph node dissection (ALND), with 18.6% undergoing sentinel lymph node biopsy (SLNB) alone. Patients receiving NAC were more likely to be clinically node-positive (69.1% vs. 34.3%; $p = 0.0005$), have grade 3 disease (18.7% vs. 8.7%; $p = 0.0082$), and undergo mastectomy (84.2% vs. 69.6%; $p < 0.001$), and ALND (83.5% vs. 53.4%; $p < 0.0001$) compared to patients receiving NET. Overall breast and axillary nodal pCR rates were 4.9% and 9.3%, respectively. Among patients who had a breast pCR, nearly all received NAC (95.2%). Similarly, 97.5% of patients who had a nodal pCR received NAC. Both breast and nodal pCR occurred in 22 patients (2.6%), all of whom received NAC. Multivariate analysis demonstrated that breast and nodal pCR was significantly associated with subtype (HER2+ > TNBC > HR+; $p < 0.0001$). At a median follow-up of 8.9 years, the cumulative incidence of local recurrence after mastectomy was 4.8%, and in-breast tumor recurrence rate after lumpectomy was 9%. A nodal recurrence occurred in 2.7%, with 13 in the axillary nodes, 8 in supraclavicular nodes, and 2 in internal mammary nodes. Among 159 patients who had a SLNB, there was 1 axillary nodal recurrence (0.6%). The 10-year DRFS for patients who had a breast pCR was 61% compared to 43% for those who did not ($p = 0.177$). Patients who had a nodal pCR demonstrated significantly higher 10-year DRFS compared to those without a nodal pCR (47% vs. 30%; $p = 0.023$; Figure). Patients with a nodal pCR had a higher 10-year OS compared to those without (65% vs. 48%; $p = 0.068$).

Conclusion: In this largest, single-institutional analysis of NST in ILC patients, the occurrence of both a breast and nodal pCR was a rare event. However, distant recurrence-free survival and overall survival were increased in patients with ILC receiving NST who experienced a nodal pCR (9.3%) compared to those without. Sentinel lymph node biopsy after NST appears to be safe and effective in ILC patients, as

it was associated with a very low long-term nodal recurrence rate.

Figure:



Quality Measures

1023 - Functional Outcomes for Breast Cancer Survivors Following an Intense Resistance Training Program Based on Surgical Management of the Breast and Axilla

Lucia Castro Hernandez[1], David Carpenter[2], Thomas Julian[1], Suzanne Coopey[1], Emil Fernando[1], Colin Champ[3]

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Background/Objective: Traditional postoperative guidelines have long discouraged upper extremity resistance training in patients undergoing mastectomy (Mx) or axillary lymph node dissection (ALND) due to concerns for impaired recovery. However, emerging evidence supports exercise as both safe and beneficial for patient survivorship. However, the extent to which breast and axillary surgery influences objective functional recovery after a structured resistance training program remains unclear. The purpose of this study is to identify if such a structured program affects recovery.

Methods: We performed a secondary analysis of a prospective cohort of 197 breast cancer survivors completing a 3-month in person and supervised resistance training regimen utilizing dose-escalation of compound movements and exercise volume to promote hypertrophy. Participants were stratified by Mx (n=85) versus lumpectomy (Lx) (n=112) and ALND (n=26) versus no ALND (n=171), the latter encompassing patients who either underwent sentinel lymph node biopsy (SLNB) or omission of axillary staging. Baseline clinical, physical, and functional parameters were assessed via ultrasound and bioimpedance analysis (for body composition), Functional movement Screen (FMS), hand grip strength, Godin activity surveys, and Y-balance test. Weight lifted was measured via load (repetitions x sets x weight) during split squat, dumbbell bench press, dumbbell rows, and hex bar deadlifts. These variables were compared using Welch's t-test, chi-square, and Mann–Whitney U tests. Pre- to post-regimen changes were assessed using paired t-tests, and multivariable linear regression identified predictors of both baseline and pre- to post-regimen change in functional movement screen (FMS) score.

Results: At baseline, Mx patients were younger, more likely to have received ALND or chemotherapy, and less likely to have received radiation (all $p < 0.05$). Specifically, the Mx group had a median age of 51 years old versus 59 years old in the Lx group; 21 patients (24.7%) in the Mx group underwent ALND compared with 5 (4.5%) in the Lx group; 38 (44.7%) in the Mx group received chemotherapy versus 30 (26.8%) in the Lx group; and 55 (64.7%) in the Mx group received radiation therapy compared with 94 (83.9%) in the Lx group. No significant baseline differences were observed in body composition or functional parameters. Both Mx and Lx groups demonstrated significant pre- to post-regiment improvements in BMI, muscle mass percentage, body fat percentage, phase angle, FMS score, composite load lifted, and load lifted for each movement pattern (all $p < 0.001$). The magnitude of improvement across all parameters did not differ by Mx or ALND status, except for greater Y-balance gains in patients without ALND (Table 1). In multivariable models, older age ($\beta = –0.09$, 95% CI: –0.124 to –0.055) and receipt of radiation ($\beta = –0.86$, 95% CI: –1.709 to –0.011) were associated with lower baseline FMS ($p < 0.05$), while age alone predicted smaller FMS improvement ($\beta = –0.05$, 95% CI: –0.087 to 95% CI: –0.015, $p = 0.006$). While Mx trended with less improvement in bench press load lifted, it was not significant ($p = 0.19$). Baseline clinical and treatment factors explained 18.5% of the variability in FMS scores ($R2 = 0.185$), indicating a modest influence on initial functional status. In contrast, these factors accounted for only 6.7% of the variability in pre- to post-program FMS improvement ($R2 = 0.067$), suggesting that functional gains were largely independent of surgical or treatment history and primarily driven by the exercise intervention.

Conclusion: Participation in a 3-month supervised resistance training regimen yielded meaningful functional gains in breast cancer patients, regardless of surgical management of the breast and axilla. Mx and ALND were not independent predictors of either baseline or pre- to post-regimen improvement in FMS or load lifted, even with bench press movements. The findings of this secondary analysis support the broad applicability of dose-escalated resistance training across surgical modalities for breast cancer.

Table 1. Comparison of the Magnitude of Changes Across Pre- and Post-Regimen Parameters for Participants Across (A) Receipt of Mastectomy and (B) Receipt of Adjuvant Lymph Node Dissection (ALND).

A.

Parameter	Lumpectomy (n=112)	Mastectomy (n=85)	P-value
Change in Composite Load	2144.70 [1610.75 - 2960.40]	2031.00 [1422.90 - 2987.10]	0.922
Change in BMI (kg/m2)	-0.11 [-0.64 - 0.36]	-0.26 [-0.97 - 0.13]	0.269
Change in Inbody Bodyfat (%)	-1.50 [-2.50 - -0.10]	-1.50 [-2.80 - -0.10]	0.992
Change in Inbody Muscle Mass (%)	0.98 [0.17 - 1.72]	1.03 [0.20 - 1.86]	0.446
Change in Bone Mineral Content	0.02 [-0.09 - 0.19]	0.00 [-0.11 - 0.11]	0.169
Change in Whole Body Phase Angle	0.20 [0.00 - 0.35]	0.20 [0.00 - 0.40]	0.755
Change in Inbody RMR	16.00 [-1.25 - 36.00]	14.00 [-1.00 - 28.00]	0.387
Change in Grip Strength	3.50 [0.00 - 6.00]	2.50 [0.00 - 6.00]	0.900
Change in Godin Score	21.00 [8.75 - 28.25]	20.00 [10.00 - 34.00]	0.601
Change in FMS Score	2.00 [0.00 - 3.00]	2.00 [1.00 - 4.00]	0.217
Change in Y Balance	10.06 [4.58 - 16.11]	8.99 [4.89 - 16.28]	0.318

B.

Parameter	No ALND (n=171)	ALND (n=26)	P-value
Change in Composite Load	2110.60 [1551.40 - 2977.90]	2384.00 [1324.00 - 2942.00]	0.504
Change in BMI (kg/m2)	-0.13 [-0.72 - 0.32]	-0.30 [-0.65 - 0.18]	0.985
Change in Inbody Bodyfat (%)	-1.50 [-2.75 - -0.10]	-1.30 [-2.28 - 0.07]	0.099
Change in Inbody Muscle Mass (%)	1.03 [0.19 - 1.79]	0.85 [0.11 - 1.46]	0.172
Change in Bone Mineral Content	0.02 [-0.09 - 0.14]	-0.04 [-0.16 - 0.07]	0.915
Change in Whole Body Phase Angle	0.20 [0.00 - 0.30]	0.26 [0.10 - 0.40]	0.840
Change in Inbody RMR	16.00 [-1.00 - 32.50]	9.00 [-11.50 - 28.00]	0.243
Change in Grip Strength	3.00 [0.00 - 6.00]	1.75 [-0.38 - 3.75]	0.325
Change in Godin Score	21.00 [9.00 - 30.50]	17.50 [12.50 - 33.00]	0.908
Change in FMS Score	2.00 [1.00 - 4.00]	1.00 [0.00 - 2.75]	0.123
Change in Y Balance	9.93 [4.77 - 16.39]	7.11 [3.41 - 14.12]	0.036

Quickshots

NSM

1515 - A Prospective, Multicenter Investigation of the da Vinci® Surgical System in Prophylactic Nipple-Sparing Mastectomy Procedures

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Background/Objective: Nipple-sparing mastectomy (NSM) accounts for up to 40% of mastectomies in some centers according to recent reports. Robotic nipple-sparing mastectomy (R-NSM) was initially described for human use in 2014 and has since increased in popularity and adoption internationally. Within the United States, data is limited and thus an Investigational Device Exemption (IDE) G190065 was obtained through the Food and Drug Administration (FDA) to evaluate the safety and effectiveness of the da Vinci® Surgical System for the application of prophylactic NSM.

Methods: A prospective, multicenter, single-arm trial was designed to evaluate R-NSM for patients seeking prophylactic NSM to reduce the risk of breast cancer. Eligible patient criteria included female sex, age 18-80, increased risk for breast cancer, breast ptosis ≤grade 2, cup size ≤C, and body mass index (BMI) <30 kg/m2. The primary safety endpoint was intraoperative NSM procedure-related adverse events (AE)s with the surgical system, device-related adverse events, and all post-operative AEs through 42-day follow-up. The primary effectiveness endpoint was completion of R-NSM without conversion to open. The study initially utilized the multiport (Xi) Surgical System and was revised to the use of the Single Port (SP) Surgical System in 2024. The BREAST-Q questionnaire was administered preoperatively, at 42 days post-operatively, and annually thereafter. R-NSM time is measured from incision to removal of gland, reconstruction time from plastic surgery start to incision close. Enrollment ended prior to planned 145 patients due to the FDA granting 510(k) clearance, concluding the IDE trial. Since 510(k) clearance was designated for the da Vinci® SP platform, the results of this analysis will focus on patients treated with the SP device.

Results: From 2021-2025, 94 subjects enrolled and signed consent and 85 completed a rNSM before the data cutoff date. Of those, 57 procedures (109 breasts) were completed with the Xi System and 28 (56 breasts) using the SP System. Of the patients treated with the SP system, the median age was 41 years (range 27-60), median BMI 23 kg/m2 (range 18.3-29.0), predominant race was white (92.9%) with 89.3% non-Hispanic or Latino ethnicity. 18 patients (64.3%) had grade 1 ptosis and predominant cup size was B (57.1%) with most (N=19, 67.9%) premenopausal. A total of 15 AEs among 10 subjects were reported. Of the 10 patients who experienced AEs, 3 had a serious AE (SAE) including 1 cellulitis, 1 hematoma and 1 gastrointestinal bleed, none of which were deemed related to the device. Most non-serious AEs were classified as mild (75%) including skin burn (n=4), skin flap/nipple areolar complex (NAC) ischemia (n=1), NAC injury or scab (n=4) and rash (n=3). No patients required conversion to open and 93% were discharged on day 0. Those admitted had a mean stay of 1.0 days (SD 0.0). All specimens were an intact mammary gland. Pathology included 2 breasts with ductal carcinoma in-situ (3.6%), 1 (1.8%) with

invasive ductal carcinoma, and 1 (1.8%) with atypia. The mean incision length was 3.4cm and all patients had pre-pectoral implant-based reconstruction, 66.7% (n=37 breasts) having expanders as first stage. Of the SP cases, the median rNSM time per breast was 102 minutes (range 68-297) with median reconstruction time per breast of 50.5 minutes (range 17-112). Median estimated blood loss was 50mL (range 5-125) and no transfusions were reported. With long term follow-up ongoing, 42-day NAC sensitivity scores indicated that 59.3% of patients (n=16/27) report some nipple sensitivity. 26 of 27 patients (96.3%) answered that they would "probably" or "certainly" choose the same operation again and 100% (n=27) of patients would "probably" or "certainly" advise this operation to other women.

Conclusion: Robotic NSM is a safe and feasible procedure for risk reduction in women at increased risk of breast cancer. With 510(k) clearance for the use of the da Vinci® SP surgical system for NSM, this data is a valuable addition to the literature representing the prospective experience of a multi-institutional collection of surgeons from the United States with early adoption of rNSM for prophylactic breast surgeries. Early patient reported outcome data supports high patient satisfaction with the procedure. Long-term follow-up to 5 years is ongoing.

Reconstruction

1501 - Preoperative vs Postmastectomy Radiotherapy in Immediate DIEP Breast Reconstruction: CAPPELLA Trial Interim Analysis

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Background/Objective: The optimal sequencing of radiotherapy and immediate autologous reconstruction in patients receiving neoadjuvant chemotherapy remains uncertain. Preoperative radiotherapy may reduce radiation exposure to the flap and potentially streamline overall treatment. The CAPPELLA trial (ClinicalTrials.gov Identifier: NCT05512286) is a multicenter randomized controlled trial comparing patient-reported outcomes and safety between preoperative radiotherapy and conventional postmastectomy radiotherapy (PMRT) in this setting.

Methods: In this ongoing open-label, multicenter randomized controlled trial conducted in China, women with locally advanced breast cancer planned for mastectomy, radiotherapy, and immediate deep inferior epigastric perforator (DIEP) flap reconstruction after neoadjuvant chemotherapy were enrolled. Patients were randomly assigned (1:1) to receive either preoperative radiotherapy (preop-RT) (42.56 Gy in 16 fractions to the breast and regional nodal areas, including internal mammary nodes) followed by skin-sparing/nipple-sparing mastectomy with DIEP flap reconstruction, or to undergo mastectomy with immediate DIEP reconstruction followed by PMRT (42.56 Gy in 16 fractions to the chest wall and regional nodal areas, including internal mammary nodes). The primary endpoint is satisfaction with breasts (BREAST Q) at 2 years. Secondary endpoints include quality of life, complications, and oncological safety. This pre planned interim analysis reports 3-month surgical complications and early BREAST Q scores. Continuous variables were compared using t-tests and

categorical variables using chi-square tests.

Results: Between September 2022 and April 2025, 89 patients were randomized, 45 preop-RT and 44 PMRT. At 3 months, the incidence of major delayed incision healing was 2.8% (1/36) in the preop-RT group versus 9.5% (3/36) in the PMRT group. No complete/partial flap loss occurred. Fat necrosis (≥2 cm) was identified in 1 patient (2.8%) in the preop-RT arm and 2 patients (5.6%) in the PMRT arm. Baseline BREAST-Q satisfaction scores were lower in the preop-RT group (54.56 ± 19.94) than in the PMRT group (62.38 ± 25.53). At 3-month postoperative assessment, scores improved in both groups to 62.36 ± 13.58 (preop-RT) and 69.64 ± 21.99 (PMRT). Importantly, the interval from last neoadjuvant chemotherapy to completion of local treatment (surgery and radiotherapy) was significantly shorter in the preop-RT group (median 67.5 days, mean 72.31 ± 22.70) compared to the PMRT group (median 113 days, mean 113.63 ± 19.74), demonstrating a substantial reduction in overall treatment time with the preoperative sequence.

Conclusion: This interim analysis demonstrates comparable early safety and patient-reported satisfaction between preoperative radiotherapy and conventional PMRT in immediate DIEP reconstruction after neoadjuvant chemotherapy. Furthermore, preoperative radiotherapy significantly shortened the total local treatment duration by approximately 45 days, offering a clear logistical advantage by potentially reducing the overall treatment time. The transient lower baseline satisfaction in the preop-RT group likely reflects pre mastectomy breast changes from radiotherapy and warrants consideration in patient counseling. Long term follow-up is essential to evaluate aesthetic outcomes, quality of life, and oncological safety.

Table 1. Baseline characteristics of participants

Characteristics		Preoperative (n=36)	Postmastectomy(n=42)	t/χ2
Age (mean±std.)		40.86±6.95	39.52±5.67	0 921
BMI (mean±std.)		23.06±3.13	23.41±3.15	-0 490
Marriage	Married	31(86.11)	39(92.86)	0 958
	Unmarried	5(13.89)	3(7.14)	
Give Birth	None	6(16.67)	5(11.90)	0 861
	Single	18(50.00)	19(45.24)	
	Multiple	12(33.33)	18(42.86)	
Cesarean	No	19(63.33)	26(70.27)	0 361
	Yes	11(36.67)	11(29.73)	
Histological type	IDC	35(97.22)	42(100.00)	1 182
	ILC	1(2.78)	0(0.00)	
Molecular subtyping	Luminal A	11(30.56)	10(23.81)	1 721
	Luminal B	10(27.78)	10(23.81)	
	HER2+/ER-	4(11.11)	9(21.43)	
	HER2+/ER+	8(22.22)	9(21.43)	
	TNBC	3(8.33)	4(9.52)	
cT	T1	0(0.00)	2(4.76)	2 303
	T2	20(55.56)	21(50.00)	
	T3	11(30.56)	15(35.71)	
	T4	5(13.89)	4(9.52)	
cN	N0	2(5.56)	3(7.14)	2 995
	N1	12(33.33)	21(50.00)	
	N2	18(50.00)	16(38.10)	
	N3	4(11.11)	2(4.76)	
IMN M	No	34(94.44)	39(92.86)	0 081
	Yes	2(5.56)	3(7.14)	

1470 - Effect of Breast Cancer and Antibiotic Duration on the Microbiome and Outcomes After Implant-Based Breast Reconstruction

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Background/Objective: The most common reconstructive method after mastectomy is implant-based reconstruction (IBR), accounting for over 70% of cases. Postoperative infection is a major source of morbidity in IBR, with rates up to 30%, compared to 0.1-1.5% after cosmetic breast augmentation. These infections can lead to serious consequences, including implant failure and delays to adjuvant treatment. In other surgical fields, the microbiome influences postoperative complications, including infection, and gut microbial differences have been linked to breast cancer risk. Once presumed sterile, breast tissue harbors its own microbiome, with prior work showing altered diversity and abundance between breast cancer patients and healthy controls. While antibiotics may modify these microbial environments, their impact in post-mastectomy IBR remains unclear. We investigated how antibiotic duration and breast cancer status affect gut and breast microbiomes and their association with postoperative infection after IBR.

Methods: We designed a two-arm, randomized controlled trial enrolling patients undergoing mastectomy with immediate IBR. Patients were randomized to receive either 24 hours or 7 days of postoperative antibiotics. Pre- and postoperative stool samples and skin swabs, intraoperative breast tissue, and postoperative periprosthetic fluid samples were collected. Baseline demographics, cancer diagnosis and treatment history, as well as surgical details including prior breast surgery, mastectomy indication, use of tissue expander or permanent implant, and implant plane (prepectoral vs. subpectoral) were analyzed. Primary outcomes included postoperative implant infection rates and changes in microbial diversity. Specimens underwent 16S rRNA sequencing and alignment using the SILVA database. Data were rarified. α diversity was estimated by calculating Shannon index, and β diversity was tested using PERMANOVA. We previously demonstrated that it is feasible to perform 16S rRNA sequencing of breast tissue and periprosthetic fluid to define the local breast microbiome. Development of implant infection and changes in patients' microbiomes were first compared between antibiotic regimen groups and then by mastectomy indication (therapeutic (TM) vs. prophylactic (PM)). A p-value < 0.05 was considered significant.

Results: A total of 133 patients (234 breasts) were enrolled and completed mastectomy with at least 3 months of follow-up. Of these, 65 patients (109 breasts) received 24 hours of postoperative antibiotics and 68 (125 breasts) received 7 days. Antibiotic duration was not associated with infection rate (p=.526), implant loss (p=.303), or time from surgery to infection (p=.323). Among the 234 breasts, 133 underwent PM and 101 underwent TM. TM was significantly associated with increased postoperative infection (p<.001), implant loss (p<.001), and longer time to first infection (p=.045). A pilot cohort of 38 patients (62 breasts) underwent 16S rRNA sequencing: 20 patients (32 breasts) received 24 hours, and 18 patients (30 breasts) received 7 days of antibiotics. In stool samples, α diversity significantly decreased postoperatively in both groups, with greater reduction after 7 days of antibiotics (24h p=.027; 7d p=.0026). Patient characteristics were primary drivers of β diversity in stool samples (p=.027). In periprosthetic fluid, α diversity differed across antibiotic regimens (p=.041), but β diversity did not; PERMANOVA showed no effect of antibiotic duration on bacterial composition (overall p=.304; 24h

p=.136; 7d p=.349). Breast tissue and skin samples showed no significant differences in α or β diversity between regimens. The pilot cohort was next analyzed by disease state: 29 patients (78%) had breast cancer and 8 (22%) did not, undergoing TM and PM, respectively. In stool samples, β diversity differed significantly between TM and PM groups (p=.049), accounting for 2% of variance. In periprosthetic fluid, disease state did not affect α diversity but was associated with significant differences in bacterial composition (p=.014), accounting for 2% of variance. In breast tissue and skin samples, α diversity (p=.82 and p=.65) and β diversity (p=.26 and p=.43) did not differ by disease state.

Conclusion: Prophylactic antibiotic duration did not significantly impact postoperative infection rates or alter overall gut and breast microbiome composition, though differences in α diversity were observed in stool and periprosthetic fluid samples. Breast cancer was associated with higher postoperative infection rates and distinct differences in β diversity of both breast and gut microbiomes, suggesting disease-related alterations in local and systemic microbial communities. Ongoing sequencing and integration of additional patient samples from our randomized controlled trial will further delineate these relationships. Capturing the influence of these microbiomes, and their modulation by antibiotics and disease state, on implant infections provides a foundation for precision strategies in reconstructive surgery. A more comprehensive understanding of how microbial variance, antibiotic exposure, and disease state together shape susceptibility to implant infection may enable prediction of high-risk patients and guide personalized optimization. Ultimately, these insights could inform individualized antibiotic regimens and reconstructive approaches tailored to both a patient's microbiome and oncologic status, with the goal of minimizing infection, improving outcomes, and reducing delays to adjuvant care.

Complications

1445 - Extended Follow-Up of Trimodality Therapy Demonstrates Durable Disease Control for Radiation-Associated Angiosarcoma of the Breast

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Background/Objective: Radiation-associated angiosarcoma of the breast (RAASB) is a rare, relatively understudied, but aggressive malignancy following breast irradiation. Our prior work demonstrated high rates of pathologic complete response (pCR), durable local control, and superior relapse free survival (RFS) of trimodality therapy compared to surgery alone. In this analysis, we report longer follow-up and an expanded cohort to more definitively characterize the durability of locoregional control and RFS with a trimodality therapeutic approach to RAASB.

Methods: With Institutional Review Board approval, we re-identified previously reported patients (n=16) with RAASB to update their follow-up and identified n=7 additional recent cases to expand our RAAS trimodality cohort. Patients were included if they had their initial diagnosis of RAASB treated at our institution with trimodality therapy. Clinical, treatment, and oncologic outcome data were abstracted. Trimodality therapy was defined as (i) induction chemotherapy, (ii) preoperative radiation,

and (iii) surgical resection with wide margins. Recurrence-free survival (RFS) was estimated using the Kaplan-Meier method and reported with 95% confidence intervals (CI).

Results: 23 patients (median age 68 years, range 52-80) diagnosed with RAASB from 2010-2024 met inclusion criteria. At diagnosis, the extent of skin involvement was none in 2 patients (9%), <25% in 11 (48%), 25-50% in 4 (17%), and >50% in 6 (26%) with extension beyond the footprint of the breast in 2 patients (9%). Disease was unifocal in 15 patients (65%) and multifocal in 8 (35%). Of the 23 patients treated with trimodality therapy, 21 received taxane-based induction chemotherapy (median 4 cycles), one received epirubicin, and one doxorubicin. Preoperative radiation (median 50 Gy) was administered concurrently with chemotherapy in 20 patients and sequentially in 3. Reconstructive procedures for wound closure or coverage were required in 22 patients (96%). Eighteen patients (78%; 95% CI, 58-90%) achieved a pathologic complete response (pCR). With a median follow-up of 6 years, there were no local recurrences. One patient developed distant recurrence at 14 months postoperatively and subsequently died of RAAS; no additional deaths occurred. The estimated 5-year local RFS was 100%, and overall RFS was 96% (95% CI, 87-100%). Surgical complications that required re-operation or prolonged healing occurred in 30% of patients (95% CI; 16-51%).

Conclusion: Trimodality therapy for RAASB continues to demonstrate a high rate of pCR, local control, and survival.

SLN/NAC

1431 - Nodal Pathologic Response After Neoadjuvant Systemic Therapy in Clinically Advanced Node-Positive (cN2 and cN3) Breast Cancer

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Background/Objective: Patients with clinically advanced node-positive (cN2/3), non-metastatic breast cancer have traditionally undergone axillary lymph node dissection (ALND) after neoadjuvant systemic therapy (NST). Randomized ALND de-escalation trials have excluded cN2/3 disease. However, some of these patients achieve nodal pathologic complete response (ypN0), potentially allowing for less extensive axillary surgery. We sought to determine the rate of ypN0 in a large hospital-based database and identify clinicopathologic factors associated with nodal response to guide potential axillary surgery de-escalation strategies.

Methods: Data from the National Cancer Database (NCDB, 2004-2022) were analyzed. Female patients with clinically node-positive (cN2/3), non-metastatic breast cancer who received NST followed by surgery were included. Patients were stratified by pathologic nodal status (ypN0 vs ypN+). Demographic, tumor, and treatment characteristics were compared using Chi-square or Fisher's exact tests for categorical variables and the Mann-Whitney U test for continuous variables. Examination of ≥10 lymph nodes was used as a surrogate for ALND. Multivariable logistic regression identified factors associated with pathologic complete response (pCR), with odds ratios (OR) >1 indicating increased odds of pCR.

Overall survival was analyzed using Kaplan-Meier survival curves and log-rank tests. A p value of < 0.05 was considered statistically significant.

Results: A total of 26,906 patients with non-metastatic, clinically advanced node-positive cN2/3 breast cancer received NST followed by surgery and met inclusion criteria. Among them, 35% (n = 9,417) achieved a complete nodal response ypN0 after NST, while 65% (n = 17,489) had residual nodal disease ypN+. Overall pCR rate (ypT0/Tis ypN0) was 21.1% (5,692 patients); therefore 3,725 patients (13.8%) achieved a nodal ypN0 pCR without a breast pCR. Demographic characteristics like age and race/ethnicity were similar between groups. However, complete nodal response was more frequent in younger patients (median age 52 vs. 55 years old, $p < 0.001$) with higher Ki-67 indices (median 64% vs. 40%, $p < 0.001$), and histologic grade 3 (36% ypN0 rate vs. 19.9 % grade 2, $p < 0.001$). Complete nodal response was also frequent in hormone receptor-negative tumors (60.2% ypN0 rate), HER2-positive tumors (69.7% ypN0 rate), and triple-negative breast cancer (54% ypN0 rate). Nodal pCR rate was infrequent in hormone-positive and grade 1 tumors (26% and 11% ypN0 rates, respectively). In multivariate logistic regression, higher Ki-67 index (OR 1.31, $p < 0.001$), increasing age (OR 0.99 per year, $p < 0.001$), and hormone receptor-positive status (OR 0.22, $p < 0.001$) were independently associated with achieving pCR. Despite 35% ypN0 rate achieved, 75.6% (13,220) patients underwent an ALND, suggesting a potential subpopulation of patients who could have avoided an ALND. Patients achieving pCR demonstrated significantly improved overall survival compared to those with residual disease (HR 0.32, 95% CI 0.29-0.35, $p < 0.001$). Similarly, patients achieving nodal pCR (ypN0) had markedly improved survival compared to those with residual nodal disease (ypN+; HR 0.40, 95% CI 0.38-0.43, $p < 0.001$). Median overall survival was not reached in the pCR or ypN0 groups, whereas it was 128.5 months for non-pCR and 114.5 months for ypN+ disease.

Conclusion: In this large national cohort of clinically advanced node-positive (cN2/3) breast cancer, over one-third of patients achieved nodal pathologic complete response after NST, yet most still underwent ALND. Younger age, higher Ki-67, and hormone receptor-negative or HER2-positive disease were associated with higher likelihood of nodal complete response, which correlated with significantly improved survival. These findings highlight an opportunity to refine axillary management in selected cN2/3 patients and support prospective evaluation of ALND de-escalation strategies in this historically trial-excluded population.

1245 - Is It Time to Redefine Clinical Nodal Staging for Breast Cancer?

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Background/Objective: Nodal status remains a strong prognostic factor in breast cancer. Definitions of clinical (cN) and pathologic nodal categories (pN) within the current AJCC staging system are misaligned: pN stratifies patients by the number of positive lymph nodes, while cN is defined by location and mobility, but not the number of suspicious nodes. Various breast imaging modalities are performed preoperatively with demonstrated diagnostic value in identifying lymph nodes suspicious for metastatic disease. Whether cN1 patients with four or more suspicious lymph nodes represent a biologically distinct subset from cN1 patients with less apparent axillary tumor burden on preoperative imaging is

unclear. We sought to assess whether cN1 patients with 4 or more abnormal nodes on pretreatment imaging have a difference in pathologic stage and survival outcomes compared to cN1 patients with 1 to 3 abnormal lymph nodes or cN2a patients.

Methods: We identified patients with biopsy-proven cN1 or cN2a breast cancer diagnosed between 2018 and 2023 who received neoadjuvant chemotherapy (NAC) and underwent surgery at a single institution. All imaging studies were independently reviewed by 3 radiologists to document the number of abnormal axillary nodes noted. Patients were categorized into three groups based on pretreatment imaging and clinical examination: cN1a (cN1 with 1-3 mobile nodes), cN1b (cN1 with 4 or greater mobile nodes), and cN2a (matted nodes). Baseline clinicopathologic characteristics, treatment information, and clinical outcomes were obtained through chart review and compared using χ^2 and Kruskal-Wallis tests. Disease-free survival (DFS) and overall survival (OS) were estimated using the Kaplan–Meier method and compared across nodal groups using a log-rank test. Multivariable Cox proportional hazards models evaluated associations between nodal group and time-to-event outcomes, adjusting for baseline patient and tumor characteristics.

Results: Among 617 patients with node-positive breast cancer, 390 (63.0%) were categorized as cN1a, 166 (26.8%) as cN1b, and 63 (10.2%) as cN2a. Median age of the cohort was 56 years (interquartile range, IQR=45.5, 66.5). Clinical tumor stages were T1 (14.2%), T2 (48.6%), T3 (25.0%), and T4 (12.1%). Nottingham grades were 1 (2.9%), 2 (34.4%), 3 (60.4%), and not available (2.3%). Tumor histology was IDC (87.7%), ILC (6.1%), mixed (5.7%), and other (0.5%). Tumor subtypes were HR+/HER2- (43.0%), HR+/HER2+ (20.7%), HR-/HER2+ (12.6%), and TNBC (23.7%). Imaging review was performed for all cases, and final node count for cN1 cases was determined by MRI alone (40.3%), ultrasound alone (26.3%), CT alone (0.2%), and both MRI and ultrasound (33.3%). Most patients (84.8%) were treated with adjuvant radiation. Axillary surgical management varied significantly (p<.001): patients in the cN2a group were more likely to undergo axillary lymph node dissection (ALND) (n=30, 47.6%) than those in the cN1a (n=80, 20.5%) or cN1b (n=40, 24.1%) groups. While rates of pathologic complete response (pCR) did not vary by nodal group, in those without pCR, there was a significant difference in the average number of positive nodes identified: 2.9 nodes in cN1a, 4.6 in cN1b, and 5.4 in cN2a (p<.001). Patients in the cN1b group (n=40, 24.1%) were more likely to upstage to ypN2 or ypN3 than the cN1a group (n=50, 12.8%, p=.003). Pairwise comparisons showed the number of pathologically positive nodes and the rate of ypN2 or ypN3 staging were similar between cN1b and cN2a and significantly different (p<.001) than the cN1a group. Median follow-up was 42 months (IQR=25, 59). Adjusting for age, grade, histology, tumor subtype, and clinical T stage, nodal group was not independently associated with DFS or OS (Table 1). Age (p=.040, p=.001), tumor subtype (p=.010, p=.032), and clinical T stage (p=.020, p=.017) were significant independent predictors of DFS and OS, respectively.

Conclusion: In breast cancer patients with cN1 disease, higher nodal count (≥4) determined by pretreatment imaging is associated with a higher pathologic nodal stage and more pathologically positive nodes identified compared to cN1 patients with fewer (1-3) suspicious lymph nodes. While there was no difference in DFS and OS between the three nodal groups studied, the observed correlation between clinical nodal count and pathologic stage may have implications for staging interpretation and treatment planning. Further subclassification of cN1 disease by nodal count on pretreatment imaging could have prognostic value.

Table 1. Clinical outcomes for cN1a (1-3 nodes), cN1b (4+ nodes), and cN2a.

	cN1a (1-3 nodes) n=390	**cN1b (4+ nodes)** n=166	**cN2a (matted)** n=63	**P value**
Axillary procedure, n (%)				
SLNB	171 (43.8)	65 (39.2)	21 (33.3)	
SLNB + ALND	139 (35.6)	61 (36.7)	11 (17.5)	**<.001**
ALND	80 (20.5)	40 (24.1)	30 (47.6)	
None	0 (0)	0 (0)	1 (1.6)	
ypN category, n (%)				
0	200 (51.3)	79 (47.6)	31 (49.2)	
1	140 (35.9)	47 (28.3)	14 (22.2)	**<.001**
2	44 (11.3)	28 (16.9)	10 (15.9)	
3	6 (1.5)	12 (7.2)	8 (12.7)	
pCR, n (%)				
Yes	134 (34.4)	55 (33.1)	24 (38.1)	.779
No	256 (65.6)	111 (66.9)	39 (61.9)	
pCR in nodes, n (%)				
Yes	200 (51.3)	79 (47.6)	31 (49.2)	.720
No	190 (48.7)	87 (52.4)	32 (50.8)	
Mean positive nodes in those without pCR	2.9	4.6	5.4	**<.001**
ypN2 or higher after NAC	50 (12.8)	40 (24.1)	18 (28.6)	**.001**
3-year disease-free survival, % [95% CI]	85.7 [83.8-87.5]	83.8 [81.1-86.5]	79.6 [72.8-84.4]	.256
3-year overall survival, % [95% CI]	87.3 [85.8-88.8]	84.8 [82.4-87.2]	84.6 [81.4-87.8]	.910

Other

1136 - Is Mastectomy Necessary in Patients with Occult Breast Cancer and Advanced (N2/N3) Nodal Disease?

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Background/Objective: NCCN guidelines for patients with occult breast cancer (OBC) recommend axillary lymph node dissection (ALND) for all patients, however, recommendations for management of the breast vary depending on nodal status. Patients with N1 disease have the option for mastectomy or whole-breast radiation, whereas those with N2 or N3 disease are recommended to undergo mastectomy. As these guidelines are based on limited evidence, we aimed to compare therapies among patients with OBC to examine their long-term outcomes.

Methods: An observational cohort study was conducted including patients with cT0N1-3M0 breast cancer using an institutional database. Patients were excluded if they had a previous breast cancer. Variables included demographics, clinical characteristics, treatment details, and long-term outcomes including recurrence, overall survival (OS), and disease-free survival (DFS). Survival was estimated using the Kaplan-Meier method with nonparametric pointwise confidence intervals.

Results: The cohort included 102 patients with OBC, with a mean age of 58.0 years (SD 9.9). Fifty-three (52.0%) patients presented with clinical N1 disease (cN1), 16 (15.7%) cN2, and 33 (32.4%) cN3. 46 (45.1%) patients had tumors that were HR+HER2-, 14 (13.7%) HR+HER2+, 6 (5.9%) HR-HER2+, and 36 (35.3%) had TNBC. Eighty-five (88.5%) patients received neoadjuvant systemic therapy (NST), including 42 patients with cN1 disease and 43 patients with cN2/3 disease. Of these patients, 14 (14.6%) underwent mastectomy: 7 (16.7%) with cN1 disease and 7 (16.3%) with cN2/3 disease. Mastectomy pathology was benign in 11 patients, with foci of atypical ductal hyperplasia in 1 patient, evidence of treated tumor bed with pathologic complete response (pCR) in 1 patient, and residual in-situ carcinoma and multiple foci of invasive carcinoma in 1 patient. All patients who received NST underwent axillary surgery and 51 (60%) had pCR in the lymph nodes. All patients with cN1 disease who received NST completed adjuvant radiation, compared with 97.7% of those with cN2/N3 disease, and 1 patient had unknown radiation treatment details. This included regional nodal radiation as well as whole-breast radiation or post-mastectomy chest wall radiation, except for one patient with cN3 disease who received regional nodal radiation only. There were no in-breast or chest wall recurrences in the cohort. One of 42 patients with cN1 disease experienced regional nodal recurrence and subsequently died of breast cancer. Two of 43 patients with cN2/N3 disease experienced regional nodal recurrence and died of breast cancer. In addition, five patients with cN2/N3 disease experienced distant recurrence, of whom 4 died. The 5-year OS was 100% for all patients who underwent NST, irrespective of nodal status (cN1 versus cN2/3) or local therapy (mastectomy versus whole-breast radiation). OS and DFS are presented in the Table.

Conclusion: In this cohort of patients treated at a high-volume cancer center for OBC with NST and axillary surgery, management of the breast did not vary significantly by nodal status, with the majority

receiving whole-breast radiation and fewer patients undergoing mastectomy. There were no in-breast recurrence events and OS was excellent, regardless of nodal status. While DFS was superior for patients undergoing mastectomy, estimates are limited by wide confidence intervals, and trends were similar for both patients with cN1 disease and those with cN2/3 disease. These results suggest that the option for whole-breast radiation in lieu of mastectomy may be appropriate for patients with OBC and N2 or N3 disease, similar to those with N1 disease.

Table. 5-year overall survival and disease-free survival of patients with occult breast cancer (OBC) who received neoadjuvant systemic therapy, stratified by nodal status and local therapy.

Local Therapy	Overall Survival		Disease-Free Survival	
	cN1	cN2/3	cN1	cN2/3
Mastectomy	100% (95% CI 59-100%)	100% (95% CI 59-100%)	100% (95% CI 29.2-100%)	100% (95% CI 2.5-100%)
Whole-breast radiation	100% (95% CI 90-100%)	100% (95% CI 90.3-100%)	91.8% (95% CI 65.8-99.1%)	73.6% (95% CI 52.2-99.2%)

Lymphedema

1079 - Timing of Surgical Axillary Staging and Impact on Effectiveness of Immediate Lymphatic Reconstruction Following Axillary Lymph Node Dissection

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Background/Objective: Immediate lymphatic reconstruction (ILR), e.g. prophylactic lymphovenous bypass, has been shown to decrease the risk of lymphedema in patients undergoing axillary lymph node dissection (ALND). The impact of timing of surgical axillary staging prior to ALND on the technical feasibility of ILR is not well described. We aimed to determine if the success of ILR varies among patients undergoing ALND, between those undergoing sentinel lymph node dissection (SLND) or targeted axillary dissection (TAD) followed by completion ALND under the same anesthetic, and those undergoing initial axillary staging and ALND performed at two separate surgeries.

Methods: Our departmental database was queried to identify patients undergoing ALND from 2020-2024. Retrospective chart review was performed to collect details regarding type and timing of axillary surgical staging and ILR technical details. ILR success was measured by the proportion of patients in whom ILR was planned and completed, as well as the number of reconstructed lymphatic channels. Descriptive statistics were performed using Chi-square and Kruskal-Wallis tests as appropriate.

Results: 1887 patients underwent ALND during the study period, of whom 1156 (61.3%) underwent ALND alone, 552 (29.3%) underwent concurrent SLND/TAD and ALND, and 179 (9.5%) underwent SLND/TAD with completion ALND at a second surgery. A significantly lower proportion of patients undergoing concurrent SLND/TAD and ALND were planned for ILR: 21.7% (120/552) versus 56.7% (655/1156) of patients undergoing ALND alone and 50.8% (91/179) of patients undergoing axillary surgical staging and ALND over two surgeries (p<0.001). Success of ILR did not vary significantly between groups. Among patients in whom ILR was planned, ILR was successfully performed in 93.4% (612/655) of those undergoing ALND as the initial procedure, 95.0% (114/120) of those undergoing concurrent SLND/TAD and ALND, and 96.7% (88/91) of those undergoing axillary staging followed by ALND over two surgeries (p=0.415). Additionally, the number of reconstructed lymphatic channels did not vary significantly between groups (p=0.173), with a median of 2 (IQR 1-3) channels. Reasons for ILR not being performed (n=52) included: failure to identify blue channels by axillary reverse mapping (n=21), all blue channels intact without disruption (n=9), channels injured (n=2), insufficient channel caliber (n=3), insufficient channel length (n=3), lymphatic-vein caliber mismatch (n=3), and no suitable veins (n=11). Trends in timing of ALND and ILR performance by year are shown in the Table. The proportion of patients in whom ILR was planned at the initial surgery increased steadily over time (p<0.001), from 23.3% in 2020 to 78.1% in 2024. ILR success was high across all years (range 90.5%-97.2%) and did not vary significantly over time (p=0.140). The median number of reconstructed channels was 2 and did not vary significantly over time (p=0.006).

Conclusion: In patients undergoing ALND, ILR was successfully performed in >90% of patients undergoing ALND, irrespective of concurrent or staged SLND/TAD procedures. Most patients (62.9%) had at least 2 lymphatic channels reconstructed. Deferring decision-making about completion ALND to await surgical pathology from SLND/TAD does not appear to negatively impact feasibility of ILR.

Table. Trends in axillary lymph node dissection (ALND) timing and immediate lymphatic reconstruction (ILR) performance by year.

	2020 (n=360)	2021 (n=334)	2022 (n=523)	2023 (n=437)	2024 (n=233)	p-value
ALND timing						
ALND alone	180 (50.0%)	98 (29.3%)	364 (69.6%)	332 (76.0%)	182 (78.1%)	<0.001
SLND/TAD + ALND	144 (40.0%)	191 (57.2%)	123 (23.5%)	72 (16.5%)	22 (9.4%)	
Staged/two surgeries	36 (10.0%)	45 (13.5%)	36 (6.8%)	33 (7.6%)	29 (12.4%)	
ILR planned						
Yes	84 (23.3%)	107 (32.0%)	215 (41.1%)	278 (63.6%)	182 (78.1%)	<0.001
No	276 (76.7%)	227 (68.0%)	308 (58.9%)	159 (36.4%)	51 (21.9%)	
ILR success rate	90.5% (76/84)	97.2% (104/107)	95.8% (206/215)	92.1% (256/278)	94.5% (172/182)	0.140
#channels, median (IQR)	2 (1-3)	2 (1-3)	2 (1-3)	2 (1-3)	2 (1-4)	0.006

Abbreviations: immediate lymphatic reconstruction (ILR), axillary lymph node dissection (ALND), sentinel lymph node dissection (SLND), targeted axillary dissection (TAD), interquartile range (IQR)

Posters

Top Posters

1066 - Persistent Circulating Tumor Cells in Early ER+ Breast Cancer Exhibit Stem-Like Phenotypes, Variable ER Expression, and Partial EMT Suggesting Mechanisms of Late Recurrence

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Background/Objective: Estrogen receptor–positive (ER+) breast cancer demonstrates a persistent risk of recurrence up to two decades after diagnosis, often despite adherence to endocrine therapy. The biologic drivers of this delayed failure remain unclear. Circulating tumor cells (CTCs) are detectable in a subset of clinically disease-free patients and may represent minimal residual disease. We previously validated tumor-specific genomic alterations by FISH confirming malignant origin of CTCs in early-stage patients on endocrine therapy. Here, we hypothesized that a portion of persistent CTCs possess breast cancer stem cell (BCSC) features, display variable ER expression, and exhibit evidence of epithelial-mesenchymal transition (EMT).

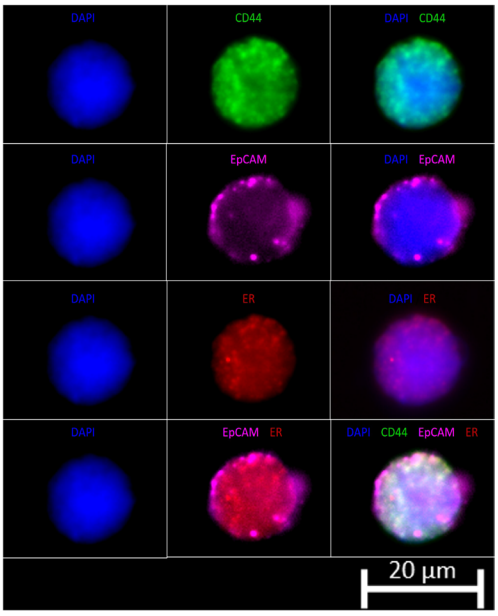
Methods: Patients with Stage I–III ER+ breast cancer were enrolled in an IRB-approved prospective study. Peripheral blood was collected pre- or post-treatment. CTCs were isolated using size-based filtration. Multiplex immunofluorescence was performed for CD44, EpCAM, and ER. Cells were classified as: • BCSC-like: CD44+ with variable EpCAM and ER expression • Epithelial CTCs: EpCAM+ / CD44- • Excluded: Non-specific or hematopoietic phenotype ER localization was categorized as nuclear, mixed, or cytoplasmic. Loss or reduction of EpCAM was used as a surrogate of EMT-like transition. Quantification was performed using FIJI with standardized colocalization thresholds.

Results: CTCs were detected in 81% (35/43) of post-treatment patients without radiographic evidence of disease. Approximately 7% of all cells analyzed were considered CTCs. Among these, 95% of CTCs co-expressed CD44, consistent with a stem-like phenotype. ER expression was heterogeneous: - 44%: Strong nuclear ER - 51%: Predominantly cytoplasmic ER - 5%: Expressed strong nuclear ER but no CD44 CD44+ cells were more likely to demonstrate cytoplasmic ER than nuclear ER. Reduced expression of EpCAM was noted predominantly in the CD44+ population, reflecting a partial EMT state. Several patients demonstrated stable persistence of these phenotypes across serial timepoints while receiving endocrine therapy.

Conclusion: Persistent CTCs in early-stage ER+ breast cancer frequently demonstrate stem-like characteristics, non-canonical ER localization, and reduced epithelial marker expression, collectively suggesting phenotypic plasticity consistent with endocrine therapy resistance and metastatic potential. These findings support a model in which minimal residual stem-like disease persists during endocrine therapy, providing a biologically plausible mechanism for late recurrence. Ongoing transcriptomic profiling will clarify therapeutic vulnerabilities in this CTC subpopulation.

Figure:

Representative image from a post-treatment patient sample depicting an ER+(nuclear)/EpCAM+/CD44+ CTC. Using colocalization functions in FIJI software, it was confirmed that ER and DAPI were colocalizing in the nucleus and CD44 is mostly cytoplasmic or peri-nuclear according to the staining pattern.



1150 - Age-Stratified Temporal Trends in Surgical Management and Reconstruction for Early-Stage Invasive Breast Cancer: A National Cancer Database Study (2012–2022)

Ivy Stejskal[1], Nova Foster[1], Geoffrey Gurtner[1], Aaron Mason[1], Marwan Sheckley[1], Kyra Singh[1], Chiu-Hsieh Hsu[1], Gongzheng Yao[1], Joseph Carey[1], Jad Abdelsattar[1]

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Background/Objective: Surgical management of early-stage breast cancer continues to evolve, yet patterns of operative choice remain influenced by age, preference, and access to reconstruction. Prior national analyses largely predate 2018 and encompass all disease stages thus failing to distinguish cases where surgery reflects patient and surgeon preference rather than oncologic requirement. By isolating women with T1 unifocal invasive breast cancer, this study provides a contemporary, decade-long evaluation (2012–2022) of national surgical and reconstructive trends, examining how temporal factors shape treatment decisions in an era of de-escalation and personalized care.

Methods: Using the National Cancer Database (NCDB), we identified women ≥ 26 years diagnosed with T1 (≤ 2 cm) unifocal invasive breast cancer between 2012 and 2022. Patients were stratified into four age cohorts: Young Adults (26–41 yrs), Midlife Adults (42–57 yrs), Older Adults (58–76 yrs), and Elderly (≥ 77 yrs). Surgical procedures were categorized as lumpectomy/partial mastectomy (BCS), unilateral mastectomy, or bilateral mastectomy; reconstruction as none, implant-based, or autologous. Patients with multifocal disease, lymph node involvement, or genetic mutations were excluded. Multivariable logistic and multinomial regression models were used to evaluate temporal trends adjusted for race, tumor grade, and tumor biology. AIC-selected breakpoint analysis prevented post-hoc selection bias in identifying an inflection year. Annual segmented linear regression was performed to examine temporal patterns.

Results: Among 27,756 patients, an age related shift toward BCS was observed across all age cohorts between 2012 and 2022: young adults (45.0%→48.1%, p=0.075; OR 1.44 [95% CI 0.96-2.16]), midlife adults (55.9%→65.4%, p<0.001; OR 1.56 [95% CI 1.41-1.72]), older adults (66.8%→77.6%, p<0.001; OR 1.81 [95% CI 1.67-1.96]), and the cohort with largest absolute gains in BCS: elderly (64.1%→76.3%, p < 0.001; OR 1.96 [95 % CI 1.60–2.40]). Unilateral mastectomy declined significantly in midlife adults (17.4%→11.9%, p<0.001; OR 0.60 [95% CI 0.52-0.69]), older adults (16.5%→10.5%, p<0.001; OR 0.54 [95% CI 0.49-0.60]), and elderly (24.6%→16.2%, p<0.001; 0.55 [95% CI 0.44-0.70]), with a non-significant decrease in unilateral mastectomy in young adults (20.6%→18.0%). Although younger women continued to undergo bilateral mastectomy for T1 disease more often than older cohorts, rates have plateaued in young adults (28.3%→34.5%, p=0.36) and midlife adults (18.6%→20.7%, p=0.001). Implant based reconstruction rates increased between 2012 and 2022: Young adult rates more than doubled (12.2%→32.9%, p <0.001; OR 3.52 [95 % CI 2.16-5.96]) with similar increase observed in midlife adults (10.6% → 19.0%, p <0.001; OR 1.97 [95 % CI 1.73-2.24]). Implant-based reconstruction also grew modestly among older adults (4.0%→6.0%, p<0.001) and elderly (0.4%→2.0%, p=0.003). Autologous reconstruction expanded significantly, primarily in older women (Age 58–76: 1.9%→6.2%; Age 77+: 0.3%→3.9%, both p<0.001). Breakpoint analysis using AIC recognized 2019 as the most statistically supported convergence/maturation point. Segmented regression showed no significant post-2019 slope acceleration in BCS (strong model fit: R^2 0.72–0.97). Young adults demonstrated a slope change from −0.29%/yr to −0.71%/yr (Δ −0.43, p=0.70), indicating cohort convergence after earlier lag. Unilateral mastectomy demonstrated persistently negative slopes with no significant change in trend across all age groups. (Fig.1)

Conclusion: Breast-conserving surgery increased steadily across all age groups, with the greatest absolute gains seen in older women. This reflects the decade-long system-wide shift toward de-escalation in breast cancer surgery. These trends parallel the maturation of evidence and guideline-driven practices that prioritize shared decision making and patient centered care. Younger women, historically leaning toward more aggressive surgery, demonstrated a later-decade convergence toward breast preservation. Unilateral mastectomy slopes remained durably negative, reinforcing sustained cultural movement away from unnecessary mastectomies while moving toward personalized care. Reconstruction expanded across all cohorts, driven primarily by implant-based techniques. The marked rise in autologous reconstruction among women ≥58, including those ≥77, could highlight refinements in microsurgical technique, improved perioperative safety, and more equitable access to reconstruction regardless of age. Further institution-based studies should help determine the underlying factors contributing to these trends.

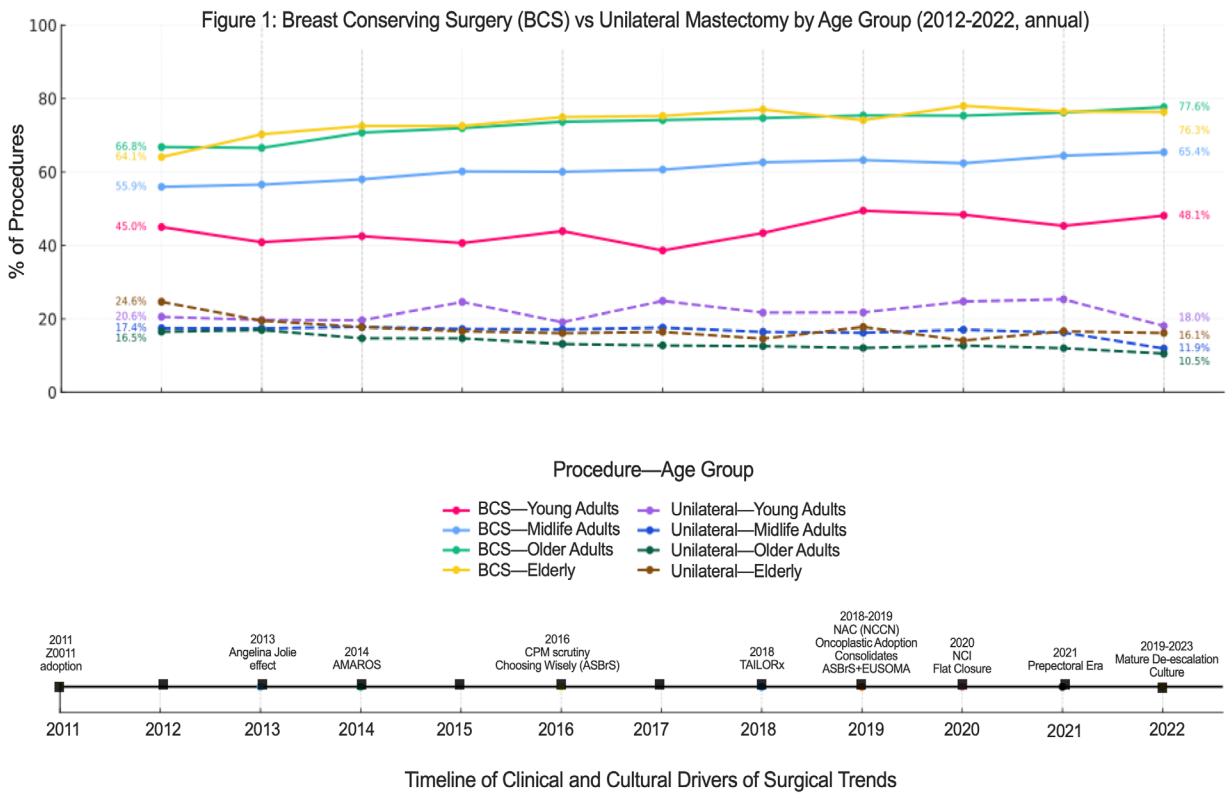
Figure 1: Breast Conserving Surgery (BCS) vs Unilateral Mastectomy by Age Group (2012-2022, annual)
% of Procedures
100
80
60
40
20
0
66.8%
64.1%
55.9%
45.0%
24.6%
20.6%
17.4%
16.5%
77.6%
76.3%
65.4%
48.1%
18.0%
16.1%
11.9%
10.5%
Procedure—Age Group
BCS—Young Adults
BCS—Midlife Adults
BCS—Older Adults
BCS—Elderly
Unilateral—Young Adults
Unilateral—Midlife Adults
Unilateral—Older Adults
Unilateral—Elderly
2011
Z0011
adoption
2013
Angelina Jolie
effect
2014
AMAROS
2016
CPM scrutiny
Choosing Wisely (ASBrS)
2018
TAILORx
2018-2019
NAC (NCCN)
Oncoplastic Adoption
Consolidates
ASBrS+EUSOMA
2020
NCI
Flat Closure
2021
Prepectoral Era
2019-2023
Mature De-escalation
Culture
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Timeline of Clinical and Cultural Drivers of Surgical Trends

1166 - Radiation-Associated Angiosarcoma of the Breast Among Breast Cancer Survivors: Clinicopathologic Features and Oncologic Outcomes

Rick Vavolizza[1], Amelie Perrier[1], Keila Torres[1], Hannah Wingate[1], Emily Keung[1], Heather Lyu[1], Christina Roland[1], Ashleigh Guadagnolo[1], Kelly Hunt[1], Heather Lillemoe[1]

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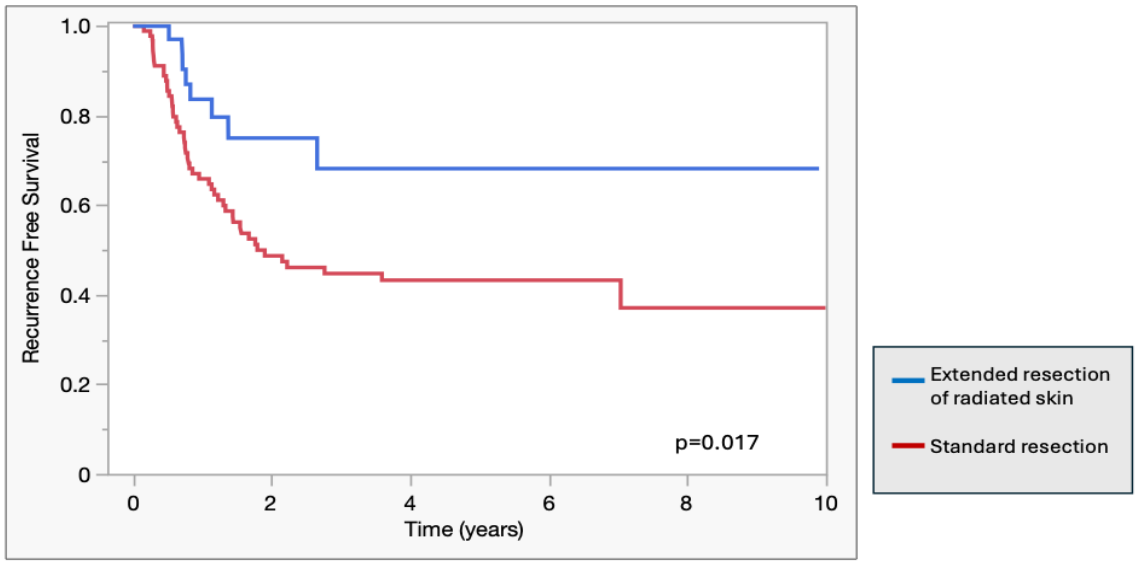
Background/Objective: Radiation-associated angiosarcoma (RAAS) of the breast/chest wall is a rare, aggressive malignancy that can occur in patients who have received radiation therapy (RT) for breast cancer. Data is limited given its rarity and the tendency to consider primary breast angiosarcomas and patients with RAAS as similar disease processes for analysis of outcomes. This study sought to expand on our previous institutional series assessing outcomes in patients with RAAS from 1993-2011, capturing clinicopathologic features and treatment patterns from a recent cohort of patients to provide updated prognostic information and inform future management.

Methods: A retrospective study was conducted of patients with RAAS of the breast/chest wall who received care at a comprehensive care center from 2011 through early 2025. All patients had a prior history of breast cancer treated with surgery and RT. RAAS was defined as angiosarcoma in the breast or chest wall arising within a previously irradiated field. Patients were excluded if they had insufficient data or did not receive any treatment for their disease. Data were collected and analyzed using descriptive statistics, reported using numbers and percentages and median (interquartile range [IQR]). Survival analyses were performed using the Kaplan-Meier method.

Results: Of 155 patients, 141 met inclusion criteria. Most were Caucasian (88%) and all were female, with median age of 68 (IQR 61, 73) at RAAS diagnosis. Most patients (93%) had breast conservation as treatment for their breast cancer. The latency period following RT exposure ranged from 2.4 to 27.6 years (median, 7.5). Skin changes were the most common clinical presentation (88%). Ten patients (7%) had distant metastases at presentation, however 6 had disease confined to the chest and/or axilla and were treated with curative intent. Most patients (79%, n=112) received systemic chemotherapy. For those who underwent surgical resection (n=127), 76 (60%) underwent total mastectomy, with 36 patients (28%) undergoing additional extended resection of the radiated chest wall skin. Axillary surgery was performed in 9% of patients, with only 5 (4%) of the total cohort having nodal metastases. Final margins were positive in 12 patients (9%). One hundred patients (71%) received multimodal treatment: chemotherapy/surgery (n=96), chemotherapy/RT (n=1), or chemotherapy/surgery/RT (n=3). Among 94 patients who received neoadjuvant chemotherapy, 47 (50%) had complete or near-complete pathologic response (<10% residual viable tumor cells). Complete response was seen in 22 patients (23%). Median OS was 7.5 years (IQR 2.4, NR) with a 5-year OS of 60%. Median OS was longer for patients who underwent surgical resection (7.5 vs 2.1 years, p=0.004) and those without recurrence (NR vs 3.9 years, p<0.001). Among patients who underwent resection, 57 (45%) had recurrence with median RFS of 3.6 years (IQR 0.8, NR) and 5-year RFS of 49%. Most recurrences were local (70%). Median RFS was prolonged for patients who received chemotherapy (7 vs. 1.5 years; p=0.016) and who demonstrated complete or near-complete pathologic response (NR vs. 1.8 years, p=0.028). Prolonged median RFS was seen for those who underwent extended resection of irradiated skin compared to those who did not (NR vs. 1.8 years; p=0.017).

Conclusion: In this large single-institution series, RAAS of the breast/chest wall most often presented with skin changes within 10 years of treatment with radiation for breast cancer. Most patients received multimodal therapy with chemotherapy and surgical resection, with very few receiving re-irradiation at our institution. Neoadjuvant chemotherapy was given more frequently than in our early reported data and half of patients who received neoadjuvant chemotherapy demonstrated complete or near-complete pathologic response, demonstrating its utility. Local recurrence was more common than distant recurrence following surgical resection, and the incidence of local failure was decreased by both receipt of chemotherapy and performing a more extended skin/chest wall resection. This information will help refine current clinical algorithms for the management of RAAS. Further research with larger patient numbers to allow for risk stratification will help better assess the role of specific therapies on survival outcomes.

Figure:



1278 - Clinicopathologic Features of Women >50 Years with Invasive Lobular Carcinoma Who Are Eligible for Omission of Surgical Axillary Staging

Cristina Checka[1], Ana Refinetti[1], Catherine Akay[1], Makesha Miggins[1], Jessica Colen[1], Min Yi[1]

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Background/Objective: Studies such as CALGB 9343 led to "Choosing Wisely" recommendations supporting omission of sentinel lymph node biopsy in women older than seventy years with early-stage hormone receptor positive breast cancer. More recently, the SOUND trial extended axillary surgery de-escalation to a younger patient population, demonstrating the safety of omitting sentinel lymph node biopsy in women age ≥ 50 years with small tumors (cT1) and negative axillary nodal ultrasound. However, invasive lobular cancer (ILC) comprised only 8.5% of the SOUND trial patients. Because patients with ILC often present with greater mammographically-occult extent of disease, clinically occult nodal disease and have been under-represented in axillary omission trials, the clinical relevance of

omitting sentinel lymph node biopsy in this group has not been well established. We sought to identify clinicopathologic features associated with nodal upstaging in patients with ILC.

Methods: A prospectively maintained institutional database was queried to identify women aged 50 years or older diagnosed with early-stage invasive lobular carcinoma (cT1 N0) between January 1, 2010 and December 31, 2020. Clinical data included age, ethnicity, BMI, type of breast and nodal surgery, and MRI findings. Pathological variables included histologic subtype, tumor size, nodal stage, grade, lymphovascular invasion (LVI), multifocality and biomarker profile (ER, PR, HER2). Univariable analysis and multivariable logistic regression were used to identify predictors of nodal upstaging.

Results: We identified 322 patients with early stage cT1 cN0 ILC, with a mean age of 65 years. All patients underwent preoperative nodal sonography. Unifocal disease was identified in 270 patients (83.9%). Two-thirds were cT1c (65.2%), 92 were cT1b (28.6%), and a small proportion (6%) were T1mi or T1a. Grade II disease was identified in 182 patients (57%); 9 patients (3%) had grade III disease. There was no LVI in 258 patients (80.1%), while only 18 had LVI (6%). Multifocal disease was noted in 52 patients (16.1%). Sentinel node biopsy was omitted in 3% of patients. Nodal upstaging occurred in 42 patients (13%). Of note, 8 patients (2.5%) were upstaged to N2 or N3 disease. Age <70 (OR 2, p=0.007) and LVI (OR6.6 p<0.0001) were associated with nodal upstaging on univariate analysis. On multivariable analysis, LVI remained the only predictor of nodal upstaging (OR 7.1, 95% CI 2.5-19.4; p<0.001).

Conclusion: In our cohort of 322 patients with early-stage ILC, the rate of overall nodal upstaging was low, with 13% having metastatic disease on final pathology, and 2.5% being upstaged to N2 or N3. Although LVI was only identified in a small subset of patients, it was the only independent predictor of nodal upstaging. The extent of disease in the breast for patients with ILC can also be underestimated, as 16% of our patients had multifocal disease. Omission of axillary surgical staging should be individualized and discussed in a multidisciplinary, pre-operative fashion, particularly if nodal upstaging would impact adjuvant therapy planning.

Table 1. Univariable and multivariable analysis for predictors associated with nodal upstaging

	Univariable		multivariable			
	OR	P	OR	P	96% CI	
Age ≥70-year-old	0.5	0.007	0.4	0.06	0.2	1.02
Race						
White						
Black	0.4	0.4				
Hispanic	1.6	0.4				
Asian	-	-				
Multifocal disease	1.3	0.5				
Grade						
G1						
G2	1.4	0.4				
G3	2.6	0.3				
Unknown	0.6	0.5				
LVI present	6.6	<0.0001	7.1	<0.0001	2.5	19.7
MRI size >2 cm	2.0	0.2				
PR positive	0.7	0.4				
Clinical T1c vs. T1b, T1a, T1mic	2.1	0.06				

1288 - Does This SOUND Right? National Trends in Dual De-Escalation of Axillary Surgery and Adjuvant Radiation in Early-Stage HR+/HER2- Breast Cancer

Dylan Brokaw[1], Leonardo Kozian[1], Rebecca Shulman[1], Richard Bleicher[1], Cecilia Chang[2], Walker Lyons[1], Alycia So[1], Allison Aggon[1], Austin Williams[1]

[1]Fox Chase Cancer Center, Philadelphia, PA, [2]Endeavor Health, Evanston, IL

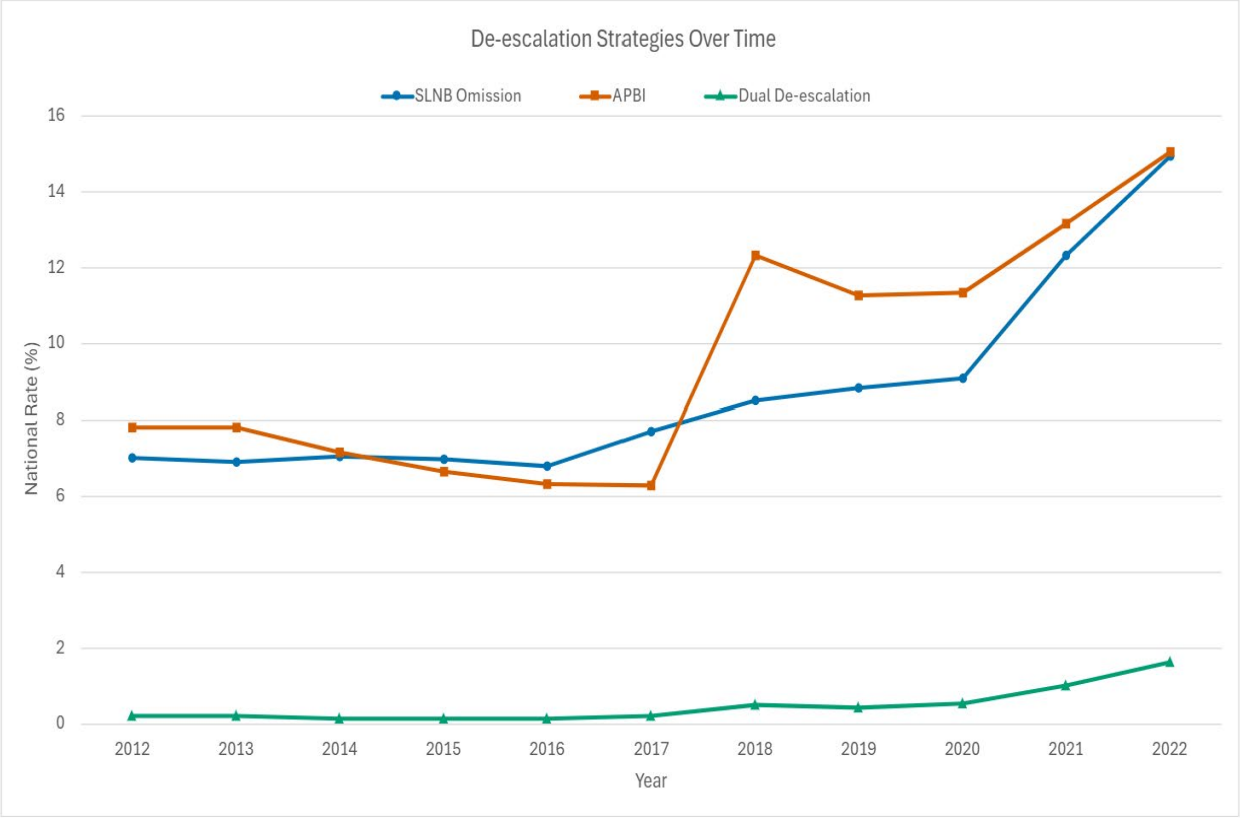
Background/Objective: De-escalation of therapy for appropriately selected patients has become the standard across all disciplines of breast cancer management. The SOUND and INSEMA trials have demonstrated the safety of omitting sentinel lymphadenectomy (SLNB) among patients aged ≥50 years with early-stage HR+/HER2-negative disease and a negative preoperative axillary ultrasound who are treated with breast-conserving surgery and whole breast irradiation (WBI). Many of these same patients are also eligible for accelerated partial breast irradiation (APBI), a shorter and less morbid alternative to WBI. However, the oncologic safety of dual de-escalation (omission of SLNB and use of APBI) has not been evaluated except in patients ≥70 years. We sought to characterize national practice patterns and factors associated with adoption of this dual de-escalation approach.

Methods: Females aged 50–69 years with clinical T1–T2N0 breast cancer who underwent upfront breast-conserving surgery between 2012 and 2022 were identified from the National Cancer Database. Patients were categorized by whether axillary surgery was performed and by adjuvant radiation modality (WBI, APBI, or none). Multivariable logistic regression was used to identify patient, tumor, and institutional factors associated with surgical de-escalation (SLNB omission), radiation de-escalation (APBI or omission), and dual de-escalation.

Results: A total of 316,324 patients met inclusion criteria, of whom 98% underwent SLNB. Among patients who underwent SLNB, 83% received WBI, 11% received APBI, and 6% received no radiation. In contrast, among patients in whom SLNB was omitted, 63% received WBI, 8% received APBI, and 30% received no radiation. SLNB omission increased from 7% to 14% over the study period, while APBI use increased from 8% to 15%. Dual de-escalation was rarely performed prior to 2018 but rose from 0.5% to 2% between 2018 and 2022. On multivariable analysis, similar predictors were identified for surgical and radiation de-escalation including younger age, higher median income, treatment at a community cancer center, and low grade, cT1 tumors. A higher Charlson-Deyo score, however, predicted SLNB omission and WBI receipt. The strongest predictor of SLNB omission was receiving radiation (WBI: OR 0.30; APBI: OR 0.32; both $p<0.001$) while undergoing SLNB was the strongest predictor of APBI use (OR 1.89, $p<0.001$). Factors independently associated with dual de-escalation included high Charlson-Deyo score (≥3; OR 1.30, $p=0.03$) and treatment at an academic center (OR 2.24, $p<0.001$).

Conclusion: National practice patterns demonstrate a steady shift toward surgical and radiation de-escalation in early-stage HR+/HER2- breast cancer. The increasing adoption of dual de-escalation reflects growing interest among both clinicians and patients in minimizing treatment burden while maintaining oncologic safety. The higher rate of radiation omission among patients who omitted SLNB likely reflects patient preference or other factors that precluded full guideline-concordant therapy. These findings highlight the need for prospective studies to define the safety, outcomes, and patient selection criteria for combined de-escalation strategies. Until these data are available, patient-centered discussions are essential to determine the most appropriate and evidence-based strategy for patients with low-risk disease.

Figure:



1295 - Long-Term Survival Outcomes After Breast-Conserving Surgery with Radiotherapy versus Mastectomy in Invasive Lobular Carcinoma

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Background/Objective: Breast-conserving surgery with adjuvant radiotherapy (BCS+RT) is an established, effective and safe treatment for invasive breast cancer. Given concerns for margin positivity and underestimation of occult disease with conventional imaging for lobular breast cancer, many patients consider upfront mastectomy. Prior historical randomized trials did not perform subgroup analysis for invasive lobular carcinoma (ILC), the second most common histologic subtype characterized by diffuse and often multifocal growth. In this study we conducted a large, contemporary, population-based analysis to compare overall survival (OS) and disease-specific survival (DSS) in patients with ILC who received BCS+RT compared with patients who received mastectomies.

Methods: Female adult patients with primary ILC (ICD-O-3 8520/3) who were diagnosed between 2000 and 2022 were selected from the SEER-17 registry database. Demographic variables, oncological data,

treatment status, and survival data were collected. Patients were excluded if they lacked or had inconsistent covariate data, including age, race, tumor stage, tumor grade or receptor subtype. Our primary endpoint compared BCS+RT vs mastectomy, where OS and DSS were evaluated over full follow-up and at truncated 5-, 10-, and 15-year endpoints (right-censored). To mitigate confounding, we performed variable-ratio nearest-neighbor propensity score matching (PSM) without replacement using age, race, tumor grade, overall receptor subtype, T stage, and N stage in the propensity score. The optimal ratio found was 1. Remaining residual imbalances were included as covariates in Cox proportional hazards models for a doubly robust approach. Kaplan-Meier curves were generated for OS and DSS. Sensitivity analyses repeated survival models with additional mixed lobular histologies (ILC mixed with invasive ductal carcinoma 8522/3, ILC mixed with other histologies 8524/3). All statistical analyses were performed using R. Two-sided p-values less than 0.05 were considered statistically significant.

Results: Before matching, 66,964 patients met criteria (BCS+RT: 30,137; mastectomy: 36,827). On average compared with mastectomy, BCS+RT patients were older (mean 63.6 +/-10.7 vs 61.1 +/- 12.5 years), had higher relative income and increased urban residence. BCS+RT patients had tumors that were smaller (1.86 +/- 1.41 vs 3.61 +/- 3.02 cm), lower grade (grade 1–2: 84.4% vs 78.5%), and earlier stage (AJCC I–II: 95.9% vs 75.5%). Higher stage (T3-T4: 3.5% vs 24.2%) and nodal positivity (18.6% vs 47.4%) were more common with mastectomy. ER+/PR+ HER2- phenotypes were slightly more frequent with BCS+RT; triple-negative disease was uncommon but somewhat higher with mastectomy. Chemotherapy use was higher after mastectomy (43.6% vs 21.5%). As expected, RT was universal in BCS+RT while 33.8% of mastectomy patients received RT.

One-to-one PSM yielded 30,137 patients per arm. With OS, BCS+RT was associated with lower mortality at full follow-up (HR: 0.828, 95% CI: 0.799-0.858, $p < 0.0001$) compared with mastectomy patients. Time-restricted benefits were greatest at 5 years (HR: 0.685, 95% CI: 0.640-0.733, $p < 0.0001$), and persisted at 10-year (HR: 0.769, 95% CI: 0.735-0.804, $p < 0.0001$) and 15-year (HR: 0.820, 95% CI: 0.789-0.852, $p < 0.0001$) follow up. With DSS, BCS+RT showed lower breast cancer-specific mortality over full follow-up (HR: 0.795, 95% CI: 0.744-0.850, $p < 0.0001$) as well as comparative lower mortality at 5-year (HR: 0.727, 95% CI: 0.650-0.814, $p < 0.0001$), 10-year (HR: 0.756, 95% CI: 0.699-0.818, $p < 0.0001$), and 15-year (HR: 0.783, 95% CI: 0.730-0.840, $p < 0.0001$) follow up against mastectomy patients.

Sensitivity analyses which included mixed lobular histologies (8520/3, 8522/3, 8524/3) showed similar findings. BCS+RT had improved benefit in patient OS at full follow-up (HR: 0.788, 95% CI: 0.768-0.808, $p < 0.0001$). Similarly, DSS showed BCS+RT benefit at full follow-up (HR: 0.766, 95% CI: 0.730-0.803, $p < 0.0001$).

Conclusion: BCS+RT was associated with superior OS and DSS compared with mastectomy in patients ILC across the full follow-up and at 5-, 10-, and 15-year endpoints. Sensitivity analyses supported these results for mixed lobular histologies. This supports BCS+RT as a standard surgical option for patients with ILC, with equivalent if not better survival that mastectomy. These data should be shared with patients with ILC who are contemplating mastectomy when eligible for breast-conserving therapy.

1298 - Rates of Sentinel Lymph Node Positivity in Women

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Background/Objective: The landmark SOUND and INSEMA trials demonstrated noninferiority of omission of sentinel lymph node biopsy (SLNB) in breast cancer patients with tumors <2cm that are clinically node-negative with a negative preoperative axillary ultrasound undergoing breast conserving surgery (BCS). Although these trials did not restrict enrollment by age, women <50 years were underrepresented; therefore, we sought to evaluate the rate of SLNB positivity in women <50 with small, early-stage breast cancers and identify predictors of pathologic nodal disease and recurrence to better understand the applicability of the SOUND/INSEMA findings in this population.

Methods: This was a retrospective analysis of newly diagnosed breast cancer patients <50 years of age with clinical T1-2N0 tumors and a negative preoperative axillary ultrasound who underwent BCS and SLNB, identified from a prospectively maintained database. Patients who underwent neoadjuvant chemotherapy were excluded. Demographics, tumor characteristics, and pathology after surgery as well as adjuvant treatment regimens and recurrence data were collected. Analyses were stratified by SLNB result (negative/positive), and a subgroup of patients defined as "low risk" by SOUND eligibility criteria (unifocal cT1, grade 1 or 2) and hormone-receptor (HR) positive, HER2-negative status was separately analyzed for rates of SLNB positivity. Multivariable logistic regression analyses were performed to identify predictors of a positive SLNB, recurrence and death from any cause.

Results: A total of 721 patients who met inclusion criteria were included in the study. Median age was 44 years (IQR 39-47). Of the 721 patients, 136 patients (18.9%) had a positive SLNB. Clinicopathologic characteristics were similar between the SLNB- and SLNB+ groups; most patients had cT1 tumors (393 [67.2%] SLNB- patients versus 85 [62.5%] SLNB+ patients), ductal histology (537 [91.8%] SLNB- patients versus 124 [91.2%] SLNB+ patients), and HR+/HER2- receptor status (389 [66.5%] SLNB- patients versus 115 [84.6%] SLNB+ patients). One-hundred and ninety-six (33.5%) SLNB- patients and 53 (39%) SLNB+ patients had grade 3 tumors. The SLNB+ cohort demonstrated significantly higher rates of lymphovascular invasion (LVI) (23.5% SLNB+ versus 10.4% SLNB-, p<0.001) and tumor multifocality (6.6% SLNB+ versus 4.6% SLNB-, p=0.01). Most patients (509 [87.0%] SLNB- patients versus 116 [85.3%] SLNB+ patients) were designated as low risk for recurrence on genomic assay testing. Among the "low risk" cohort (n=74), SLNB was positive in 12 patients (16.2%). For all patients, there were significantly higher rates of receiving chemotherapy among the SLNB+ cohort (75.0% SLNB+ versus 30.6% SLNB-, p<0.001) as well as radiation therapy (83.8% SLNB+ versus 70.6% SLNB-, p<0.003). At a median follow up of 69.4 months, there was a trend towards a higher rate of local recurrence among the SLNB- cohort (29 SLNB- patients [5.0%]) versus 2 SLNB+ patients [1.5%], p=0.10), but axillary recurrence (0.9% SLNB- versus 0.7% SLNB+, p=0.97) and distant recurrence (4.6% SLNB- versus 3.7% SLNB+, p=0.92) were similar between both groups. On multivariable logistic regression analysis, only the presence of LVI was a predictor of a positive SLNB (OR 6.17, 95% CI 2.09-18.79), and no variables were associated with recurrence or death.

Conclusion: Patients <50 years of age had higher rates of positive SLNB compared to those published in SOUND and INSEMA, even among a subset of clinically low risk patients. Although no significant

difference in recurrence was observed at five years of follow-up in this patient population, SLNB continues to play a critical role in guiding adjuvant systemic therapy decisions. SLNB should not be omitted in women <50 years without any validation from randomized trials.

Adjuvant Treatments and Outcomes by Sentinel Lymph Node Biopsy Status			
	Negative SLNB (N=585)	Positive SLNB (N=136)	p-value
Completion Axillary Lymph Node Dissection	49 (8.4%)	76 (55.9%)	<0.001
Adjuvant Chemotherapy	179 (30.6%)	102 (75.0%)	<0.001
Adjuvant Immunotherapy	12 (2.1%)	2 (1.5%)	0.67
Adjuvant Radiation Therapy	413 (70.6%)	114 (83.8%)	0.003
Recurrence			
Local	29 (5.0%)	2 (1.5%)	0.10
Axillary	5 (0.9%)	1 (0.7%)	0.97
Distant	27 (4.6%)	5 (3.7%)	0.92
Deaths	25 (4.3%)	6 (4.4%)	0.96

1359 - Impact of Omitting Sentinel Lymph Node Biopsy on Adjuvant Therapy Decisions in Early-Stage Breast Cancer for Patients ≥50

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Background/Objective: Recent studies have shown that selective omission of sentinel lymph node biopsy (SLNB) in patients with early-stage breast cancer can reduce surgical morbidity without compromising oncologic outcomes. However, the question remains how omitting SLNB in these patients may impact multidisciplinary recommendations for adjuvant therapy that depend on nodal status, such as CDK4/6 inhibitors like Ribociclib and accelerated partial breast irradiation (APBI). To establish an institutional protocol for omitting SLNB, we sought to identify patients with early-stage breast cancer who might lose access to adjuvant Ribociclib or APBI if this protocol was enacted.

Methods: Health records from a single institution cancer registry (2012-2024) were used to identify women ≥50 years of age with cT1N0, ER-positive, Her2-negative, grade 1-2 breast cancers who would otherwise be candidates for SLNB omission. This cohort was chosen because their eligibility for a CDK4/6 inhibitor would depend on nodal status per the inclusion criteria of the NATALEE trial. Pathologic nodal

status and resulting eligibility for adjuvant APBI and Ribociclib therapy were analyzed based on current national treatment guidelines. Chi-squared and Cochran trend tests were used to identify how age, grade, and clinical T stage affected the likelihood of node-positive disease.

Results: 922 patients were included. Overall, 8.8% (n=81) of patients had at least 1 positive sentinel lymph node, but only 0.3% (n=3) had ≥4 positive sentinel lymph nodes. Nodal positivity declined with age (11.2% at 50–59, 8.0% at 60–69, and 7.4% at ≥70; p = 0.11), though the trend was not statistically significant. Grade 2 tumors had 2 times higher odds of nodal positivity compared to grade 1 tumors (10.9% vs. 5.4%, OR 2.2, 95% CI 1.3–3.7, p < 0.01). There was a significant association between clinical tumor size and nodal positivity, with rates increasing from 3.7% in cT1a to 4.6% in cT1b and 12.8% in cT1c tumors (p < 0.001). Among patients <60 years with tumors ≤1cm (cT1a and cT1b), the rate of nodal positivity was slightly higher for grade 2 than grade 1 (11.1% vs 6.8%), but the difference was not statistically significant (p = 0.53). For those ≥ 60 years of age and with tumors ≤1cm (cT1a and cT1b), nodal positivity rates were overall lower than <60 years and did not differ significantly between grade 1 and grade 2 tumors (2.1% vs. 3.1%, p = 1.00). 84.0% (n=68/81) of node positive patients had molecular gene assay results available (64.7% Oncotype and 35.3% Mammaprint). Of those with gene assay results, 91.1% (n=62/68) were low risk (97.7% Oncotype recurrence score <26 and 79.2% Mammaprint low risk).

Conclusion: Under current treatment guidelines, omission of SLNB in women with cT1N0, ER-positive, Her2-negative, grade 1-2 breast cancers would have resulted in 8.8% of patients being excluded from consideration for adjuvant ribociclib therapy and/or APBI based on pathological nodal status. Among patients aged ≥60 years with ≤1 cm tumors, nodal involvement was rare and did not differ by grade. This extremely low likelihood of nodal positivity suggests that older patients with sub-centimeter, low-grade tumors would seldom meet the criteria required for adjuvant ribociclib eligibility. Overall, SLNB omission in this cohort of patients appears to have a minimal effect on eligibility for adjuvant therapies. Additionally, the majority of patients who were node positive were low risk on molecular gene assays. Findings like these could help multidisciplinary teams decide on appropriate candidates for omission of sentinel lymph node biopsy.

1372 - Improving Timely Access to Breast Oncology Care for Patients with High-Risk Lesions Through the Advanced Practice Provider-Led Breast Rapid Access Visit and Education (BRAVE) Program

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Background/Objective: Traditionally, patients with high-risk breast lesions, such as intraductal papilloma (IDP), radial scar (RS), atypical ductal hyperplasia (ADH), and some fibroepithelial lesions, underwent surgical excision due to concern for histologic upgrade. However, evolving evidence, improved imaging, and multidisciplinary collaboration now support selective nonoperative management with close surveillance. Rising patient volumes and physician shortages have led to longer wait times, especially for those with high-risk but nonmalignant diagnoses. To address this, our breast surgical oncology team and advanced practice providers (APPs) developed the Breast Rapid Access Visit and Evaluation (BRAVE) program to expedite care, reduce patient distress, and preserve surgeon availability for confirmed cancers. We hypothesized that this APP-led model would shorten wait times, maintain high patient satisfaction, and safely reduce unnecessary surgical consultations.

Methods: This single-institution prospective cohort study was conducted at a large, high-volume tertiary academic breast center. The APP-led initiative was designed in collaboration with physician leaders and guided by the National Cancer Institute's conceptual framework for patient-centered communication. The pilot phase was implemented from September 2024 through August 2025. Eligible patients with biopsy-proven high-risk breast lesions were identified by the breast center's nurse navigator and offered an expedited BRAVE appointment with a specialty-trained breast oncology APP. The APP visit included a comprehensive clinical assessment, breast examination, patient education, review of imaging and pathology results, coordination of diagnostic work-up, and multidisciplinary referrals, as indicated. All patient cases were reviewed collaboratively with attending breast surgeons, pathologists, and radiologists. During the pilot period, 100 patients were evaluated through the BRAVE program. Data was prospectively collected and included patient demographics, pathology diagnosis, and time intervals between biopsy, APP consultation, subsequent surgeon visits, and date of surgical excision, when applicable. The initiative also tracked patient decisions regarding surgical versus surveillance management and documented any upgrades in diagnosis on final surgical pathology.

Results: The study cohort included 100 female patients, aged 22–75 years (median, 52.5 years). Pathology diagnoses included: ADH (n=31, 31%), IDP (n=27, 27%), RS (n=28, 28%), atypical lobular hyperplasia (n=5, 5.0%), fibroepithelial lesions (n=4, 4.0%), classic lobular carcinoma in situ (n=2, 2.0%), and flat epithelial atypia (n=3, 3.0%).

Prior to implementation of the BRAVE pilot program, the average time from biopsy to surgeon visit for high-risk lesions was 55.9 days. Conversely, with the BRAVE program, the median time from breast biopsy to APP visit was 14 days (range 0–70) for patients with high-risk lesions, and the median time from APP visit to surgeon visit was 38 days (range 7–153). During the interval between APP and surgeon visits, additional diagnostic evaluations were frequently completed, including breast MRI, image-guided biopsies, and/or germline genetic testing, as desired by the consulting surgeon.

Of the 100 patients seen through the BRAVE program, 42 (42%) proceeded to a surgeon visit, either by personal preference or team recommendation, while 54 (54%) opted to continue in an imaging

surveillance program after detailed counseling and shared decision-making with the APP. Four patients (4%) were lost to follow up. Surgical excision was recommended for six patients (6%), all of whom underwent surgery. Of these, two patients (33.3%) demonstrated a pathologic upgrade on final surgical pathology, both with invasive lobular carcinoma.

Conclusion: Implementation of the BRAVE program, a novel APP-led, rapid-access pathway for patients with newly diagnosed high-risk breast lesions, significantly reduced the time interval between biopsy and initial consultation, optimizing access to care in the setting of limited surgeon availability. The model facilitated timely evaluation, patient education, and coordination of diagnostic work-up, while preserving surgeon clinic availability for patients with confirmed malignancies. Furthermore, a small minority of patients (n=2) were found to have histologic upgrade on final surgical pathology, which highlights the safety and appropriateness of APP-led triage and evaluation for high-risk breast lesions, while maintaining close multidisciplinary oversight. In addition to improved patient experience and operational efficiency, the program carries significant potential for healthcare cost savings by avoiding unnecessary surgical consultations and optimizing resource allocation. With the growing national shortage of physicians and rising oncology patient volumes, the BRAVE program represents a scalable and sustainable model for multidisciplinary breast centers. APP-led rapid-access programs such as this can enhance timely care delivery, maintain a positive patient experience, and support health system resilience while maintaining high standards of quality and safety.

1419 - Omission of Radiation Therapy in Patients with a Low Oncotype Score: Confirming DEBRA Trial Criteria

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Background/Objective: Genomic profiling of hormone receptor positive (HR+), HER2-negative tumors is predictive for benefit of adjuvant chemotherapy and can stratify risk of local recurrence. The ongoing DEBRA trial is investigating if the Oncotype DX (ODX) recurrence score (RS) can be used to identify women at low risk of recurrence where radiation therapy (XRT) can be omitted. Specifically, HR+, HER2- patients aged 50-69 with T1N0 breast cancer who undergo breast-conserving surgery (BCS) and have a ODX RS ≤18 are randomized to endocrine therapy (ET) with or without XRT. We sought to determine the rate of locoregional recurrence (LRR) in patients meeting DEBRA eligibility criteria.

Methods: This is a retrospective single-institution analysis of prospectively collected data. Pre- and post-menopausal patients aged 50-69 with pT1N0 HR+, HER2- breast cancer who underwent BCS with an ODX RS ≤18 between 2010-2020 were included. Patients treated with neoadjuvant therapy were excluded. Clinicopathologic, treatment, overall survival, and LRR data were collected. The LRR rates of patients with ODX RS ≤18 treated with XRT versus no XRT were estimated using the Kaplan-Meier method and differences were compared with the log-rank test.

Results: A total of 1464 patients met study eligibility criteria. Clinical characteristics of the overall cohort and patients treated with or without XRT are listed in Table 1. Median (IQR) age was 60 (55-64) years and ODX RS of 13 (9-16). All patients had a sentinel node biopsy confirming N0 status and median (IQR)

tumor size was 11 (8-14) mm. Most tumors were invasive ductal carcinoma (1254/1464, 86%), and either intermediate (585/951, 62%) or low (253/951, 27%) grade. Only 12% (131/1089) had lymphovascular invasion (LVI). Almost all patients received adjuvant XRT (1260/1406, 90%) and ET (1261/1439, 88%), while only 3.8% (56/1464) received adjuvant chemotherapy. Overall crude rate of LRR for the entire cohort was 1.8% (26/1464) with a median (IQR) follow up time of 5.3 (3.3-8.0) years and median (IQR) time to LRR of 4.8 (2.9-8.2) years. To further examine DEBRA eligibility criteria, Kaplan-Meier analysis of 5-year LRR rates for ODX ≤18 treated with and without XRT was performed. The 5-year rate of LRR for patients treated with XRT was 1.1% versus 3.2% in those treated without XRT (log rank $p < 0.0001$).

Conclusion: In patients aged 50-69 with T1N0 breast cancer and ODX RS ≤18, omission of XRT resulted in a higher, but still acceptably low rate of LRR. This study provides evidence from a real-life data set that the DEBRA trial hypothesis of the safety of omitting XRT for pT1N0 patients with an ODX RS ≤18 is sound. The results of the DEBRA trial will determine whether omission of RT in patients with HR+, HER2- breast cancer and low genomic risk should become standard practice.

Table 1: Clinical Characteristics of the Study Cohort Stratified by Receipt of XRT

Characteristic	*Overall, N = 1464*	*XRT, N = 1260*	*No XRT, N = 146*
Age	60 (55-64)	60 (55-64)	62 (57-66)
Tumor Size, mm	11 (8-14)	11 (8-14)	11 (8-15)
Histology			
IDC	1254 (86%)	1073 (85%)	131 (90%)
ILC	174 (12%)	158 (13%)	11 (8%)
Mixed	35 (2%)	28 (2%)	4 (3%)
Other	1 (0.1%)	1 (0.1%)	0 (0%)
Grade			
1	253 (27%)	214 (26%)	38 (32%)
2	585 (62%)	509 (61%)	74 (63%)
3	113 (12%)	108 (13%)	5 (4%)
LVI	131 (12%)	113 (12%)	14 (13%)
Oncotype DX RS	13 (9-16)	13 (9-16)	12.5 (7-16)

Continuous variables are presented as median (IQR); categorical variables are presented as n (%) with unknowns excluded from percentage calculations.

1425 - Does Repeat Sentinel Node Biopsy Impact Adjuvant Treatment in Local Recurrence of HR+/HER2− Breast Cancer?

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Background/Objective: Axillary management of local recurrence (LR) in hormone receptor–positive, HER2-negative (HR+/HER2−) breast cancer remains controversial. Altered lymphatic drainage limits the accuracy of re-operative sentinel lymph node biopsy (re-SLNB), yet current guidelines continue to support attempts at re-SLNB despite little evidence that it changes adjuvant treatment. In a cohort of women with HR+/HER2- locally recurrent breast cancer, we hypothesized that sentinel node surgery would not significantly impact adjuvant treatment.

Methods: Patients with non-metastatic HR+/HER2- invasive breast cancer recurrence between 2007-2025 were retrospectively identified at a single institution. All were clinically and imaging node negative or underwent benign and concordant lymph node biopsy at recurrence. Clinical and pathologic variables collected for primary and recurrence included age, size, disease-free interval (DFI), breast and axillary surgery, and radiation and systemic therapy treatments. Re-SLNB was defined as any surgical attempt at SLNB at the time of recurrence. Patients who did not undergo any axillary surgery at recurrence were considered "node negative" (rcN0). Univariate and multivariate analyses assessed factors associated with attempts at re-SLNB and receipt of adjuvant chemotherapy or radiation. A p-value of <0.05 was considered significant.

Results: There were 120 eligible patients. Median age at recurrence was 62 years (IQR 53-72) with median DFI 9 years (IQR 5-14). Lumpectomy was the primary surgery in 68% of patients (82/120) and mastectomy in 30% (37/120). Axillary staging at primary diagnosis included SLNB in 78% and axillary lymph node dissection (ALND) in 16%. 53% of the patients received adjuvant radiation.

At recurrence, 0.8% of patients underwent ALND, 44% underwent re-SLNB and 55% did not undergo surgical axillary staging. Among those who underwent re-SLNB, 77% (41/53) had at least 1 lymph node retrieved, while 12 re-SLNBs were attempted without success. The median number of lymph nodes removed at re-SLNB was 1 (range 1-3), and 7 patients had at least 1 positive lymph node. Attempt at re-SLNB was more common after prior SLNB (38/88 patients, 43%) than ALND (2/18, 11%), p=0.02. It was also significantly lower among patients who underwent prior mastectomy (13%) compared to lumpectomy (87%) (p<0.0001). On univariate analysis, successful re-SLNB was associated with prior SLNB compared to ALND (OR 2.7, 95% CI 1.1-6.4, p=0.03) but inversely associated with each additional year of DFI (OR 0.93, 95% CI 0.88-0.99; p=0.02).

In node-positive recurrences, 29% received adjuvant chemotherapy compared with 9% of patients with node-negative disease (p=0.15). Adjuvant radiation after recurrence was administered to 33 patients, which was more common among those without prior radiation but did not vary by nodal status (p=0.12). Adjuvant endocrine therapy was recommended to most patients and did not vary by nodal status (86% node-positive vs 77% node-negative, p=1.00). Older age (>70 years) and recurrence size <10mm were independently associated with omission of adjuvant therapies (p<0.05). In multivariable analysis

adjusting for recurrence size and history of prior radiation and chemotherapy, nodal positivity was not an independent predictor for receipt of adjuvant chemotherapy or radiation (p=0.29 and p=0.83).

Conclusion: In this study of non-metastatic HR+/HER2− breast cancer local recurrence, re-SLNB was only performed in half of patients and was influenced by prior surgical history. Among the 42% of patients who did undergo successful axillary staging, adjuvant systemic and radiation treatments were not significantly different compared to those without axillary staging. These findings suggest that there may be limited value in routine re-SLNB in this population, particularly in the absence of data supporting escalation of systemic treatment beyond adjuvant endocrine therapy. Prospective or multi-site retrospective studies are needed to establish definitive guidelines for staging optimization, as limiting axillary surgery in this population would minimize morbidity and appears unlikely to alter oncologic management.

Patient, tumor and treatment characteristics among women with local recurrence of HR+/HER2- breast cancer comparing lymph node negative versus lymph node positive axillary disease

Variable	Total (n=120)	*r*c/pN0 (n=113)	*r*pN1 (n=7)	p-value
Patient and Tumor Characteristics				
Age at recurrence, years — median (IQR)	62.4 (53.25-71.75)	62.0 (53.5-70.5)	69.0 (52.0-74.5)	0.76
Disease-free interval, years — median (IQR)	9.0 (5.0-14.0)	9.0 (5.0-14.0)	7.0 (4.5-11.0)	0.65
Recurrence size, mm — median (IQR)	13.0 (8.25-18.0)	13.0 (8.0-18.0)	13.0 (11.0-15.0)	0.70
Treatment of the Primary Breast Cancer				
Lumpectomy	82 (68.3%)	76 (67.3%)	6 (85.7%)	0.43
Mastectomy	37 (30.1%)	36 (31.9%)	1 (14.3%)	0.44
SLNB	94 (78.3%)	88 (77.9%)	6 (85.7%)	1.00
ALND	19 (15.8%)	18 (16.0%)	1 (14.3%)	1.00
Radiation	64 (53.3%)	59 (52.2%)	3 (42.9%)	0.71
Chemotherapy	35 (29.2%)	34 (30.0%)	1 (14.3%)	0.67
Endocrine therapy	83 (69.2%)	79 (70.0%)	4 (57.1%)	0.68
Adjuvant Treatment of the Breast Cancer Local Recurrence				
Adjuvant radiation	49 (40.8%)	44 (38.9%)	5 (71.4%)	0.12
Adjuvant chemotherapy	12 (0.1%)	10 (8.8%)	2 (28.6%)	0.15
Adjuvant endocrine therapy	93 (77.5%)	87 (77.0%)	6 (85.7%)	1.00

Notes: Continuous variables reported as median (IQR) with Mann–Whitney U p-values.
Categorical variables reported as n (%)

Age Extremes

1458 - Comparison of Breast Cancer Survival Outcomes According to Age at Diagnosis

Caitlin Moran[1], Kerri-Anne Crowell[2], Amanda Nash[3], Samantha Thomas[4], Gayle DiLalla[5], Maggie DiNome[5], Kendra Modell Parrish[5], Akiko Chiba[6], Ton Wang[6], Astrid Botty van den Bruele[5], Laura Rosenberger[6], Jennifer Plichta[7], E. Shelley Hwang[5]

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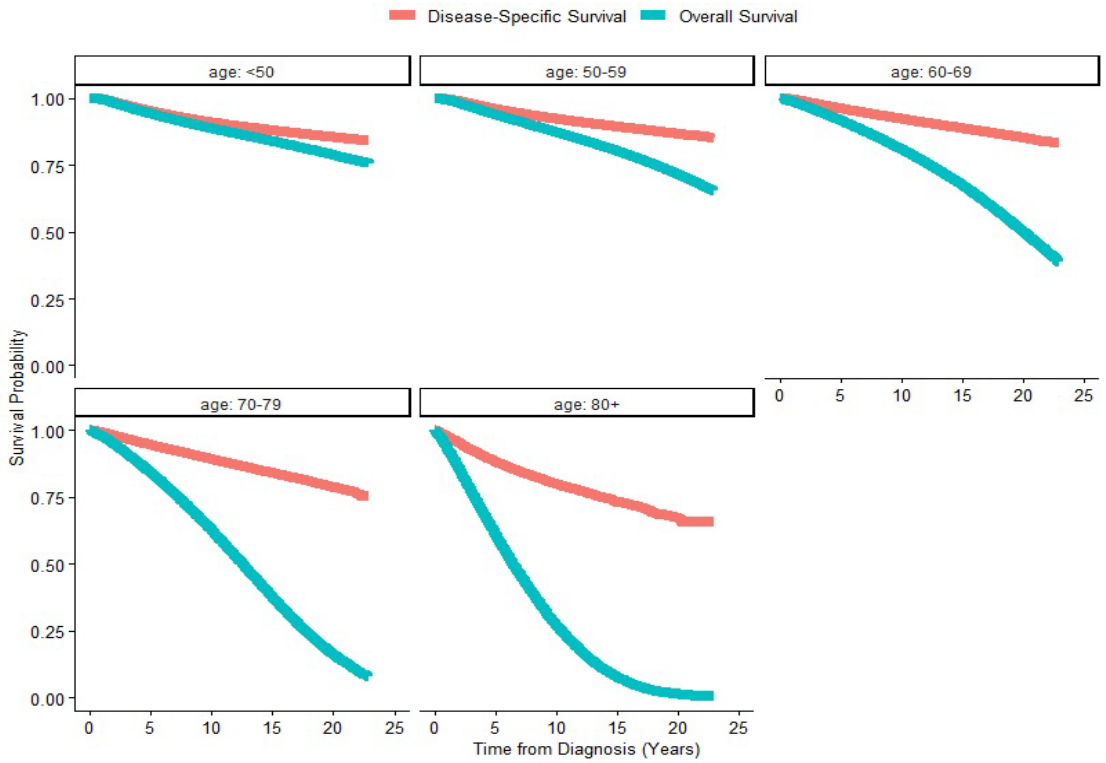
Background/Objective: National cancer registries often report overall survival (OS) but have limited capture of disease-specific survival (DSS). We studied a cohort of patients with early-stage breast cancer to compare the effect of age at diagnosis and tumor features on both OS and DSS.

Methods: Female patients with a new diagnosis of stage I/II invasive breast cancer at age 18+ were identified from the SEER-17 Research Plus Data (2000-2022). Tumor stage was determined according to AJCC anatomic staging. Patients were excluded if they were younger than 18 years, had anatomic stage 0, III, or IV disease, or had missing biomarker or survival data. Patient characteristics and clinicopathologic variables were summarized with N (%) and mean (SD) for categorical and continuous variables, respectively. Unadjusted OS and DSS were estimated using the Kaplan-Meier method. Cox proportional hazards models were used to estimate the association of variables with OS and DSS after adjustment for available covariates, including age, race and ethnicity, tumor classification, node classification, hormone receptor (HR) status, and CoC accreditation.

Results: A total of 997,949 patients met inclusion criteria. Median follow-up time was 9.3 years (95% CI 9.25 – 9.33) for OS and 7.8 years (95% CI 7.75 – 7.83) for DSS. The majority of patients were non-Hispanic White (n=701831; 70.3%). AJCC anatomic stage was stage I in 61.0% (n=608655) and stage II in 39.0% (n=389294); 79.3% (n=791741) were node negative. As expected, the 10-year DSS in the cohort was significantly higher than OS [90.4% (95% CI 90.4 – 90.5) for DSS, and 74.9% (95% CI 74.8 – 75.0) for OS]. The difference between 5-year OS and DSS varied by HR status: for HR-negative tumors, OS was 82.1%, and DSS was 88% (a 5.9% difference), whereas for HR-positive tumors, OS was 89.1% and DSS was 96.1% (a 7.0% difference). The difference between 5-year OS and DSS increased with age at diagnosis. Among women diagnosed before age 50, OS was 94.2% and DSS was 95.2% (a 1% difference). This gap widened to 10.5% for patients aged 70-79 years (OS 84.0% vs DSS 94.5%) and 27.7% for those aged 80 years or older (OS 60.5% vs DSS 88.2%). Multivariable analysis showed that among patients aged 70-79 and ≥80 years, age at diagnosis had a greater effect on both DSS and OS than nodal status or HR status, and a comparable or greater effect than tumor size.

Conclusion: OS is a reasonable surrogate for DSS in younger women with early-stage breast cancer, but this relationship weakens with advancing age. In older patients, where competing comorbidities drive a widening gap between OS and DSS, reliance on OS as a cancer outcome measure may obscure true disease-related effects.

Figure:



1434 - The Use and Utility of Adjuvant Therapy for Ductal Carcinoma In Situ in the Elderly

Lena Egbert[1], Nadia Islam[1], Heidi Kosiorek[1], Natasha Sioda[1], Julie Billar[1], Patricia Cronin[1], Richard Bold[1], Barbara Pockaj[1]

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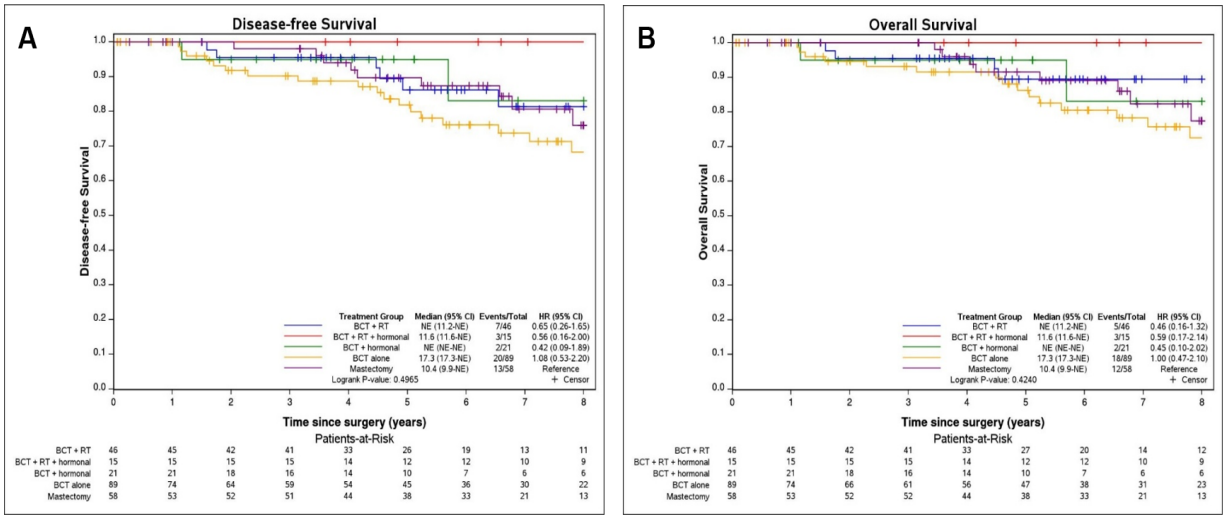
Background/Objective: Ductal carcinoma in situ (DCIS) is a nonobligate precursor to invasive breast cancer. The goal of its treatment is to prevent invasive breast cancer. Surgery is the mainstay of treatment. For patients undergoing breast-conserving surgery, the addition of radiotherapy and endocrine therapy are used to reduce the risk of local recurrence. We evaluated a contemporary group of elderly patients to determine their treatment patterns and how these treatments impact their ultimate outcomes.

Methods: A single institution prospective database was retrospectively reviewed for female patients ≥70 years old with a first-time diagnosis of DCIS alone on surgical pathology from 2000-2023. This cohort was stratified into five groups: patients undergoing mastectomy, lumpectomy alone, lumpectomy with adjuvant radiation (RT), lumpectomy with adjuvant endocrine therapy, and lumpectomy with both adjuvant RT and endocrine therapy. Multivariable analysis was used to determine variables associated with the receipt of adjuvant RT and adjuvant endocrine therapy in only those patients undergoing lumpectomy. Time-to-event outcomes were analyzed with Kaplan-Meier.

Results: A total of 229 elderly patients with DCIS alone on surgical pathology were identified. The median age of the cohort was 74 (range 70–89). Fifty-eight patients (25%) underwent mastectomy, and 171 (75%) underwent lumpectomy. Due to high risk of upstaging, 51 patients (22%) also underwent sentinel lymph node biopsy (SLNB): 38 of the patients undergoing mastectomy (66% of mastectomies) and 13 of the patients undergoing lumpectomy (8% of lumpectomies). Of those undergoing mastectomy, 10 (17%) underwent bilateral mastectomy and 13 (22%) underwent reconstruction. The median tumor size of the cohort was 1 cm (range 0–8 cm). Grade 1 DCIS was present in 36 cases (17%), 77 (35%) were grade 2, and 105 (48%) were grade 3. Of the cohort, 158 (77%) of the tumors were estrogen receptor positive (ER+), with 123 (64%) having comedo necrosis. Multifocal disease was present in 24 patients (11%). Of those 171 patients who underwent lumpectomy, 89 (52%) had lumpectomy alone, 46 (27%) had adjuvant RT only, 21 (12%) had endocrine therapy only, and 15 (9%) had both RT and endocrine therapy. On multivariable analysis of these patients undergoing lumpectomy, use of adjuvant radiation and endocrine therapy were not associated with patient or tumor characteristics. Specifically, there was no association with age, tumor size, grade, or the presence of comedo necrosis with the use of either adjuvant RT or endocrine therapy. With a median follow-up of 6.6 years, in the entire cohort, there were 6 documented local recurrences (3%): 3 were recurrent DCIS and 3 were invasive carcinoma. Recurrences occurred in the 5 groups with the following frequencies: 1 patient (2%) who underwent mastectomy, 3 (3%) after lumpectomy alone, 2 (4%) after lumpectomy with RT, none (0%) after lumpectomy with endocrine therapy, and none (0%) after lumpectomy with both RT and endocrine therapy. There was no significant difference in disease-free survival (p=0.50) or overall survival (p=0.42) among the 5 groups.

Conclusion: Among elderly patients with DCIS, the risk of recurrent disease after surgery is low at 3% with a median follow-up of 6.6 years, regardless of use of adjuvant RT or endocrine therapy. An individualized approach to adjuvant therapies should be made based upon the above data combined with patient and tumor characteristics.

Figure. Disease-free survival (A) and overall survival (B) in elderly patients with DCIS at a single academic institution. The events of interest were any disease recurrence or death for disease-free survival and death by any cause for overall survival.



1339 - Disease Patterns of Young Adults with de Novo Stage IV Breast Cancer

Jennifer Hale[1], Elsa Wani[1], Yevgeniya Gokun[1], Brandon Slover[1], Doreen Agnese[2], Samilia Obeng-Gyasi[1], Erin Burke[2], Ashley Davenport[1], Nerea Lopetegui-Lia[1], Therese Andraos[1], Heather LeFebvre[1], Daniel Stover[1], Tari King[3], Sara Myers[1]

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Background/Objective: A higher proportion of young adult (YA) women aged 18-44 years present with de novo stage IV breast cancer compared to those diagnosed at age >50. While YAs with metastatic disease have poor prognosis, little is known about outcomes among YAs with oligometastatic breast cancer (OBC) limited to ≤5 sites, which is generally thought to have more favorable physiology compared to non-oligometastatic breast cancer (NOBC). Although the recently developed Duke Metastatic Breast Cancer (MBC) prognostic staging system, which predicts overall survival based on clinical characteristics, does take into account site(s) of distant disease, there is limited data with regard to how it performs in the YA cohort. As a first step in understanding opportunities for customizing treatment for YAs with metastatic disease, this retrospective analysis of institutional data characterizes differences among YAs with OBC vs NOBC focusing on patterns of progression free survival (PFS).

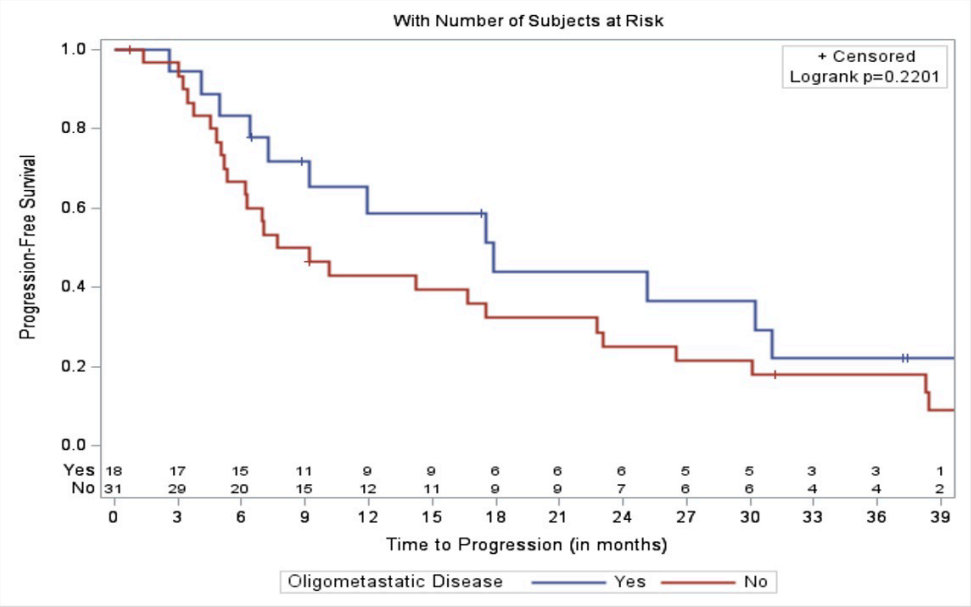
Methods: Women aged 18-44 years treated for de novo stage IV breast cancer at a single US academic medical center between January 1, 2020 and December 31, 2024 were identified. This 5-year window was selected to ensure contemporary relevance and reflect current treatment standards. Demographics, disease and treatment characteristics, response to first line treatment based on Response evaluation criteria in solid tumors (RECIST) criteria, and Duke Metastatic Breast Cancer (MBC) prognostic stage were compared between patients with OBC and NOBC. Duke MBC stages A through D provide prognostic estimates, with stage A indicating highest probability of overall survival, based on clinical T stage, tumor grade, hormone receptor (HR) and human epidermal growth factor receptor 2 (HER2) status, histology, metastatic site (bone, brain, or visceral) and number of metastatic organs at the time of diagnosis. Kaplan-Meier curves were generated to understand differences in PFS by oligometastatic disease status.

Results: Of 49 women with de novo stage IV disease, 17(35%) had HR+/HER2+, 17(35%) had HR+/HER2-, 7(14%) had HR-/HER2+, and 6(12%) had triple-negative (TN) breast cancer. 43(88%) patients identified as White, 3(6%) as Black, 2(6%) as Asian, and 1(2%) as Other. Median age was 34 (IQR 31,37). Distribution of Duke MBC prognostic stage among the 45 women with sufficient data complete calculations was: 3/45(7%) stage A, 26/45(58%) stage B, 10/45(22%) stage C, and 6/45(13%) stage D disease. 18/49 (37%) patients were considered to have OBC. While no statistically significant differences were observed between OBC and NOBC patients in age (p=0.519), race (p=0.140), HR/HER2 subtype (p=0.194), or Duke MBC stage (p=0.148), numerical differences in race and subtype were noted. Compared to the racially diverse NOBC cohort, all patients with OBC were White. 10/18(56%) of OBC patients exhibited the HR+/HER2+ subtype while the greatest proportion of NOBC patients had HR+/HER2- disease (13/31(45%). More OBC patients received surgery (9/18(50%) vs 1/31(3%); p=0.004) and radiation (6/18 (33%) vs 0/31; p=0.005) for the index breast lesion but radiation to distant sites did not differ between OBC and NOBC groups (p=0.407). There were no differences in RECIST response to first line treatment by OBC status (p=0.234). 3/18 (17%) OBC patients had disease progression during the study period compared to 11/29 (38%) NOBC patients. There were no differences in PFS based on

HR/HER2 subtype (p=0.073) or Duke MBC stage (p=0.783). There were no significant differences in 6 or 12-month PFS among OBC patients based on whether they received surgery/radiation of their primary site (p=0.637). Although OBC and NOBC cohorts exhibited similar 6 and 12-month PFS (p=0.220), there was a trend (HR 0.65 95% CI 0.34-1.25) toward greater PFS in OBC patients (Figure). Among those who received radiation to distant sites, there was a nonsignificant trend toward improved PFS in patients with OBC compared to NOBC (p=0.062).

Conclusion: In this study, although patients with OBC did more frequently receive locoregional management of their primary breast tumor compared to patients with NOBC, no significant differences were noted between cohorts with regard to disease characteristics or clinical trajectories, likely due to limited sample size. However, several trends were noted that could inform hypotheses for future research. In particular, the tendency toward longer PFS in YAs with OBC highlights the need for population-based studies to determine whether clinically meaningful distinctions between OBC and NOBC exist and how they might guide personalized treatment strategies.

Figure. Progression free survival by oligometastatic disease status.



1261 - Navigating Complexity: A Mixed-Methods Study of Breast Oncologists' Perspectives on Challenges and Potential Solutions in Caring for Young Adult Cancer Patients

Caroline Lommer[1], Lila Schroeder[1], Caroline Amato[1], Ashley Davenport[1], Therese Andraos[1], Nerea Lopetegui-Lia[1], Heather LeFebvre[1], Daniel Stover[1], Lindsey Sova[1], Ann McAlearney[1], Sara Myers[1]

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Background/Objective: While the rising incidence of breast cancer among young adults (YAs) aged 18-39 years has brought awareness about the unique challenges faced by YA patients, how oncology providers are affected by caring for the complex issues experienced by this demographic is unknown. Given the elevated risk for burnout among oncologists, this mixed-methods study sought to characterize providers' perspectives on whether challenges of caring for YAs with breast cancer impact emotional wellbeing.

Methods: A multidisciplinary cohort of breast oncology practitioners from a single Comprehensive Cancer Center were recruited to participate in semi-structured interviews to gain insight into perspectives on caring for YAs with breast cancer and complete the validated 22-item Maslach Burnout Inventory-Human Services Survey (MBI-HSS) between August-November 2025. Interview questions prompted participants to reflect on challenges in treating YAs, how these might affect their own emotional wellbeing, and how system-level interventions might influence care delivery. Transcribed audio-recordings of interviews were analyzed independently by 3 coders to identify recurring themes. The MBI-HSS has 3 subscales, which were scored according to thresholds denoting emotional exhaustion (low ≤16, moderate 17-26, high ≥27), depersonalization (low ≤5, moderate 6-9, high ≥10), and reduced personal accomplishment (high ≤33, moderate 34-39, low ≥40).

Results: 14 (70%) physicians and 6(30%) advanced practice providers participated from surgical (9(45%)), medical (4(20%)), and radiation oncology (3(15%)), as well as reconstructive surgery (3(15%)), and radiology (3(15%)). Median age was 41 (IQR 34-47). 13 completed the MBI-HSS; 6(46%) scored as moderate/high risk for emotional exhaustion and depersonalization, and 8(63%) scored as moderate/high risk for reduced sense of professional achievement. 5 major themes emerged from participant narratives: 1) age-based challenges complicate patient care; 2) addressing these challenges affects providers' emotional wellbeing; 3) barriers hinder patient care; 4) multidisciplinary collaborations are important for care optimization and maintaining provider wellbeing; and 5) system-level initiatives are needed to facilitate delivery of high-value care (Table). Patients' low familiarity with illness, lack of social support, and media-perpetuated mistrust of the medical field were sources of frustration. One provider noted "a growing lack of trust in our recommendations….often coming more from younger [patients] who are [more] online….Having disagreements in that way… is hard, I think mentally as well." The majority of providers (16(80%)) reported feelings of grief with one stating "the young patients are often the ones you go home and think about… [and that] weighs on your heartstrings … because they have so much that they're trying to manage." Insufficient time to address patients' needs and ineffective multidisciplinary collaborations hindered patient care. Effective multidisciplinary communication, however, improved patient outcomes and reduced emotional strain for the providers themselves. One provider said that she felt the biggest factor in reducing her risk of burnout was "having that core group [to] talk to when [you've] had a bad outcome." The importance of system-level interventions to improve multidisciplinary communication were felt to be crucial to professional happiness.

Conclusion: In this mixed-methods study of breast oncology providers caring for YA patients, risks for emotional exhaustion, depersonalization, and reduced sense of accomplishment were common. Qualitative findings underscore the emotional complexity of caring for this population and suggest that multidisciplinary support may play a role in mitigating risk for burnout.

Table. Major themes that emerged from participants' narratives and accompanying representative quotes.

Theme	Representative quote
Age-based challenges complicate patient care	*"From a reconstructive standpoint, it can be incredibly emotional for these patients. Most of them are young women. Ones that have had recent children are breastfeeding. They, you know, now we're facing a lifelong change. Change in their body."*
Addressing challenges affects providers' emotional wellbeing	*"I had once a pregnant patient and I was also pregnant at that time. I was talking to the patient about getting chemotherapy for a HER2-positive breast cancer while she is 26 weeks pregnant. So, she asked me what I would do, because I was also pregnant at that time. I was actually very emotional at that time….[it's] a harder diagnosis…especially for getting chemotherapy for during pregnancy, because there are so many moving pieces there….It really affected my mental health…."*
Barriers hinder patient care	*"You know, we have a long conversation with a patient who is really sick and it takes longer. And I apologize to my patients for being late, but I also explain, you know, somebody really needed some extra time."*
Multidisciplinary collaborations are important for care optimization and maintaining provider wellbeing	*"…sharing it with other colleagues, I think, and getting their input helps me also come to terms…[to know that] I tried to do absolutely everything I could for this patient to have the best possible outcome…. [S]haring and having, you know, the sense of belonging and being able to share these kinds of stories, yes, I do think that that helps with, you know, burnout, and emotionally being able to deal with things a little bit better.*
System-level initiatives are needed to facilitate delivery of high-value care	*"Since this population has specific needs that may differ from other cancer populations, maybe having avenues where we can discuss or come up with pathways that can, that are very clearly outlined, that can help us sort of shepherd patients through the process would be helpful. And then having a particular forum where we can discuss challenging obstacles that patients may have in terms of their care, even from psychosocial, socio-environmental factors, might be incredibly meaningful."*

1173 - Practice Patterns and Overall Survival for Octogenarians with Triple-Negative Breast Cancer Treated at Accredited Cancer Centers in the United States

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[1]Endeavor Northshore, Evanston, IL, [2]University of Chicago, Chicago, IL

Background/Objective: The aim of this study is to examine treatment patterns and overall survival for patients 80 years or older with triple-negative breast cancer (TNBC).

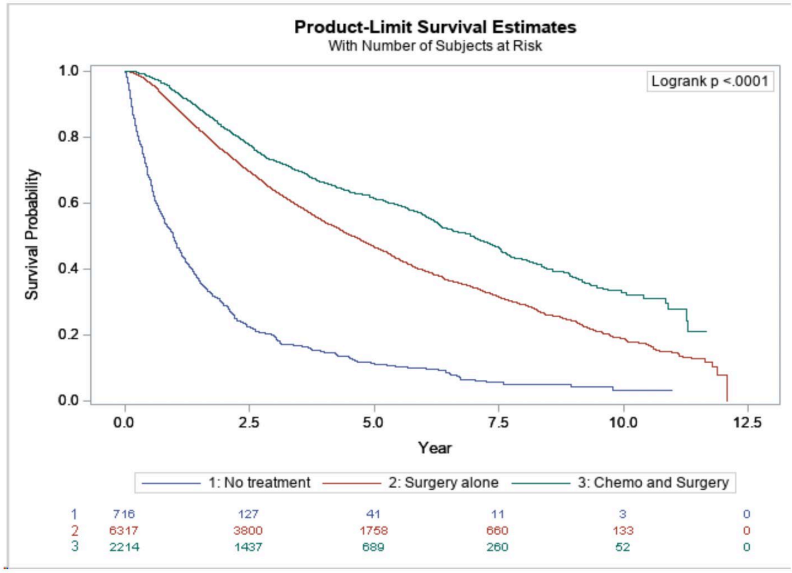
Methods: We queried the National Cancer Data Base and selected patients >=80 years old with TNBC diagnosed between 2012 and 2022. Patients with T1a tumor size or distant metastatic disease were excluded. Treatment patterns of chemotherapy, radiation therapy and surgery were examined. Charlson-Deyo comorbidity scores were used to assess how patient comorbidities affected treatment.

Overall survival (OS) was evaluated using Kaplan-Meier estimates with median survival at the 95% confidence interval. Survival differences were stratified by treatment groups: no treatment, surgery alone, and chemotherapy + surgery and by patient age. Multivariable Cox proportional hazards models were used to evaluate factors associated with OS, adjusted for patient age.

Results: A total of 10,767 patients met inclusion criteria, of whom 5,876 (54.5%) were 80-84 years old, 3,296 (30.6%) were 85-89 and 1,595 (14.8%) were >=90. Most patients had a Charlson-Deyo score of 0 (69.53%) and 565 patients (5.25%) had a score of >=3. Most patients (89.58%) underwent surgery with 51.85% undergoing breast-conserving surgery and 37.73% undergoing mastectomy. 6916 (64.23%) patients underwent surgery alone, 2584 (24.0%) underwent surgery and chemotherapy, 811 (7.5%) patients received no treatment, and 284 (2.63%) received chemotherapy alone. Of patients with a Charlson-Deyo score >=3, 367 (64.96%) patients underwent surgery alone, 105 (18.58%) underwent surgery and chemotherapy, 66 (11.68%) received no treatment, and 18 (3.19%) patients only received chemotherapy. The mean tumor size was 3.17cm (SD:3.11). Regional lymph nodes were positive in 3001 patients (27.87%) and nodes were not examined in 2457 patients (22.82%). 2,753 (26.5%) of patients with tumor >=0.5cm underwent chemotherapy. Chemotherapy was given to 1984 (39.51%) patients age 80-84, 530 (18.03%) age 85-89, and 95 (6.48%) patients >=90 with a tumor size >1cm. Of patients with a clinically positive node or a tumor >2.0cm, 798 (36.03%) underwent neoadjuvant chemotherapy. Surgical treatment of TNBC in this patient population had the biggest impact on OS compared to other adjuvant therapies. On a Cox regression model incorporating tumor and treatment factors, the hazard ratio (HR) for OS was 0.38 (95%CI:0.33-0.42) for surgery, 0.67 (95% CI:0.61-0.83) for chemotherapy, and 0.72 (95%CI:0.67-0.76) for radiation therapy. The HR for surgery was 0.42 vs 0.32 in women age 80-84 and >=90 respectively versus 0.70 and 0.72 for radiation treatment and 0.62 and 0.80 for chemotherapy. At 2.5 years of follow-up, the OS rate was 22.2% for patients who received no treatment, 69.5% for patients who underwent surgery alone, and 77.6% for patients who underwent surgery and chemotherapy (Figure 1).

Conclusion: Surgical management of TNBC in this older patient population is associated with greater OS than chemotherapy or radiation therapy. Surgical management should be highly considered for these patients despite their biological age.

Figure 1. Kaplan-Meier Curve Demonstrating Overall Survival



Benign

1481 - From Atypia to Malignancy: Multi-Institutional Upstaging Rates of Atypical Ductal Hyperplasia Over Time and Risk Factors

Sally Justus[1], Elisabeth Abeles[1], Djanira Fernandes[1], Mario Keko[1], Anna Modest[2], Alessandra Mele[3]

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Background/Objective: Atypical ductal hyperplasia (ADH) is a high-risk proliferative breast lesion that portends increased lifetime breast cancer risk. Excisional biopsy can uncover more insidious disease, though estimates of upstaging to in situ or invasive cancer range widely in the literature (7 - 41%). In this study, multiple variables were evaluated for their association with upstaging, including patient factors, imaging findings and pathology attributes.

Methods: Following IRB approval, a multi-center retrospective chart review was conducted by querying online medical record systems for pathology results with ADH. One institution's pathology department supplemented cases from its repository. Charts were excluded if in situ or invasive cancer, lobular carcinoma in situ, lymphoma, or phyllodes tumors were also present in the sample, or if the patient never underwent excision. Data were collected in REDCap, and analysis was performed using the SAS software, version 9.4. Descriptive statistics (median and interquartile range (IQR) and absolute and relative frequencies) were used to summarize the variables of interest. To compare differences, chi-square (for categorical variables) and Mann-Whitney tests (for continuous variables) were used. Adjusted risk ratios (RR) and 95% confidence intervals (CIs) were calculated using Poisson regression with robust error variance. A priori, models were adjusted for age, race, BMI, and presence of atypical lobular hyperplasia (ALH). Other covariates were added based on univariate analyses and retained in the final model if they were statistically significant. The significance threshold was set at the two-sided alpha of 0.05.

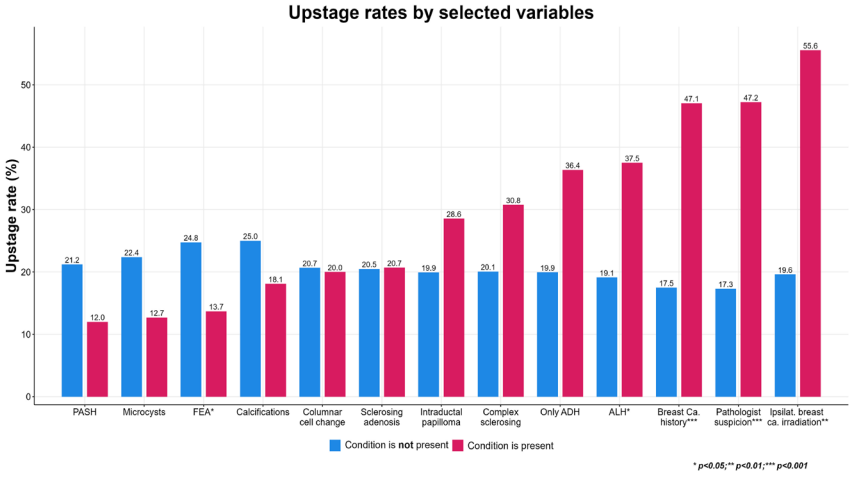
Results: Of the 1,919 medical records reviewed, 322 (16.8%) met the inclusion criteria. The median age at the time of biopsy was 52.5 years (IQR: 47.0–64.0), and 74.5% (n=237) of the cohort was White. Sixty-six (20.5%) cases were upstaged, with the median age being significantly higher (p=0.029) among patients who were upstaged (55 years; IQR 49–67) compared with those who were not (52 years; IQR 46–62). The upstaging rates were higher among patients with a history of breast irradiation on the ipsilateral side (55.6% vs 19.6%, p=0.009), pathologist's suspicion that a lesion might be upstaged (as determined by the lesion being reported as borderline for in situ disease) (47.2% vs 17.3%, p<0.001), history of breast cancer (47.1% vs 17.5%, p<0.001), and presence of ALH in core needle biopsy (CNB) (37.5% vs 19.1%, p=0.032) (Figure 1).

In the final model, the risk of upstaging was twofold higher among patients with a history of breast cancer (RR 2.04, 95% CI 1.28–3.25) and more than twofold higher when the pathologist suspected upstage (RR 2.63, 95% CI 1.73–4.01), and when the CNB had ALH in addition to ADH (RR 2.20, 95% CI 1.24–3.91). Further, for each increase in needle gauge by 1 G (i.e., at smaller needle sizes), the adjusted risk of upstaging increased by 14% (RR 1.14, 95% CI 1.02-1.26).

Among the patients for whom the lesion size and number of cores taken were reported, patients who were upstaged had a significantly lower median number of cores taken (6 [IQR 4–8] vs 9 [IQR 6–16], p=0.015), and a larger median lesion size (9.0 mm [IQR 6.0–16.0] vs 7.0 [5.0-12.0]), although the difference in size was not statistically significant (p=0.129). Upstaging rates fluctuated over time in the periods before 2005, 2005–2009, 2010–2014, 2015–2019, and 2020 and after (22.2%, 5.3%, 8.6%, 16.7%, and 28.3%, respectively).

Conclusion: Our understanding of ADH and the extent to which it is a harbinger of malignancy has evolved over time. Upstaging rates widely range, with a variety of risk factors reported in the literature. In our cohort, the upstaging rate was 20.5%. In regression analysis, only breast cancer history, pathologist suspicion, presence of ALH, and needle gauge were significantly associated, though several variables correlated with increased risk of upstaging in the univariate analysis. While older age and breast irradiation were significant on univariate analysis, the effect diminished in the regression model and can likely be explained by their correlation with breast cancer history. Taking fewer cores was associated with upstaging, as were larger lesions (albeit not significant); however, these variables were not consistently reported in the data, thus limiting the strength of this conclusion and requiring future investigation. An unexpected finding is that rates of upstage have increased in the last decade. This may reflect a trend among breast surgeons towards observation rather than excision for low-risk patients, and the increased incidence could therefore be explained by selection bias as surgeons may preferentially offer excision to patients at higher risk. This is also reflected in the updated ASBrS guidelines released in February 2025 that support observation in low-risk patients, offering excision only to patients who are at higher risk of upstaging. Alternatively, given the American Cancer Society's estimate of a 1% yearly increase in breast cancer incidence in the United States from 2012 to 2021, increasing breast cancer rates could also explain this finding. Collectively, our results support the recommendation for excision of ADH when encountered on CNB while also providing information for counseling patients on their risk of upstaging during shared decision-making.

Figure:



1368 - Cost-Effectiveness Analysis of Active Surveillance versus Surgery for the Management of Intraductal Papilloma without Atypia

Omolade Sogade[1], Su-Hsin Chang[1], Julie Margenthaler[1]

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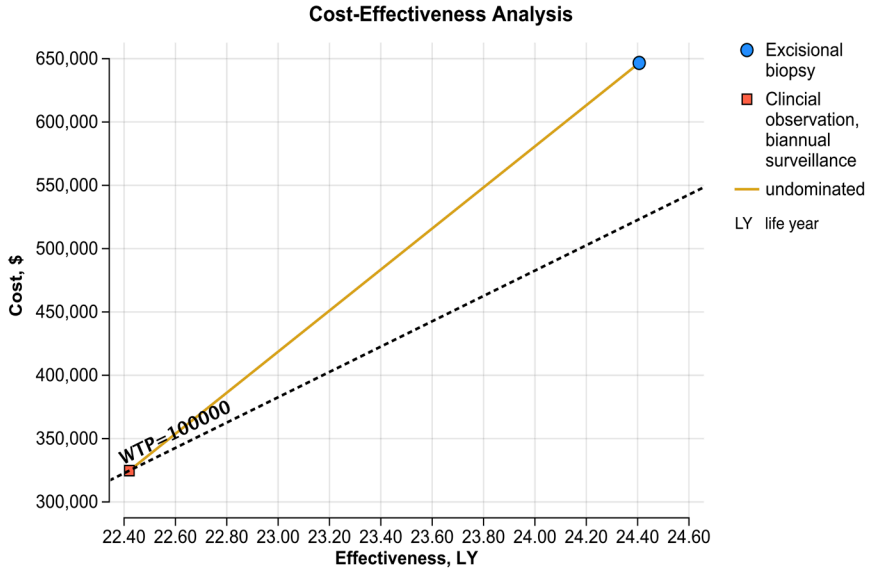
Background/Objective: The management of intraductal papilloma without atypia is controversial given its variable rate of upgrade to malignancy after excisional biopsy. Recent data suggests these lesions may be safely managed nonoperatively with observation, however the cost-effectiveness of surgery versus active surveillance has not been well characterized. We aim to assess the cost-effectiveness of clinical observation as an alternative to excisional biopsy for the management of biopsy-proven intraductal papilloma.

Methods: We performed an economic evaluation using a decision analytic model with a 25-year time horizon to compare the decision between excisional biopsy and clinical observation a typical patient – a 58-year-old female with intraductal papilloma without atypia of average risk. In the surgery arm, excisional biopsy is performed followed by definitive chemotherapy and radiation (for patients with postoperative upgrade to malignancy), while in the clinical observation arm, active surveillance is performed via biannual imaging surveillance and crossover to surgery if upgraded to malignancy within 2-year follow-up period. Estimates were sourced from national data, literature review, and single-center institutional review of outcomes of adult patients with intraductal papilloma without atypia. Costs (in US dollars) were evaluated from a healthcare sector perspective and adjusted to the 2024 price level. The analysis was conducted at the population level. Primary outcomes were cumulative cost and quality-adjusted life-years (QALYs) for effectiveness. Both cumulative costs and QALYs were discounted at 3%/year. A willingness-to-pay threshold of $100,000/QALY was used to calculate net monetary benefits (NMBs). One-way sensitivity analysis was conducted with parameters derived from the literature. Effectiveness was examined for each variable and incremental cost-effectiveness ratios (ICER) were plotted against the risk of upgrade to malignancy at the time of excision.

Results: The analysis showed that compared to excisional biopsy, clinical observation incurred decreased costs ($324,709 versus $646,598 for surgery) and modestly decreased effectiveness (22.42 versus 24.41 QALYs for excisional biopsy) over a two-year period at the population level. However, clinical observation yielded a higher NMB of $1.9M versus $1.7M for surgery. The ICER of clinical observation over a two-year period was $162,124 per QALY. Given the higher NMB, clinical observation was the preferred strategy despite the slightly increased effectiveness of excisional biopsy. Sensitivity analyses revealed that clinical observation remained more cost-effective at a moderately increased cost over time, for probability of a lesion being upgraded to a high-risk lesion at final pathology of 6.2% or greater. The effectiveness of excisional biopsy remained relatively over time. The probability for a patient to receive surgery at a later point after initially undergoing observation was also assessed and increasing probability of a patient requiring surgery within two years of active surveillance was associated with increased cost of clinical observation while cost and effectiveness of excisional biopsy remained relatively constant.

Conclusion: The guidelines surrounding management of intraductal papilloma without atypia are evolving in the field of breast surgery. This cost effectiveness analysis demonstrated that clinical observation is favorable to excisional biopsy for patients with intraductal papilloma without atypia over a lifetime horizon, with decreased costs and higher net monetary benefit and only modestly decreased clinical effectiveness. These findings align with the increasing body of clinical literature suggesting the safety of clinical observation for intraductal papilloma without atypia and support the shift in practice towards increased clinical observation of well-selected patients with intraductal papilloma without atypia.

Figure:



1350 - A 20-Year Review of Upgrade to Malignancy in Atypical Ductal Hyperplasia: Insights by Biopsy Modality

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Background/Objective: Atypical ductal hyperplasia (ADH) is a high-risk benign breast lesion associated with an approximately fourfold increased risk of subsequent breast cancer. Significant gaps remain in optimal risk stratification for ADH diagnosed via percutaneous core needle biopsy, with ongoing concerns for both overtreatment and undertreatment. The risk of upgrade remains heterogeneous across biopsy techniques and imaging modalities. The objective of this study was to evaluate upgrade rate of ADH and management trends by biopsy technique.

Methods: We performed a retrospective review of women diagnosed with benign breast lesions on image-guided core needle biopsy between 2001 and 2021. Analysis was limited to cases of pure ADH, excluding lobular or mixed atypia. Biopsy type was categorized by guidance method: ultrasound, MRI, or stereotactic. The primary outcome was upgrade rate to ductal carcinoma in situ (DCIS) or invasive carcinoma on surgical excision. Demographic, radiologic, and procedural variables were collected. These variables were evaluated according to biopsy type to determine whether upgrade rates differed. We performed descriptive statistics and comparative analyses using Fisher's exact test, Kruskal-Wallis test,

or Pearson's chi-squared test. Trends in diagnosis and management of ADH were analyzed by stratifying cases into tertiles based on time: pre-2014, 2015–2018, and post-2019.

Results: From a larger cohort of 5330 patients, a total of 507 patients with pure ADH met the inclusion criteria. Biopsy type distribution remained stable over time, with stereotactic-guided biopsy (67%) being the predominant approach, followed by US-guided biopsy (30%) and MRI-guided biopsy (<5%) (p=0.90). Patient characteristics differed by biopsy type. MRI-guided biopsies demonstrated the largest median lesion size (1.2 cm), followed by stereotactic (0.95 cm) and ultrasound-guided (0.8 cm) biopsies (p = 0.03). Median BMI was higher for patients who received ultrasound-guided biopsies (29) than MRI (27) or stereotactic (27) (p = 0.050). Post-menopausal status was associated with ultrasound-guided biopsy (84%; p = 0.022). Family history of breast cancer was more common in MRI-guided cases (79%) versus ultrasound (51%) or stereotactic (47%; p = 0.062).

Overall, upgrade to malignancy (DCIS or invasive carcinoma) occurred in 19% of cases. Upgrade rates did not differ significantly by biopsy type, ultrasound (23%), MRI (14%), stereotactic cases (17%) (p = 0.3). Final malignancy on excision was not significantly different by biopsy type (p=0.12). Upgrade to carcinoma increased over time with 13% of cases before 2014, 20% between 2015-2018, and 26% after 2019 (p = 0.006). Final excisional biopsy diagnosis also showed an increasing rate of malignancy across the time periods (10%, 16%, and 22%; p = 0.024). Core-final pathology concordance demonstrated comparable diagnostic accuracy across biopsy techniques (MRI 68%, ultrasound 68%, stereotactic 70%); (p = 0.9). For management strategy, surgical excision predominated across biopsy modalities in comparison to radiographic surveillance (MRI 100%, ultrasound 88%, stereotactic 89%); (p = 0.5).

Conclusion: In this large cohort of women with pure ADH, the risk of upgrade to malignancy on final biopsy has increased over time. Though biopsy technique did not significantly influence upgrade risk among patients with ADH, patient and lesion characteristics differed significantly by biopsy type. Consistent with evolving clinical management, surgical excision remained the predominant management approach over time in comparison to radiologic surveillance. We plan future multivariable models to assess predictors of upgrade to malignancy to better define a low-risk population of patients with ADH.

1325 - Focal Atypical Ductal Hyperplasia: Is Observation Enough?

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Background/Objective: Atypical ductal hyperplasia (ADH) on core biopsy is typically excised due to an approximately 20% risk of upgrade to ductal carcinoma in-situ (DCIS) or invasive carcinoma. "Focal" ADH (fADH) identified in pathology reports implies a low volume of ADH, although no standard definition exists. Observation may be considered in these cases, but there is little data on clinicopathologic characteristics that identify patients with fADH who may safely forgo surgical excision. We reviewed institutional outcomes of fADH to evaluate potential observation criteria.

Methods: Using a natural language processing software, we conducted a retrospective review of all patients with breast core biopsies from a single institution between 2014-2024 to identify patients with isolated fADH and no other high-risk lesions. For this cohort, fADH was defined by institutional pathologists when ADH was confined to a single duct or single histologic level. Only cases with documented radiology-pathology concordance were included for analysis. Clinical, radiologic, and pathologic data were collected including patient demographics, imaging features (calcifications vs. mass/asymmetry), biopsy modality, imaging size, surgical pathology, and outcomes on follow-up. Comparisons between categorical variables were performed using Fisher's exact test. Data are presented as median with interquartile range (IQR) and were performed using Microsoft Excel for Microsoft 365 (Microsoft Co., Redmond, WA).

Results: A total of 1072 cases with fADH were identified. Cases with coexistent high-risk lesions were excluded, yielding 47 patients. Median age was 58.9 years (50.3-66.0). All core biopsies were signed out by dedicated breast pathologists (with a second pathologist opinion performed for each case). All radiology-pathology concordance was performed by a dedicated breast radiologist. Of the total cohort, 44 (93.6%) underwent surgical excision and 3 (6.4%) elected observation. Excision was done by iodine-125 seed-localization (n=39, 88.6%), wire-localization (n=2, 4.5%), mastectomy (n=2, 4.5%), or palpation-guidance (n=1, 2.3%). On final pathology after excision, 56.8% (n=25) had no residual ADH, 20.5% (n=9) had residual ADH, and 22.7% were upgraded to DCIS (n=7, 15.9%) or invasive carcinoma (n=3, 6.8%). Overall, 77.3% (n=34) of patients showed no carcinoma on final pathology, or findings limited to no residual atypia or residual ADH. In total, 37 (78.7%) were classified retrospectively as 'observation-eligible' (OE). Upgrade risk did not differ by imaging characterization (calcifications vs. mass/asymmetry 18.5% (n=5) vs. 25.0% (n=4); p=0.706) or biopsy method (ultrasound/MRI vs. stereotactic 27.3% (n=3) vs. 23.3% (n=7); p=1.00). No upgrades occurred among lesions <5 mm on imaging while upgrades were confined to lesions ≥5 mm (n=10, 29.4%) (p=0.085). Among 9 patients with fADH within a fibroadenoma, there were no upgrades to DCIS or invasive cancer. Adjuvant endocrine therapy was given to 80% (n=8) of upgraded patients; 14.3% (n=5) of OE patients opted for endocrine therapy (p<0.001). All patients upgraded to DCIS or invasive cancer demonstrated estrogen receptor positivity; all invasive cancers were HER2 negative. Median follow-up was 5.8 (3.0-9.1) years. In follow-up, 8.1% (n=3) of OE patients developed invasive carcinoma (n=2) or DCIS (n=1). No patients developed recurrence in the upgrade group (p=1.00). None of the patients who declined surgery developed cancer.

Conclusion: The overall upgrade rate of fADH to DCIS or invasive cancer is similar to reported upgrade rates in all ADH. Given this similarity, we do not support routine observation for fADH. fADH confined to a single duct or single histologic level may serve as a practical working definition for clinical use. Observation may be a reasonable option for carefully selected patients with concordant fADH when imaging findings measure <5 mm; this threshold remains exploratory. Further studies are warranted to validate observation criteria.

Table 1. Outcomes in Patients with Focal ADH

Management Type (n = 47)		**p-value**
Excision	44 (93.6%)	
No Excision	3 (6.4%)	
Excision Outcomes (n = 44)		
No residual ADH	25 (56.8%)	
Residual ADH only	9 (20.5%)	
DCIS	7 (15.9%)	
IDC	3 (6.8%)	
Upgrade Rates by Imaging Findings		0.706
Calcifications	5 (18.5%)	
Mass or Asymmetry	4 (25.0%)	
Upgrade Rates by Biopsy Type		1.00
Stereotactic	7 (23.3%)	
Ultrasound or MRI	3 (27.3%)	
Upgrade Rates by Imaging Size		0.085
≥5 mm	10 (29.4%)	
<5mm	0	
Endocrine Therapy		<0.001
OE	8 (80.0%)	
Upgrade	5 (14.3%)	
Surgical Pathology (Upgrade Group)		
T		
pT1b	1 (33.3%)	
pT1c	2 (66.7%)	
N		
pN0	2 (66.7%)	
pT1mi	1 (33.3%)	
Tumor Biology (Upgrade Group)		
Estrogen Receptor Positive	10 (100%)	
Progesterone Receptor Positive	9 (90%)	
Her2 Positive (Invasive Cancer)	0	
Ki-67	8-20%	

ADH = atypical ductal hyperplasia, DCIS = ductal carcinoma in-situ, IDC = invasive ductal carcinoma

1318 - The Clinical Presentation and Management of Breast Abscess: A Comparison of Patients by Age

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Background/Objective: In this study, we aimed to describe the presentation of women with breast abscesses by comparing clinical characteristics, management, and outcomes stratified by age (≥50 years and <50 years) to improve diagnostic accuracy and guide management strategies. We hypothesized that postmenopausal abscesses would demonstrate distinct risk factors, clinical presentations, and microbial profiles compared to premenopausal infections.

Methods: A retrospective review was performed of all adult female patients with a clinical diagnosis of breast abscess at a safety net hospital in an urban area from 2010–2025 identified by ICD-9/10 codes. Those with recent breast surgery (<90 days) and a prior diagnosis of ipsilateral breast cancer were excluded. Patients were stratified by age (<50 vs. ≥50 years, with ≥50 serving as a surrogate for postmenopausal status). Data collected included demographics, comorbidities, clinical presentation, laboratory findings, bacteriology, and management outcomes. Chi-squared and Mann Whitney U tests were used to compare categorical and continuous variables, respectively, between the two age groups. Results were considered statistically significant with a p-value <0.05.

Results: A total of 569 patients were included (median age 41; interquartile range 23). Of these, 189 (33.2%) were ≥50 and 380 (66.8%) were <50. The cohort was mostly Black (n=477, 83.8%) and non-Hispanic (n=496, 87.2%). Older patients were more likely to be Black (92.6% vs. 79.5%, p=0.002) and less likely to be Hispanic (3.7% vs. 14.5%, p=0.004). Older patients were less likely to be uninsured (47.6% vs. 66.1%, p=0.001). The ≥50 group was less often evaluated in the emergency room (35.5% vs 44.0%, p=0.04), and more often presented in the outpatient setting (51.3% vs. 42.4%, p=0.04). Considering risk factors, patients ≥50 more frequently had diabetes (53.5% vs 24.7%, p<0.001) and BMI ≥30 (65.1% vs. 55.7% p=0.01). Older women more often reported smoking (current: 38.62% vs 34.75%; former: 23.3% vs. 13.5%, p<0.001). There was no difference in clinical exam considering presence of palpable mass, tenderness, induration, erythema, fluctuance, nipple inversion, or nipple discharge; elevated temperature; or leukocytosis (p>0.05). Interestingly, 41.3% of patients ≥50 reported spontaneous drainage prior to evaluation compared to 27.6% of patients <50 (p=0.01). Regarding management, initial intervention type differed significantly with older women less commonly undergoing procedural treatment than younger women: percutaneous aspiration 28.6% vs. 40.5%, bedside incision and drainage (I&D) 13.8% vs 17.1%, surgical I&D 4.2% vs 5.5%, and no procedure 53.4% vs 36.8%, (p=0.002). Despite lower rates of initial procedural intervention, patients ≥50 more often did not require any additional procedure at a later visit (10.6% vs 22.4%, p=0.004). Notably, age ≥50 was associated with higher rates of presenting for clinical follow up (72.0% vs 63.7%, p=0.04). Of the patients who had cultures obtained (n=281), results were similar (p>0.05). Of patients who had surgical pathology (n=70), only 2 had an underlying breast malignancy with no difference in cancer diagnosis between groups (p>0.05).

Conclusion: In this retrospective study, we described 569 women diagnosed with breast abscess and compared demographics, clinical presentation, management, and microbial profiles based on age. While postmenopausal breast abscess has historically been described as a rare presentation, breast abscess in

women ≥50 represented a third of this cohort, making this study, to the authors' knowledge, the largest series to report on this clinical presentation of disease. Older women were more likely to be insured, likely reflecting increased access to government health plans (Medicare) and were less likely to present for initial evaluation through the emergency department, demonstrating a disparity in access to care across age. As expected, older women had higher rates of diabetes and obesity than younger women, and they also more frequently endorsed current and previous smoking. Whether these comorbidities are risk factors for development of breast abscess in older patients needs to be further investigated. There was no difference in clinical presentation of abscess based on age except that older women were more likely to have reported spontaneous abscess drainage. Likely this could contribute to older women being less likely to require procedural intervention for abscess drainage. There was no clear difference in microbial profiles or risk of malignancy in these age groups. These findings highlight the relationship between age, comorbidity, and social determinants of health on presentation and management of breast abscesses.

Table:

Comparison of Treatment, Microbial Profiles, and Pathology of Women Diagnosed with a Breast Abscess Stratified by Age

	All Patients (n=569) Frequency (%)	*50 years and older (n=189) Frequency (%)*	*<50 years old (n=380) Frequency (%)*	*p-value*
Initial Intervention Type				0.002
Aspiration	208 (36.56)	54 (28.57)	154 (40.53)	
Bedside Incision and Drainage	91 (15.99)	26 (13.76)	65 (17.11)	
Surgical Incision and Drainage	29 (5.10)	8 (4.23)	21 (5.53)	
No intervention performed	241 (42.36)	101 (53.44)	140 (36.84)	
Need for Further Intervention				0.004
Repeat Aspiration	46 (8.08)	9 (4.76)	37 (9.74)	
Bedside Incision and Drainage	32 (5.62)	8 (4.23)	24 (6.32)	
Surgical Incision and Drainage	27 (4.75)	3 (1.59)	24 (6.32)	
None	464 (81.55)	169 (89.42)	295 (77.63)	
Outpatient Follow-up				0.04
No	191 (33.57)	53 (28.04)	138 (36.32)	
Yes	378 (66.43)	136 (71.96)	242 (63.68)	
Culture Results (n=281)				0.06
Gram-positive	132 (46.98)	44 (47.83)	88 (46.56)	
Gram-negative	23 (8.18)	8 (8.70)	15 (7.94)	
Polymicrobial	25 (8.90)	10 (10.87)	15 (7.94)	
Skin Contaminants	17 (6.05)	4 (4.35)	13 (6.88)	
No Growth	84 (29.89)	26 (28.26)	58 (30.69)	
Malignancy on Pathology (n=70)				0.2
No	68 (97.14)	13 (92.86)	55 (98.21)	
Yes	2 (2.86)	1 (7.14)	1 (1.79)	

1291 - Risk of Malignancy in Radial Sclerosing Lesions with and without Atypia

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Background/Objective: Radial sclerosing lesions (RSLs) are benign breast lesions composed of fibroelastic cores and radiating ducts. These lesions are routinely identified during screening and diagnosed on core biopsy. Although benign, radial scars are often surgically excised due to their concerning radiological features and potential upgrade to malignancy. When the lesions have not been "adequately sampled" or when there is associated atypia, current guidelines recommend excision. Consequently, many patients undergo repeat biopsy for additional sampling or surgical excision. In some cases, these procedures may be unnecessary, resulting in avoidable healthcare burdens.

Methods: We conducted an observational cohort study involving all patients diagnosed with a RSL on core needle biopsy performed at our institution between 2020 and 2025. We excluded patients with a history of concurrent ipsilateral malignancy or atypia unless the atypia involved the index RSL. Information on baseline patient demographics, risk factors for malignancy, lesion characteristics on imaging, biopsy gauge and sampling, histopathologic features, and imaging follow-up were collected. For lesions that underwent repeat percutaneous biopsy or surgical excision, we estimated the probability that additional sampling revealed ductal carcinoma in-situ (DCIS) or invasive cancer. For the entire population, whether excision was performed or not, we estimated the cumulative incidence of malignancy at the site of RSL during follow-up.

Results: There were 460 RSLs diagnosed without atypia and 111 diagnosed with atypia. Of those without atypia, 58 (12.6%) underwent initial ultrasound (US)-guided biopsy, 291 (63.3%) underwent stereotactic vacuum assisted biopsy, and 111 (24.1%) underwent MRI guided vacuum-assisted biopsy. Among those who underwent US-guided biopsy, most underwent biopsy with a spring-loaded 14-gauge needle and < 6 cores sampled. 33 patients (56.9%) underwent a subsequent vacuum-assisted biopsy with 3 (9.1%) patients having atypia on repeat biopsy and none having malignancy. In total, among all patients without atypia, 32 of 460 (7.0%) underwent surgical excision and 1 patient had DCIS with none having invasive cancer. No other DCIS or cancer events occurred over a median of 2 years of imaging follow-up. The estimated 3-year risk of DCIS was 0.2% (95% CI: 0, 2.6%) and the 3-year risk of invasive cancer was 0% (95% CI: 0, 2.3%). Of the patients with RSL and associated atypia on initial biopsy, 66 (59.5%) had atypical ductal hyperplasia (ADH) and 45 (40.5%) had other atypias (lobular carcinoma in-situ, atypical lobular hyperplasia, flat epithelial atypia, and/or atypical apocrine adenosis). Lesion characteristics and work-up details for these lesions are shown in the Table. 43 (65.2%) patients with ADH underwent surgical excision with 2 (4.7%) having invasive cancer and 10 (23.3%) having DCIS. 23 patients with other atypias underwent surgical excision with none having invasive cancer and 2 (8.7%) having DCIS. For the entire population, whether excision was performed or not, the estimated 3-year risk of DCIS or invasive cancer was 18.2% (95% CI: 8.3, 27.0%) for lesions with ADH and 4.4% (95% CI: 0, 10.3%) for those with other atypias (log rank test p value: 0.03).

Conclusion: For RSLs without atypia diagnosed on core needle biopsy by any imaging modality, additional sampling and/or subsequent surveillance was very unlikely to reveal malignancy. For RSLs

with atypia, those without ADH were also unlikely to be diagnosed with malignancy. These findings support narrowing of indications for repeat biopsy or surgical excision in patients with RSLs, avoiding many potentially unnecessary procedures.

Table. 1 Characteristics of Radial Scars on Initial Biopsy

		Radial scars without atypia (stratified by initial biopsy type)			Radial scars with atypia (stratified by type of atypia)	
Variable	level	US-guided	Stereotactic	MRI-guided	ADH	Other atypia
No.		58	291	111	66	45
Abnormality biopsied	Calcifications	0 (0.0)	65 (22.3)	0 (0.0)	20 (30.3)	8 (18.6)
	Mass	49 (84.5)	10 (3.4)	35 (31.5)	8 (12.1)	6 (14.0)
	Hypoechoic area	3 (5.2)	0 (0.0)	0 (0.0)	1 (1.5)	1 (2.3)
	Distortion	4 (6.9)	188 (64.6)	4 (3.6)	26 (39.4)	12 (27.9)
	Asymmetry	0 (0.0)	27 (9.3)	0 (0.0)	3 (4.5)	5 (11.6)
	Non-mass enhancement	0 (0.0)	0 (0.0)	72 (64.9)	7 (10.6)	10 (23.3)
	Other	2 (3.4)	1 (0.3)	0 (0.0)	1 (1.5)	1 (2.3)
Abnormality size	< 1 cm	33 (56.9)	70 (24.1)	41 (36.9)	20 (30.3)	4 (8.9)
	1-2 cm	18 (31.0)	107 (36.8)	39 (35.1)	23 (34.8)	20 (44.4)
	> 2 cm	7 (12.1)	87 (29.9)	26 (23.4)	19 (28.8)	16 (35.6)
	Not specified	0 (0.0)	27 (9.3)	5 (4.5)	4 (6.1)	5 (11.1)
Biopsy needle gauge	9 G	0 (0.0)	291 (100.0)	111 (100.0)	59 (89.4)	40 (88.9)
	12 G	1 (1.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	14 G	52 (89.7)	0 (0.0)	0 (0.0)	5 (7.6)	5 (11.1)
	16 G	3 (5.2)	0 (0.0)	0 (0.0)	2 (3.0)	0 (0.0)
	21 G	2 (3.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Number of biopsy cores	< 6	47 (92.2)	1 (0.4)	0 (0.0)	6 (9.5)	5 (11.1)
	7-11	4 (7.8)	31 (11.2)	9 (8.3)	9 (14.3)	5 (11.1)
	≥ 12	0 (0.0)	246 (88.5)	100 (91.7)	48 (76.2)	35 (77.8)
Repeat biopsy	Y	33 (56.9)	2 (0.7)	0 (0.0)	2 (3.0)	4 (9.1)
	N	25 (43.1)	289 (99.3)	111 (100.0)	64 (97.0)	40 (90.9)
Surgical excision	Y	5 (8.6)	11 (3.8)	16 (14.4)	43 (65.2)	23 (51.1)
	N	53 (91.4)	280 (96.2)	95 (85.6)	23 (34.8)	22 (48.9)

Numbers are No. (%)

1271 - A Novel Scoring System to Improve Diagnostic Accuracy of Idiopathic Granulomatous Mastitis

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Background/Objective: Idiopathic granulomatous mastitis (IGM) is a benign inflammatory breast condition that can resemble mastitis or inflammatory breast cancer (IBC) clinically and radiographically. We sought to develop a quantitative scoring system, to offer a standardized approach to diagnosing IGM based on clinical and radiologic features that can distinguish it from other benign and malignant breast conditions.

Methods: Patients with biopsy proven IGM who were diagnosed from 2014 to 2025 were identified through our institutional EMR. A retrospective chart review was performed to evaluate patients' onset of symptoms, clinical features, and diagnostic imaging. A continuous scoring scale from 1-59 was developed from the most commonly reported clinical features. The proposed IGM scoring system includes three categories: onset of symptoms, clinical features, and radiographic findings (Table 1). An IGM score was calculated for all patients with biopsy proven IGM and compared against a group of patients diagnosed with inflammatory breast cancer (IBC) and mastitis (both lactational and non-lactational). Welch's two sample t-test was used for statistical analysis. A Youden J's index calculating the sensitivity and specificity at each score was utilized to determine the appropriate score threshold to accurately predict IGM.

Results: 149 patients with biopsy proven IGM and were compared to 8 IBC and 6 mastitis patients. The majority of the IGM patients were Hispanic (59.7%) and Asian (24.8%). IGM patients were older than mastitis patients, (37.3 yrs vs 31.5, $p<0.005$ Welch's two sample t-test) and younger than IBC patients (51.5 yrs, $p=0.02$). Out of the IGM group, 85.2% (127) had recurrent episodes or new lesions, 100% (149) had a painful breast mass, 77.8% (116) had a fistula or draining wound, 94.6% (141) had erythema, and 87.9% (131) had a phlegmon. Additionally, on imaging, 84.6% (126) patients had a mass with collection and 38.9% (58) presented with multiple masses or collections. The IGM patients had a higher mean score of 43.2 compared to the IBC and mastitis patient groups,14.4 and 25.5 respectively ($p<0.005$). Using Youden J's index, a score ≥ 28 was strongly predictive of IGM with a sensitivity of 95% and specificity of 100%.

Conclusion: Timely and accurate evaluation and diagnosis of idiopathic granulomatous mastitis (IGM) are critical for determining optimal therapeutic strategies. Currently, there is no standardized scoring system for IGM that has been adopted into clinical practice. The proposed IGM scoring system establishes a standardized and objective framework to assist clinicians in distinguishing IGM from possible similar presentation of mastitis and IBC. By facilitating early recognition and guiding appropriate diagnostic workup and biopsy, this tool enhances diagnostic accuracy and supports evidence-based management of IGM. We propose using the IGM scoring system to guide management decisions and plan to evaluate its ability to predict the appropriate treatment approach for the future.

Table 1. Idiopathic granulomatous mastitis (IGM) scoring system

Category	Feature	Score		Priority Factor	Weighted Score
Onset of symptoms	≤1 week	1		x1	1
	>1 week ≤3 mo	3		x2	6
	4-6 mo	2		x2	4
	>7 mo	1		x2	2
Clinical Features		**P**	**NP**		
	Recurrent episode or new lesion	3	0	x3	9
	Painful breast mass	3	0	x3	9
	Fistula or draining wound	3	0	x3	9
	Erythema	2	0	x2	4
	Phlegmon	2	0	x2	4
	Nipple retraction or asymmetry	1	0	x1	1
Imaging Findings	Mass with collection	3	0	x2	6
	Multiple collections or masses	2	0	x2	4
Total Score					59

**P – Present; NP – Not Present*

1270 - Trends in Surgical Excision Rates and Outcomes for Intraductal Papilloma and Radial Sclerosing Lesion: Defining Modern Performance Benchmarks

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Background/Objective: Surgical excision rates and outcomes reporting for institutions adopting modern consensus guidelines for IDP and RSL can help define performance benchmarks, expected trends in surgical volumes, and assure acceptable patient outcomes as more institutions implement measures for surgical de-escalation of benign and high-risk breast lesions. This study aims to identify trends in surgical excision rates and outcomes for patients with RSL and IDP utilizing a multidisciplinary consensus conference for treatment recommendations, as well as to define the biopsy rate, surgical excision rate, and outcomes of the low-risk sub-groups, RSL without atypia and IDP < or =1cm without atypia.

Methods: This IRB-approved, retrospective, single institution study included females with IDP and/or RSL as a primary diagnosis on image-guided breast biopsy during two separate time periods; 2015 for historical comparison and 2020-2022, when modern guidelines for active surveillance were supported after multidisciplinary review of concordant RSL and IDP with benign features. Charts were reviewed to document demographics, personal history of breast cancer (BC), concurrent ipsilateral or contralateral BC, symptoms (nipple discharge, palpable lump, other), histology, IDP size (1cm), associated atypia, and follow-up recommendations. Surgical excision and malignant upgrade rates were determined, with a minimum of one-year follow-up for the active surveillance groups. Descriptive statistics were calculated for all variables in the analysis. Categorical variables were analyzed using Pearson's Chi-squared tests, or Fisher's Exact Tests when there were low expected cell counts. All analyses were conducted using R (version 4.2.1).

Results: There were 520 patients (mean age 56 years) with 553 biopsies meeting inclusion criteria. A minority (11.2%, 58/520) had a personal history of BC and 10.2% (53/520) had concurrent BC at the time of biopsy. There were 311 IDP, with 13.2% (41/311) of IDP having associated atypia, 50.5% (157/311) being < or =1cm, and 45.3% (141/311) having both no atypia and < or =1cm. Nearly half (48.9%, 22/45) of IDP < or =1cm without atypia underwent surgical excision in 2015 and only 13.5% (13/96) in 2020-

2022. The malignant upgrade rate for all surgically excised IDP was 17.8% (24/135), though the upgrade rate for IDP < or =1cm without atypia was 0% (0/35). While personal history of BC or concurrent BC did not impact IDP surgical excision rates, symptoms at presentation did increase the likelihood of surgical excision for both IDP (p=0.002) and IDP < or =1cm without atypia (p=0.016). There were 242 RSL and only 7.4% (18/242) had associated atypia. The majority (63.6%, 21/33) of RSL without atypia were surgically excised in 2015 while only 18.3% (35/191) were excised in 2020-2022. The overall malignant upgrade rate for RSL was low (3.2%, 2/63). Only one (1/56, 1.8%) surgically excised RSL without atypia had upgrade to DCIS, low to intermediate grade, with the excised RSL contained within a bracketed lumpectomy for known contiguous DCIS. Concurrent BC increased the likelihood of surgical excision for RSL without atypia (p<0.0001). The active surveillance groups for both RSL and IDP had 1-10 years follow-up and no malignant upgrades (0.0%, 0/334) at the site of biopsy.

Conclusion: The majority of biopsied RSL and approximately half of biopsied IDP meet updated consensus guidelines for active imaging surveillance. Adoption of modern management guidelines and appropriate stratification with multidisciplinary review, to account for unique imaging and patient factors, can reduce surgical excision rates for IDP < or =1cm without atypia and RSL without atypia to below 15-20%, with malignant upgrade rates in this study suggesting even lower surgical excision rates are safe for these low-risk sub-groups. Multi-institutional analysis of trends in surgical excision rates and patient outcomes may help define benchmarks in the era of surgical de-escalation for benign and high-risk breast lesions.

Trends in Surgical Excision Rates for Intraductal Papilloma and Radial Sclerosing Lesion

Characteristic	Overall Number	2015 (year)	2020-2022 (years)
Intraductal papilloma	**311**	**72**	**239**
Surgical excision			
Yes	135 (43.4%)	40 (55.6%)	95 (39.7%)
No	176 (56.5%)	32 (44.4%)	144 (60.3%)
Intraductal papilloma without atypia &≤1cm	**141**	**45**	**96**
Surgical excision			
Yes	35 (24.8%)	22 (48.9%)	13 (13.5%)
No	106 (75.2%)	23 (51.1%)	83 (86.5%)
Radial sclerosing lesion	**242**	**34**	**208**
Surgical excision			
Yes	63 (26.0%)	21 (61.8%)	42 (20.2%)
No	179 (74.0%)	13 (38.2%)	166 (79.8%)
Radial sclerosing lesion without atypia	**224**	**33**	**191**
Surgical excision			
Yes	56 (25.0%)	21 (63.6%)	35 (18.3%)
No	168 (75.0%)	12 (36.4%)	156 (81.7%)

1227 - Aspiration or Incision and Drainage: Predictors of Successful Breast Abscess Management Strategy and Risk Factors for the Development of Breast Fistula

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Background/Objective: Breast abscesses represent a common pathology managed by surgeons and are associated with significant morbidity related to self-image, discomfort, anxiety, and risk of developing a breast fistula. Breast abscesses can be managed by antibiotics, needle aspiration, incision and drainage (I&D), or a combination thereof. Over the last two decades, needle aspiration has become more common. However, there are limited data surrounding the optimal management of breast abscesses and risk factors associated with intervention types. We sought to determine risk factors for type of intervention (aspiration, I&D, or no procedural intervention) for breast abscesses with the hypothesis that patients with higher comorbidities and more severe infectious presentation would be related to intervention type. A secondary outcome was to determine risk factors associated with breast fistula development with the hypothesis that more invasive intervention would be associated with this complication.

Methods: This is a retrospective study of patients who presented to a safety net hospital in an urban area from 2010-2025. All patients with ICD 9 or 10 codes related to breast infection (mastitis, breast abscess, inflammatory disorders of the breast, or induration of the breast) were identified. Charts were reviewed, and women 18 or older who had a documented diagnosis of breast abscess by a clinician were included. Patients with recent (<90 days) breast surgery or prior diagnosis of ipsilateral breast cancer were excluded. Data were collected regarding patient demographics, comorbidities, clinical presenting factors, and treatment. National Area Deprivation Index (ADI) was determined using zip codes where higher values represent increased neighborhood deprivation. Type of intervention included aspiration, I&D, or no procedure. We further classified type of intervention as initial or definitive. The initial intervention was delivered at the first patient encounter for breast abscess treatment. If no additional intervention was needed, the first intervention also represented the definitive intervention. If patients required additional treatment beyond the first encounter, the last treatment was considered definitive. When patients received more than one type of treatment, we define first and definitive treatments as the most invasive treatment that the patient received. A multivariate multinomial logistic regression models was created to identify independent risk factors associated with aspiration, I&D, and binomial logistic regression for breast fistula formation.

Results: For the 569 women included, median age was 41 (IQR 23). The majority were non-Hispanic (87.2% n=496) and Black (83.8% n=477) with 5.1% (n=29) White and 10.4% (n=59) Other. Median ADI was 62 (IQR 30). Many were current (36.0% n=204) or former (16.7% n=91) smokers. Median BMI was 31.3 (IQR 11.3). Nipple piercings were reported in 2.3% (n=13 current) and 3.9% (n=22 former). Initial treatment was: aspiration (36.7% n=208), bedside I&D (16.0% n=91), surgical I&D (5.1% n=29), and no procedure (42.7% n=241). At presentation, 32.2% (n=183) reported a history of spontaneous abscess drainage. After initial visit, 81.6% (n=464) did not need additional treatment. Additional interventions after initial aspiration were repeat aspiration (47.0% n=39) and I&D (53.0% n=44). Definitive treatment was 29.0% aspiration (n=165), 19.9% bedside I&D (n=113), 9.7% surgical I&D (n=55), and 41.5% no intervention (n=236). In multivariate analysis, compared to no intervention, risk factors for aspiration as definitive treatment (Table 1) were higher temperature (OR1.6 95%CI 1.6-1.7 p<0.01) and history of breast surgery (OR2.2 95%CI 1.2-6.4 p=0.02). Spontaneous drainage was associated with lower odds of aspiration (OR0.1 95%CI 0.1-0.3 p<0.01). Risk factors for I&D (Table 1) compared to no procedure were Black race (OR910.0 95%CI 1.0-99.2 p=0.049), ADI >75 (OR5.0 95%CI 1.1-23.7 p=0.04), and higher temperature (OR2.2 95%CI 2.1-2.3 p<0.01). Spontaneous abscess drainage was associated with decreased odds of I&D (OR0.3 95%CI 0.2-0.7 p<0.01). When aspiration was the first intervention, volume aspirated was not related to patients needing an I&D(OR1.0 95%CI 1.0-1.0 p=0.67). Breast fistula developed in 39 (6.9%) patients. In multivariate logistic regression risk factors for breast fistula

development included previous/current nipple piercings (OR3.9 95%CI 1.3-10.9 p=0.01), definitive aspiration (OR3.7 95%CI1.4-10.3 p<0.01), and definitive I&D (OR3.0 95%CI 1.2-8.1 p=0.02).

Conclusion: In this retrospective study of 569 patients, we describe the treatment course of breast abscesses, which ranged from non-procedural interventions to aspiration and I&D. Higher temperature and history of breast surgery in the past were associated with aspiration, indicating the importance of clinical history and presentation. In addition to higher temperature, independent risk factors for I&D included black race and ADI >75; these findings may highlight a potential healthcare disparity that should be further explored. Spontaneous drainage of the abscess was negatively correlated with aspiration and I&D, suggesting that this history may support omission of additional procedures, dependent on presentation and clinical judgement. Approximately 20% of patients required additional intervention after initial presentation. Interestingly the amount of volume aspirated was not related to whether the patient ultimately required I&D, making it difficult to easily predict who may require escalation of intervention. While breast fistula development was uncommon, nipple piercings and procedural interventions for abscess treatment were predictors of breast fistula formation. Aspiration and surgical I&D appeared to have a similar risk of fistula. Our findings illustrate the spectrum of management strategies among patients with breast abscess and suggest the need for a thoughtful approach to treatment.

Table 1: Multivariate Multinomial Regression For Risk of Aspiration Compared to No Procedural Intervention and Risk of Incision and Drainage Compared to No Procedure Intervention

Risk of Undergoing Procedure Compared to No Procedural Intervention						
	Aspiration			Incision and Drainage		
Variable	**Odds Ratio**	**95%CI**	**P-value**	**Odds Ratio**	**95%CI**	**P value**
Race						
Black	3.11	0.37-26.1	0.30	9.99	1.01-99.2	0.049*
White	1.42	0.11-18.5	0.79	8.19	0.63-106.37	0.11
Other	Reference			Reference		
Hispanic	4.37	0.52-36.8	0.18	7.50	0.80-71.14	0.079
Non-Hispanic	Reference			Reference		
ADI (1-100)						
<25	Reference			Reference		
26-50	1.59	0.46-5.41	0.46	4.23	0.96-18.73	0.06
51-75	1.30	0.40-4.27	0.66	4.02	0.94-17.18	0.06
>75	2.56	0.72-9.16	0.15	5.03	1.07-23.68	0.04*
Age (years)	0.99	0.97-1.02	0.79	0.99	0.92-1.02	0.40
Currently Smoking	4.00	0.66-24.3	0.13	1.88	0.29-12.09	0.51
Diabetes	1.12	0.51-2.47	0.78	1.32	0.60-2.90	0.50
Immunocompromised	0.50	0.07-3.46	0.48	1.23	0.25-6.08	0.80
BMI						
≥30	0.86	0.43-1.69	0.66	0.79	0.39-1.58	0.50
<30	Reference			Reference		
History of breast surgery	2.19	1.15-6.41	0.02*	2.19	0.91-5.30	0.08
Nipple piercing	0.98	0.26-3.68	0.97	0.33	0.07-1.67	0.18
Currently pregnant	1.02	0.05-19.5	0.99	1.48	0.06-37.5	0.81
Currently lactating	0.94	0.25-3.60	0.93	2.13	0.67-6.78	0.20
Temperature (F)	1.63	1.59-1.68	<0.001*	2.22	2.14-2.28	<0.001*
WBC > 11	1.43	0.69-2.95	0.33	0.49	0.25-0.96	0.04*
Spontaneous drainage	0.12	0.05-0.27	<0.001*	0.34	0.17-0.68	0.002*

1212 - Lactational Breast Abscess and Galactocele: Efficacy of Outpatient Minimally Invasive Drainage

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Background/Objective: Though lactational fluid collections most recently have been managed with needle aspiration and interventional radiology drainage, this treatment modality presents an unacceptably long duration to resolution and risk of recurrence. This is likely due to the fact that lactational fluid collections contain breastmilk, which can solidify and septate, often rendering needle aspiration or small catheter drainage ineffective. Additionally, remaining or subsequent fluid has no

capacity to drain during healing after needle aspiration. Stab incision with minimally invasive drain placement allows for a hemostat to be inserted into the cavity, loculations disrupted, and thick milky contents be manually expelled, which is not feasible with the aforementioned methods. As such, we hypothesized that in-office minimally invasive drain placement as first-line management of lactational fluid collections is preferable. We sought to demonstrate the efficacy and feasibility of this approach in an outpatient setting.

Methods: We conducted a retrospective review of 27 cases of lactational fluid collections diagnosed and managed in the outpatient setting at a breast surgery clinic. Patient data, including demographic variables, treatment details, and clinical outcomes, were ascertained through chart review. Abscess was defined as fluid collection containing pus and galactocele was defined as fluid collection containing milk without clinical signs of infection. The following demographic variables were selected and abstracted: age, weeks postpartum, parity, weeks completed gestation at delivery, mode of delivery, and self-reported race and ethnicity. Lactation-related clinical variables were selected and abstracted as follows: infant feeding modality, formula supplementation, and milk production as diagnosed by a clinician. Interventions during or after evaluation at our clinic were described and included the following: procedures performed, repeat procedures performed, and additional treatment recommendations. Clinical outcomes include visits until resolution, days until resolution, and continuation of breastfeeding. Descriptive statistics were performed.

Results: Twenty-seven patients diagnosed with lactational abscess and/or galactocele were treated with minimally invasive drain placement between 2021 and 2024. The mean age of patients was 36.9 (SD 4.2) and the mean weeks postpartum at diagnosis was 8.9 (SD 6.6). Ninety-two percent were uniparous and the mean weeks at delivery were 38.8 (SD 2.0). Only six (22.2%) were exclusively breastfeeding, six were exclusively pumping (22.2%), and 15 were combination pumping and breastfeeding (55.5%). 40.7% of patients had an excess of milk production. All patients had an in-office ultrasound at the time of diagnosis, which showed a fluid collection (range 1-20cm). Evaluation of drainage contents revealed that 19 patients (70.4%) had abscess, and 8 patients (29.6%) had a galactocele. The median number of clinic visits was two (range 1-9), the median days to resolution was seven (range 2-29), and the mean days to drain removal was six and a half (range 2-21). Twenty-four patients (88.9%) continued to breastfeed after treatment. No patients reported adverse outcomes.

Conclusion: These findings support the use of minimally invasive drain placement as a first-line, in-office procedure for the definitive management of lactational fluid collections. We demonstrated early time to resolution, low rates of recurrence, remarkably high rates of breastfeeding continuation and no hospital admissions. Minimally invasive drain placement is a simple technique that should exist within the armamentarium of all breast surgeons and be accessible to any individual afflicted with a lactational fluid collection.

1147 - Clinical Adherence to Updated NCCN Guidelines for Lobular Carcinoma In Situ and Atypical Lobular Hyperplasia

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Background/Objective: The National Comprehensive Cancer Network (NCCN) guidelines on lobular carcinoma in situ (LCIS) and atypical lobular hyperplasia (ALH) changed in 2018. Current recommendations involve core needle biopsy for LCIS/ALH and observation with routine physical examination and mammograms. The purpose of this multi-center retrospective chart review was to evaluate the adherence to the updated guidelines and investigate the consequences of the guidelines on patient care at two community hospitals.

Methods: A retrospective chart review was conducted of female patients diagnosed with LCIS and/or ALH across two hospital systems. Demographic and clinical factors were documented from the electronic health records between October 2015 and May 2022 and analyzed statistically.

Results: Of the 443 patients, 35.9% had LCIS and 63.0% had ALH. Of these, 76.3% presented with a palpable mass, and 52.8% underwent surgical excision with ALH cases slightly higher than LCIS (55.0% vs. 48.4%). After the updated guidelines in 2018, excision rates remained congruent at 52.7%. Analysis only identified genetic testing as a significant predictor of surgical excision (OR = 1.66; 95% CI: 1.01-2.70).

Conclusion: Based on results of this review, operative management remains consistent for ALH and LCIS despite NCCN updated recommendations and supporting literature. The continued reliance on surgical excision after 2018 suggests variability in clinical practice, potentially reflecting patient or surgeon preference. This study emphasizes the importance of individualized risk assessment for lobular neoplasia and emphasis on updated guideline implementation.

Table 2. Demographic and Clinical Characteristics by Surgical Excision (n = 443)

	Surgical Excision		
	No	Yes	p-value
Age – mean (sd)	63.8 (11.8)	62.2 (11.8)	.15
Age at first birth – mean (sd) (n = 212)	25.0 (5.5)	25.8 (6.2)	.30
Number of pregnancies – mean (sd) (n = 317)	2.3 (1.4)	2.2 (1.4)	.39
Number of live births – mean (sd) (n = 317)	1.9 (1.2)	1.7 (1.1)	.23
Age at menarche – mean (sd) (n = 243)	12.6 (1.7)	12.5 (1.3)	.79
BIRAD Score – median (25^{th}, 75^{th}) (n=327)	2.0 (1.0, 2,0)	2.0 (1.0, 2.0)	.23
Benign Breast Disease			.37
ALH	125 (44.8)	154 (55.2)	
LCIS	82 (51.6)	77 (48.4)	
Both	2 (40.0)	3 (60.0)	
Hospital System			.85
Hospital A	17 (50.0)	17 (50.0)	
Hospital B	192 (46.9)	217 (53.1)	
Year			.84
2015 – 2017	22 (45.8)	26 (54.2)	
2018 – 2022	187 (47.3)	208 (52.7)	
Mastectomy or Lumpectomy			.005
Yes	147 (43.5)	191 (56.5)	
No	62 (59.1)	43 (41.0)	
Ever Breastfed			.37
Yes	26 (42.6)	35 (57.4)	
No	35 (42.2)	48 (575.8)	
Don't Know	148 (49.5)	151 (50.5)	
Hormone Replacement Therapy			.41
Yes	38 (47.5)	42 (52.5)	
No	95 (44.2)	120 (55.8)	
Don't Know	76 (51.4)	72 (48.7)	
Genetic Testing (n = 290)			.14
Yes	70 (50.4)	69 (49.6)	
No	63 (41.7)	88 (58.3)	

1075 - A Total Telemedicine Pathway for Screen-Detected Breast Lesions: Travel Burden, Time Valuation, Outcomes, and Patient Experience

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Background/Objective: Telemedicine has become integral to modern surgical care. In breast surgery, initial consultations are often in-person, though many patients present with asymptomatic, image-detected findings and normal exams. Long-distance travel for specialty care is common. A structured total telemedicine pathway may reduce travel and associated costs while maintaining quality of care. We evaluated the clinical characteristics, economic impact, and patient experience associated with a structured total telemedicine pathway for patients undergoing breast surgery.

Methods: We conducted a single-institution cohort study of patients with screen-detected, non-cancerous breast lesions or referrals for abnormal imaging who completed an initial synchronous audio-video telemedicine visit from February 2023 to October 2025. Patients with a significant family history or a breast symptom were excluded. Variables included age, diagnosis-to-telemedicine interval, telemedicine-to-surgery interval, and postoperative outcomes. Geographic data were abstracted from patient and clinic ZIP codes. Latitude and longitude centroids from U.S. Census ZIP Code Tabulation Areas were used to calculate great-circle distances via the Haversine formula; round-trip travel distances were reported. Driving times were estimated with the Google Maps Distance Matrix API. Time value savings were estimated as round-trip hours × Pennsylvania median hourly wage, inflation-adjusted, with a 1.3 multiplier for fringe benefits. Sensitivity analyses varied wage estimates ±25%. Patient geographic distribution was summarized using Rural-Urban Commuting Area (RUCA) classification. Patient experience was measured with a Telehealth Usability Questionnaire (TUQ), scored on a 7-point Likert scale. Descriptive statistics are reported as mean (standard deviation) unless otherwise noted. Data analysis was performed using Microsoft Excel for Microsoft 365 (Microsoft Co., Redmond, WA).

Results: A total of 58 patients completed a telemedicine consultation, and 43 (74.1%) underwent surgery within the study window. Mean age was 54 (12) years. The mean diagnosis-to-telemedicine interval was 47.4 (63.4) days, and the telemedicine-to-surgery interval was 58.3 (47.9) days. Mean follow-up was 3.3 (5.1) months. Postoperative complications occurred in 3 (7%) patients, consisting of two minor skin separations and one symptomatic seroma requiring aspiration. TUQ responses were obtained from 47 patients (81.0%). Satisfaction was high, with a mean of 6.7 (0.7). The highest-rated item was travel time saved with a mean score of 6.9 (0.4). The lowest was the ability of the computer system to help resolve technical problems with a mean score of 5.8 (1.8). By self-report, 61 .7% (n=29) of patients would have traveled 100 miles. By Haversine calculation, mean avoided round-trip distance was 48.2 (63.1) miles. Estimated travel costs were $80 for 2.1% (n=1). The base time value of avoided travel was $38.9 (51.8), with sensitivity analyses ranging from $29.2–$48.6. With fringe adjustment, the mean increased to $50.6 (67.4) (range $37.9–$63.2). By RUCA classification, 82.8% (n=48) of patients were metropolitan and 17.2% (n=10) suburban /rural. Time value savings were significantly greater among suburban/rural patients with a mean of $83.9 (41.0) compared with metropolitan patients with a mean of $29.3 (48.7) (p=0.003).

Conclusion: A total telemedicine pathway for patients with screen-detected breast lesions was feasible, safe, and associated with high patient satisfaction. Geographic analysis demonstrated meaningful reductions in travel and time value costs, with pronounced benefit among suburban and rural patients. Structured telemedicine visits offer a practical and economically favorable model for initial consultation in appropriately selected breast surgery patients.

Table 1: Geographic Variations in Travel Burden and Associated Costs by RUCA Category

	Metropolitan core	Metropolitan area	Suburban	Rural	P- value
N = 58	44 (75.8%)	4 (6.9%)	7 (12.1%)	3 (5.2%)	
	48 (82.8%)		10 (17.2%)		
Time value $	$29.1 (51.5)	$31.5 (7.9)	$86.5 (46.9)	$78 (41.7)	
	$29.3 (48.7)		83.9 (41.0)		0.003
Fringe $	$37.9 (67)	$40.9 (10.3)	$112.4 (60.9)	$101.4 (54.2)	
+/-25%	$28.4-47.3	$30.7-51.1	$84.3-140.5	$76.1-126.8	
	$38.1 (64.0)		$109.1 (56.1)		
+/-25%	$28.6-47.6		$47.7-136.4		
Round trip (minutes)	61.4 (104.5)	64.5 (24.4)	180.4 (107.9)	182.6 (97.5)	
	61.6 (100.0)		181.0 (99.4)		0.001
Round trip distance (miles)	35.8 (60.9)	37.6 (14.2)	105.2 (62.9)	106.5 (56.9)	
	36.0 (57.7)		105.6 (55.0)		0.004

Data are reported as mean (SD). RUCA = Rural-Urban Commuting Area Codes. RUCA definitions area defined as follows: Metropolitan core = Metropolitan area core, primary flow within an urbanized area; Metropolitan area = Metropolitan area high commuting, primary flow 30% or more to a urbanized area; Suburban = Micropolitan area core, primary flow within a large urban cluster (10,000-49,999); Rural = Rural areas, primary flow to a tract outside an urbanized area or urban cluster

CPM

1305 - Trends and Predictors of Contralateral Prophylactic Mastectomy in Young Women at a Single Comprehensive Cancer Center

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Background/Objective: Rates of contralateral prophylactic mastectomy (CPM) for unilateral breast cancer have significantly increased despite lack of evidence that CPM improves disease-specific survival in low or average-risk patients. Recognizing this trend, the American Society of Breast Surgeons has emphasized shared decision-making and evidence-based counseling regarding CPM risks and benefits. However, limited data exists on which patient or tumor factors influence CPM decision-making, particularly among young women of average- or low-risk. This study aimed to evaluate longitudinal trends in CPM utilization and identify demographic and clinical predictors of CPM among young women treated at a single comprehensive cancer center.

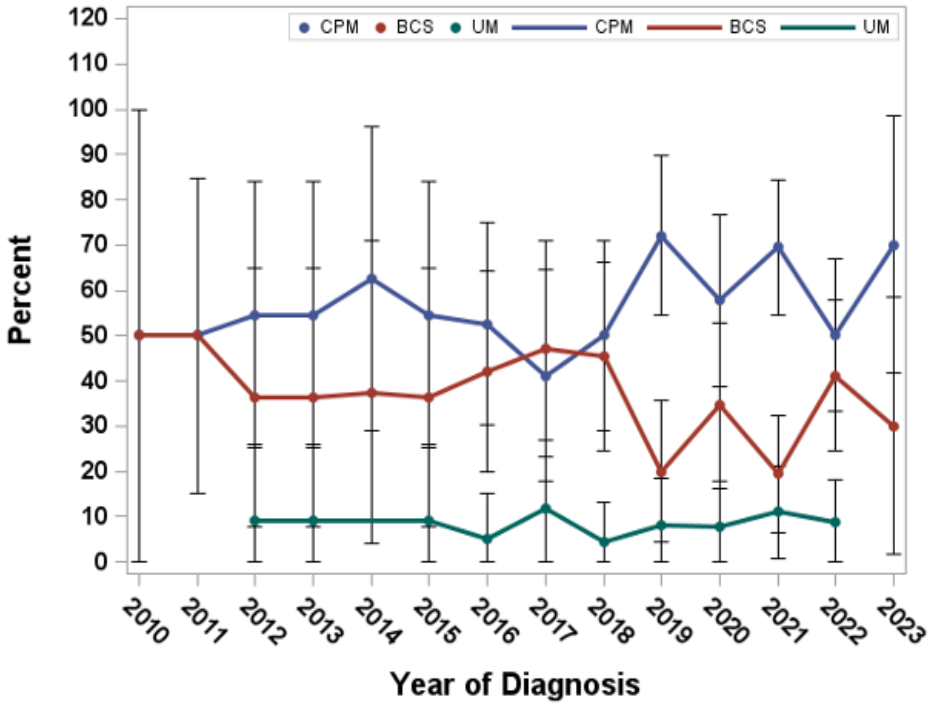
Methods: We conducted a retrospective cohort study of patients age 45 and younger diagnosed with unilateral, clinically node negative Tis, T1, or T2 breast cancer from January 2010 to December 2023 at our institution. Patients who underwent neoadjuvant chemotherapy or with high-risk pathologic genetic mutations were excluded from our analysis. Demographic, tumor, and surgery data were collected from our institutional registry and the electronic medical record. The CPM and non-CPM (unilateral mastectomy or breast-conserving surgery) cohorts were compared. Univariable and multivariable logistic regression were performed to analyze predictors of undergoing CPM.

Results: Among 241 eligible patients, 57.3% (n=138) underwent CPM. Patients undergoing CPM were slightly younger (mean age: 36.0 years versus 37.6 years, p=0.02) than those not undergoing CPM. Nearly 64% of White patients opted for CPM (p=0.0007) compared to 35.1% of Black patients and 28.5% of Other race patients. Overall, 22.4% (n=54) patients had Tis disease, 23.2% (n=56) had T1 disease, and 54.36% (n=131) had T2 disease. Most patients had invasive disease (76.8%, n= 185), while 22.8% (n=55) had in-situ disease. Patients with DCIS or LCIS were more likely to undergo CPM (70.9% vs. 53.5%, odds ratio [OR]=2.12, p=0.02). No significant differences were observed in histology, grade, ER/PR/HER2 receptor status, or clinical stage between the CPM and non-CPM cohorts (all p>0.05). Between 2017-2023, we observed that CPM rates increased, while breast-conserving surgery rates decreased (Figure 1). CPM rates peaked at 72.0% (54.5-89.6) in 2019. In multivariable logistic regression, younger age was associated with significantly higher odds of undergoing CPM (OR: 0.94; 95% CI: 0.89-0.99, p=0.016) and Black women were significantly less likely to undergo CPM when compared to White women (OR: 0.28; 95% CI: 0.13-0.60, p=0.001).

Conclusion: In this single-institution cohort of young women with unilateral breast cancer, CPM rates have continued to rise over time. Younger age and White race were independent predictors of CPM, suggesting that in our cohort patient demographics rather than tumor characteristics play a dominant role in surgical decision-making. These findings underscore the need for targeted interventions to support equitable, informed decision-making and to ensure alignment of CPM utilization with individual

risk and evidence-based guidelines. Further prospective study is needed to better understand the psychosocial, cultural, and informational factors that influence patient decision-making regarding CPM.

Figure:



1246 - Prophylactic Contralateral Mastectomy versus Unilateral Mastectomy for Unilateral Breast Cancer: An Analysis of Clinical and Patient Variables Influencing Patient Choice at a Community Hospital

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Background/Objective: Previous studies have demonstrated that contralateral prophylactic mastectomy (CPM) rates among patients with unilateral breast cancer in the United States continue to rise significantly over recent decades. This is occurring despite evidence demonstrating no survival benefit with CPM and higher complication rates with CPM as compared to unilateral mastectomy (UM). Trying to better understand this phenomenon, prior studies have shown increased CPM rates in younger patients, white patients, patients with preoperative MRI, patients undergoing immediate reconstruction, and patients with a family history of breast cancer. The goal of our study was to analyze the clinical factors of patients with unilateral breast cancer in a community hospital setting choosing to undergo CPM.

Methods: In one community hospital system with two surgical centers, a retrospective chart review identified 298 patients who underwent mastectomy surgery for breast cancer from January 2019 through December 2021. Of these 153 patients who had bilateral surgery, 30 patients were excluded for

bilateral breast cancer, and 1 patient was excluded for missing data. A total of 123 patients with unilateral breast cancer who underwent either CPM or UM were analyzed. The bivariate relationships between the decision to undergo CPM rather than UM and several patient and clinical variables were tested using chi-squared and t-tests. Multivariate relationships were examined using logistic regression.

Results: Of patients with unilateral breast cancer (n=267), 46.07% (n=123) underwent CPM. Bivariate analysis showed patients undergoing CPM tended to be younger (mean age 52.95 years) compared to those who chose UM (mean age 61.86 years, p <0.0001). Patients who stated they wanted peace of mind were more likely to choose CPM (58.06% compared to 39.05% of those not concerned, p=0.003). Women with multicentric disease were less likely to choose CPM, 37.50% compared to 51.85% of those without multicentric disease (p = 0.02). In patients who had genetic testing, 57.31% chose CPM compared to 26.04% of those without genetic testing (p<0.0001). When a pathological mutation was identified, 88% of patients chose CPM compared to those who did not undergo genetic testing (p<0.0001). For patients planning to undergo reconstructive surgery following their mastectomy, 56.99% chose CPM compared to 20.99% undergoing CPM and not planning to have reconstruction (p<0.0001). See table 1 for additional bivariate relationships identified.

Logistic regression models showed that age (OR = 0.97, CI 0.95, 1.00), wanting peace-of-mind (OR = 2.39, CI 1.31, 4.37), not having multicentric tumors (OR = 2.13, CI 1.18, 3.85), having genetic testing with a pathologic mutation result (OR = 13.22, CI 3.33, 52.49), and planning to undergo reconstructive surgery (OR = 3.96, CI 1.80, 8.69) were the variables that most predicted the choice of CPM. Other variables were no longer statistically significant when these five variables were in the model.

Conclusion: This data reflects some of the many nuanced clinical factors that influence a patient with unilateral breast cancer to choose CPM in a community hospital setting. The five strongest variables that predicted choice of CPM for our patients were younger age, wanting peace-of-mind, not having multicentric tumors, having genetic testing with a pathologic mutation result, and planning to undergo reconstructive surgery. Previous studies have supported many of these points, however higher rates of CPM in patients without multicentric disease was an outlier. We do believe that the COVID19 pandemic could have influenced some patients' decision making during the time the data was collected, however further investigation is needed to identify a definitive relationship. This study further emphasizes the continued need for informed shared decision making between the patient and surgeon to ensure that patients are making the best decision for their individualized cancer care.

Table 1. Bivariate Analysis of Patient and Clinical Variables vs Decision to Undergo UM vs CPM

	UM	CPM	p-value
Average Age	61.86 years	52.95 years	p <0.0001
Insurance Type			
Private Insurance	40%	60%	p<0.0001
Medicare	74.47%	25.53%	
Medicaid/other	68.42%	31.58%	
Living Situation			
Patient living with another person	48.88%	51.12%	p=0.03
Patient living alone	63.75%	36.25%	
Hormone Receptor Status			
ER+	51.14%	48.86%	p=0.08
ER-	65.22%	34.78%	
PR+	50%	50%	p=0.04
PR-	64.62%	35.38%	
Pre-Op MRI Finding			
+	45.93%	54.07%	p=0.001
-	68%	32%	
Multicentric Disease			
Present	62.5%	37.50%	p=0.02
Absent	48.15%	51.85%	
Underwent Genetic Testing			
Yes	42.69%	57.31%	p<0.0001
No	73.96%	26.04%	
Mother had breast cancer			
Yes	45.28%	54.72%	p=0.19
No	55.29%	44.71%	
Concerned about having peace of mind			
Yes	41.94%	58.06%	p=0.003
No	60.5%	39.05%	
Want to avoid follow up imaging			
Yes	33.33%	66.67%	p=0.04
No	56.25%	43.75%	
Planning for breast reconstruction			
Yes	43.01%	56.99%	p<0.0001
No	79.01%	20.99%	

1244 - Variants of Uncertain Significance and Contralateral Risk-Reducing Mastectomy in Early-Stage Breast Cancer: Insights from a Safety-Net and Private University Hospital

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Background/Objective: Current guidelines recommend considering contralateral risk-reducing mastectomy (RRM) for patients with pathogenic or likely pathogenic variants in high-risk breast cancer susceptibility genes, but not for those with variants of uncertain significance (VUS); however, VUS results may still influence patient and clinician decision-making. This study examines the impact of VUS on surgical decisions across two healthcare settings - a safety-net and private university hospital.

Methods: We retrospectively reviewed patients with early-stage invasive breast cancer treated between 2012 and 2022 who underwent germline testing and standardized genetic counseling before surgery. Patients with a VUS at a safety-net hospital (n = 86) were compared to those with a VUS at a university hospital (n = 102) and a control cohort with normal genetic results at the safety-net hospital (n = 115). Demographic and clinical characteristics, genetic testing results, and surgical treatment

decisions were analyzed. Descriptive statistics along with univariate and stepwise logistic regression were performed to identify factors associated with RRM.

Results: Demographic data are summarized in Table 1 and demonstrate significant differences in socioeconomic characteristics between our safety-net and university cohorts. RRM was performed in 32.6% of safety-net VUS patients, 36.3% of university VUS patients, and 17.4% of safety-net controls. Both safety-net and university VUS groups had higher RRM rates than controls ($p = 0.013$ and $p = 0.002$, respectively). In the stepwise model, safety-net control patients were less likely to undergo RRM than safety-net VUS patients (OR 0.396, 95% CI: 0.176 - 0.888, $p = 0.025$), while university VUS patients were more likely to undergo RRM than safety-net VUS patients (OR 4.129, 95% CI: 1.307 - 13.047, $p = 0.016$). Additional independent predictors of RRM included age (OR 0.944, 95% CI: 0.912 - 0.977, $p = 0.001$), positive family history (OR 2.146, 95% CI: 1.038 - 4.437, $p = 0.039$), and higher tumor grade (grade 2: OR 5.126, 95% CI: 1.319 - 19.927, $p = 0.018$; grade 3: OR 6.362, 95% CI: 1.609 - 25.159, $p = 0.008$). On univariate analysis, non-English speakers were less likely to undergo RRM (OR 0.492, 95% CI: 0.289 - 0.838, $p = 0.009$), and patients who received chemotherapy were more likely (OR 2.216, 95% CI: 1.202 - 4.086, $p = 0.011$); however, these associations did not remain significant in the stepwise model.

Conclusion: Our study achieved its aim of examining how VUS and socioeconomic factors interact to influence decisions regarding contralateral RRM. VUS results were associated with a higher likelihood of RRM across both healthcare settings, with the highest rates occurring at the university hospital. These findings, which align with and expand upon prior evidence of variability in genetic result interpretation, suggest that genetic uncertainty, institutional context, and socioeconomic factors may influence surgical decision-making. Informed genetic counseling and standardized interpretation and communication of VUS results by all providers are needed to promote evidence-based surgical choices across diverse healthcare settings.

Table 1. Demographic Descriptive Statistics

Variable	Safety-Net Control	Safety-Net VUS	University VUS	All	p-value
n	115	86	102	303	
Age, years					< 0.0001
Mean ± SD	48.94 ± 9.17	46.30 ± 11.80	54.80 ± 12.35	50.17 ± 11.58	
Range	25 - 73	22 - 83	29 - 85	22 - 85	
Race/Ethnicity, *n (%)*					< 0.0001
White (non-Hispanic)	4 (3.48%)	4 (4.65%)	50 (49.02%)	58 (19.14%)	
Hispanic	88 (76.52%)	53 (61.63%)	5 (4.90%)	146 (48.18%)	
Black	20 (17.39%)	21 (24.42%)	26 (25.49%)	67 (22.11%)	
Other (1)	3 (2.61%)	8 (9.30%)	21 (20.59%)	32 (10.56%)	
Spoken language, *n (%)*					< 0.0001
English	38 (33.04%)	34 (39.53%)	102 (100%)	174 (57.43%)	
Non-English (2)	77 (66.96%)	52 (60.47%)	0 (0%)	129 (42.57%)	
Family history (3), *n (%)*					< 0.0001
Yes	36 (31.30%)	55 (63.95%)	29 (28.43%)	120 (39.60%)	
No	79 (68.70%)	31 (36.05%)	73 (71.57%)	183 (60.40%)	
Insurance Status, *n (%)*					< 0.0001
Insured	38 (33.04%)	24 (27.91%)	99 (97.06%)	161 (53.14%)	
Uninsured	77 (66.96%)	62 (72.09%)	3 (2.94%)	142 (46.86%)	

1. Other: South Asian, East Asian, Southeast Asian, Unspecified
2. Non-English: Spanish, Arabic, Pashto, Bengali, Malayalam, Chinese, Urdu, Vietnamese
3. Family History: First, second, or third degree relative with prostate, pancreatic, breast, or ovarian cancer

Complications

1276 - Postmastectomy Pain Syndrome: Its Incidence and Associated Factors

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Background/Objective: Over 100,000 mastectomies are performed in the United States annually. Indications include breast cancer, risk reduction, trauma and benign disease. Postmastectomy pain syndrome (PMPS) is a debilitating and potentially chronic complication of this procedure affecting up to 60% of patients. It can severely affect quality of life and lead to chronic use of pain medications or require additional invasive procedures. The etiology is poorly understood and likely multifactorial. Physiologically, inappropriate signals from T3, T4 and T5 spinal nerve endings secondary to neuroma formation appear to play a role. Other known risk factors include age, extent of axillary surgery, prior history of chronic pain and history of psychiatric disease. Adjuvant cancer therapies may also contribute to the development of PMPS. The objective of this study is to analyze the incidence of PMPS at a single institution and to identify preoperative and intraoperative factors that might be associated with PMPS.

Methods: This study was a retrospective cohort analysis of patients aged 18 years or older from a single institution, who underwent unilateral or bilateral mastectomy without reconstruction for all indications from January 2019 to December 2024. PMPS was defined as new and persistent chest wall pain 3 or more months post operatively. Analyzed variables include patient demographics, preoperative comorbidities, intraoperative variables, postoperative complications, and type of treatment for PMPS. Descriptive statistics were calculated. All continuous variables were checked for normality using skewness and kurtosis statistics. Results for continuous variables are shown as either mean and standard deviation (sd) for normally distributed variables or median and interquartile range (iqr) for skewed variables, while categorical variables are shown as n and %. T- test was used for continuous variables with a normal distribution and Mann Whitney U test was used for skewed variables. Chi-square test and fisher exact test were used for categorical variables.

Results: There were 327 patients included, the majority of which were female (n=312, 95.4%). The average age of the patients was 63, ranging from 29 to 94 years, and average BMI was 30.8 (range 15-64). Most of the patients were Caucasian (n= 260, 80.2%). Unilateral mastectomy was performed most commonly (n=225, 68.8%). Sentinel lymph node biopsy was performed in 226 (52.8%) cases. 29.9% of the mastectomies (n=128) did not have an associated axillary surgery. Most patients (n=280, 85.6%) received a regional block prior to surgery. Thirty-four patients (10.4%) met criteria for post-mastectomy pain syndrome in this cohort. These patients were noted to require 2 additional clinic visits on average. Other observed postoperative complications in this cohort included post-operative seroma (n=71, 21.7%), hematoma (n=26, 8.0%), wound infection (n=39, 11.9%), and skin necrosis (n=9, 2.8%) leading to an overall complication rate of 36.7%.

PMPS was more frequent among patients who had bilateral mastectomy (17.6%) when compared with a unilateral procedure (7.1%, $p<0.001$). The development of post operative complications was associated with development of PMPS (20% vs 4.8%, $p=<0.001$). Additionally, past medical history of fibromyalgia

(54.5% vs 8.9%, p<0.001), as well as pre-operative gabapentinoid medication (25.9% vs 9%, p=0.01) use was found to be associated with PMPS.

While personal history of prior breast or chest wall radiation was not independently associated with the development of PMPS (13.7 vs 9.7%, p=0.36), we did note a significant association with the development of postoperative complications, 51% of patients in this subgroup compared with 33% among patients without prior radiation exposure (p<0.001).

Pain management strategies for the 34 patients included nerve blocks, gabapentin, Tylenol, NSAIDs, and physical therapy.

Conclusion: In our patient cohort of 327 patients who had mastectomy without reconstruction, the incidence of PMPS was overall low at 10%. Even with our low incidence of PMPS, we were able to identify factors that increase a patient's risk of developing PMPS. These factors included bilateral mastectomy, post-operative complications, history of fibromyalgia, and preoperative gabapentinoid medication use. Identifying patients pre-operatively who may have increased risk for PMPS can potentially help guide treatment plans to achieve better patient outcomes and overall care.

1235 - Time Interval Between Neoadjuvant Chemotherapy Completion and Mastectomy Does Not Impact 30-Day Complication Rate

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Background/Objective: The optimal interval between neoadjuvant chemotherapy (NAC) and breast cancer surgery remains unclear, balancing recovery from cytopenias and systemic therapy and associated potential perioperative complications with risk of disease progression. We evaluated whether the time interval between completion of NAC and date of surgery for patients undergoing mastectomy affects 30-day post-operative complication rates.

Methods: An IRB-approved retrospective review was performed of female patients undergoing mastectomy with or without immediate reconstruction following NAC at a single institution from 2014-2024. 30-day complication rates are routinely assessed in our practice with a nurse phone call and if unable to reach the patient, information is gathered with chart review. We defined complications as surgical site infection requiring antibiotics or drainage, hematoma, seroma requiring operation or drain placement, necrosis requiring debridement or hyperbaric therapy, unplanned reoperations, venous thrombosis events requiring medical treatment and hospital re-admissions within 30 days. Patients with bilateral breast cancer, breast cancer recurrence, distant metastasis, angiosarcoma, or history of non-breast cancer were excluded. Postoperative complications within 30 days were analyzed by interval between NAC completion and surgery using chi-square tests for univariate analysis and logistic regression for multivariable analysis.

Results: We evaluated 862 patients treated with mastectomy following NAC with a median age of 59 (range 22-86) years. Tumor subtypes were 38% HR+/HER2– (324/862), 35% HER2+ (305/862), and 27% triple-negative (233/862). 462 (54%) patients had bilateral mastectomies with reconstruction, 117 (14%)

had unilateral mastectomy with reconstruction, 118 (14%) had bilateral total mastectomies without reconstruction, and 165 (19%) had a unilateral total mastectomy without reconstruction. Overall, 54 patients (6.3%, 95% CI: 4.8-8.1%) experienced a post-operative complication within 30 days, including hematoma (n=11), surgical site infection (n=19), necrosis (n=19), thromboembolic event (n=3), and C. diff infection (n=2). 3/69 (4.3%) of patients treated with pembrolizumab had a 30-day surgical complication (1 PE, 1 necrosis, 1 seroma treated with sclerotherapy), which was not significantly different from patients without pembrolizumab overall (6.4%, p=0.47) or patients with TNBC without pembrolizumab (6.7%, p=0.48). The median interval from NAC completion to mastectomy was 32 days (IQR: 27-40), and 90% of patients had surgery between 20 days and 62 days after NAC completion. Comparing days from last dose of NAC to surgery between patients with and without complications, there was no significant difference between the groups (median 32 days in each group, p=0.85 on univariate analysis). There was also no significant difference in the percent of patients with complication comparing time from NAC to surgery of ≤32 days vs > 32 days (5.8% vs 6.7%, p=0.61) and these time-interval categories were also similar on most baseline and clinical features [see Table 1]. There remained no significant association between timing and 30-day surgical complications after adjusting for age, current smoking, and surgery year on multivariable analysis (adjusted odds ratio for >32 days vs ≤32 days 1.24, 95% CI: 0.71-2.16, p=0.45).

Conclusion: In this large cohort, the timing between completion of NAC to mastectomy did not impact the likelihood of experiencing a 30-day complication. These findings support flexibility in surgical timing after NAC (between 3 and 9 weeks) to accommodate clinical recovery and logistical considerations.

Table:

	Total (N=862)	≤ 32 days interval (N=428)	> 32 days interval (N=434)	p value
Age, years				0.43
Median (Range)	49 (22-86)	49 (25-86)	48 (22-85)	
Charlson-Deyo comorbidity score >0, n (%)	72 (8.4%)	35 (8.2%)	37 (8.5%)	0.85
Current smoker at diagnosis, n (%)	45 (5.2%)	28 (6.5%)	17 (3.9%)	0.08
Diabetes mellitus, n (%)	60 (7.0%)	35 (8.2%)	25 (5.8%)	0.16
BMI category, n (%)				0.96
<30	601 (69.7%)	299 (69.9%)	302 (69.6%)	
30-34.9	166 (19.3%)	81 (18.9%)	85 (19.6%)	
≥35	95 (11.0%)	48 (11.2%)	47 (10.8%)	
Mastectomy type, n (%)				0.04
Total	283 (32.8%)	126 (29.4%)	157 (36.2%)	
SSM/NSM	579 (67.2%)	302 (70.6%)	277 (63.8%)	
Mastectomy laterality, n (%)				0.15
Unilateral	282 (32.7%)	150 (35.0%)	132 (30.4%)	
Bilateral	580 (67.3%)	278 (65.0%)	302 (69.6%)	
Axillary lymph node dissection, n (%)	316 (36.7%)	160 (37.4%)	156 (35.9%)	0.66
Tumor biology, n (%)				0.96
HER2+	305 (35.4%)	153 (35.7%)	152 (35.0%)	
HR+/HER2-	324 (37.6%)	161 (37.6%)	163 (37.6%)	
TNBC	233 (27.0%)	114 (26.6%)	119 (27.4%)	
Neoadjuvant pembrolizumab, n (%)	69 (8.0%)	28 (6.5%)	41 (9.4%)	0.12
Any 30-day surgical complication(s), n (%)				0.61
No	808 (93.7%)	403 (94.2%)	405 (93.3%)	
Yes	54 (6.3%)	25 (5.8%)	29 (6.7%)	
Surgical site infection, n (%)	19 (2.2%)	9 (2.1%)	10 (2.3%)	0.84
Necrosis, n (%)	19 (2.2%)	8 (1.9%)	11 (2.5%)	0.51
Hematoma	11 (1.3%)	5 (1.2%)	6 (1.4%)	0.78
Thromboembolic event, n (%)	3 (0.3%)	2 (0.5%)	1 (0.2%)	0.55
Other complication, n (%)	4 (0.5%)	3 (0.7%)	1 (0.2%)	0.31
Reoperation, n (%)	26 (3.0%)	10 (2.3%)	16 (3.7%)	0.25
Rehospitalization, n (%)	27 (3.1%)	13 (3.0%)	14 (3.2%)	0.87
Reoperation and/or rehospitalization, n (%)	38 (4.4%)	18 (4.2%)	20 (4.6%)	0.77

Table 1. Comparison of baseline characteristics and complication outcomes between patients with an interval from NAC completion to surgery that was at or below the median versus above the median

1217 - Frailty as a Predictor of Post-Surgical Outcomes in Older Breast Cancer Patients: Insights from an Academic Center

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Background/Objective: Frailty is a key determinant of surgical risk in older adults, yet its effect on breast cancer surgery outcomes is not well established. Older patients are a diverse group, with wide variation in physiologic reserve that chronological age alone does not capture. This study examines the relation between age, frailty, and postoperative outcomes in women aged 65 years and older who underwent breast cancer surgery.

Methods: A retrospective review of geriatric (> 65 yo), female breast cancer patients who underwent surgery between December 2020 and August 2024 at a single academic medical center was performed. Age at surgery was stratified into 5-year groups: 65–69, 70–74, 75–79, 80–84, and ≥85 years. Frailty was determined using an electronic frailty index (eFI) derived from electronic health data. These values were categorized into three levels: fit (eFI < 0.10), prefrail (0.10 < eFI < 0.21), and frail (eFI > 0.21). Our postoperative outcome of interest was an unplanned acute hospital presentation, defined as any emergency department (ED) visit or hospital readmission within 90 days of surgery. Analyses were performed using SAS 9.4, and a two-tailed alpha of 0.05 was used throughout to denote statistical significance.

Results: A total of 374 women were included. The mean age was 72.8 ± 5.7 years with a mean eFI of 0.15 ± 0.08. Overall, 72 women (19.3%) experienced a postoperative event. While the eFI was found to be significantly different across the age cohorts ($p < 0.004$), there was no statistically significant difference in rates of unplanned acute hospital encounters ($p>0.80$). Multivariate analysis found that neither age ($p = 0.62$) nor race significantly increased rate of unplanned acute hospital presentations, but eFI did ($p = 0.003$). Pairwise analysis found that while the eFI significantly increased between the 65-69 yo and 70-74 yo age groups, the eFI did not significantly differ when the oldest cohorts (80-84 yo and 85+ yo age groups) were compared with the younger cohorts. The highest proportions of fit patients were seen in the 65-69 yo age group (35.9%) followed by the 80-84 yo age group (32.1%).

Conclusion: Rates of unplanned acute hospital presentation following surgical intervention in geriatric female breast cancer patients was not associated with age but rather frailty. Age failed to be an accurate surrogate for frailty, making an eFI score a more reliable marker for post-op representation. The high proportion of fit patients seen in the >80 yo cohorts suggests an element of selection bias in the patients who underwent operative intervention. Surgeons may be choosing fitter candidates for surgery based on comorbidities, functional status, or overall clinical impression, a process that is more formally captured by the eFI. Incorporating routine eFI-based screening with tailored risk-mitigation measures can support more transparent patient selection and shared decision-making, as well as perioperative planning, in patients aged 65 and older.

Table:

Age group (years)	N (% of total sample)	eFI, mean (sd)	90-day postoperative event, n (%)
65-69	131 (35.0)	0.14 (0.07)	28 (21.4)
70-74	121 (32.4)	0.15 (0.08)	22 (18.2)
75-79	77 (20.6)	0.18 (0.09)	14 (18.2)
80-84	28 (7.5)	0.16 (0.09)	6 (21.4)
85+	17 (4.6)	0.18 (0.08)	2 (11.8)

DCIS

1195 - Time to Surgery and Risk of Upstaging to Invasive Disease in Patients with DCIS

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Background/Objective: Increased screening rates and utilization of 3-D tomosynthesis have led to increased DCIS detection in recent years. Standard DCIS treatment includes surgery; however, the COMET trial found no difference in short-term upstage rates among those undergoing active monitoring, regardless of DCIS volume on imaging, compared to guideline-concordant care with surgery. With evolving imaging techniques and the advent of an active monitoring approach, the effect of time to surgery (TTS) on DCIS upstaging is unclear. We assessed national upstaging rates, factors associated with upstaging, and the effect of TTS on upstaging.

Methods: A retrospective cohort study was performed using the National Cancer Database. Women diagnosed with clinical DCIS from 2018–2022 who underwent upfront surgery were included. Upstaging was defined as any invasive disease in the breast and/or axillary nodes on surgical pathology. Patient demographics, tumor clinicopathologic variables, and TTS were compared between women who upstaged and those who did not. A multivariable logistic regression (MLR) model was used to identify factors associated with upstaging.

Results: A total of 144,550 patients met inclusion. Median age was 61 (IQR: 51, 69). Most patients were non-Hispanic White (68.4%), had private insurance (54.9%), with ER+ (83.8%) and PR+ (64.9%) disease. DCIS grade was only recorded for 30.3% of patients (21.5% with grade I-II disease) and was not included in the MLR model. Over two thirds had lumpectomy (70.8%), and most did not receive surgical axillary nodal staging (56.8%). A total of 24,709 (17.1%) upstaged on surgical pathology.

On MLR analysis (Table 1), patients who self-reported as Other race (excluding Hispanic, non-Hispanic Black) had a higher risk of upstaging compared to non-Hispanic White (OR 1.10, 95% CI 1.05 – 1.16,

p<0.01). Increasing comorbidity index was associated with upstaging, while patients with government sponsored insurance were less likely to upstage compared to patients with private insurance (p<0.01 for all). Patients who received surgery ≥30 days after diagnosis had higher odds of upstaging compared to patients who had surgery <30 days (OR 1.22, 95% CI 1.18 – 1.26, p<0.01) and the odds increased when TTS was ≥60 days (OR 1.29, 1.24 – 1.35, p<0.01).

Those with ER- or PR- disease were more likely to upstage (OR 1.07, 95% CI 1.02 – 1.12 and OR 1.59, 95% CI 1.53 – 1.66, respectively, p<0.01). Patients treated with mastectomy were over twice as likely to upstage compared to those that had lumpectomy (OR 2.09, 95% CI 2.02 – 2.15, p<0.01). Women diagnosed post-2018 and those treated at an Academic or Integrated Program were more likely to upstage compared to those treated at a Community Cancer Program (p<0.01 for all).

Conclusion: DCIS upstaging was seen in 17.1% of patients. TTS >30 days was associated with an increased odds of upstaging and was highest with those with TTS >60 days, suggesting active monitoring may increase the odds of progressing to invasive disease, especially in those diagnosed in more recent years via 3-D tomosynthesis. Additionally, mastectomy was associated with upstaging, suggesting that patients with high-volume DCIS may not be suitable candidates for active monitoring. Long-term follow-up of DCIS active monitoring trials are needed to best understand which patients require timely surgical excision rather than an active monitoring approach.

Table 1. Factors associated with upstaging from DCIS to invasive cancer on final surgical pathology in women in the NCDB from 2018–2022.

Variable	OR	95% CI	*p*-value
Race and Ethnicity			
NH White	*Reference*		
NH Black	0.98	0.94 - 1.03	0.47
Hispanic	1.01	0.96 - 1.07	0.74
Other	1.10	1.05 - 1.16	<0.01
Unknown	0.89	0.78 - 1.02	0.09
Charlson-Deyo Comorbidity Index			
0	*Reference*		
1	1.09	1.04 - 1.14	<0.01
2	1.10	1.01 - 1.20	0.02
≥3	1.19	1.08 - 1.32	<0.01
Insurance status			
Private	*Reference*		
Medicaid	1.04	0.98 - 1.10	0.21
Medicare	1.01	0.97 - 1.05	0.74
Other government	0.79	0.69 - 0.90	<0.01
Not insured	0.93	0.81 - 1.06	0.27
Unknown	1.10	0.94 - 1.29	0.22
Time to Surgery (days)			
0–30	*Reference*		
30–60	1.22	1.18 - 1.26	<0.01
>60	1.29	1.24 - 1.35	<0.01
Year of Diagnosis			
2018	*Reference*		
2019	1.08	1.03 - 1.13	<0.01
2020	1.14	1.09 - 1.20	<0.01
2021	1.20	1.15 - 1.26	<0.01
2022	1.21	1.15 - 1.26	<0.01
ER Status			
Negative	*Reference*		
Positive	1.07	1.02 - 1.12	<0.01
Unknown	13.27	11.57 - 15.22	<0.01
PR Status			
Negative	*Reference*		
Positive	1.59	1.53 - 1.66	<0.01
Unknown	0.13	0.11 - 0.14	<0.01
Breast Surgery			
Lumpectomy	*Reference*		
Mastectomy	2.09	2.02 - 2.15	<0.01
Treating Facility Type			
Community Cancer Program	*Reference*		
Comprehensive Community Cancer Program	1.05	0.98 - 1.12	0.16
Academic / Research Program	1.20	1.12 - 1.28	<0.01
Integrated Network Cancer Program	1.18	1.11 - 1.26	<0.01
Unknown	1.89	1.71 - 2.09	<0.01
Distance Traveled (miles)			
0–20	*Reference*		
21–40	1.06	1.01 - 1.11	0.02
41–60	1.03	0.95 - 1.12	0.45
>60	0.95	0.89 - 1.02	0.15
Unknown	0.95	0.91 - 0.98	<0.01

1157 - In Our COMET Era: Revisiting Upgrade Rates of Atypia to Invasive Breast Cancer and Need for Surgical Excision

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Background/Objective: Historically, surgical excision has been recommended for high-risk breast lesions, including atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), lobular carcinoma in situ (LCIS), and flat epithelial atypia (FEA) due to reported upgrade rates to ductal carcinoma in situ (DCIS) or invasive carcinoma ranging from 10–30%. The aim of this study is to determine the risk of upgrade of these lesions to low-intermediate grade DCIS, high-grade DCIS, or invasive carcinoma given that the recent Comparing an Operation to Monitoring, with or without Endocrine Therapy (COMET) trial has prompted reconsideration of routine surgical excision by demonstrating that patients with low-intermediate grade DCIS treated with active surveillance have a lower-than-expected rate of invasive carcinoma at 2 years.

Methods: A retrospective review was conducted of patients diagnosed with ADH, ALH, LCIS, FEA on image-guided core needle biopsy at our institution between 2014-2024. Clinicopathologic data were collected, including patient demographics, imaging features, biopsy method, atypia subtype, mammographic density, hormonal and reproductive history, and comorbidities. The primary outcome was upgrade to invasive carcinoma on surgical excision. Secondary outcomes included upgrade to high-grade and low-intermediate grade DCIS, and factors associated with upgrade. Descriptive statistics characterized the cohort, and univariate and multivariable logistic regression analyses identified independent predictors of upgrade.

Results: A total of 582 atypical lesions were identified. The rate of surgical excision was 90.03%. Of the 524 patients undergoing excision, 29 (5.53%) upgraded to invasive carcinoma, 4 (0.76%) upgraded to high-grade DCIS, and 52 (9.92%) upgraded to low-intermediate risk DCIS. When stratified by subtype, upgrade to invasive disease occurred in 11 of 337 ADH (3.26%), 10 of 114 ALH (8.77%), 5 of 153 FEA (3.27%), and 7 of 41 LCIS lesions (17.07%). Significant predictors of upgrade to invasive disease included breast density category A, prior breast cancer and LCIS, of which only LCIS remained significant in multivariate analysis. There were no significant predictors for upgrade to high-grade DCIS; breast density "A", ADH, and radiologic-pathologic discordance were predictors for upgrade to low-intermediate grade DCIS, with ADH and discordance remaining significant in multivariate analysis. Of 47 patients who were observed, only 1 (2.13%) had a future invasive breast cancer event, which was ipsilateral in a different quadrant than the original atypia. Of patients who underwent surgical excision without upgrade to invasive disease, 29 (5.89%) developed future breast cancer events. Seventeen (58.62%) occurred ipsilateral to original atypia, of which 13 (76.47%) were in the same quadrant.

Conclusion: Upgrade rates among 582 high-risk lesions to invasive carcinoma were lower than historical estimates at only 5.5%. Most of the upgrades were low-intermediate grade DCIS (9.9%). Only one patient of 47 who did not undergo excision developed invasive breast cancer (2%). As management of low-intermediate grade DCIS shifts towards active surveillance, individualized approaches to atypia should be considered to balance overtreatment and oncologic safety. Prospective validation and standardized reporting of atypia outcomes are needed to inform updated clinical guidelines in the post-COMET era.

1149 - From PREDICT to Practice: A Single Institution Retrospective Review of Outcomes in Women with Ductal Carcinoma In Situ Tested with DCISionRT

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Background/Objective: The utilization of adjuvant radiation therapy (RT) following breast-conserving surgery (BCS) in women with ductal carcinoma in situ (DCIS) of the breast has become increasingly nuanced. The DCISionRT test, an individualized risk profile utilizing biosignature data combined with clinicopathologic factors, can help guide clinician recommendations regarding adjuvant RT as demonstrated in the PREDICT trial. This review presents outcomes related to a single institution's use of DCISionRT, the first non-industry sponsored report on rates of ipsilateral breast cancer recurrence within the test's low and high-risk categories.

Methods: A retrospective, single-institution, observational database was generated using clinician-ordered DCISionRT tests from 2018 to 2025, totaling 803 unique female patients. This population was further limited to tests ordered from 2018 to 2023 to allow for sufficient follow up time. Patients were excluded if they had incomplete chart data, insufficient tissue for DCISionRT testing, upgraded to invasive breast cancer on final pathology, had papillary carcinoma treated as DCIS, or did not undergo surgery. Those patients undergoing mastectomy as their index surgery or as a secondary surgery prior to an identified ipsilateral or contralateral breast event were excluded from final statistical review. The average follow-up period was 4 years as defined by date of DCISionRT test order to end of database collection on November 1, 2025. A DCISionRT continuous decision score (DS) of ≤3 was considered low-risk predicting an ipsilateral recurrence rate of less than 10% without adjuvant RT. A DS >3 was considered high-risk. The primary endpoint was the rate of ipsilateral recurrence (DCIS or invasive breast cancer) stratified by patients' DCISionRT risk category and use of adjuvant RT.

Results: Five hundred women with DCIS who had a DCISionRT test ordered between 2018 and 2023 during their treatment and underwent partial mastectomy as their index surgery were reviewed. There were 293 patients (55.6%) with low-risk DS and 234 patients (44.4%) with high-risk DS. Of the patients with a low-risk DS, 10.3% received adjuvant RT. Of the patients with a high-risk DS, 71.9% received adjuvant RT. There were 29 ipsilateral recurrences, of which 22 were DCIS (75.8%) and 7 were invasive breast cancer (24.1%). The average time from index diagnosis to recurrence was 2.6 years. The overall ipsilateral recurrence rate (IRR) was 5.8%. In patients receiving adjuvant RT, the IRR was 2.7%; the IRR increased to 7.7% in those not receiving adjuvant RT. In high-risk DS patients who received adjuvant RT, the IRR was 2.5%. In high-risk DS patients who did not receive adjuvant RT, the IRR was 6.5%. In low-risk DS patients who received adjuvant RT, the IRR was 3.4%. In low-risk DS patients who did not receive adjuvant RT, the IRR was 8%. There were 11 contralateral breast events, including 1 patient who underwent mastectomy as their index case for their DCIS diagnosis.

Conclusion: These results demonstrate that patients with DCIS who undergo adjuvant radiation therapy appear to benefit from a reduction in ipsilateral breast cancer recurrences, regardless of their DCISionRT risk category. The rate of ipsilateral recurrence within the low-risk group not receiving adjuvant radiation therapy supports the reported DCISionRT rate of less than 10%. However, the rate of ipsilateral recurrence within the high-risk group not receiving adjuvant radiation therapy was lower than the DCISionRT reported rate of greater than 10%, potentially due to the shorter duration of follow-up or other patient-specific factors influencing local recurrence risk. Overall, this single institution analysis demonstrates the potential benefit of incorporating molecular risk assessment into the treatment of patients with DCIS to personalize treatment decisions regarding adjuvant radiation therapy. Longer term follow-up will be needed to further assess these results.

1073 - Outcomes of Observation in Atypical Ductal Hyperplasia Stratified by Criteria Adapted from COMET

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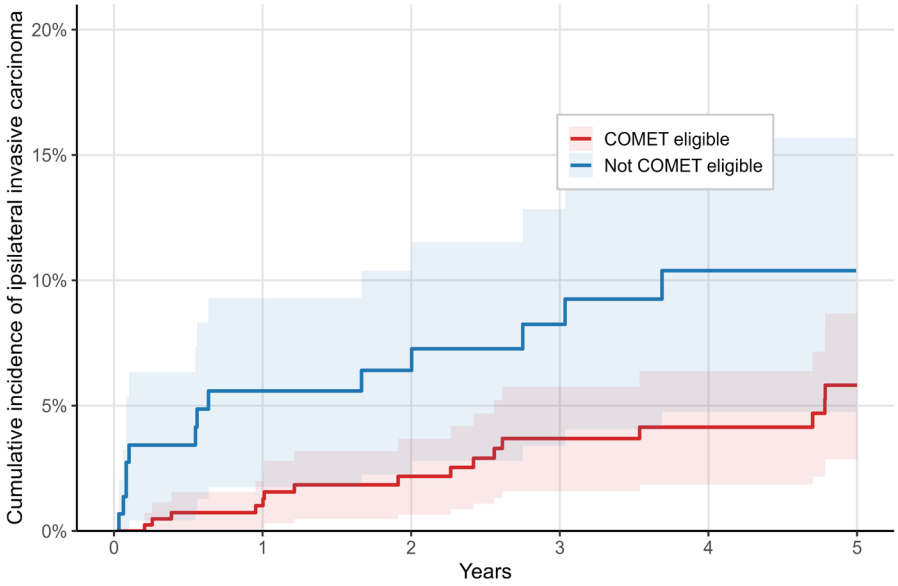
Background/Objective: Atypical Ductal Hyperplasia (ADH) is an increasingly common diagnosis often managed with excision, with an estimated upgrade to invasive cancer ranging from 0-20%. Early results of the COMET trial have increased interest in potential de-escalation of surgical excision for low-risk ductal carcinoma in situ (DCIS). However, the implications of these findings for patients with ADH remain unclear. Our group recently observed that patients with ADH who meet criteria adapted from the COMET trial and undergo surgical excision are much less likely to have invasive cancer on surgical pathology compared with patients who do not meet these criteria. This study aims to evaluate the cumulative incidence of ipsilateral invasive cancer and DCIS among patients with ADH managed with observation alone, stratified by modified COMET eligibility criteria.

Methods: We conducted an observational cohort study of women diagnosed with ADH on core needle biopsy at our institution between 2004 and 2022, who underwent at least 6 months of observation without surgical excision following diagnosis. Data collected from the electronic medical record included age, race, imaging history, pathology, cancer history, hormonal therapy use and development of ipsilateral invasive cancer and DCIS. Modified COMET-eligible patients were defined as those aged >40 years, with no evidence of mass lesions, no concurrent invasive cancer or DCIS, and no ipsilateral invasive cancer within 5 years. We estimated the cumulative incidence of ipsilateral invasive cancer and DCIS stratified by whether modified COMET criteria were met at the time of ADH diagnosis.

Results: A total of 701 patients were included in the cohort, 505 patients met modified COMET criteria, while 196 patients did not. Average age for COMET eligible cohort was 57.7 years, and 55.5 among non-COMET eligible. Among the COMET-eligible patients, 89% had calcifications, compared to 34% in the non-eligible group. Non-COMET eligible patients had a mass on imaging in 27.6% cases and 7.7% had architectural distortion. Utilization of endocrine therapy was 20.4% and 21% in the non-COMET and COMET-eligible groups respectively. Cumulative incidence of ipsilateral invasive cancer was significantly lower among COMET-eligible women with ADH vs non-COMET eligible women at 1 year; 1% (95% CI: 0.0, 2.0%) vs. 5.6% (95% CI: 1.7, 9.3%), 3 years; 3.7% (95% CI: 1.6, 5.8%) vs. 8.2% (95% CI: 3.4, 12.8%), and 5 years; 5.8% (95% CI: 2.9, 8.7%) vs. 10.4% (95% CI: 4.8, 15.7%). Cumulative incidence of DCIS or invasive cancer events were also lower among COMET-eligible women with ADH compared to non-COMET eligible women at 1 year; 2% (95% CI: 0.6, 3.3%) vs. 7% (95% CI: 2.7, 11.1%), 3 years; 5% (95% CI: 2.6,v7.3%) vs. 9.7% (95% CI: 4.5, 14.6%), and 5 years; 7.6% (95% CI: 4.3,v10.7%) vs. 11.8% (95% CI: 5.9, 17.4%).

Conclusion: Patients with ADH who met modified COMET criteria and were managed with observation had a low risk of ipsilateral invasive cancer. The risk was higher in patients not meeting these criteria. These findings extend and complement prior research, suggesting that criteria based on the COMET trial can be used to identify patients with ADH for whom active surveillance is a safe strategy.

Figure:



1024 - Human Ductal Carcinoma In Situ: Role of Spatial Niches in Invasive and Metastatic Progression

Isabella Nair[1], Fariba Behbod[2], Kunal Rai[3], Emily Schueddig[2], Veena Kochat[3], Emre Arlsan[3], Peiyand Yang[3], Ziyi Li[3], Rashna Madan[2], Timothy Fields[2], Seema Khan[4], Jamie Wagner[2], Kelsey Larson[2], Carol Fabian[2], Christa Balanoff[2], Allison Aripoli[2]

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Background/Objective: Ductal Carcinoma in Situ (DCIS) is a common non-invasive breast cancer and a non-obligate precursor to invasive ductal carcinoma (IDC). While DCIS can progress to IDC in 14–53% of untreated cases, the long-term breast cancer-specific mortality remains low (~3.3%), raising concerns about overtreatment. Accumulating evidence suggests that stem-like, hybrid epithelial/mesenchymal cancer cells drive invasion and metastasis, yet the role of epithelial stemness and the tumor microenvironment in DCIS progression remains poorly defined. In particular, the spatial organization of stem-like epithelial cells within tumor niches and their regulatory mechanisms could provide critical insights into the biology of progression and therapeutic targets.

Methods: We utilized 37 patient-derived DCIS samples in the Mouse INtraDuctal (MIND) xenograft model. After 9 months, 20 samples progressed to invasive lesions, while 17 remained non-invasive. To dissect stemness and spatial niche biology, we performed single-cell RNA-seq, spatial transcriptomics (Xenium) on 43 samples (DCIS and DCIS with associated IDC). CytoTRACE was used to quantify stemness. Spatial transcriptomic data was integrated with cell type annotations from normal human breast reference atlases. Ligand-receptor interactions were inferred using CellPhoneDB and CellChat. Niche analysis was performed using SpaGCN. Spatial epigenomics was used to map open chromatin and

enhancer activity within spatially defined stemness-enriched niches. Transcriptional drivers were functionally validated using Lysine-Specific Demethylase 1(LSD1) inhibitors (ORY-1001 and bomedemstat) in HER2+ DCIS cell lines and xenograft models (BCM 3613, BCM 3963). Open chromatin and enhancer activity was assessed using scATAC/RNA-sequencing to define transcriptional drivers. The targets identified were further assessed in spatially defined stemness-enriched niches.

Results: Luminal hormone-responsive epithelial cells exhibited the highest stemness by CytoTRACE. In the MIND model scRNA-seq data, these high-stem-like cells were significantly enriched in DCIS samples that progressed to invasion, both before and after transplantation. Spatial transcriptomics revealed an increase in Luminal hormone-responsive cells and a decrease in basal and LumSec cells from benign epithelium to DCIS to IDC. Unique spatial niches (e.g., Niche-6) were identified (Figure 1), enriched in high-stemness luminal hormone-responsive cells with CEACAM6 expression, interacting with EGFR on immune and stromal cells. Paired scATAC/RNA-seq identified FOXA1 as a key transcriptional driver of epithelial stemness, with enriched binding motifs in open chromatin regions of high-stemness clusters, particularly in HER2+ DCIS. FOXA1 expression correlated with HER2 and CEACAM6. Pharmacologic inhibition of FOXA1 via LSD1 inhibitors downregulated these genes and significantly reduced tumor growth in HER2+ DCIS models.

Conclusion: Spatial niches enriched with FOXA1-driven, stem-like luminal hormone-responsive cells play a key role in the underlying invasive and metastatic potential of DCIS, particularly in HER2+ subtypes. These niches are characterized by distinct ligand-receptor signaling (e.g., CEACAM6–EGFR) and epigenetic regulation. Targeting transcriptional regulators of stemness, like FOXA1, along with their microenvironmental signals, offers a promising strategy to prevent progression in high-risk DCIS. By integrating single-cell, spatial transcriptomic, and epigenomic analyses, our approach identifies predictive biomarkers and therapeutic targets. Ongoing validation in clinical DCIS cohorts aims to enhance risk stratification and guiding precision treatment strategies.

Figure:

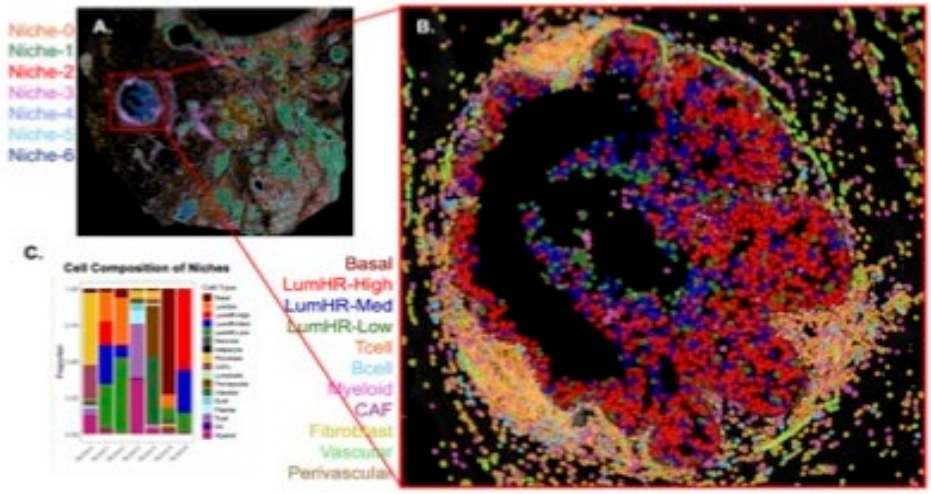

Figure 1. Unique DCIS lesions were identified within a pure DCIS sample using SpaGCN (Spatial Graph Convolutional Network). SpaGCN is a deep learning tool for detecting unique niches. **A.** Within a pure DCIS sample, a DCIS lesion, identified as Niche-6, differed from the remaining DCIS lesions identified as Niche-1. **B.** A zoomed-in view of Niche-6 to show immune cell responses in Niche-6. **C.** The cell composition within each niche. The cell composition of Niche-6 was clearly different from that of Niche-1.

Disparities

1460 - The Impact of Demographic Differences on Breast Cancer Risk Assessment Completion

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Background/Objective: Breast cancer risk assessment (CRA) is a reliable tool in identifying women at high risk for breast cancer. CRA allows for personalized screening plans that have been shown to diagnose cancers at an early stage and prevent deaths. However, despite this, CRA is not uniformly adopted by patients. This study aims to investigate the demographic distribution of patients who opted out of CRA and to identify potential factors impacting that decision.

Methods: Our breast imaging center implemented a program in July 2020 to offer CRA to all patients between the ages of 25 - 75 presenting for a mammogram. This program included male and female patients and was deployed across six breast imaging centers. This study is a retrospective review that included data from female patients between July 2020 and July 2025. Demographics data were extracted from the Clarity Database of the Epic EMR and included Race, Age, Primary Language and Location of mammogram along with CRA response. Race was categorized as White, Black or African American, Hispanic or Latino, Asian, and Other. Age was divided into decades beginning with 25-35 and ending with 66-75 years of age. Primary Language was categorized as English, Spanish, Bilingual (English and Spanish), and Other. Six breast imaging centers were included in this study. The locations are

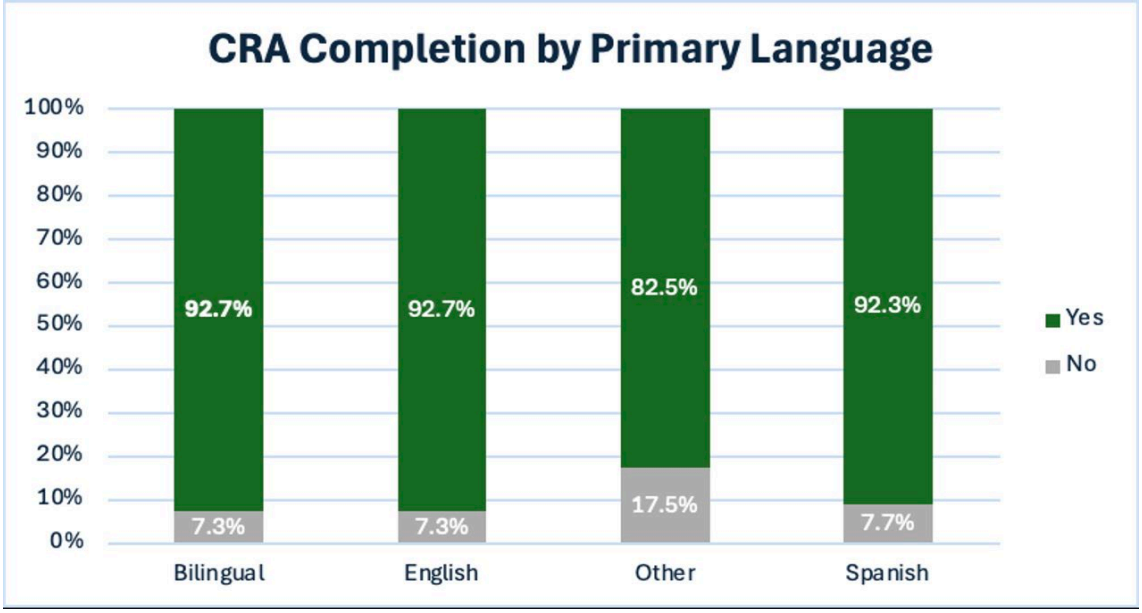
further subcategorized based on the center's association with a hospital system, used as a proxy to represent presumed access to resources. Locations A and B are associated with a major academic hospital system. Location D is the sole breast imaging center associated with a community hospital. Locations C, E, and F are considered off-site, stand-alone breast imaging centers within their respective communities. Formal statistical analysis for significance is ongoing. Chi-squared analysis will be used to determine the significance of demographic variables on the decision to decline CRA. Cramer's V will be used to understand the strength of these associations.

Results: 50419 patients were eligible for participation in this study. Of those, 3861 (7.7%) declined CRA. When categorized by age, the highest CRA completion rate was seen in the 36-45 age group (95.8%), while the lowest completion rate was seen in the 66-75 age group (88.0%). There was a gradual decline in completion rate with age, particularly after age 55. When grouped by Race, Asian race was associated with the lowest CRA completion rate (88.5%), compared to all other groups with a completion rate >90%. Looking at Primary Language, CRA completion was high (>90%) across all languages, except "Other" at 82.5%. Finally, when grouped by Location, Location C had a lower CRA completion (87.9%) compared to all other sites (>91%). Location C represents an imaging center in a predominantly White, English-speaking suburb with a higher median household income compared to the city average. When Location was further subcategorized based on hospital association, CRA completion was strong across all academic, community, and off-site imaging centers (>90%). However, Location D did show a greater completion rate (94.2%) compared to academic (91.9%) and off-site centers (90.9%). When looking at distribution of Primary Language across the three Location subcategories, the off-site centers had a more linguistically diverse population with the highest percentage of 'Other' language speakers (4.4%) compared to academic (1.6%) and the community centers (2.2%). When looking at Age distribution, Location D had the highest percentage of patients aged 66-75 (26.0%), compared to academic (21.2%) and off-site centers (19.4%). The off-site centers had the highest percentage of patients aged 36-45 (27.4%) compared to academic (22.7%) and community centers (21.2%). Finally, when looking at Race distribution across centers, there was a notable equal distribution of Asian patients across the academic, community, and off-site centers (3.2%, 2.6%, and 2.3%, respectively).

Conclusion: Each variable- Race, Age, Primary Language, Location- influences a decision to opt out of CRA. When looking at location, there was no distinguishing feature of the Location C clinic that makes it clear why CRA completion was lower at that location. This potentially indicates a deficit in the training, staffing, or some additional factor inherent to that center. This explanation could influence the lower CRA amongst off-site centers. Although, the initial hypothesis that an academic center would correlate with increased resources and higher CRA did not hold true as the sole community-based center outperformed both the academic and off-site centers. This suggests that there may be components of the academic and off-site settings that combine to enhance the success at the community clinic. These could include access to more resources and training similar to academic centers, but with more time per patient and stronger patient relationships that could be a positive factor at an off-site center. When comparing the distribution of the different demographic variables across the Location subcategories, there was no substantial variability to suggest that one group of people favors a certain Location contributing to that Location's performance. This suggests that demographic variables may play a stronger role in CRA completion than any individual clinic. The observation of lower CRA completion amongst Asian race and non-English, non-Spanish speakers could point to cultural differences inherent to those populations, or an opportunity to broaden and improve cultural competency and translation services across all sites. The trend with older populations declining CRA at higher rates may point to barriers related to digital literacy or differing health priorities amongst this group compared to younger

populations. Overall, this study suggests an opportunity for potential interventions based on a patient's demographics that may increase the likelihood of CRA completion.

Figure:



1456 - Regional Anesthesia for Opioid Stewardship and Reduced Postoperative Analgesic Costs in Breast Surgery: Impact of Pectoral Nerve Blocks in an Underserved Population

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Background/Objective: Opioid stewardship remains a critical public health and surgical quality priority in breast surgery. Mastectomy frequently requires substantial postoperative pain control, and opioids have historically served as the mainstay of therapy. However, opioid-related adverse effects have prompted a nationwide shift toward multimodal, non-opioid analgesic strategies. Regional anesthesia techniques, such as pectoral nerve (PEC) blocks, are increasingly incorporated into enhanced recovery after surgery (ERAS) pathways. PEC I and PEC II blocks target the pectoral, intercostobrachial, intercostal, and long thoracic nerves, providing localized analgesia that may reduce systemic opioid use. In parallel, the rising cost of postoperative care and national emphasis on opioid reduction have increased interest in cost-effective, multimodal pain management strategies. While PEC block efficacy has been demonstrated in tertiary centers, data from community hospitals serving underserved populations remain limited. These patients often face socioeconomic hardship, limited access to ERAS protocols, and higher postoperative complications risk, making cost-conscious strategies especially impactful. This study evaluated whether PEC blocks during mastectomy reduced postoperative opioid use, decreased

postoperative analgesic costs and increased multimodal analgesia utilization in an underserved population.

Methods: A single-institution Institutional Review Board approved a retrospective chart review of 116 patients who underwent mastectomy between January 2014 and April 2024 at a community-based hospital attending to a predominantly underserved population. A selected group of patients undergoing mastectomies after PEC I/II administration (66 patients, 57%), were matched to a similar group of patients managed with traditional analgesia (50 patients, 43%). The PEC blocks were ultrasound guided and performed at the anterolateral fourth rib using a dilute long-acting local anesthetic (0.25/0.5% ropivacaine or 0.25% bupivacaine) with or without dexamethasone (4-10 mg), and dexmedetomidine (200 mcg/2mL) selected at the anesthesiologist's discretion. The non-PEC group underwent standard anesthesia without regional block. Primary outcomes were (1) postoperative opioid utilization (any vs. none) and (2) total postoperative analgesic cost including PACU administration, discharge medications and refills. Secondary outcomes included non-opioid adjunct utilization (NSAIDs, acetaminophen and gabapentin). Medication costs were extracted from the institutional billing data and included gabapentin, acetaminophen, ketorolac, ibuprofen, tramadol, oxycodone, fentanyl, hydromorphone, hydrocodone-acetaminophen, oxycodone-acetaminophen, and morphine. Mean cost per patient was compared between groups using independent two-sample t-tests assuming unequal variances. Group comparison used chi-square or Fisher's exact and logistic adjusted for potential confounders. Statistical significance was defined as $p < 0.05$.

Results: PEC block utilization was associated with a significant reduction in postoperative opioid requirements (31.7% reduction, $p = 0.0014$). Patients receiving PEC block were more likely to receive NSAIDs or acetaminophen ($p = 0.0126$) and gabapentin ($p = 0.0319$), reflecting increased multimodal analgesia adoption. No significant demographic differences were observed between groups. Mean postoperative analgesic cost was significantly lower in the PEC block group ($5.99 ± 3.08) compared to the non-PEC block group ($9.37 ± 6.25 in the ($t(\approx 89) = -3.30$, $p = 0.0017$), representing a 36% reduction in average postoperative drug cost per patient. This cost difference persisted when discharge prescriptions were included, indicating sustained downstream benefits. Patients without PEC blocks required higher doses and a broader range of analgesics, which contributed to elevated per-patient costs.

Conclusion: These findings highlight the clinical and economic impact of regional anesthesia integration in a community hospital setting. PEC block integration not only reduces postoperative opioid use, but also substantially lowered analgesic costs and encouraged ERAS-consistent multimodal pain management. Importantly, these improvements occurred without major infrastructure investment, suggesting PEC block adoption as a scalable and sustainable practice in resource-limited environments. From an equity perspective, underserved patients often face disparities in postoperative pain control, including both undertreatment and excessive opioid exposure. Incorporating PEC blocks may help mitigate these disparities by providing effective, opioid-sparing analgesia that aligns with opioids stewardship and value-based care initiatives. While the retrospective design limits causal inference, the consistent statistical and clinical signals strengthen confidence in the observed benefits. Future prospective studies could further evaluate long-term opioid consumption, patient satisfaction, and the broader cost-effectiveness of PEC block integration within ERAS frameworks. Implementation of PEC I/II blocks for mastectomy in a community hospital serving an underserved population was associated with significantly reduced postoperative opioid use, lower analgesic costs, and greater adoption of multimodal analgesia. PEC blocks represent an effective, low-cost, and equitable strategy to enhance recovery, promote opioid stewardship, and improve surgical quality outcomes in breast surgery.

1444 - Impact of Financial Toxicity on Quality of Life in Breast Cancer Patients in a Safety-Net Hospital

Rachel Chen[1], Katie Kenny[1], Jessica Dzubnar[1], Jackelyn Moya[1], Karina Powell[1], Ayemoethu Ma[1], Jackelyn Moya[1]

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Background/Objective: Financial toxicity (FT) is the stress and hardship, including both emotional and physical, that patients experience as a result of financial burden associated with both direct and indirect costs of their treatment. This study aims to assess and document the impact of financial toxicity on the quality of life (QoL) among breast cancer patients treated at an urban safety-net hospital serving a diverse immigrant and minority patient population.

Methods: We prospectively surveyed patients in a breast clinic at Highland hospital, a safety-net hospital for the Alameda county in California between 2023-2025. Eligible patients were aged 18 years and older who had received a new breast cancer treatment within 18 months prior to the date of enrollment. Patients were approached during their routine clinic visits and invited to participate in the survey. Those who consented completed three questionnaires during their visit: a general demographic and background questionnaire, the Comprehensive Score for Financial Toxicity (COST), and the Functional Assessment of Cancer Therapy–Breast (FACT-B). COST and FACT-B are validated measures of financial toxicity and quality of life, respectively. Descriptive statistics, Pearson correlation, and ANOVA were conducted to examine the correlation between financial toxicity and quality of life, with a p-value $< .05$ deemed statistically significant.

Results: 93 of 100 patients surveyed completed all portions of the 3-part survey. The majority 69 (74.19%) of participants were immigrants, with 31 (44.9%) originating from Mexico, 16 (23.1%) from Asia, 15 (21.7%) from South America (excluding Mexico), 3 (4.3%) from Africa, and 3 (4.3%) from other areas. Breast cancer treatment affected patients' employment significantly. Of the 38 (40.86%) of patients who reported working prior to their diagnosis, 24 (63.2%) of them reported stopping work, 10 (26.3%) reported cutting down on work hours, and 4 (10.5%) reported no change in their work hours. None of the patients reported increasing their work hours during their cancer treatment. The most frequently reported financial concerns were housing and food, each reported by more than 30% of respondents, followed by job loss and treatment fees, each reported by more than 17%. Patients reported that they would benefit most from assistance with food (34.4%), financial navigation (20.4%), and cancer navigation (20.4%). Patients were almost twice as likely to report experiencing "very much" support from family (61.6%) when compared to friends (33.3%). Over 80% of patients reported that they had "not at all" lost hope in fighting against their illness. Patients with a higher financial toxicity burden had a statistically significant ($\rho = 0.489$, $p < 0.00001$) lower QoL score as measured by FACT-B. The mean FACT-B score of all the patients was 107.1. The median COST score was 19.56, which is generally considered as experiencing mild financial toxicity. Education ($p = 0.33$) and baseline income ($p = 0.27$) levels were not associated with financial toxicity, as measured by COST scores.

Conclusion: This study successfully assessed and documented that financial toxicity is associated with lower quality of life in breast cancer patients in a safety-net hospital. Education and baseline income levels did not result in higher financial toxicity burdens in patients. This is surprising and may be due to resources provided by the safety-net hospital as well as state and federal support available, indicating the importance of continued support of such programs. Furthermore, patient-reported needs, such as

assistance with food, financial navigation, and cancer navigation, highlight the areas where targeted resources can drastically improve patient experience. These findings can guide the development of future programs aiming to enhance the quality of care for future breast cancer patients, improving their well-being.

Figure:

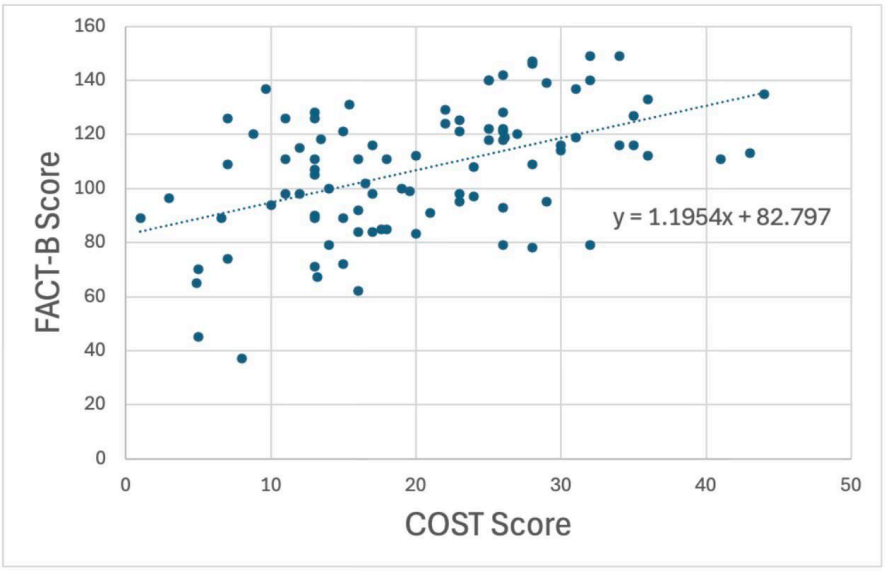

Figure 1. FACT-B Scores are positively associated with COST scores.

1417 - Do Racial Disparities Exist in the Surgical Treatment of the Breast after Neoadjuvant Chemotherapy in Patients with Breast Cancer? Findings from I-SPY2 Clinical Trial

Marissa HowardMcNatt[1], Katrina Dimitroff[2], Shon Black[3], Erin Burke[4], Neil Taunk[5], Thomas Li[2], Kamran Ahmed[6], Kelly Hewitt[7], Elisabeth Abeles[2], Jennifer Tseng[9], Lauren Postlewait[10], Mehra Golshan[11]

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Background/Objective: Disparities exist in the surgical management of breast cancer. We sought to investigate racial differences in surgical choice and outcomes in women with breast cancer enrolled in a large, multicenter neoadjuvant chemotherapy trial I-SPY 2.0.

Methods: We conducted a retrospective analysis of the I-SPY 2 trial. All patients received NAC, but type of surgery was at the patients discretion. Multivariable logistic regression was used to predict odds ratio (OR) of undergoing mastectomy or BCS by race while adjusting for clinical and demographic findings including age, region of the United States, tumor receptor subtype, clinical tumor category (cT) and clinical node status (cN) at diagnosis, pathologic node status (ypN) and pathologic tumor category (ypT), tumor receptor subtype, clinical and pathologic node status and clinical and pathologic tumor size.

Results: Among 1394 patients, 79.4% identified as White, 11.2% Black, and 9.4% Asian/other. Examining BCS vs Mastectomy by race within the baseline clinical and pathologic T categories, there was no significant difference between the groups. When comparing BCS versus Mastectomy by race in each region, the Mid-west is the only region that had a significant difference by race where Black patients had the highest rate of BCS compared to White and Asian/other patients (50% vs 29.8% and 20%, respectively, p=0.046). When performing a multivariate logistic regression for BCS vs Mastectomy adjusting for Patient Age, Region, Race, Tumor Subtype, Tumor size, and pathologic node status, was no difference in odds for breast-conserving surgery and mastectomy for black or Asian patients compared to white patients .Older women were more likely to undergo BCS (OR: 0.96, 95% CI: 0.95-0.97, p<0.001). Patients with ypT3-4 after NAC had significantly higher odds of undergoing mastectomy than those with ypT0/ypTis (OR: 3.89, 95%CI: 2.22-7.10, p<0.001). Patients who were pathologically node positive had significantly higher odds of undergoing mastectomy than those who were node negative (OR: 1.86, 95% CI: 1.36-2.55, p<0.001).

Conclusion: Overall, we found no difference between BCS and mastectomy rates between racial groups in our cohort. Patients with larger tumors, positive lymph nodes, and those who are younger are more likely to undergo mastectomy. Additionally, there were different regional variations in surgical treatment amongst these patients. Our findings are important in examining racial variation in surgical choice in patients receiving neoadjuvant chemotherapy. These findings suggest that enrolling patients within a clinical trial, such as ISPY, can help mitigate racial disparities in regards to surgical choice.

1410 - Survival Outcomes in Patients with Triple-Negative Breast Cancer: Insights from a Single-Institution Cohort (2012–2023)

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Background/Objective: Breast cancer incidence is similar between NH-White (NHWW) and NH-Back women (NHBW) due to equitable screening. However, the mortality rates for NHBW are 42% higher than NHWW. This is amplified within Wisconsin, which had the third largest Black-White disparity in female breast cancer mortality in 2022. This study aims to describe the TNBC patient population within a multisite tertiary care cancer center in Wisconsin, including treatment patterns, overall survival (OS), and risk factors associated with poor OS.

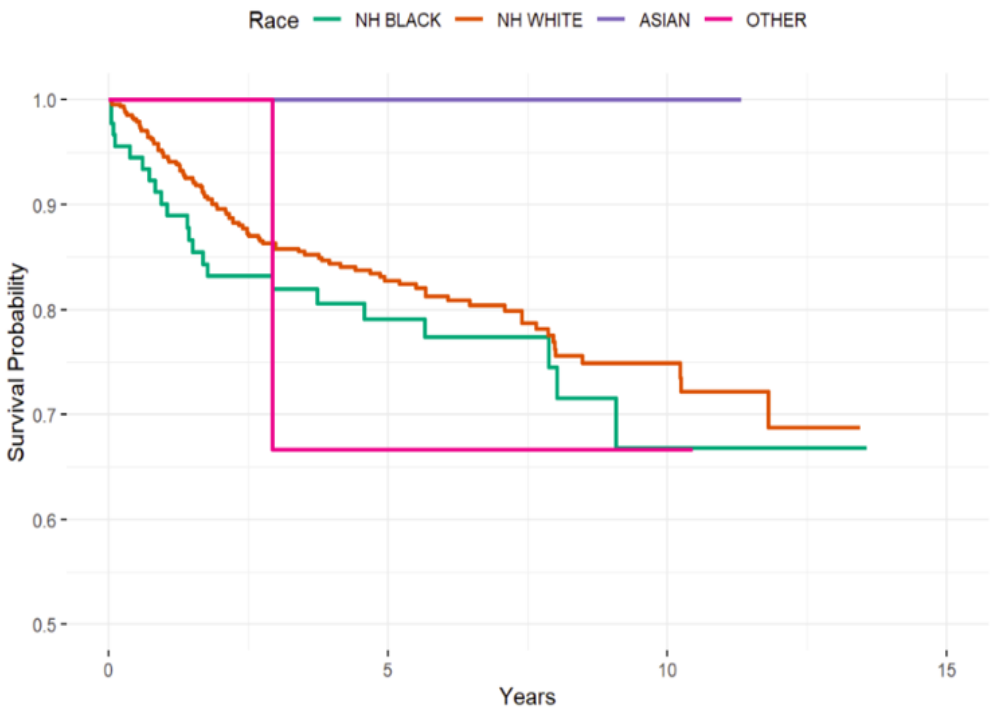
Methods: Female patients age ≥18 with Stage I-III TNBC were identified using a prospectively maintained cancer registry from 2012–2023 within a multisite tertiary care cancer center: a main academic campus and two community satellite locations. Patient demographics and clinicopathologic characteristics were summarized and stratified by treatment site. Overall survival (OS), stratified by race and treatment site, was evaluated with Kaplan–Meier analysis. Cox proportional hazard model was used to identify factors associated with poor OS.

Results: A total of 615 patients met inclusion. Median age was 58 years and of the three sites, most patients were treated at the main academic campus (67.9%). Most were NHWW (83%), 15% were

NHBW, 1% were Asian, 0.8% were classified as other. Almost all (99%) had insurance: 53% had private insurance, 38% with Medicare, 6.5% with Medicaid, and 1.8% with other government coverage. Over half of patients (64%) received radiation and nearly all underwent surgery (91%) with 52% undergoing lumpectomy and 39% mastectomy. While 74% underwent sentinel lymph node biopsy, 24% received an axillary dissection. Overall, 86% (n=530) of patients received chemotherapy, of whom 58% had neoadjuvant chemotherapy. The 10-year OS probability in NHBW was 67% (95% CI: 54%-82%) vs 75% (95% CI: 69%-80%) in NHWW and was not statistically significant (p=0.53, Figure 1). There was also no difference in OS by treatment location within multisite tertiary care cancer center (p=0.6). Patient age >70 (HR 1.32 95% CI 0.37-4.77), being uninsured (HR 2.54 95% CI 0.32-20.36), and having a mastectomy (HR 1.73 95% CI 0.93-3.22) were suggestive of an increased hazard of death but did not reach statistical significance (p>0.05 for all).

Conclusion: OS did not vary by race nor treatment site in this cohort of patients with TNBC treated at a multisite tertiary care center. Findings suggest that system level factors present within our system such as standardized imaging practices, a cohesive multidisciplinary team and resources to aid patients to and through treatment may be the drivers of similar OS.

Figure 1. Overall survival by race and ethnicity in women ≥18 with TNBC in a prospectively maintained cancer registry 2012- 2023



Log rank p=0.5243

Race	Number at Risk			
NH White	482	245	60	0
NH Black	91	51	12	0
Asian	6	3	1	0
Other	4	2	1	0
Years	0	5	10	15

1348 - Impact of Socioeconomic Neighborhood Disadvantage on Disease Presentation and Survival in Young Women with Breast Cancer

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Background/Objective: The incidence of breast cancer is rising in young women, with an annual increase of 1.4% per year since 2012, exceeding rates observed among older women. This increase has been most pronounced among very young non-Hispanic Black women (less than 40 years old) with emerging increases in Hispanic women as well. Living in a socioeconomically disadvantaged neighborhood is associated with more poorly differentiated disease at diagnosis and worse breast cancer-specific survival. We sought to evaluate the association between neighborhood disadvantage and breast cancer presentation and outcomes among young women.

Methods: Women aged 20-64 with stage I–IV breast cancer diagnosed between 2016 and 2022 were identified in the National Cancer Database (NCDB). Patients were stratified into two age groups (20-39 and 40-64). Neighborhood socioeconomic disadvantage was measured using 2020 Census–linked quartiles for median household income and percentage of adults without a high school diploma. Multivariable logistic regression was used to identify factors associated with young age at diagnosis. Stratified Cox proportional hazards models evaluated the association between neighborhood disadvantage and overall survival, adjusting for race, rurality, stage, age, median income, high school education and insurance status.

Results: Among 678,504 women aged 20–64 diagnosed with stage I–IV breast cancer between 2016 and 2022, 9.4% were aged 20–39 and 90.6% were aged 40–64 (Table 1). Younger women were more likely to be non-Hispanic Black (20-39yo16.4%, 40-64yo 12.4%) or Hispanic (20-39yo 12.8%, 40-64yo 8.7%). Young women had higher proportions of stage 3 and 4 disease (24.5% vs. 13.4%) and poorly differentiated disease at diagnosis compared with women aged 40-64 (54.8% vs. 31.8%). Tumor biology also differed by age: younger patients were more likely to have HER2+ disease (24.5% vs. 15.3%) or triple negative disease (19.6% vs. 11.2%) when compared to their older counterparts.

Among women aged 20–39, 12.3% lived in neighborhoods with median household income <$46,277, and 17.8% lived in neighborhoods where more than 15.3% of adults did not have a high school degree. Younger women were also less likely to have private insurance coverage and were more often uninsured at diagnosis, reflecting greater financial vulnerability at treatment entry.

On multivariable analysis controlling for race, stage, age, rurality, neighborhood income, educational attainment, and insurance status, neighborhood disadvantage remained significantly associated with mortality, with a 20% higher risk of death among women in the lowest income neighborhoods (HR 1.2 , $p<0.001$) and a 10% higher risk among those in neighborhoods with lower levels of educational attainment (HR 1.1, $p<0.001$).

Conclusion: Although the majority of young women with breast cancer are non-Hispanic White, non-Hispanic Black and Hispanic women are disproportionately affected among those diagnosed at younger ages. Young women from these groups are more likely to live in socioeconomically disadvantaged neighborhoods and to present with more advanced and biologically aggressive disease. Neighborhood disadvantage remained an independent predictor of mortality after controlling race, stage, age, rurality, and insurance status. (we can add treatment factors in later) These findings highlight the intersection of age, race, and place in shaping breast cancer diagnosis and survival, underscoring the need for equity-focused approaches to early detection, timely treatment access, and survivorship support for young women in disadvantaged communities. Further research is needed to better understand the factors contributing to rising breast cancer incidence among young women and to clarify the mechanisms of underlying persistent racial and socioeconomic disparities in this population.

Table:

		Age 20-39	Age 40-64
N (%)		63,431 (9.35%)	615,073 (90.65%)
Race/Ethnicity	nH White	38,764 (5.7%)	436,561 (64.3%)
	nH Black	10,427 (1.5%)	76,537 (11.3%)
	Hispanic	8,086 (1.2%)	53,138 (7.8%)
	Other/ Unknown	6,154 (0.9%)	48,792 (7.2%)
Stage at Presentation	1	26,796 (42.2%)	404,875 (65.8%)
	2	21,112 (33.3%)	127,750 (20.8%)
	3	**10,654 (16.8%)**	**50,866 (8.3%)**
	4	**4,869 (7.7%)**	**31,582 (5.1%)**
Grade	Well	4,140 (6.5%)	122,925 (20.0%)
	Mod	22,503 (35.9%)	276,663 (45.0%)
	Poor	**34,779 (54.8%)**	**195,799 (31.8%)**
	Unknown	2,009 (3.2%)	19,686 (3.2%)
Subtype	ER	44,179 (69.7%)	499,046 (81.1%)
	PR	38,847 (61.2%)	441,924 (71.9%)
	HER2	15,506 (24.5%)	94,132 (15.3%)
	TNBC	12,451 (19.6%)	69,098 (11.2%)
Rural/Urban	Metropolitan	55,484 (87.5%)	527,918 (85.8%)
	Urban	6,944 (11.0%)	75,738 (12.3%)
	Rural	1003 (1.6%)	11,417 (1.9%)
Median Neighborhood Income	< $46,277	**7,784 (12.3%)**	68,023 (11.1%)
	$46,227-$57,856	10,407 (16.4%)	97,140 (15.8%)
	$57,857-$74,062	12,595 (19.9%)	119,116 (18.4%)
	>= $74,063	23,463 (37.0%)	233,900 (38.0%)
	Unknown	9182 (14.9%)	96,894 (15.8%)
Insurance Status	Private Insurance	47,462 (74.8%)	507,921 (82.6%)
	Public Insurance	13,309 (20.5%)	84,616 (13.7%)
	Not Insured	2,282 (3.6%)	15,847 (2.6%)
	Unknown	668 (1.1%)	6,689 (1.1%)
Neighborhood Level Education (% non-high school graduate)	>=15.3%	**11,285 (17.8%)**	95,487 (15.5%)
	9.1-15.2%	14,280 (22.5%)	133,266 (21.7 %)
	5-9%	15,801 (24.9%)	153,914 (25%)
	<5%	12,948 (20.4%)	136,502 (22.2%)
	Unknown	9,117 (14.4%)	95,904 (15.6%)

Table 1: Sociodemographic and tumor characteristics of women aged 20–39 and 40–64.

1327 - Evaluating Health Care Disparities in Implementation of Choosing Wisely Guidelines at a Single Institution

Gavin McGrath[1], Amanda Mendiola[2], Mary Murray[1], Adina Brett-Moris[1], Caroline Mangira[1], Andrew Fenton[1]

[1]Cleveland Clinic Akron General, Akron, OH, [2]Cleveland Clinic Akron General, Doylestown, OH

Background/Objective: "Choosing Wisely" guidelines include omission of lymph node evaluation in patients 70 years or older in which the results would not substantially change treatment. At our single institution, we planned a quality improvement study based on these guidelines to assess over a four-year time span whether there was any difference in adherence due to race, insured status, or geographic location.

Methods: Patients aged 70 years or older, diagnosed between 2021 and 2024 at our institution, with hormone receptor–positive, HER2-negative breast cancers measuring 2 cm or less were included. This initiative consisted of a retrospective chart review to determine whether racial disparities exist in compliance with "Choosing Wisely" guidelines at our institution. This project was submitted to the Institutional Research Review Board (IRB) where it was decided that it met criteria for quality assurance/quality improvement and therefore did not require IRB oversight. A total of 205 hormone receptor–positive cancers in patients aged 70 or older were initially identified. After excluding cases with HER2 positivity, tumors larger than 2 cm, clinically node-positive disease, mixed or rare histologic subtypes, and patients who did not undergo surgery, 91 patients met eligibility criteria and were included in the final analysis. They were then divided into two categories by whether they had sentinel lymph node biopsy (SLNB) performed or omitted. Data was stratified by race, insured status (Medicare vs. Medicare with supplemental coverage) and geographic location (divided into 5 regions around the hospital area based on zip code of the patient's home address). These categories were all evaluated with statistical analysis to assess significance. We also investigated overall compliance with "Choosing Wisely" guidelines; however, this was not one of the primary outcomes being assessed.

Results: Of the collected population, median age was 75 years (IQR 72-79), 92% of patients were white, and 66% had Medicare without supplemental insurance. Sentinel Lymph Node Biopsy was omitted in 35 of 91 (38.5%) eligible patients by "Choosing Wisely" criteria. There were no statistically significant differences in SLNB omission by race (p=0.24), insurance (p=0.35), or geographic region (p=0.15). Categorical variables are presented as frequencies and percentages and compared using Chi-Squared tests or Fisher's exact tests as appropriate. Continuous variables are presented as median with interquartile range. Significance level was set at 0.05 for all tests. Analyses were performed using SAS Software (Version 9.4, Cary, NC).

Conclusion: In a retrospective review of 4 years of data at a single institution, we found that race, insured status, and geographic location did not significantly impact adherence to "Choosing Wisely" recommendations. This is the first study at this institution to evaluate disparities regarding implementation of these recommendations. However, it is important to note that overall compliance remained low, although fairly comparable to data from other studies. It must be noted that upon evaluation of the data, our compliance rates improved from 2021 moving toward 2024 as there was more evidence supporting de-escalation of axillary management. This also coincided with efforts at an institutional level to make this an area for improvement. The change in compliance rates over the time

period assessed in this study is beyond the scope of this quality improvement project, as it was primarily to investigate disparities in health care. There was a recent update to our institution's "Care Paths," which include a multidisciplinary discussion of de-escalation of axillary management in post-menopausal patients age 50 or older with small, hormone-positive breast cancers. This will likely work to improve rates of adherence at this institution, and ongoing research will need to be done to evaluate system-level interventions to improve guideline compliance.

Table:

Characteristic	All patients n = 91	Sentinel Lymph nodes examined n=56	Sentinel Lymph nodes not examined n=35	p-value
Age at diagnosis	75 (72 - 79)			
Race				
• White	84 (92.31)	50 (59.52)	34 (40.48)	0.2429
• Non-White	7 (7.69)	6 (85.71)	1 (14.29)	
Insurance				
• Medicare without Supplement	60 (65.93)	39 (65.00)	21 (35.00)	0.3450
• Private/Supplemented Medicare	31 (34.07)	17 (54.84)	14 (45.16)	
Region				
• Akron Proper	17 (18.68)	8 (47.06)	9 (52.94)	0.1513
• East Akron	14 (15.38)	6 (42.86)	8 (57.14)	
• North Akron	27 (29.67)	21 (77.78)	6 (22.22)	
• Southeast Akron	11 (12.09)	7 (63.64)	4 (36.36)	
• West Akron	22 (24.18)	14 (63.64)	8 (36.36)	

Statistics presented as median (Q1 – Q3) or n (%).

1280 - Impact of Insurance Status on Breast Cancer Treatment and Overall Survival in the Post-Medicaid Expansion Era: A National Cancer Database Analysis

Jamie Rand[1], Rebecca Nelson[1], Katharine Schulz-Costello[1], Veronica Jones[1], Nina Behdin[1]

[1]*City of Hope Comprehensive Cancer Center, Duarte, CA*

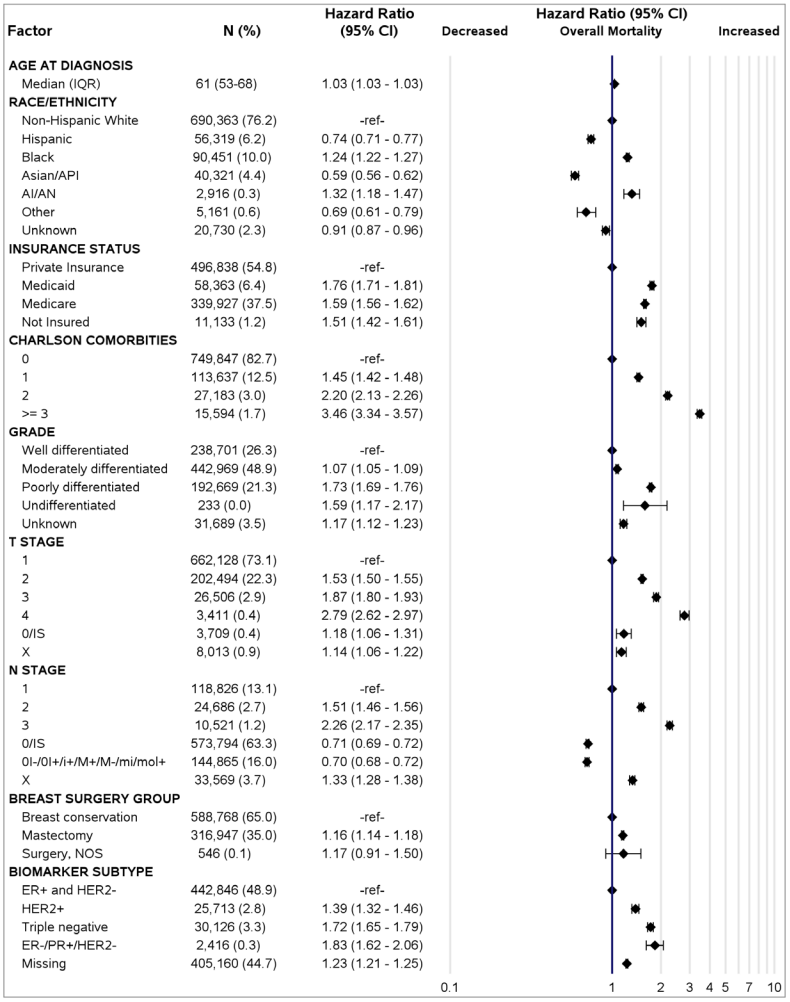
Background/Objective: Equity in health insurance is critical in breast cancer care, as delays in diagnosis and treatment negatively impact outcomes. Previous studies showed that patients with Medicaid or no insurance have higher disease stages at diagnosis and increased mortality rates. In 2014, under provisions of the Affordable Care Act, Medicaid expansion began. Expansion has been adopted by 41 states and Washington D.C., expanding coverage to over 20 million Americans. Prior research demonstrated that, compared to non-expansion states and the pre-expansion period, Medicaid expansion states experienced reductions in both advanced-stage diagnoses and time to treatment. Our objective is to assess the national impact of insurance status on breast cancer stage at presentation, treatment, and disease outcomes post-Medicaid expansion. To our knowledge, this is the first study to evaluate how the post-expansion Medicaid metrics compare to private payors, Medicare, and uninsured.

Methods: Using data from the National Cancer Database (NCDB) from January 2014 to December 2022, we conducted a retrospective cohort study on female patients aged 18-75 with stage I-III breast cancer undergoing upfront surgery to examine associations between payor status and clinicopathologic features, time-to-surgery, and overall mortality. Patients who received neoadjuvant chemotherapy or radiation, had <12 months follow-up, received other government insurance, had unknown insurance status, or whose vital status was unknown were excluded. Data were analyzed using Wilcoxon rank-sum (continuous) and chi-square (categorical) tests to assess differences across payor status. Multivariable Cox proportional hazard models were used to assess associations between payor status and overall mortality.

Results: Among the 906,261 patients included in this study, 54.8% had private insurance, 37.5% Medicare, 6.4% Medicaid, and 1.2% were uninsured. Compared to patients with private insurance, patients with Medicaid were significantly more likely to be Hispanic (17% vs 6%, p<0.001) or Black (19% vs 9%, p<0.001), have poorly differentiated tumors (28% vs 23%, p<0.001), pathologic stage II or III disease (30% vs 22%, p<0.001), node positive disease (32% vs 25%, p<0.001), and longer median time-to-surgery (42 days vs 36 days, p<0.001). On univariate analysis, insurance status other than private insurance was associated with a higher risk of death (Medicaid hazard ratio [HR] 2.04, 95% confidence interval [CI]: 1.97-2.09; Medicare HR 2.52, CI: 2.47-2.55; uninsured HR 1.65, CI: 1.55-1.77; p<0.001). On multivariable analysis, after adjusting for age, race/ethnicity, comorbidities, tumor grade, T stage, N stage, surgery type, and biomarker subtype, patients without private insurance had significantly worse overall survival (Medicaid HR 1.76, CI: 1.71-1.81; Medicare HR 1.59, CI: 1.56-1.62; uninsured HR 1.51, CI: 1.42-1.61) (Figure 1).

Conclusion: In the post-Medicaid expansion era, patients with Medicaid continue to have worse clinicopathologic features and outcomes compared to those with private insurance. This includes more advanced tumor stage and more aggressive disease biology at presentation, as well as increased time-to-surgery. While Medicaid expansion has certainly improved outcomes for the Medicaid patient population, these results demonstrate that further initiatives are needed to improve time-to-diagnosis, time-to-treatment, and outcomes for breast cancer patients to ensure equity across payor status.

Figure:



1243 - Socioeconomic Disparities in Survivorship Care Plan Dissemination Among Breast Cancer Survivors: A Retrospective Cohort Study Using a National Survey Database

Vatsala Kapoor[1], Katharine Armstrong[2], Alicia Arnold[1]

[1]Medical College of Georgia, Augusta, GA, [2]Candler Hospital, Savannah, GA, [3]Medical College of Georgia, Cumming, GA

Background/Objective: In 2012, the American College of Surgeon's Commission on Cancer published recommendations that all cancer survivors receive survivorship care plans (SCP), a combination of treatment summaries and written follow-up instructions. Receiving SCP has been associated with improved screening, surveillance, and management of long-term effects of treatment. There is also evidence that breast cancer survivors express increased satisfaction with care and patient-physician communication when given SCP. Unfortunately, it has been shown that certain patient groups are less likely to receive SCP. We hypothesize that socioeconomically disadvantaged patient populations are less likely to receive SCP.

Methods: We analyzed the 2021 BRFSS database for breast cancer survivors who reported completing treatment. Univariate and multivariate logistic regression models identified factors associated with SCP receipt. Independent variables studied included age, language, income ($0-$35000, $35000-$100000, or $100000 or greater), race/ethnicity (White, Black or African American, Hispanic, Asian/Pacific Islander, or other), marital status (married, divorced, widowed, or other), primary doctor type (cancer surgeon, general surgeon, medical oncologist, family practitioner, general practitioner/internist, or other), employment status (working, not working, or retired), highest level of education (less than high school, high school graduate, 1-3 years of college, or college graduate), insurance coverage at the time of treatment, home ownership (own or not own), and household size.

Results: After excluding breast cancer survivors who did not know or refused to report whether they received SCP (n=22), our sample size was 655 individuals. Multivariate logistic regression identified the following as negative predictors of receiving treatment summaries: age (OR = 0.97, 95% CI = 0.95 - 0.99, p = 0.01) and not having insurance at the time of treatment (OR=0.36, 95% CI = 0.15 - 0.81, p = 0.02). Certain factors, including age (OR = 1.06, 95% CI = 0.02 - 0.09, p < 0.01), not having insurance at the time of treatment (OR = 2.56, 95% CI = 0.29 - 1.62, p < 0.01), and the primary doctor being a general surgeon (OR = 3.99, 95% CI = 0.18 - 2.64, p = 0.02) were associated with increased odds of not receiving follow-up instructions. The primary doctor being a medical oncologist was associated with a decreased likelihood of receiving no follow-up instructions (OR = 0.29, 95% CI = -2.49 - -0.32, p = 0.02). The primary doctor being a family practitioner was associated with an increased likelihood of receiving non-written versus written follow-up instructions (OR = 1.64, 95% CI = 0.01 - 0.98, p = 0.04).

Conclusion: This study identifies that older age, lack of insurance at the time of treatment, and type of primary doctor influence receipt of SCP among breast cancer survivors. There are currently a few similar studies aimed at identifying socioeconomic influencers of SCP receipt among cancer survivors. These studies have shown that older age, lower income, lack of insurance at the time of treatment, and certain races are associated with decreased SCP dissemination. However, these studies either do not focus on breast cancer survivors, are not recent, or were not conducted on a national level. Based on our findings, we believe that public health efforts need to be made to target these disparities and improve SCP dissemination among vulnerable groups. We also believe that further education regarding the importance of SCP dissemination should be given to general surgeons and family practitioners.

1237 - Mastectomy Use Despite Breast-Conserving Eligibility: National Trends in Stage I Breast Cancer (2004–2021)

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Background/Objective: Breast-conserving surgery (BCS) with radiation is guideline-preferred and provides survival equivalent to mastectomy for Stage I breast cancer, yet national practice remains inconsistent among clinically eligible patients. Prior national analyses often included patients not uniformly eligible for BCS, limiting interpretation of true trends. We evaluated national trends and predictors of mastectomy exclusively among strictly defined BCS-eligible Stage I patients (≤2 cm, node-negative) in the National Cancer Database (NCDB) to establish a precise benchmark of current U.S.

practice. We hypothesized that mastectomy use has not declined over time and that disparities continue to drive variation in surgical selection.

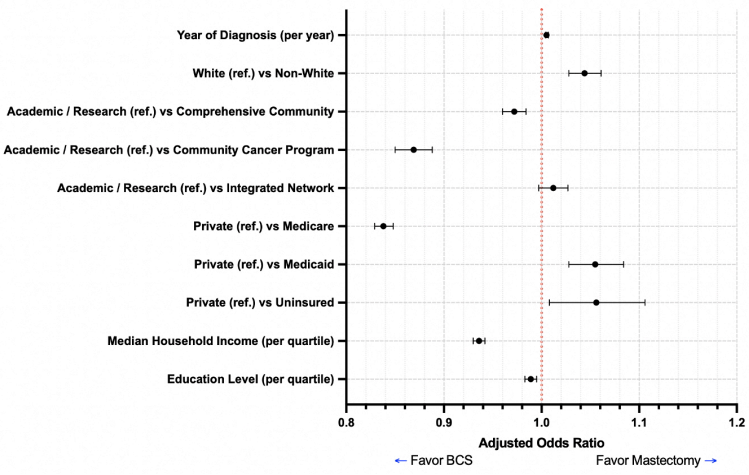
Methods: Female patients ≥18 years with pathologic Stage I invasive breast cancer were identified in the NCDB (2004–2021). Patients with missing tumor size, nodal status, or surgical data were excluded. The primary outcome was mastectomy versus BCS. Covariates included year, race (White vs Non-White), facility type (academic/research, comprehensive community, community cancer program, integrated network), insurance status (private, Medicare, Medicaid, uninsured), median household income quartile, and education level quartile. Multivariable logistic regression estimated adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for mastectomy versus BCS, with year of diagnosis modeled continuously. Patients with missing data were excluded, $p<.05$ was considered statistically significant, and analyses were performed in SPSS version 29.

Results: We identified 714,216 BCS-eligible Stage I patients (71.13% BCS, 28.87% mastectomy). Each more recent year of diagnosis was associated with a higher likelihood of mastectomy, increasing by approximately 0.5% per calendar year (OR 1.005; 95% CI 1.004–1.007; $p<.001$). Compared with White patients, Non-White patients were more likely to undergo mastectomy (OR 1.044; 95% CI 1.028–1.061; $p<.001$). Higher socioeconomic status was protective: each higher household income quartile (OR 0.936; 95% CI 0.930–0.942; $p<.001$) and each higher education level quartile (OR 0.989; 95% CI 0.983–0.995; $p<.001$) was associated with lower mastectomy rates. Compared with academic/research centers, comprehensive community programs (OR 0.972; 95% CI 0.960–0.984; $p<.001$) and community cancer programs (OR 0.869; 95% CI 0.850–0.888; $p<.001$) had lower mastectomy rates, while integrated networks showed no significant difference (OR 1.012; 95% CI 0.997–1.027; $p=.111$). Insurance status exerted marked effects: compared with private insurance, Medicare patients had lower mastectomy rates (OR 0.838; 95% CI 0.829–0.848; $p<.001$), while Medicaid (OR 1.055; 95% CI 1.028–1.084; $p<.001$) and uninsured patients (OR 1.056; 95% CI 1.008–1.106; $p=.022$) had higher mastectomy rates.

Conclusion: In this analysis of patients universally eligible for breast conservation, mastectomy use among strictly BCS-eligible Stage I patients has persisted and even modestly increased since 2004. Importantly, the rise did not appear to be clinically driven: race, facility type, socioeconomic status, and insurance coverage were all independently associated with surgical selection. By isolating the most guideline-appropriate cohort, this study shows that anticipated declines in mastectomy rates have not occurred in the population most suitable for BCS-revealing a critical equity and quality gap in U.S. breast cancer care. Improving guideline-concordant breast conservation in this uniformly eligible population represents a key opportunity for equity-focused national breast quality improvement.

Figure 1. NCDB 2004–2021: Predictors of Mastectomy in Stage I Breast Cancer

Adjusted OR (95% CI)	P value
1.005 (1.004–1.007)	<0.001
1.044 (1.028–1.061)	<0.001
0.972 (0.960–0.984)	<0.001
0.869 (0.850–0.888)	<0.001
1.012 (0.997–1.027)	0.111
0.838 (0.829–0.848)	<0.001
1.055 (1.028–1.084)	<0.001
1.056 (1.008–1.106)	0.022
0.936 (0.930–0.942)	<0.001
0.989 (0.983–0.995)	<0.001



1236 - Socioeconomic Status as a Risk Factor for Late-Stage Breast Cancer Across the United States

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Background/Objective: Breast cancer affects 1 in 8 women throughout their lifetime. Breast cancer is based on size and spread at the time of diagnosis. The Surveillance, Epidemiology, and End Results (SEER) summary staging system contains data that is used for statistical analysis of breast cancers in the United States. Discrepancies in health care such as income, race/ethnicity, rurality, and poor access to healthcare can affect incidence of early breast cancer versus late-stage breast cancer. We hypothesized that lower income patients in the US are more likely to have a late-stage breast cancer at diagnosis compared to those with a higher income. We also hypothesized that non-white patients in the US are more likely to be diagnosed with late-stage breast cancer compared to white patients with a similar income.

Methods: We used a refined generalized linear regression model to compare early (stage 1-2, localized) and late (stage 3-4, regional/distant) stage breast cancer diagnosis across income brackets. Income levels: 1: <$40,000-54,999, 2: $55,000-74,999, 3: $75,000-94,999, and 4: $95,000->120,000. We also organized other socioeconomic factors including a race and age. We included female patients between the ages of 30-79, diagnosed between 2010-2021. Patients with multiple cancers were excluded. The final sample size was n=593,881.

We used a simple logistic regression model using R.4.4.2 without interaction terms and set our independent variable to be income and our dependent variable as breast cancer stage with the outcome as a binary for late-stage cancer. The simple model used late-status as the outcome variable, income category as the exposure, and age category, race/ethnicity category, and diagnosis year as confounding variables. Our R generated logistic regression model showed that all 4 risk factors were significant with a p<0.001. Because confounding variables can interact with the primary exposure variable, we then coded

a similar generalized linear model (logistic regression) to include interaction terms for all 3 confounders. We found that the interaction term with race-ethnicity and income was significant ($p<0.001$) and the other two categories (age and diagnosis year) were not significant. Our final model set income as the predictor variable, late stage as the outcome, and included age, diagnosis year, race/ethnicity, and an interaction term between race-ethnicity and income. This model was used to calculate the odds ratios for each variable in the model and the upper and lower 95% confidence intervals.

We included new cancer diagnosis between 2010-2021. We chose to include female patients only, between the ages of 30-79. We excluded individuals with more than one cancer diagnosis, breast or otherwise.

Results: The R generated logistic regression model was used to calculate the odds ratios and confidence intervals seen in Figure 1. All the odds ratios for each variable are statistically significant with no null values included in the 95% confidence interval. Category 1 represents the lowest annual income group of <$40,000 to $54,999, and this was set as our reference value. We can see that the odds of late-stage breast cancer decrease as the income category increases compared to the reference value. For each step up to the next income group (across 4 income categories), the odds of a late-stage breast cancer diagnosis decrease by 0.9316. This translates to a 6.84% decrease in the odds of late-stage breast cancer diagnosis for an increasing income level compared to the reference group.

When we look at race/ethnicity, we can see that the odds of late-stage diagnosis increase compared to the reference group. The odds of receiving a late-stage breast cancer diagnosis in the non-Hispanic black group are 1.11 times the odds for the reference group of white non-Hispanic females. For the interaction term, we see that race/ethnicity attenuates the relationship that income has on decreasing late-stage breast cancer diagnoses.

Conclusion: Using the SEER staging system data, we determined that there is a relationship between income level and late-stage breast cancer diagnosis. Women with a lower income are more likely to be diagnosed with breast cancer in a later stage compared to those with a higher income. This may be due to differences in access to care, health literacy, transportation, or screening mammograms. Non-white patients also face higher odds of late-stage diagnosis compared to white patients with similar income. Even at higher income levels, non-white patients still show higher late-stage rates compared to their white counterparts. This is congruent with our hypothesis and shows racial gaps in breast cancer care. For non-white patients diagnosed with breast cancer, the odds of receiving a late-stage diagnosis are higher when compared to white patients in a similar income group. Our data suggests that even at the higher income levels, non-white patients still demonstrate increased odds of late-stage breast cancer diagnosis compared to their white counterparts. This is congruent with our hypothesis and highlights the ongoing racial disparities present in breast cancer care. There are a few limitations in our study. The SEER data set was limited to certain geographic areas. We controlled for confounding variables such as age, race/ethnicity and diagnosis year, but other confounding variables may exist. We also excluded individuals with more than one cancer diagnosis. Using this research, we are able to determine discrepancies in breast cancer diagnosis. Going forward it is imperative to use this information to tailor preventative outreach towards areas with less access to care, emphasizing communities of lower income level and non-white populations.

Figure 1. Statistical results for defined categories of interest.

Variable	Odds Ratio	Lower 95% CI	Upper 95% CI
Income	0.9316	0.9212	0.9422
Race/Ethnicity	1.1104	1.0925	1.1287
Age	0.8942	0.8920	0.8964
Diagnosis Year	0.9928	0.9911	0.9944
Income * Race/Ethnicity	0.9904	0.9849	0.9960

1163 - Associations Between Body Mass Index and Treatment Outcomes Among Women with Breast Cancer at a Canadian Tertiary Care Centre: Results from a Prospective Cohort Study

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Background/Objective: Obesity is an established risk factor for the development of breast cancer. In the literature, an elevated body mass index (BMI) has also been linked with adverse clinical outcomes among those diagnosed with the disease. At diagnosis, an elevated BMI has been associated with larger tumor size, higher tumor grade, and a greater propensity toward node-positive disease. In the longer-term, obesity has also been associated with poorer disease-specific survival. The objective of this study was to further characterize relationship between BMI and detection method, tumor characteristics, and treatment outcomes among those diagnosed with breast cancer.

Methods: This study consisted of a retrospective analysis of prospectively collected data of individuals diagnosed with ductal carcinoma in-situ (DCIS) or invasive carcinoma on core biopsy between 2018 and 2025. Exclusion criteria included male sex and those not referred for surgical consultation. Participants were classified into 3 groups on the basis of BMI, according to World Health Organization criteria: normal weight (18.5–24.9), overweight (25–29.9), and obese (≥30). Baseline data collected included age, anthropometric measurements, method of detection, index operation, and staging information. Five years after diagnosis, chart review was repeated to determine treatment modalities received and mortality. Primary outcomes included detection by screening mammogram, tumor characteristics (size, grade, and receptor status), and treatment modalities received (breast-conserving surgery versus mastectomy, as well as receipt of adjuvant chemotherapy or radiotherapy). Secondary outcomes included TNM stage, margin positivity, and all-cause mortality. Continuous variables were assessed using Kruskal-Wallis test, while categorical variables were assessed with chi-square test or Fisher's exact test. For outcomes found to be significant in univariate analyses, bivariate and multivariate logistic regression were then conducted to calculate crude and adjusted odds ratios, respectively. Results were considered statistically significant when p-values were less than 0.05.

Results: A total of 781 participants were included; the majority were overweight (253/781, 32.4%) or obese (332/781, 42.5%), with a median BMI of 29.0 (IQR 25.0–33.9) at diagnosis. Median age at diagnosis was 64.0 years (IQR 54.0–72.0), with no significant difference in age at diagnosis among the 3 weight groups (p=0.93). The majority of tumors were estrogen-receptor (ER) positive (621/784, 79.2%), with no significant differences noted between BMI groups (p=0.62). Similarly, no significant differences were found between BMI categories and tumor grade at diagnosis (p=0.36). There was a trend toward

larger tumor size with increasing BMI, with mean tumor sizes of 2.0cm and 2.3cm among those in the normal and obese BMI categories, respectively (p=0.15). Compared to women in the normal BMI range, diagnosis by screening mammogram was more common among overweight (OR=1.50, 95% CI 1.03–2.18, p<0.05) and obese women (OR=1.59, 95% CI 1.11–2.26, p<0.05). Across BMI categories, there were no statistically significant differences in tumor stage (p=0.11), nodal status (p=0.77), or metastatic disease at presentation (p=0.99). The majority of patients (546/784, 69.6%) underwent breast-conserving surgery as the index operation. Women in the obese BMI category had decreased odds of undergoing mastectomy (OR=0.68, 95% CI 0.46–0.99,1, p<0.05), with this trend persisting in multivariate regression with adjustment for tumor size and patient age (aOR=0.61, 95% 0.40–0.92, p<0.05). Among those receiving breast-conserving surgery, similar rates of margin positivity were observed across BMI groups (84/546, 15.4%, p=0.89). Obese patients were more likely to receive adjuvant radiotherapy (OR = 1.79, 95% CI 1.22–2.63, p<0.01), though this trend was explained by procedure type (lumpectomy versus mastectomy), margin status, and nodal status in multivariate analyses (aOR=1.45, 95% CI 0.76–2.78, p=0.15). There were no significant differences in all-cause mortality between groups (37/781, 4.7%, p=0.52).

Conclusion: The current study sought to examine diagnostic methods, tumor characteristics, and treatment outcomes among patients diagnosed with breast cancer at Canadian tertiary care centre. Similar to previous literature, the current study documented increased odds of detection by screening mammogram among obese women. Obese women were more likely to undergo breast-conserving surgery and were more likely to receive adjuvant radiotherapy, though this latter finding was largely explained by adjustment for procedure type in multivariate analysis. This study highlights the importance of screening mammograms in this patient population.

TABLE 1. Patient demographic information, tumor characteristics, as well as diagnostic and treatment outcomes among those diagnosed with DCIS or invasive carcinoma, according to BMI category

Outcome		*BMI (kg/m²)*			*p-value*
	All	*18.5–24.9*	*25–29.9*	*≥30*	
BMI					
Sample size	781	196 (25.1)	253 (32.4)	332 (42.5)	
Median (IQR)	29.0 (25.0–33.9)				
Mean (SD)	29.8 (6.7)				
Age					
Median (IQR)	64.0 (54.0–72.0)	63.0 (53.0–73.0)	64.0 (54.0–72.8)	64.0 (55.0–71.0)	0.93
Mean (SD)	62.6 (12.4)	62.6 (13.2)	62.2 (12.8)	63.0 (11.5)	
Tumor characteristics					
ER positive	621 (79.5)	151 (77.0)	201 (79.4)	269 (81.0)	0.62
Median size (IQR) in mm	16.0 (10.0–26.0)	15 (8.0–25.0)	18.0 (11.0–25.0)	16 (10.0–30.0)	0.15
Mean size (SD) in mm	21.1 (19.5)	20.1 (21.0)	19.9 (13.7)	22.7 (22.0)	
Grade 1	136 (17.4)	32 (16.3)	43 (17.0)	61 (18.4)	0.35
Grade 2	354 (45.3)	79 (40.3)	117 (46.3)	158 (47.6)	
Grade 3	195 (25.0)	58 (29.6)	63 (24.9)	74 (22.3)	
Grade not recorded	96 (12.3)	27 (13.8)	30 (11.9)	39 (11.7)	
Diagnosis					
*By screening mammogram	425 (54.4)	91 (46.4)	142 (56.1)	192 (57.8)	0.03
Crude OR	———	Referent	1.48 (1.02–2.15)	1.58 (1.11–2.26)	
Adjusted OR	———	Referent	1.49 (1.02–2.18)	1.57 (1.10–2.25)	
Tis	76 (9.7)	23 (11.7)	27 (10.7)	26 (7.8)	0.11
T1	425 (54.4)	111 (56.6)	140 (55.3)	174 (52.4)	
T2	207 (26.5)	45 (23.0)	71 (28.1)	91 (27.4)	
T3	43 (5.5)	9 (4.6)	10 (4.0)	24 (7.2)	
T4	6 (0.7)	4 (2.0)	0 (0)	2 (0.6)	
T stage not recorded	24 (3.1)	4 (2.0)	5 (2.0)	15 (4.5)	
Node positive	206 (26.4)	49 (25.0)	63 (24.9)	94 (28.3)	0.77
Metastatic disease	16 (2.0)	4 (2.0)	5 (2.0)	7 (2.1)	0.99
Treatment					
Mastectomy	235	71	72	92	0.09
†Breast-conserving surgery	546	125	181	240	
Crude OR	———	Referent	0.70 (0.47–1.04)	0.68 (0.46–0.99)	
Adjusted OR	———	Referent	0.72 (0.47–1.11)	0.61 (0.40–0.92)	
Margin positivity (BCS only)	84 (15.4%)	22 (17.6)	26 (14.4)	36 (15.0)	0.89
Adjuvant chemotherapy	205 (26.2%)	44 (22.4%)	70 (27.7)	91 (27.4)	0.38
‡Adjuvant radiotherapy	553 (70.8)	125 (63.8)	176 (69.6)	252 (75.9)	0.01
Crude OR	———	Referent	1.30 (0.87–1.93)	1.79 (1.22–2.63)	
Adjusted OR	———	Referent	1.00 (0.51–1.93)	1.45 (0.76–2.78)	
All-cause mortality	37 (4.7%)	11 (5.6)	9 (3.6)	17 (5.1)	0.52

IQR, interquartile range. SD, standard deviation. *Multivariate regression of detection by screening mammogram included adjustment for age and primary care provider status. †Multivariate regression of breast-conserving surgery versus mastectomy included adjustment for age and tumor size. ‡Multivariate regression of receipt of radiotherapy included adjustment for surgery type, nodal status, and margin positivity.

1160 - Associations of Body Mass Index and Height with Oncotype DX Scores and Clinicopathologic Features in Women with Early-Stage ER-Positive Breast Cancer

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Background/Objective: Obesity has been associated with adverse clinicopathologic characteristics and an increased risk of breast cancer, yet its relationship with genomic tumor profiling remains unclear. The biologic role of height in breast cancer development and prognosis is also poorly defined, with prior studies suggesting an association with incidence but not outcomes. This study aimed to evaluate how body-mass index (BMI) and height correlate with Oncotype DX scores, tumor features, and recurrence patterns in a racially diverse cohort of women with early-stage estrogen-receptor–positive (ER^+) breast cancer in the New York City metropolitan region.

Methods: A retrospective review was performed using data from a large tumor registry in the New York City metropolitan area, identifying 1,435 female patients with ER^+, N0–1 breast cancer diagnosed between 2010 and 2023. Patients without Oncotype DX scores or with stage IV disease were excluded. BMI (kg/m^2) and height (m) were analyzed as continuous variables. Associations with clinicopathologic and genomic characteristics were evaluated using Spearman's correlation and non-parametric tests, with subgroup analyses stratified by race (White, African American, Asian, Hispanic, and mixed). Multivariable Cox regression assessed the impact of anthropometric measures on locoregional and distant recurrence, adjusting for chemotherapy receipt, T/N stage, and Oncotype DX score.

Results: The mean follow-up was 3.83 ± 3.3 years; the median (IQR) BMI was 24.7 (21.9–28.4) kg/m^2 and the median height 1.63 (1.57–1.68) m. Patients with higher BMI presented with larger tumors ($p < 0.001$) and were older at diagnosis ($p < 0.001$). BMI demonstrated a statistically significant negative correlation with Oncotype DX score ($p = 0.008$), suggesting a paradoxical trend toward less proliferative biology in heavier patients. This inverse relationship was most pronounced among Asian women ($p = 0.046$). Higher BMI was also associated with poorly differentiated histology ($p = 0.008$), a finding significant in White patients ($p = 0.017$). No association was observed between BMI and nodal stage ($p = 0.20$) or lymphovascular invasion ($p = 0.382$). Taller patients tended to have larger tumors on presentation ($p = 0.066$), a difference that reached statistical significance among White women ($p = 0.022$). Height was negatively correlated with age at diagnosis ($p < 0.001$) but was not associated with Oncotype DX score ($p = 0.954$) or nodal stage ($p = 0.972$). Regarding racial disparities, African American patients had higher BMI ($p < 0.001$), greater height ($p < 0.001$), and a higher likelihood of T3/T4 disease ($p = 0.056$). White patients were diagnosed at older ages (mean 59.6 years), while Asian women presented younger ($p < 0.001$). African American women demonstrated a higher prevalence of poorly differentiated tumors ($p = 0.005$), although no racial differences were identified in Oncotype DX scores ($p = 0.268$). In univariate analysis, ER/PR status, T stage, grade, and lymphovascular invasion were associated with locoregional recurrence ($p < 0.05$). After adjustment for treatment modality, T/N stage, and Oncotype DX score, BMI, weight, and height showed no independent association with locoregional or distant recurrence.

Conclusion: In this large, racially diverse cohort, increased BMI was associated with larger and less-differentiated tumors but paradoxically lower Oncotype DX scores, indicating a complex relationship between adiposity and tumor genomic risk. Taller stature correlated with younger age and larger tumor size, particularly among White patients, yet did not influence genomic profile or recurrence outcomes. These findings suggest that anthropometric factors-especially obesity-may shape breast-tumor phenotype and risk biology in early-stage ER^+ disease. Incorporating such variables into future predictive and genomic models may enhance personalized risk stratification. Further multi-institutional investigations integrating metabolic, genomic, and racial data are warranted to elucidate the mechanisms underlying the observed BMI–Oncotype paradox.

1159 - Disaggregated Racial Disparities in Tumor Size, Nodal Involvement, and Recurrence Among Asian American Women With Early-Stage Breast Cancer

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Background/Objective: Breast cancer rates are rising in Asian American women. These people are often analyzed as a single group, masking clinically important subgroup differences in breast cancer presentation, treatment, and outcomes. We evaluated Asian American breast cancer patients from a multi-site academic center in New York City, looking at disaggregated subgroups to determine the differences and trends in tumor size, nodal status, treatment patterns, or recurrence rates for those patients with hormone receptor–positive, HER2-negative early-stage breast cancer.

Methods: We retrospectively analyzed Asian American women with stage I–II ER+/HER2– invasive breast cancer diagnosed between 2019 and 2022, all with 21-gene Oncotype DX results available, using data from a high-volume multisite academic tumor registry in New York City. Patients were classified as Chinese, Japanese, Korean, Taiwanese, Filipino, Indian, South Asian (Bangladesh, Nepal, and Middle Eastern ancestry), Southeast Asian (Vietnamese, Myanmar, and Guyanese of Asian ancestry), or Unknown. Clinicopathologic variables-including tumor size, nodal status, histologic grade, treatment received (surgery, radiation, endocrine therapy, chemotherapy), follow-up, and disease recurrence-were compared using Kruskal–Wallis and Fisher's exact tests.

Results: We identified 120 Asian patients: 58 (48.3 %) Chinese, 14 (11.7 %) Indian, 12 (10.0 %) Filipino, 11 (9.2 %) Korean, 6 (5.0 %) Japanese, 3 (2.5 %) Taiwanese, 6 (5.0 %) South Asian, 6 (5.0 %) Southeast Asian, and 4 (3.3 %) Unknown. Mean tumor size was 1.57 ± 0.95 cm; 26.7 percent had node-positive disease. Pathologic stage varied by subgroup ($p = 0.02$). Stage IA predominated in Chinese (72.4%), Korean (81.8%), and Japanese (83.3%) patients, while later stages were more common in South Asian (66.7% IIA/IIB) and Southeast Asian (33.3% IIA, 16.7 % IIB) groups. Tumor size differed significantly across ethnic subgroups: South Asian women presented with the largest tumors on average (2.95 cm), while Chinese (1.60 cm), Japanese (1.28 cm), Korean (1.12 cm), and Southeast Asian (1.30 cm) women had smaller tumors ($p = 0.008$). Nodal involvement also varied ($p = 0.003$). Rates of node-positive disease by subgroup were: South Asian 6/6 (100 %), Filipino 2/12 (16.7 %), Chinese 8/58 (13.8 %), Japanese 1/6 (16.7 %), Korean 1/11 (9.1 %), Taiwanese 1/3 (33.3 %), Indian 3/14 (21.4 %), Southeast

Asian 2/6 (33.3 %), and Unknown 1/4 (25 %). No significant difference was noted between disaggregated Asian race and mean age at diagnosis (p = 0.51), histologic grade (p = 0.217), lymphovascular invasion (p = 0.58) or mean oncotype score (p = 0.821). There also was no statistically significant difference seen in adjuvant radiation or endocrine and chemotherapy treatment adherence between groups. With a mean follow-up of 1.6 years, no locoregional recurrence was observed, with one distant recurrence seen in a Chinese patient.

Conclusion: Disaggregating Asian American breast cancer patients data reveals marked differences in South Asian American breast cancer stage of presentation. South Asian women presented with significantly larger tumors and higher nodal involvement. Recurrence over a mean 1.6-year follow-up was rare and not subgroup-specific, underscoring that the primary disparities lie in tumor burden at diagnosis rather than early treatment or short-term outcomes based off this follow-up. Our study suggests that South Asian American women may be susceptible to later stage of breast cancer diagnosis and more advanced breast cancers compared to other Asian American women with HR+ HER 2 negative breast cancers. Targeted screening and public health interventions may be investigated to improve screening and treatment for these populations.

1116 - Treatment Delays and Testing Disparities May Contribute to Racial Differences in Node-Positive ER+/HER2- Breast Cancer Outcomes

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Background/Objective: Despite advances in treatment therapy, Black patients with clinically node-positive (N+) ER+/HER2- breast cancer continue to experience worse overall survival outcomes compared with non-Hispanic white (NHW) patients. The extent to which disparities in neoadjuvant chemotherapy (NAC) response and social determinants of health contribute to these outcomes remains unclear. In this study, we evaluated NAC response and survival outcomes among Black and NHW patients using a large national dataset.

Methods: We identified patients in the National Cancer Database (NCDB) diagnosed between 2018–2022 with ER+/HER2-, clinically node-positive breast cancer who received neoadjuvant therapy followed by surgery. We evaluated physician-documented response to NAC, pathologic responses using breast (ypT0) and nodal (ypN0) status on final surgical pathology, and potential drivers of racial disparities (e.g., molecular assays, treatment delays, income). Statistical analyses were performed using RStudio. Categorical variables were compared using Chi-squared testing and continuous variables with the Wilcoxon rank-sum test. Propensity score matching was conducted using age and progesterone receptor (PR) status as covariates.

Results: From 2018–2022, we identified 29,663 cN+ ER+/HER2- breast cancer patients treated with NAC, including 2,535 (15.3%) Black and 19,016 (64.1%) NHW patients. Based on physician-documented clinical assessments, a larger proportion of Black patients had no response to NAC compared to White patients (14.1% vs. 12.7%, p = 0.024). When evaluating pathologic complete response (pCR), Black

patients were more likely than NHW patients to achieve both breast pCRs (ypT0: 12.8% vs. 11.2%, p = 0.022) and nodal pCRs (ypN0: 21.8% vs. 19.4%, p = 0.004). Achievement of pCR was associated with lower mortality rates. Among those with breast pCR, the risk of death was reduced by 35% in non-Hispanic White (HR 0.65, p = 0.037) and by 64% in Black patients (HR 0.36, p = 0.0002), while nodal pCR conferred a similar reduction in risk for both groups (NHW, HR 0.54; Black, HR 0.49, both p < 0.0001). Overall mortality was higher among Black patients compared to NHW patients (12.8% vs. 9.3%, HR 1.43 [1.25–1.64], p < 0.0001), with the largest mortality gap observed among patients with no response to NAC (22.8% vs. 14.3%, HR 1.72 [1.29–2.30], p = 0.0002). Among patients who did not achieve breast or nodal pCR, Black patients experienced higher mortality compared to NHW patients (HR 1.50 [1.30–1.72] for no breast pCR; HR 1.46 [1.26–1.69] for no nodal pCR, both p < 0.0001). Among patients achieving pCRs, mortality rates did not differ significantly by race (ypT0: 5.2% for Black vs. 6.2% for NHW, p = 0.487; ypN0: 7.1% for Black vs. 5.5% for NHW, p = 0.156). Black patients had higher median Ki-67 scores (40.0 vs. 30.1, p < 0.001) but were less likely than NHW patients to receive Oncotype DX testing (5.7 % vs. 7.7%, p < 0.001). Black patients also experienced longer delays to NAC initiation (43 vs. 36 days, p < 0.001), were more likely to be on Medicaid (20.0% vs. 9.4%, p < 0.001), and were more likely to reside in the lowest income quartile (29.0% vs. 8.9%, p < 0.001).

Conclusion: Among patients with cN+ ER+/HER2- breast cancer treated with NAC between 2018 and 2022, Black patients were significantly more likely to be classified as non-responders on physician assessment but demonstrated slightly higher pCR rates compared to NHW patients. Despite the greater pCR rates, survival outcomes remained significantly worse for Black patients. This is in part driven by the significantly worse survival for Black patients compared to NHW patients within the no response to NAC category, suggesting that treatment response alone does not account for the observed disparities. Potential contributing factors include more aggressive tumor biology (e.g., higher Ki-67), lower utilization of molecular assays (e.g., Oncotype DX), longer treatment delays, and socioeconomic inequities related to insurance coverage and income. Differences in comorbidities, which were not matched for in this analysis, may also contribute to the observed survival gap. These findings highlight the multifactorial nature of survival disparities in this population, underscoring the combined influence of biological, social, and systemic determinants.

Table:

Variable	Black Patients	NHW Patients	p-value
No response to NAC (clinical)	14.1	12.7	0.024
Breast pCR (ypT0)	12.8	11.2	0.022
Nodal pCR (ypN0)	21.8	19.4	0.004
Median Ki-67 (%)	40	30.1	<0.001
Oncotype DX testing (%)	5.7	7.7	<0.001
Median days to NAC initiation	43	36	<0.001
Medicaid insurance (%)	20	9.4	<0.001
Lowest income quartile (%)	29	8.9	<0.001
Overall mortality (%)	12.8	9.3	<0.0001

1098 - Financial Impact and Implementation Outcomes of a Patient Navigator to Improve Mammography Adherence

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Background/Objective: Patient navigation programs are increasingly recognized as effective tools to improve adherence to preventive screening; however, their financial impact is rarely quantified. This project was conducted at an urban academic medical center serving a diverse and predominantly underserved patient population, where barriers to preventive screening such as socioeconomic challenges, limited access to care, and competing health priorities are common. To address these disparities, a patient navigation initiative was implemented with support from the National Breast Center Foundation for women overdue for mammography in this setting. This study aimed to assess the improvement in screening rates, as well as the financial implications of integrating patient navigation into preventive care efforts.

Methods: Over a 6-month period, a dedicated patient navigator identified and contacted women overdue for mammography at a single center through electronic medical record review. The navigator conducted telephone outreach to encourage and facilitate scheduling. Data collected included the number of patients reached, eligibility for mammography, completed screenings, and associated revenue. Revenue projections were annualized and included estimates of downstream diagnostic and treatment services based on published literature. Specialized programs at the cancer center for patient support were utilized for patients reluctant to undergo screening.

Results: The navigator reached 1,394 overdue patients, of whom 941 were eligible for mammography and 749 appointments were made. A total of 293 mammograms were completed within this time period. This initiative generated $58,893 in new revenue during the initial 6 months (Table 1). Downstream diagnostic and treatment services, such as diagnostic mammograms, additional diagnostic modalities, biopsies, and cancer care were included with additional estimated revenue of $19,769, $2,648, $6,252, and $9,952, respectively. When annualized, this corresponds to $117,786 in screening revenue. Incorporating estimated downstream care from abnormal findings, the total projected annualized revenue was $272,274.75.

Conclusion: Implementation of a patient navigator to contact overdue patients increased mammography completion and generated measurable new revenue, reaching patients with complex clinical and socioeconomic characteristics who were more than 2 years overdue for screening. The multidisciplinary collaboration between the cancer center, primary care, breast radiology, breast surgery, medical oncology, and quality leadership were instrumental in achieving these outcomes. The cancer center also provided targeted peer support interventions for patients with barriers to undergo screening to address disparities and promote long-term adherence. These findings highlight the dual clinical and financial value of patient navigation and support continued investment in such programs to advance preventive care and institutional sustainability.

Table 1: Contribution margin estimates from patient navigator-led mammogram screening

Procedure	Probabilities from model	Implied from model	Contribution margin per segment	Estimated contribution margin per quarter	Annualized
Screening Mammo		293	$201	$58,893	$117,786
Diagnostic Mammo	7.97%	24	$832	$19,769.52	$79,078.06
Additional Diagnostic Tests	0.61%	2	$1,464	$2,648.15	$10,592.61
Biopsy	0.97%	3	$2,161	$6,252.27	$25,009.08
Cancer Care	0.48%	1	$6,902	$9,952.25	$39,809.00
Total				**$97,515.19**	**$272,274.75**

1074 - Task Shifting Fine Needle Aspiration of Breast Lesions from Pathologists to Technicians in Southern Ethiopia: A Report of the Pre-Implementation Phase

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Background/Objective: Breast cancer mortality is the highest worldwide in sub-Saharan Africa. Fine Needle Aspiration (FNA) is a cost-effective, minimally invasive diagnostic procedure. A tertiary cancer center in Hawassa, Ethiopia, offers comprehensive breast cancer diagnostics and treatment; however, peripheral general hospitals rely on visiting pathologists and patients face average diagnostic delays of 184 days. We report pre-implementation activities and training outcomes conducted in preparation for a Type 2 hybrid effectiveness implementation trial in two selected peripheral hospitals. We hypothesize that task shifting FNA from pathologists to trained laboratory technicians may increase access to diagnostics and decrease delays in breast cancer diagnosis and treatment.

Methods: On-site visits were conducted at two peripheral hospitals, one 80km and the other 105km from the tertiary cancer center. Evaluation was performed of space, staff, equipment, workflow, and human resource capacity. Multiple stakeholder meetings with pathologists, technicians, hospital administration, and regional health bureau officials were held to ensure the readiness and willingness to implement a task shifting intervention. Key process indicators were identified for pre- and post-intervention analysis of effectiveness and implementation outcomes.

A structured training curriculum was created. Stakeholders participated in purposive selection of laboratory technicians for training. Knowledge assessments were developed and validated using structured content validity and reliability methodology. Skills and knowledge were evaluated through a final exam, direct observation by supervising pathologists, and slide reviews by both pathologists and

external experts. Technician competency in FNA was assessed for sample aspirate adequacy, appropriate aspirate smearing technique, and slide preparation for future pathology review.

Data was entered into KoboCollect and analysis was performed using Microsoft Excel version 9. A paired t-test was used to calculate knowledge gain with $p<0.05$ for statistical significance.

Results: A 10-day in-person FNA training course was held for six participating laboratory technicians with lectures and hands-on practice. One participant was female, five were male, and all were fully employed at peripheral hospitals performing phlebotomy procedures. Content covered FNA principles, equipment and techniques, indications and contraindications for sample collection, infection prevention, and management of FNA complications. Lectures covered breast anatomy, pathophysiology of breast cancer, signs and symptoms, common presentations, consent and documentation for clinical breast examination and FNA. Two educational videos were developed and viewed on clinical breast examination and performing FNA. Pathology faculty provided didactics on smear preparation, staining, cytological interpretation, and quality control measures. Ethics and patient communication were emphasized. Hands-on practice was conducted under pathologist supervision. Participants utilized fruit and liver to master aspiration, phantom breast models to simulate clinical examination, and patient actors to practice communication. All participants completed 10 days of training, skills labs, and knowledge assessments. The median post-test score was 90.5% (range 78.9-100). Each trainee demonstrated procedural proficiency via three supervised FNA simulations. A comprehensive implementation study protocol was developed, including technician workflow checklists, patient intake forms, process indicator tracking sheets, procedure notes, and standard operating procedure for the laboratory. Ethnographic observation templates, interview guides, and Consolidated Framework for Implementation Research (CFIR)-based surveys were created for evaluation of implementation outcomes. KoboCollect was selected as the data management platform to enable review of real-time data entry in remote areas with off-site monitoring. Pre-implementation metrics for the interrupted time-series trial were collected throughout training.

Conclusion: Phase 1 demonstrated that task shifting FNA procedures from pathologists to laboratory technicians was well-received across multiple stakeholders including laboratory technicians. Training of laboratory technicians was feasible and the use of low-cost materials, including fruit and breast phantom models, provided meaningful hands-on experience and supported skill development. The project will advance to Phase 2, an effectiveness-implementation hybrid design trial. The pilot study may provide a useful framework for other institutions in low-resource settings to improve timely diagnosis and treatment.

1062 - Genomically Basal-Type Tumors Demonstrate Distinct Immune Profiles and Chemosensitivity Across Self-Reported Race Among Patients Enrolled in FLEX Receiving Neoadjuvant Chemotherapy

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Background/Objective: BluePrint, an 80-gene molecular subtyping signature, identifies intrinsic breast cancer (BC) biology beyond receptor-defined classifications. Prior studies have shown higher frequencies of genomically Basal tumors among Black and Latin American patients compared to White. However, limited data exist on chemotherapy response across race, and the biological basis of these differences remains unclear. Using whole transcriptome analysis (WTA) and clinical data from patients enrolled in the FLEX Study (NCT03053193), we investigated racial differences in pathological complete response (pCR) and associated molecular features. The objective was to evaluate pCR rates and characterize underlying biological and immune profiles among patients with BluePrint Basal early BC treated with neoadjuvant chemotherapy (NCT).

Methods: A total of 451 BluePrint Basal tumors from patients self-identified as Black, Latin American, or White with early BC enrolled in FLEX who consented to WTA, clinical data collection and received NCT with available pCR data were included. Clinical characteristics across self-reported race/ethnicity were compared using chi-squared or Fisher's exact tests. Univariate and multivariate logistic regression models assessed the association between clinical variables and achieving pCR. Differentially expressed genes (DEGs) were evaluated using limma, and pathway enrichment was performed using gene set enrichment analysis (GSEA) with Hallmark gene sets between patients who achieved a pCR vs no pCR, stratified by race. Immune cell abundances were characterized using xCell. Significance was defined as $p < 0.05$ for clinical variables and adjusted $p < 0.05$ for DEGs and xCell results.

Results: The median age was 56 years, with the youngest among Latin American patients (n = 64; 47.5 years), followed by Black (n = 81; 56 years) and White (n = 306; 57 years; $p < 0.001$) patients. Overall, 67% of patients had TNBC, 28% HR+HER2- BC, 85% grade 3, 57% T2, and 83% lymph node-negative (LN-) tumors, with no significant differences observed across race. Nearly all tumors were MammaPrint (MP) High Risk 2 (H2) (93%) and 7% were High Risk 1 (H1), with the highest incidence of H2 (97%) among Latin American patients, followed by White (93%) and Black (89%, p=0.033) patients. Platinum-based regimens were most common overall (49%), followed by anthracycline + taxane (AC-T; 36%), and TC (7%; p = 0.077). 46% of patients achieved pCR, with the highest rates among Latin American (60%), followed by Black (47%), and White (43%; p=0.067) patients. In the multivariate analysis (Table), age (OR = 0.98, p = 0.048), MammaPrint Index (OR = 0.13, p = 0.0016), and platinum-based NCT (OR = 2.76, p = 0.0012) were significantly associated with pCR, while race was not independently associated with pCR. Among all patients, GSEA for Hallmark gene sets revealed broad immune-related and inflammatory pathways in tumors that achieved pCR across all races. MYC targets, estrogen response, adipogenesis, and oxidative phosphorylation pathways were significantly upregulated among Latin American patients and downregulated among Black patients compared to White patients achieving pCR. Immune XCell

deconvolution revealed significant enrichment of plasma B cells ($log_2FC = 0.70$, adj. p = 0.048) and Treg cells ($log_2FC = 0.43$, adj. p = 0.039) among Black patients achieving pCR. In Latin American patients, pCR was associated with increases of M1 macrophages ($log_2FC = 1.34$, adj. p = 0.039), T cells, macrophages, and myeloid dendritic cells. White patients who did not achieve a pCR demonstrated significantly higher common myeloid progenitor cells ($log_2FC = –1.03$, adj. p = 0.039), stroma, and endothelial cells.

Conclusion: BluePrint Basal-Type tumors demonstrate immune-active transcriptional profiles associated with NCT response across race, highlighting both shared and race-specific biological mechanisms of response. MammaPrint Index, age, and platinum-containing regimens remained significant variables associated with achieving pCR when accounting for clinical features, while race did not. Although self-reported race was not independently associated with pCR, the notably higher pCR rates observed among LA patients and the differences in WTA across racial groups highlight potential underlying biological or treatment response mechanisms that warrant further investigation in larger, racially diverse cohorts. Future analyses should also investigate WTA differences between patients achieving pCR and no pCR across different age groups to further understand the interaction between tumor biology, immune activation, and age-related factors influencing NCT response.

Table: Univariate and Multivariate Logistic Regression for the Association of Clinical Variable with Achieving pCR among BluePrint Basal-Type Breast Cancer

Variable	Category	Univariate OR (95% CI)	p-value	Multivariate OR (95% CI)	p-value
MammaPrint Index	Continuous variable (n = 451)	0.12 (0.035–0.38)	**<0.001**	0.13 (0.036–0.44)	**0.0016**
Age	Continuous variable (n = 451)	0.98 (0.96–0.99)	**<0.001**	0.98 (0.97–1.00)	**0.048**
Self-reported Race/Ethnicity	White (n = 306)	reference	-	-	**-**
	Black (n = 81)	1.18 (0.72–1.93)	0.51	1.15 (0.68–1.95)	0.61
	Latin American (n = 64)	1.95 (1.13–3.41)	**0.017**	1.53 (0.86–2.76)	0.15
Clinical Subtype	HR+HER2- (n = 116)	reference	-	-	-
	HR-HER2+ (n = 20)	1.20 (0.50–2.80)	0.68	1.04 (0.40–2.65)	0.93
	TNBC (n = 275)	1.67 (1.09–2.57)	**0.019**	1.54 (0.97–2.46)	0.067
	Other/Unknown (n = 40)	1.00 (0.37–2.56)	0.99	0.95 (0.34–2.56)	0.92
Neoadjuvant Chemotherapy	TC/Taxanes/Other (n = 70)	reference	-	-	
	AC-T (n = 160)	1.33 (0.73–2.46)	0.36	1.16 (0.61–2.22)	0.66
	Platinum containing (n = 221)	3.21 (1.83–5.81)	**<0.001**	2.76 (1.51–5.16)	**0.0012**

1051 - Disparities in Mammography Screening in a Welfare-State Healthcare System: Data from 100,000 Women in Israel

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Background/Objective: Breast cancer is the most common malignancy among women in Israel and globally. Although early detection significantly improves prognosis, 30% of women in Israel are diagnosed at a locally advanced or metastatic stage. In the early 1990s, Israel implemented a national breast cancer screening program, offering biennial mammograms at no cost to women aged 50 and older at average risk. Such organized programs, which provide free and accessible mammography, have been shown to improve adherence rates. Despite this, a substantial proportion of women do not participate in regular screening. Our objective was to evaluate adherence to national mammography

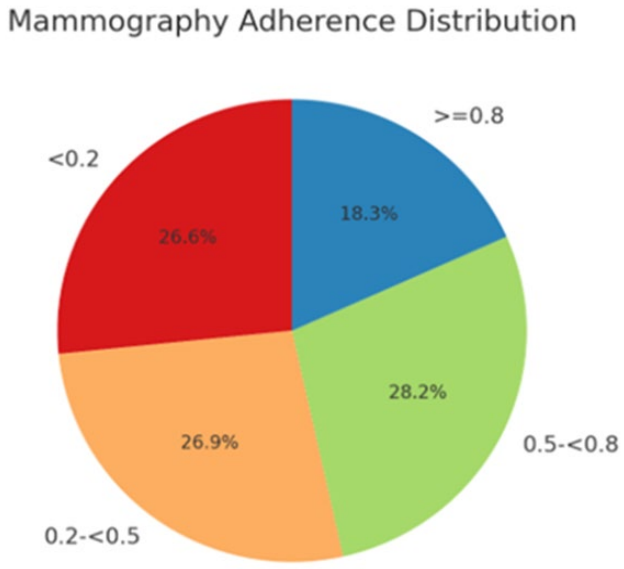
screening guidelines among Israeli women and identify sociodemographic and clinical factors associated with adherence.

Methods: We conducted a retrospective cohort study using Clalit Health Services' central database. A random sample of 100,000 women aged 45–75 years was followed from 2006–2020. Women with prior breast cancer, breast surgery, or known predisposing genetic mutations were excluded. Adherence was calculated monthly based on 24-month screening intervals and expressed as an adherence index, categorized as poor (<0.2), low (0.2–<0.5), moderate (0.5–<0.8), and full (≥0.8). Associations with sociodemographic, clinical, and preventive health behaviors were analyzed.

Results: A total of 95,603 women met inclusion criteria. Adherence was poor in 26.6%, low in 26.9%, moderate in 28.2%, and full in 18.3%. Higher adherence was associated with younger entry age, central residence, and Arab versus ultra-Orthodox affiliation. In contrast, lower adherence correlated with peripheral residence and higher religiosity. Clinical factors such as obesity, diabetes, hypertension, depression, and dementia were more common among poorly adherent women. Engagement in other preventive services (Pap smear, influenza and pneumococcal vaccination, colorectal screening) strongly clustered with mammography adherence. Mortality was substantially lower in the highest adherence group (3.8%) compared with the lowest (43.2%; p<0.0001).

Conclusion: In this nationwide cohort of nearly 100,000 Israeli women, substantial disparities in mammography adherence persisted despite universal coverage and organized outreach. Screening behavior reflected not only access but also sociodemographic, cultural, and clinical determinants, and clustered with other preventive health practices. Identifying high-risk subgroups offers opportunities for targeted, culturally tailored interventions to reduce inequities and improve early breast cancer detection.

Figure:



Genetics

1475 - Clinicopathologic Characteristics and Treatment Differences in Patients with Genomic Assay Scores within an Invasive Lobular Cancer Single-Institution Database

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Background/Objective: Invasive lobular carcinoma (ILC) represents the second most common type of invasive breast cancer and encompasses roughly 10-15% of all invasive breast tumors. However, unlike invasive ductal carcinoma (IDC), ILC has a lower response rate to chemotherapy (CTX), likely because it tends to have lower proliferation rates and high prevalence of hormone receptor positive and human epidermal growth factor receptor (HER) 2 negative status. It is molecularly distinct and presents with a low expression of the E-cadherin protein and is thought to play a role in treatment resistance. Genomic assays such as MammaPrint (MP) and Oncotype DX Recurrence Score (RS) are used to guide decisions regarding adjuvant chemotherapy as they are prognostic and can help predict response to chemotherapy. The use of genomic assays in ILC is not well studied. We investigated the use of genomic assays, the prevalence of genomic high risk in patients with ILC, and factors associated with genomic high risk.

Methods: Data were obtained from a prospectively maintained institutional ILC database. We evaluated clinicopathologic and treatment characteristics including age, tumor grade, receptor subtype, tumor size, and chemotherapy use in patients diagnosed with ILC and categorized as genomic high versus low risk. Genomic risk was defined using either MP or RS assays as either being high risk (HR) or low risk (LR). MP HR was defined as an index from 0 to 1 and LR as –1 to 0. RS HR was defined as a score >25 and a LR <25. Patients were classified as genomic HR if they met the HR criterion for either assay. Continuous variables were compared using the Wilcoxon rank-sum test, and categorical variables were analyzed using Fisher's exact test.

Results: Of 999 patients in the study cohort, 439 (44%) underwent genomic testing with MammaPrint score and/or Oncotype DX Recurrence Score. 190 (43%) patients had MP results and 274 (62%) patients had RS results. Among those with MP, 62 (33%) were HR and 128 (67%) were LR. Among RS, 26 (9%) were HR and 248 (91%) were LR. In total, 88 (19%) patients were considered HR by either assay, and 376 (81%) were considered LR. When comparing patients with genomic high versus genomic low tumors, we found the following differences. Genomic HR status was significantly associated with older age ($p<0.001$) and higher tumor grade ($p<0.001$). Interestingly, among MP tested patients, HR status was not associated with age. However, among RS tested patients, those with HR score were significantly older than those with LR score (60 years versus 54, $p<0.05$). Most tumors were grade 2 throughout the study cohort. Most patients considered at HR had the receptor subtype of ER+/PR+/HER2- (75%, $p=0.3$). Similarly, both MP groups mostly had ER+/PR+/HER2- receptor subtypes (63% versus 69%, $p=0.11$) however, the proportion of this subtype was different in RS HR and LR groups (42% versus 84%, $p<0.001$). Among RS HR patients, 31% ($p<0.001$) were ER +/PR-/HER2-. Tumor size did not differ throughout the study cohort. Most patients at genomic HR had CTX (86%, $p<0.001$), similarly, among MP

patients, most HR patients received CTX compared to LR (74% versus 27%, p<0.001). In contrast, most patients in the RS HR received CTX (75%) whereas most RS LR patients did not (76%, p<0.001). There were no significant differences noted in recurrence free survival comparing patients within the genomically high risk group that received chemotherapy or not (p=0.68).

Conclusion: Within this database, 439 patients had genomic data available and 88 of those were considered genomic high risk with associated genomic assay data represented by either MammaPrint or Oncotype DX assays. Of those considered genomic high risk, we found that there were statistical differences with patient age, tumor grade, and receiving chemotherapy. Although not statistically significant, most genomic HR patients were found to have a receptor subtype of ER+/PR+/HER2- albeit with different proportions seen in the RS LR group. We were unable to demonstrate improved recurrence free survival with the addition of chemotherapy in the genomic high risk patients in this cohort; this could reflect lack of chemotherapy benefit, but also could reflect small sample size. Further work is needed to identify predictors of chemotherapy responsiveness and how to best evaluate the utility of implementing genomic assay information in a clinical setting for treatment guidance within an ILC population.

1438 - Incorporating Certified Genetic Counselors into Multidisciplinary Clinics for Newly Diagnosed Breast Cancer Patients Improves Uptake of Genetic Evaluation and Testing

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Background/Objective: The diagnosis and treatment of breast cancer has developed into a complex field that has been shown to be enhanced by the cooperative participation of a multidisciplinary group of physicians. This has led to the creation of multidisciplinary tumor boards and clinics across the United States. An integral component of modern breast cancer care is genetic evaluation and testing, which can unfortunately become an afterthought in some clinical situations. However, Gomez et.al noted rates of appropriate genetic referrals have been reported to be higher in the multi-disciplinary setting. Additionally, there are data to support high genetic testing rates among patients who are referred for consultation with a certified genetic counselor. We hypothesized that the uptake of certified genetic counselor evaluation and testing in newly diagnosed breast cancer patients would be higher for those seen in multidisciplinary clinics (MDC) versus those seen in individual provider clinics (IPC).

Methods: This is a single center retrospective analysis, performed through the evaluation of medical records of newly diagnosed breast cancer patients seen in MDC and IPC, at a private non-profit tertiary medical center in Illinois, from November 2022 to March 2023. Patients were separated into MDC and IPC groups and then designated as invasive breast carcinoma or ductal carcinoma in situ (DCIS). We then evaluated if the patient met the 2023 NCCN criteria for genetic referral. If the patient was seen at an IPC, they received a referral order to follow up with a certified genetic counselor at a later date. However, if the patient was seen at MDC, a certified genetic counselor was available for consultation at the time of the visit. We also assessed if the patient agreed to genetic counseling, genetic testing, and the genetic testing results. A chi-square test was used for statistical analysis with significance set at P <

0.05. The remaining data subset was descriptively reported as numbers and percentages for categorical variables.

Results: We identified 195 patients diagnosed with invasive breast carcinoma or DCIS. We excluded patients who were lost to follow up, pursued palliative care, or expired shortly after initial consultation. Of the remaining 185 patients, 92 patients were seen in IPC, and 93 patients were seen in MDC. Of these, 141 patients met criteria for genetic testing with 61 being IPC patients and 80 being MDC patients. Overall, 73 (91.3%) of MDC patients who met genetic counseling criteria agreed to be seen versus 47 (77%) of patients in the IPC ($P < 0.05$). After genetic consultation with a certified genetic counselor, 103 patients completed genetic testing with 43 (91.5%) patients being initially seen in IPC and 60 (82.2%) patients being seen in MDC; no p-value was able to be reported due to low sample size. Of the patients who completed genetic testing, 16 patients were found to have pathogenic and likely pathogenic variants, 9 in the IPC group, and 7 in the MDC group. Given that the population of our MDC is overwhelmingly made up of invasive cancers and the majority of DCIS patients were seen in IPC, we also looked at patients with a diagnosis of invasive carcinoma only. 152 patients were diagnosed with invasive carcinoma, with 59 patients seen in IPC and 93 patients seen in MDC. Of the 152 patients with invasive carcinoma, 117 met criteria for genetic testing with 37 IPC patients and 80 MDC patients. Among invasive cancers, 73 (91.3%) of MDC patients who met genetic counseling criteria agreed to an appointment with a certified genetic counselor versus 30 (81.1%) of patients in the IPC, reflecting similar trends in uptake of counseling when compared to the group of both invasive carcinoma and DCIS. The mean age of the patients who met criteria for testing was 63 years (SD=12.5), consisting of 58 (40.1%) black and 77 (54.2%) white patients with 7 patients reporting "other". No demographic differences were identified between MDC and IPC.

Conclusion: Our study confirmed our hypothesis that the uptake of certified genetic counselor evaluation and testing in newly diagnosed breast cancer patients would be higher for those seen in MDC versus those seen in IPC. Others have looked at genetic counseling referrals before and after implementation of MDC with similar results. However, the increased rates in these studies could have been due to increased provider awareness. Taking into account our clinical setting, we are assessing the same group of multidisciplinary physicians and staff making referrals out of both MDC and IPC. Therefore, this study highlights the benefits of close proximity with embedded certified genetic counselors, in addition to awareness to ensure high rates of completed genetic counseling. Childers et al noted that fewer than 1 in 5 individuals with breast cancer who met National Comprehensive Cancer Network (NCCN) criteria for genetic testing have undergone evaluation, underscoring the need for change. We would advocate for expanding MDC with certified genetic counselors to accommodate larger volumes of newly diagnosed cancer patients and to bolster the goal of comprehensive cancer care. This would increase access, awareness, and convenience of certified genetic counseling.

1396 - Characteristics and Genetic Testing Result of Veterans Evaluated in National High-Risk Breast Clinic within a Veterans Health Administration

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City, UT, [6]Baylor College of Medicine, Houston, TX, [7]Duke Cancer Institute; Duke University Medical Center, Durham, NC

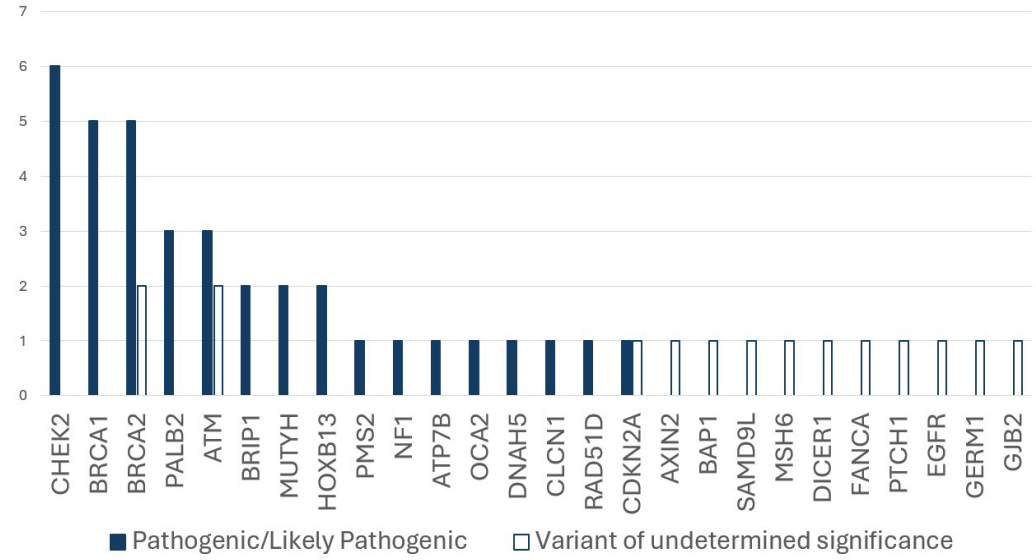
Background/Objective: Genetic evaluation of hereditary breast and related cancers has become an essential component of risk assessment and clinical management. However, limited data exist describing the genetic landscape of high-risk breast cancer patients within the Veterans Health Administration (VHA). Part of the VHA National Tele-Oncology (NTO) is the Breast and Gynecologic Oncology System of Excellence (BGSoE), a multidisciplinary network providing gold standard cancer care for Veterans diagnosed with breast and gynecologic malignancies. NTO High Risk Breast Clinic provides care to the Veterans across the country via telemedicine. Using data from the BGSoE, this descriptive study characterizes the prevalence and distribution of pathogenic variants and variants of uncertain significance among patients who underwent hereditary cancer genetic testing in the VHA.

Methods: BGSoE dashboard, which is a prospectively maintained database, was queried from initiation of the High-Risk Breast Clinic, May 2023 to September 2025 for patients referred and seen in NTO High Risk Breast Clinic. Veterans who met the criteria for genetic testing and agreed to undergo testing completed multigene panel testing. High-risk criteria included personal or family history of early-onset or multiple primary cancers and alignment with National Comprehensive Cancer Network hereditary cancer testing guidelines. Patient demographic and genetic testing results were retrospectively reviewed. Variants were classified as pathogenic/likely pathogenic or variants of uncertain significance (VUS) per American College of Medical Genetics and Genomics and Association for Molecular Pathology guidelines criteria. Descriptive statistics were used to summarize gene distribution and variant frequency.

Results: The study included 562 Veterans, with 67.3% (n=378) in urban settings, 31.9% (n=179) rural, and 0.9% (n=5) highly rural. 363 patients self-reported as white (64.6%), followed by 117 Black (20.8%), 60 (10.7%) declined to answer/no answer/unknown. Of these patients, 279 underwent multigene panel testing. 31 patients (11.1%) were found to have pathogenic or likely pathogenic variants, 103 (36.9%) patients with VUS and 142 (50.9%) negative results. A total of 36 pathogenic variants and 17 VUS were identified across multiple hereditary cancer-associated genes. Pathogenic/Likely Pathogenic Variants noted were CHEK2 (n=6), BRCA2 (n=5), BRCA1 (n=5), PALB2 (n=3), ATM (n=3), BRIP1 (n=2), MUTYH (n=2), HOXB13 (n=2), PMS2 (n=1), NF1 (n=1,) ATP7B (n=1), OCA2 (n=1), DNAH5 (n=1), CLCN1 (n=1), RAD51D (n=1), CDKN2A (n=1) (Figure 1). Several patients carried multiple variants, highlighting the genetic heterogeneity within this cohort. The most frequent findings involved CHEK2, BRCA1/2, PALB2, and ATM. Patients were appropriately counseled for pathogenic variants not implicated in breast cancer development.

Conclusion: This study characterized the Veterans seen in NTO High Risk Clinic and demonstrates a notable prevalence of pathogenic variants among high-risk patients undergoing genetic testing in a VHA. The diversity of detected variants-including mutations in DNA repair, mismatch repair, and tumor suppressor genes-underscores the value of broad multigene panel testing in identifying clinically actionable findings. The detection of both common (BRCA1/2, CHEK2) and less frequent pathogenic variants (e.g., BRIP1, HOXB13, CDKN2A) supports individualized management strategies and ongoing genetic counseling integration within multidisciplinary breast care models. Further research is warranted to assess outcomes including rate of breast cancer development, uptake of risk reduction strategies, family cascade testing rates, in this unique population.

Figure:



1395 - Breast Atypia vs Breast Cancer-Related Germline Genetic Mutations: A Comparative Study of Clinical Outcomes

Jennifer Plichta[1], Maya Blasingame[2], Samantha Thomas[3], Ebunoluwa Olunuga[1], Ton Wang[4], Akiko Chiba[4], Maya Blasingame[2]

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Background/Objective: Breast atypia and breast cancer-related germline genetic mutations both confer elevated lifetime breast cancer risk, but they likely differ in degree of risk, management, and outcomes. Despite their shared high-risk classification, few studies have directly compared these two populations and potential differences. This study aims to characterize the similarities and differences in breast cancer incidence, clinical outcomes, and uptake of risk-reducing strategies between these two groups. We hypothesize that breast atypia may be similar to some moderate penetrance germline genetic mutations, in terms of breast cancer incidence, management strategies, and outcomes.

Methods: Patients with breast cancer-related germline genetic mutations and/or those diagnosed with breast atypia were retrospectively selected from a single academic institution's database. Germline genetic mutations included BRCA1/2, non-BRCA high penetrance (CDH1, PALB2, PTEN, STK11, TP53), and moderate penetrance (ATM, BARD1, CHEK2, NF1, RAD51C, RAD51D). Atypia included atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), and lobular carcinoma in situ (LCIS). Patients with both were classified as mutation carriers. Those with atypia and prior breast cancer were excluded. All mutation carriers were included, regardless of timing of breast cancer diagnosis. Time to breast cancer was defined as time from genetic testing or atypia diagnosis to breast cancer diagnosis. Differences

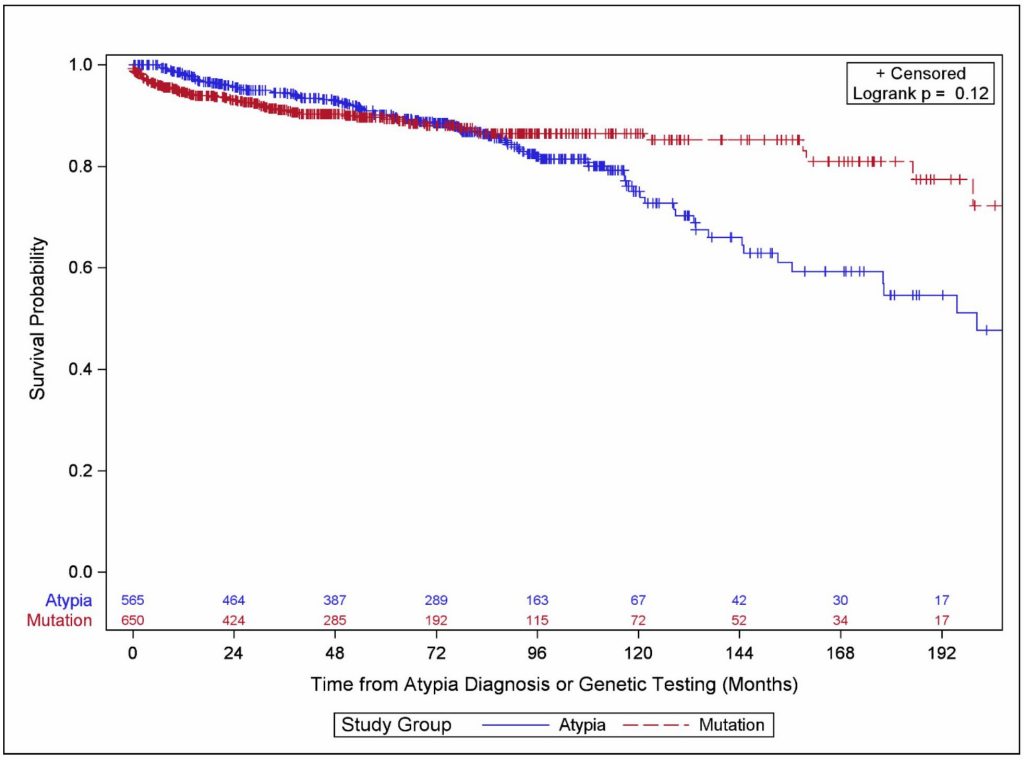
were analyzed using Chi-square/Fisher's exact tests and t-tests. Disease-free survival (DFS) was estimated with Kaplan-Meier; log-rank tests compared groups.

Results: A total of 1,902 patients were included: 1,223 with germline genetic mutations (65.8% BRCA1/2, 9.6% non-BRCA high penetrance, 24.6% moderate penetrance) and 679 patients with breast atypia (75.3% ADH, 24.7% ALH/LCIS). The median followup for all patients was 64.2 months (95% CI 59.2-68.3). At the time of atypia or mutation diagnosis, patients with mutations were younger than those with atypia [median age 46 [IQR 36-58) vs 52 (IQR 46-60); p<0.001]. Compared to patients with atypia, those with mutations were more likely to undergo risk reducing mastectomies (8.8% vs 3.1%; p<0.001), which varied by risk factor (BRCA1/2 10.7%, moderate penetrance 6.0%, ALH/LCIS 3.6%, non-BRCA high penetrance 3.4%, ADH 2.9%; p<0.001).

Overall, patients with mutations were significantly more likely to develop breast cancer (50% vs atypia 13.8%; p<0.001), which again varied by risk factor (BRCA1/2 50.4%, non-BRCA high penetrance 60.7%, moderate penetrance 44.9%, ADH 14.9%, ALH/LCIS 10.7%; p<0.001), although this may partly reflect genetic testing being more commonly performed after a breast cancer diagnosis. Patients with mutations were also younger at the time of their breast cancer diagnosis [median age 45 (IQR 37-55) vs atypia 59.5 (IQR 52-67); p<0.001]. Amongst those with breast cancer, ER+ tumors were significantly more common among patients with atypia (ER+: 78.7% vs mutations 52.6%; p<0.001). Patients with atypia were also more likely to have stage 0-II disease (68.1% vs mutations 52.3%, p=0.02). There was no significant difference in time to breast cancer diagnosis (log-rank p=0.12), although some differences became more apparent with longer followup (Figure).

Conclusion: Patients with breast cancer–related mutations exhibited higher cancer incidence and more risk-reducing surgeries, while those with atypia were more often diagnosed with favorable (ER+) and early-stage disease. Contrary to our hypothesis, moderate penetrance mutation carriers had higher cancer incidence and surgery rates than atypia patients. However, patients with atypia demonstrated a more persistent long-term risk trajectory, which may be related to higher rates of risk reducing mastectomies for those with mutations and/or breast cancer being diagnosed at older ages for patients with atypia. These findings highlight the need for individualized, long-term surveillance strategies that address the distinct temporal risk profiles of both groups.

Figure. Unadjusted Time to Breast Cancer Diagnosis by Study Group



Study Group	Total	Event (%)	Cancer-Free Survival (95% CI)			
			12-Month	36-Month	60-Month	120-Month
Atypia	565	94 (16.6%)	0.982 (0.966-0.990)	0.945 (0.922-0.962)	0.902 (0.870-0.926)	0.751 (0.684-0.805)
Mutation	650	65 (10.0%)	0.947 (0.926-0.962)	0.911 (0.884-0.933)	0.893 (0.861-0.918)	0.865 (0.825-0.896)
Total	1215	159 (13.1%)	0.963 (0.951-0.973)	0.928 (0.910-0.942)	0.895 (0.873-0.913)	0.798 (0.758-0.833)

1361 - Treatment of BRCA-Associated Cancer in Elderly Women: Missed Opportunity for Screening and Prevention?

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Background/Objective: BRCA mutations are associated with a high lifetime risk of breast cancer with a cumulative risk to age 80 of approximately 60-80% and average age of diagnosis in the 40s. Prior studies looking at the clinical benefit of preventive mastectomy have historically focused on survival benefits and not on the avoidance of potentially morbid treatments. Most studies show that there is no demonstrated survival advantage of bilateral prophylactic mastectomies in BRCA mutation carriers age 60 and over. Treatment with chemotherapy can be considered an independent adverse outcome of BRCA-associated cancers. Our study evaluated elderly, BRCA-positive women diagnosed with breast cancer, to determine outcome related to receipt of chemotherapy and type of surgery.

Methods: This was an IRB-approved, retrospective review at a single academic medical center. The study included patients with BRCA associated breast cancers who were age 60 and over at the time of their diagnosis. Clinical-pathologic features and treatment patterns were evaluated. Fisher's exact test was used for subgroup comparisons of chemotherapy receipt and the Wilcoxon rank-sum test was used to compare median ages.

Results: We identified 28 women diagnosed with BRCA-associated breast cancer, 25 (89%) of these being invasive cancers. 18/28 (64%) women were aged 60-69, and 10/28 (36%) were 70 or older at diagnosis. 16/28 (57%) of patients were BRCA1 positive and 12/28 (43%) were BRCA2 positive. Overall, 12/28(42%) patients overall, and 12/25 (48%) patients with invasive cancer were treated with chemotherapy. For those with invasive cancer aged 60-69, 9/15 (60%) received treatment with chemotherapy, compared to only 3/10 (30%) women 70+ (p= 0.288). Overall, the median age of a patient receiving chemotherapy was 66 compared to age 70 for someone not receiving chemotherapy (p=0.11). Of BRCA1 patients, 7/13 (54%) received chemotherapy, compared to 5/12 (42%) of BRCA2 patients (p=0.8). There was no significant difference in the rate of chemotherapy based on receptor status. There was a trend toward women 60-69 undergoing mastectomy more frequently than those 70+, 10/18 (56%) vs. 4/10 (40%), but this did not reach statistical significance (p=0.69). The median age of patients who underwent mastectomy was lower, 64, compared to those who underwent breast-conserving surgery, age 69, (p=0.03). Notably, only 7/28 (25%) women in this cohort were aware of their BRCA mutation prior to their cancer diagnosis or were being screened as part of a high-risk screening program. An additional 3 were diagnosed with cancer upon initial high-risk screening immediately following a positive genetic test result, while 18/28 (64%) were unaware of their BRCA status until after their cancer diagnosis. Of the 18 women who were unaware of their BRCA status prior to their cancer diagnosis, 13 (72%) had a strong family history of breast and/or ovarian cancer meeting criteria to have genetic testing prior to their diagnosis.

Conclusion: In this small cohort, approximately half of older women with BRCA-associated cancer received treatment with chemotherapy. There was a trend showing women in their 60s were more likely to receive chemotherapy than women in their 70s, though this did not reach statistical significance. There was no statistically significant difference between BRCA mutation type or cancer receptor status and treatment with chemotherapy, but our study may be underpowered to detect such differences. We also observed that a majority of patients in this cohort were not tested for BRCA mutations prior to their cancer diagnoses, highlighting a gap in the utilization of genetic testing even in patients who have a strong family history of breast cancer. The finding that almost half of women in this cohort received chemotherapy as part of their treatment underscores another potential benefit of risk-reducing mastectomy in BRCA carriers-avoidance of treatment with chemotherapy. Notably, women in their 60s were more likely to undergo mastectomy for treatment of their breast cancer, suggesting that these women were able to tolerate more extensive surgery. This information can be useful when counseling older women, particularly those in their 60s, regarding the benefit of preventative surgery in avoiding potential treatment with chemotherapy associated with a cancer diagnosis. As life expectancy increases, careful consideration and offering of risk-reducing surgery should be considered in older women.

Table. Chemotherapy utilization by age group, BRCA mutation, and receptor status

Characteristic	Category	n	Chemo: Yes n (%)	Chemo: No n (%)	p-value
Age group	60–69	15	9 (60.0%)	6 (40.0%)	0.288
	70 and over	10	3 (30.0%)	7 (70.0%)	
BRCA subtype	BRCA1	13	7 (53.8%)	6 (46.2%)	0.835
	BRCA2	12	5 (41.7%)	7 (58.3%)	
Receptor type	HR+/HER2−	14	5 (35.7%)	9 (64.3%)	0.200
	Triple Negative	9	5 (55.6%)	4 (44.4%)	
	HER2+	2	2 (100.0%)	0 (0.0%)	

1269 - Evaluating Prophylactic Mastectomy in Non-Mutation Carriers with Intermediate-Risk Breast Factors: A Retrospective Cohort Analysis

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Background/Objective: Prophylactic mastectomies are well established for BRCA1/2 carriers, however, its role in women without pathogenic mutations but with strong family history or atypical hyperplasia remains unclear. This study aims to evaluate the efficacy and clinical rationale for prophylactic mastectomy in women with negative genetic testing for breast-related mutations but with intermediate-risk factors, such as family history or atypical biopsy findings. We hypothesized that such patients exhibit significantly elevated lifetime breast cancer risk despite negative genetic results, potentially supporting surgical risk reduction.

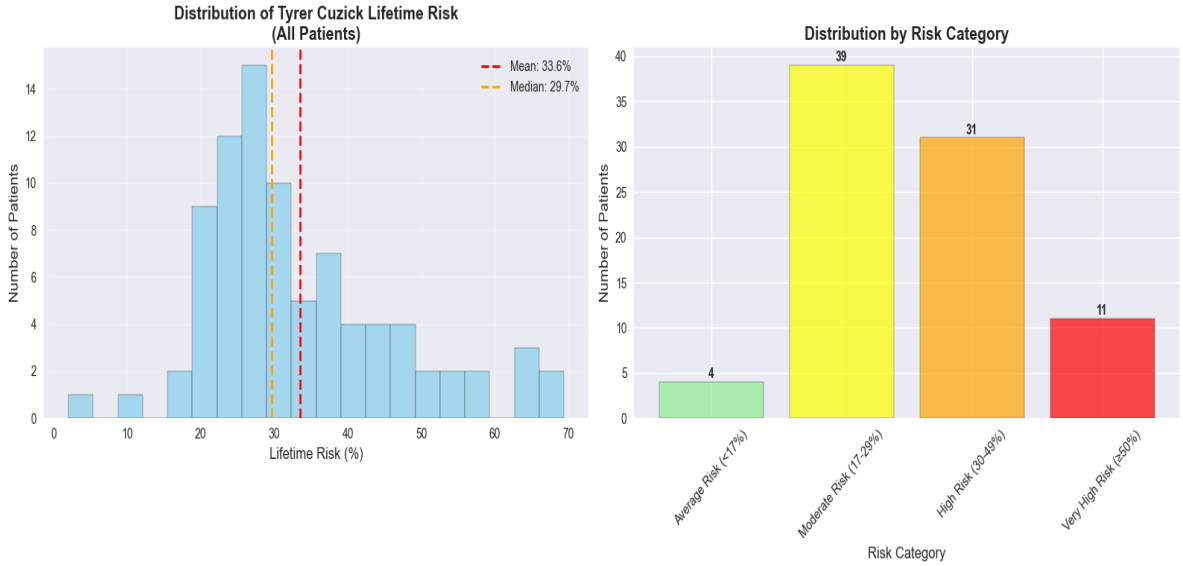
Methods: A retrospective cohort analysis was conducted of 91 women aged 23 to 80 years who underwent prophylactic mastectomy at a single institution breast surgery practice between 2017 and 2024. Inclusion criteria comprised negative genetic testing for BRCA1/2, CHEK2, and PALB2 mutations, coupled with a strong family history of breast cancer and/or histologic atypia (atypical ductal or lobular hyperplasia, or radial scar). Demographic data, clinical characteristics, and pathology findings were collected. Lifetime breast cancer risk was calculated using the Tyrer-Cuzick model and compared with population baselines using the Wilcoxon Signed-Rank Test.

Results: The study population was predominantly Caucasian (81.1%), with a mean age at first consultation of 48.2 years. Patients had an average of 2.1 pregnancies and 2.7 prior breast biopsies (ranging 1 to 16), underscoring a substantial surveillance burden before surgery. Pathologic review of combined surgical and biopsy findings identified atypical lobular hyperplasia as the most frequent incidental finding (46%), while radial scars were least common (14.2%). The mean and median Tyrer-Cuzick lifetime risk values were 33.6% and 29.7%, respectively. This was noted to be significantly higher

than both the general population baseline of 13% ($p < 0.001$) and the high-risk threshold of 20% ($p < 0.001$). These elevated risk scores persisted among women who were BRCA-negative yet had strong family histories or atypical findings, confirming their classification within higher-risk categories despite negative genetic results.

Conclusion: This study demonstrates evidence that women with negative breast cancer related genetic testing but with strong family history or atypical biopsy findings have significantly elevated lifetime breast cancer risk. For this intermediate-risk population, prophylactic mastectomy represents a reasonable and effective risk-reduction strategy when individualized risk assessment and patient preferences align. These patients face many logistical burdens from intensive surveillance protocols, and repeated imaging/biopsies. Beyond the quantitative risk, these patients also experience a substantial psychological burden of persistent anxiety surrounding potential malignancy. Prophylactic mastectomy, in this context, not only offers oncologic risk reduction but also provides psychological relief for appropriately selected individuals. These findings address a critical gap in prevention guidelines and underscore the need for more specific clinical frameworks that recognize the complex interplay between genetic, familial, and histologic risk factors. Risk stratification should extend beyond genetic testing alone to include these intermediate-risk groups, supporting a more personalized approach to breast cancer prevention and patient centered surgical decision making.

Figure:



1250 - Universal versus Guideline-Driven Germline Testing in Women with Breast Cancer: Have We Swung the Pendulum Too Far?

Jaime Alberty[1], Amy Jeng[2], Kseniya Roudakova[1], Kayla Velazquez[1], Kayla Velazquez[1]

[1]Kings County Hospital, NYC Health + Hospitals System, Brooklyn, NY, [2]South Brooklyn Health, NYC Health + Hospitals System, Brooklyn, NY

Background/Objective: In 2019, the Am Society of Breast Surgeons published a consensus statement recommending germline testing (GT) for all patients with a personal history of breast cancer (BC), in

response to concerns that strict adherence to National Comprehensive Cancer Network (NCCN) guidelines could be missing a large number of mutation carriers. At our community-based breast center, serving a mostly Black population, GT is offered to all patients with a personal history of BC. We wondered whether this universal testing (UT) approach in a historically under-tested population netted a higher yield of carrier identification, or if reverting to guideline adherence would prove to be comparable.

Methods: IRB approved, retrospective chart review was performed for all BC female patients without previous GT seen in a community breast center by breast surgeons and/or certified genetic counselors (CGC) from July 2024-October 2025. We evaluated pre-test counseling rates, testing uptake and results, pathogenic/likely pathogenic (P/LP) variant testing yields and NCCN criteria met.

Results: A total of 170 previously untested females with BC were evaluated (Table 1). Median age was 58 (range 25-85) and consisted of 94.1% non-Hispanic Black, 4.1% Hispanic, 1.2% Asian, and 0.6% non-Hispanic White (Ashkenazi Jewish). 100% of patients had documented pre-test counseling during which GT was offered, either by a breast surgeon or CGC. 23/170 (13.5%) declined GT. After counseling, 147 (86.5%) patients underwent GT. Overall testing yielded negative results in 99/147 (67.4%); 39/147 (26.5%) had a variant of uncertain significance (VUS) and 9/147 (6.1%) were found to carry a P/LP variant in actionable BC genes. Among the patients who underwent GT, 134/147 (91.2%) met one or more NCCN criteria, as per then-current guidelines. Most common criteria met were young age at diagnosis (≤50 years old), ≥1 close blood relative with breast/ovarian/pancreatic cancer history and triple-negative receptor status. There were 13 (8.8%) patients who underwent UT without meeting any NCCN criteria. One of these patients, a 53-year-old Black female with unilateral, hormone receptor positive ductal carcinoma in situ and no significant family history, tested positive for a BRCA2 heterozygous pathogenic mutation. In total, detection rate of P/LP variants was 6.0% (8/134) in those meeting NCCN criteria and 7.7% (1/13) in those who did not ($p = 0.58$, Fisher's exact test).

Conclusion: GT yielded 6.1% P/LP mutation carriers in our overall cohort, in line with published rates in the literature. Most of our overwhelmingly Black population ultimately met NCCN guidelines, possibly due to a younger demographic with a higher percentage of triple-negative tumor biology. Hence, UT only marginally increased the overall testing rate, identifying one additional BRCA2 carrier who would have been otherwise missed by guideline adherence. Given the small number of patients not meeting NCCN criteria, our study is underpowered to detect a statistical difference in detection yields between universal and guideline-driven approaches. Larger studies with more diverse cohorts are needed. In breast centers without CGCs or those lacking the infrastructure to undertake UT by surgeons, adhering to testing guidelines when making GT recommendations seems to be of comparable clinical utility.

TABLE 1:

Demographics		Counseled (%)	Tested (%)	
Total N=170		170 (100)	147 (86.5)	
Ethnicity				
Non-Hispanic Black		160 (94.1)	138 (93.8)	
Hispanic		7 (4.1)	7 (4.8)	
Asian		2 (1.2)	1 (0.7)	
Non-Hispanic White (AJ)		1 (0.6)	1 (0.7)	
	UT Cohort N = 147	**Met NCCN Guidelines** N = 134	**Did Not Meet NCCN Guidelines** N = 13	
GT Results				**p-value**[1]
Positive (P/LP variant)	9 (6.1)	8 (6.0)[1]	1 (7.7)[1]	**=0.58** (95% CI −16.8% to +13.3%)
Variant of Uncertain Significance	39 (26.6)	37 (27.6)	2 (15.4)	
Negative	99 (67.3)	89 (66.4)	10 (76.9)	
Most Common NCCN Criteria met:				
Age ≤50		40 (29.9)		
Family History ≥ 1 Close Relative		37 (27.6)		
TNBC		24 (17.9)		
Other[2]		33 (24.6)		

Key: AJ = Ashkenazi Jewish; GT = genetic testing; UT = universal testing; P/LP = pathogenic/likely pathogenic; TNBC = triple negative breast cancer; NCCN = National Comprehensive Cancer Network

1. Fisher's exact test comparing patients with positive GT results who met NCCN criteria versus patients who did not meet criteria

2. "Other" criteria met includes: Ashkenazi Jewish ancestry, ILC with personal or family history of gastric CA, >3 relatives with breast and/or prostate cancer, advanced treatment indications, and multiple primary breast cancers.

1200 - Racial Differences in Breast Cancer Predisposition Genes in the Mastery of Breast Surgery Registry

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Background/Objective: Although germline breast cancer predisposition genes have been studied in Caucasian, African American, Hispanic, and Asian/Pacific Islander populations, data remains limited for Arabic/Middle Eastern, Native American/Indian, and Indian patients. The Mastery of Breast Surgery® Program (MOBS), maintained by the American Society of Breast Surgeons (ASBrS), is a large surgeon-reported database that includes demographic and genetic testing data for such racial and ethnic groups. Our study aims to compare the differences in frequency and distribution of germline pathogenic and likely pathogenic (P/LP) breast cancer variants across Arabic/Middle Eastern, Native American/Indian, and Indian patients to the other groups within the MOBS registry.

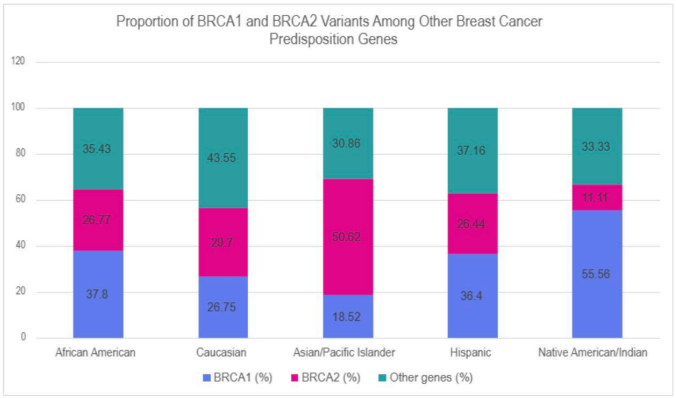
Methods: A retrospective review of the MOBS registry from inception to July 2021 was performed. Patient entries indicating testing results as "pending," "unknown," or "not done" were excluded.

Variables collected included demographics, testing status, and gene mutation results. P/LP mutations were categorized by gene and stratified by race/ethnicity. Chi-square and Fisher's exact test were used to compare differences in the frequency and distribution of P/LP variants across racial and ethnic groups documented in the registry.

Results: Among 167,302 registry patients, 20,273 had completed genetic testing with available results. Most tested patients were Caucasian (74.8%), followed by African American (10.4%), Hispanic (9.2%), and Asian/Pacific Islander (3.0%). Smaller cohorts included Arabic/Middle Eastern (0.6%), Native American/Indian (0.5%), and Indian (0.3%) patients. The proportion of patients who had genetic testing documented relative to the total registry population varied by race. Native American/Indian patients had the highest representation (25.5%), followed by Hispanic (17.4%), African American (12.9%), Arabic/Middle Eastern (12.9%), Caucasian (11.5%), Indian (10.4%), and Asian/Pacific Islander (10.0%). 3,047 patients (15.0%) had pathogenic or likely pathogenic (P/LP) variants. Across all groups, BRCA1 (24.3%) and BRCA2 (25.3%) were the most frequently identified mutations. The proportion of BRCA1 and BRCA2 variants among all breast-cancer predisposition mutations significantly differed among races (Figure 1). Notable examples include a higher proportion of BRCA1 in African American (37.8%) compared to Caucasian (26.8%, $p = 0.0009$) and Native American/Indian (55.6%) compared to Asian/Pacific Islander patients (18.5%, $p = 0.021$). Moreover, a higher proportion of BRCA2 was seen in Asian/Pacific Islander (50.6%) patients compared to Caucasian (29.7%, $p = 0.003$), African American (26.8%, $p = 0.0001$), Hispanic (26.4%, $p = 0.001$), and Native American/Indian (11.1%, $p = 0.021$). The proportion of CHEK2 variants was significantly ($p < 0.05$) higher in Arabic/Middle Eastern patients (18.8%) compared to African American (3.5%) and Asian/Pacific Islander (1.2%) patients, and in Caucasian (17.5%) compared to Hispanic (5.0%) and African American (3.5%) patients.

Conclusion: BRCA1 and BRCA2 mutations were the most frequently identified P/LP mutations across all racial and ethnic groups; however, the relative proportion of some mutations varied significantly by race, such as BRCA1 predominating in African American and Native American/Indian patients, BRCA2 in Asian/Pacific Islander patients, and CHEK2 in Arabic/Middle Eastern patients. This study is among the first to use the MOBS surgeon-reported registry to characterize racial and ethnic differences in germline genetic testing outcomes, capturing real-world genetic testing patterns in populations that are typically underrepresented. Furthermore, the differing representation of racial groups within the genetic testing subset suggests potential disparities in access to or uptake of testing that warrant further investigation. These findings underscore the importance of inclusive genetic testing and counseling to ensure equitable assessment of hereditary breast cancer risk.

Figure:



1151 - Survival Outcomes Following Neoadjuvant Chemotherapy in Breast Cancer Patients with Germline Pathogenic Variants: A Propensity-Matched Analysis

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Background/Objective: The expansion in germline genetic testing in patients with breast cancer has identified a growing subset of pathogenic variants (PVs) in breast cancer associated genes. While neoadjuvant chemotherapy (NAC) has been shown to facilitate breast-conserving surgery (BCS), data regarding surgical decision making and survival outcomes among gene mutation carriers remains limited and are essential in guiding patient counseling and shared decision making. Current NCCN guidelines support BCS and mastectomy as equivalent treatment options for most patients with early-stage breast cancer, including those with PVs. This study aims to evaluate treatment and survival outcomes following NAC in patients with PVs compared with sporadic breast cancer controls.

Methods: A retrospective cohort study identified patients who were treated with NAC between 2016-2023 using our institutional tumor registry. Patients with PVs in breast cancer-related genes were included. Propensity score matching was performed in a 1:1 ratio based on age, race, clinical stage, tumor subtype, and receptor status to identify controls. Demographic, clinicopathologic characteristics, genetic markers, treatment details, type of surgery (BCS or mastectomy), progression-free survival (PFS), and overall survival (OS) were collected. Outcomes following treatment including pathologic complete response (pCR) rate, PFS, and OS were compared between surgical groups (BCS vs mastectomy) in the study and control groups. Statistical analysis was conducted using nonparametric t-tests and Fisher's exact tests with $p < 0.05$ considered statistically significant. Overall survival was estimated using Kaplan-Meier analysis, and group differences were assessed using the log-rank test.

Results: Among 1,642 patients who underwent NAC during the study period, 126 (7.7%) carried germline PVs, and after propensity score matching, 126 sporadic controls were identified. The median age of patients with PVs and sporadic controls was 45 years (range: 23-76), with a median follow-up of 51 months (range: 9-116) and 44 months (range: 10-86), respectively.

Of the PV carriers, 112 (88.9%) patients underwent mastectomy and 14 (11.1%) underwent BCS. Among sporadic controls, 88 (69.8%) underwent mastectomy and 38 (30.2%) underwent BCS. Patients with younger age ($p<0.001$), higher clinical T category ($p<0.001$), and higher histologic grade ($p=0.048$) were more likely to undergo mastectomy. In the BCS PV group, one patient (7.1%) developed an ipsilateral second primary breast cancer.

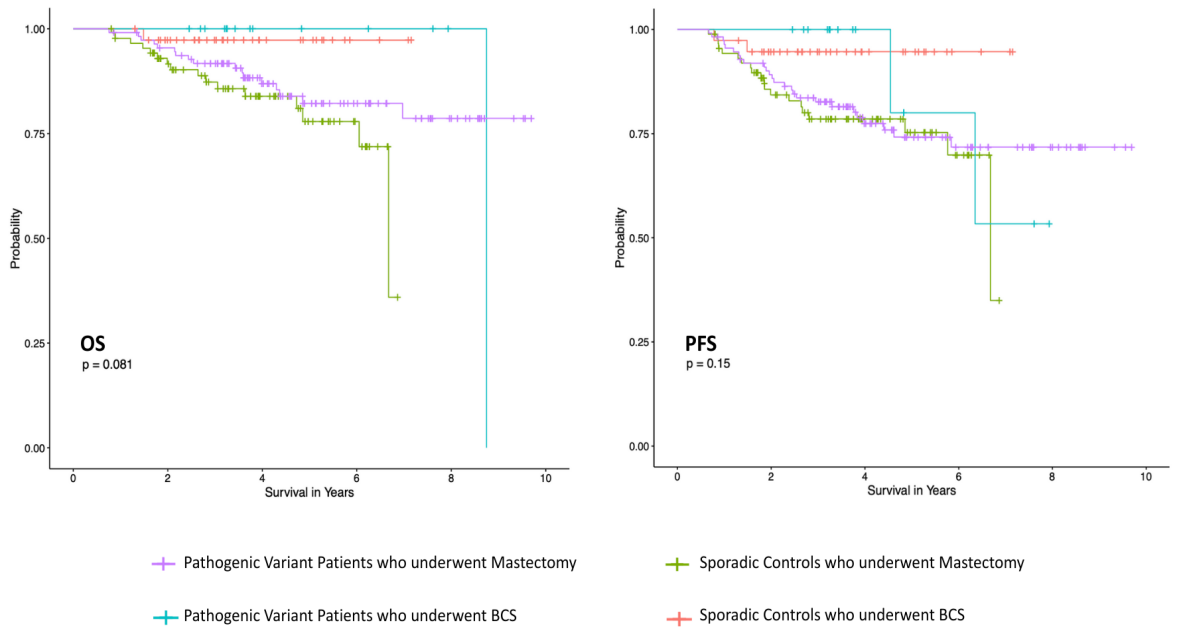
Mastectomy patients were more likely to undergo upfront axillary lymph node dissection, whereas the majority of BCS patients were able to downstage the axilla and undergo sentinel lymph node biopsy (SLNB) alone. SLNB alone was most commonly performed in the PV BCS group (n=13, 92.9%), followed by the sporadic BCS group (n=31, 81.6%), the PV mastectomy group (n=67, 59.8%), and the sporadic mastectomy group (n=52, 59.1%) ($p=0.009$).

Combined breast and axillary pCR rates were highest among the sporadic BCS group (n=24, 63.2%), followed by PV BCS group (n=7, 50.0%), the PV mastectomy group (n=43, 38.4%), and the sporadic mastectomy group (n=33, 37.5%) ($p=0.038$).

The median follow-up across the entire study population was 47 months (range: 9-116 months). No significant difference was observed in OS or PFS among the four groups at 1- and 2-year follow-up (p=0.081 and p=0.15, respectively; Figure 1).

Conclusion: Survival outcomes following BCS are comparable to mastectomy when comparing PV carriers to sporadic controls. These findings support existing NCCN guidelines regarding the use of both mastectomy and BCS as viable surgical options in breast cancer patients with a PV gene mutation undergoing NAC.

Figure 1: Overall Survival (OS) and Progression Free Survival (PFS) Post-NAC in Pathogenic Variant Carriers and Sporadic Controls Undergoing BCS vs. Mastectomy



1133 - Breast Conservation Is a Common Choice Among Individuals with CHEK2 Gene Mutation with Early-Stage Breast Cancer

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Background/Objective: This study investigated the relationship between CHEK2 gene mutation and the choice for breast conservation among individuals diagnosed with breast cancer. CHEK2 gene mutation occurs in 2.6% of breast cancer patients. CHEK2 gene mutation carries a 6-8% risk of contralateral breast disease. NCCN guidelines suggest breast conservation with close imaging surveillance is appropriate for patients with CHEK2 gene mutation diagnosed with breast cancer. Breast conservation is chosen by 64% of the general public in early-stage breast cancer. Stage IV disease is seen in approximately 7% of the general public at the time of diagnosis.

Methods: A review of individuals who underwent genetic testing from 2019 - 2024 at a tertiary care hospital breast program was performed using the Progeny Genetic software program and EPIC electronic medical records after approval by the Investigational Review Board was obtained. Individuals with breast cancer and CHEK2 gene mutation were reviewed for demographics, breast cancer biomarkers, staging, and choice of surgical procedure. Patients underwent genetic counselling and multidisciplinary consultations with treatment recommendations using NCCN guidelines.

Results: The breast center performed genetic testing on 4175 individuals during the study period. One hundred seventy-six (2.6%) individuals expressed a CHEK2 gene mutation, 22 males and 86 females. Thirty-six of the 86 females were recently diagnosed with breast cancer at the time of gene testing. No males had breast cancer at the time of testing. The average age at diagnosis was 56.8 years (24-86). A stage distribution revealed stage 0 –7 (19%), stage I-16 (45%), stage II-4, (11%), stage III- 2, (6%), and stage IV -7 (19%). Bio markers demonstrated that 32 (94%) were hormone positive, 9 (25%) were HER 2 positive, and 2 (5%) were triple-negative. Breast conservation was chosen in 21 (58%), mastectomy in 10 (28%) and no surgery in 5 (14%) with advanced disease. A Z test analysis was performed on percentage of patients choosing breast conservation and the percentage of patients presenting with Stage IV disease. The Z test demonstrated no statistical difference between patients choosing breast conservation with CHEK2 mutation (58%) and the general public choosing breast conservation (64%). However, there was a statistical significance between individuals with CHEK2 gene mutation presenting as stage IV (19 %) compared to the general public (7%).

Conclusion: This study demonstrated that the choice of breast conservation is common among individuals with CHEK2 gene mutations presenting with early-stage breast cancer. Earlier onset of breast cancer is seen in patients with CHEK2 gene mutation. Presentation of breast cancer at an advanced stage can also be seen in individuals with CHEK2 gene mutation. Future research is needed to delineate the specific variants of CHEK2 gene mutation to provide individual counseling regarding treatment options. Family history for breast cancer should trigger earlier genetic testing in individuals at risk.

1020 - Universal Genetic Testing in Female Breast Cancer Patients: An Avenue to Reduce Disparities in Breast Cancer Care

Sydney Miller[1], Jennifer Fieber[1], Andrea Riner[2], Christiana Shaw[1], Lisa Brown[3], Cecelia Hampson[1], Daniel Neal[1], Lisa Spiguel[1]

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Background/Objective: Routine use of genetic testing may guide personalized medicine and prompt cascade testing, as supported by the American Society of Breast Surgeons (ASBrS). We aimed to investigate the use of routine genetic testing, potential disparities in testing, and implications on surgical management in breast cancer patients.

Methods: A retrospective study of routine genetic testing in 470 female breast cancer patients diagnosed between January 1, 2019, and December 31, 2022, was performed. Demographic data, family history, genetic testing, P/LP variants, and surgical procedure were obtained from medical records. Fisher's exact and Mann-Whitney U tests were used to assess group differences.

Results: Over the 3-year study period, 429 patients (91.3%) were offered genetic testing. Those offered testing tended to be younger (mean age 61 vs. 69, p<.001), with no racial or ethnic disparities noted. 367 patients who were offered testing (86%) accepted to be tested. Older age was significantly associated with the decision to forgo testing (mean age 66 vs. 60 for those tested, p=.001), with no racial or ethnic disparities noted. (Table 1) 56 of the patients tested (15.2%) were identified as P/LP carriers, 25 (44.7%) of whom carried moderate or high-risk variants, and 31 of whom carried no or low-risk or variants. One patient carried a variant of uncertain significance (VUS). Of the patients with P/LP results, 22 underwent breast conservation (39%) and 34 received mastectomy (61%). No/low risk patients were more likely to choose BCT (57% vs. 16% among mod/high risk, p=.005), while patients undergoing mastectomy also tended to be younger (mean age 55 vs. 66 for BCT, p=.005). The BCT/mastectomy age gap was consistent among the no/low risk (BCT mean age 65 vs. 58, p=.1) and mod/high risk groups (70 vs. 54, p=.045). Of P/LP carriers who received mastectomy, 11/14 with high-risk variant pathology (79%) chose risk-reducing contralateral prophylactic mastectomy (CPM) while only 6/20 of those with no to moderate risk patients (30%) chose CPM (p=.015).

Conclusion: When offered, most patients complete genetic testing after a diagnosis of breast cancer, with the decision associated with younger age but not racial/ethnic disparities. Moderate and high-risk P/LP variants, as well as younger age, are associated with the decision to undergo mastectomy, with high-risk variants also associated with risk-reducing CPM. Routine offering of genetic testing per ASBrS guidelines can inform surgical treatment, surveillance and risk reduction. With no race or ethnic disparities in offering testing or receipt of testing, routine genetic testing and subsequent cascade testing has the potential to lessen the disparities gap in breast cancer care.

Table 1. Universal Genetic Testing in Breast Cancer Patients

	Testing Offered			Testing Acceptance		
	Offered (N=429, 91.3%)	Not Offered (N=41, 8.7%)	P-value	Accepted (N=367, 85.5%)	Not Accepted (N=62, 14.5%)	P-value
Age	60.6 (12.5); 62 [52,70] (22,87)	69.0 (11.3); 70 [60,78] (39,88)	.0001	59.8 (12.8); 62 [50,70] (22,87)	65.7 (9.1); 68 [58,72] (47,84)	.001
Race						
White	345 (92.0)	30 (8.0)		294 (85.2)	51 (14.8)	
Black	59 (88.1)	8 (11.9)		54 (91.5)	5 (8.5)	
Asian	15 (93.8)	1 (6.2)		12 (80.0)	3 (20.0)	
Other	8 (80.0)	2 (20.0)	.282	7 (87.5)	1 (12.5)	.476
Hispanic						
No	407 (91.3)	39 (8.7)		346 (85.0)	61 (15.0)	
Yes	22 (91.7)	2 (8.3)		21 (95.5)	1 (4.5)	
Yes	369 (93.2)	27 (6.8)	1	323 (87.5)	46 (12.5)	.226
Continuous variables presented as mean (SD); median [25p,75p] (range); categorical variables presented as N (row %); p-values are the results of Fisher's exact or Wilcoxon rank sum tests						

1019 - From DNA to Decision: The Synergy of Germline and Somatic Testing in Breast Cancer

Sarah Young[1], Emily Russell[1], Michelle Green[2], Erica Vaccari[1], Patsy Thompson[2], Daniel Pineda-Alvarez[1], Stephanie Hastings[2], Kyle Strickland[2], Taylor Jensen[2], Shakti Ramkissoon[2], Rebecca Previs[2], Marcela Canola[3]

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Background/Objective: Germline and somatic genetic testing can inform diagnosis, prognosis, and treatment decisions in breast cancer (BC). Variants in BRCA1/2 inform eligibility for poly (ADP-ribose) polymerase inhibitors (PARPi) while additional genes in the homologous recombination repair (HRR) pathway are being evaluated for their predictive utility in PARPi response. Integrating germline and somatic data offers a comprehensive view of tumor biology and supports personalized risk assessment for patients and their families. We illustrate the clinical benefits of paired germline and somatic testing in a real-world cohort of patients with BC who had evaluable results from both testing modalities.

Methods: Patients with BC receiving standard of care germline genetic testing (GGT) (Labcorp, formerly Invitae Corp.) and comprehensive genomic profiling (CGP) (Omniseq INSIGHT, Labcorp) between 2021-2024 were analyzed. Pathogenic germline variants (PGVs) were considered suggestive of driver mutations if they were 1) detected in the tumor and 2) had suggestive loss-of-heterozygosity (LOH) with a variant allele fraction (VAF) of ≥ 0.6, 3) had a second hit in the same gene, 4) had a second hit in the same gene OR 5) MSI-H/dMMR status in the setting of MMR PGV (MLH1, MSH2/EPCAM, MSH6, PMS2).

Results: 280 patients with BC underwent GGT and CGP: 98% female; 59% White; 16% Black/African American; mean (SD) age at GGT was 59.4 (14.2) years. 25/280 (8.9%) patients had 25 PGVs in 11 genes associated with autosomal dominant cancer predisposition (APC, ATM [3], BRCA1 [6], BRCA2 [2], BRIP1, CDKN2A, CHEK2 [3], MSH6, NF1 [2], PALB2 [3], PMS2 [2]). 6 (24%) of PGV+ patients would have been missed by CGP testing alone. Potentially therapeutically actionable germline and/or somatic variants were identified in 8 patients (32% of PGV+, 2.9% overall), with suggestive driver mutations identified in 6/8 of these patients (Table). Other clinical actionability of testing was also demonstrated for the remaining patients (Table).

Conclusion: These cases illustrate the synergistic value of combined germline and somatic testing in providing comprehensive workup of patients with breast cancer, including potential therapeutic and clinical trial eligibility, future cancer risk, and cascade testing.

Table. Clinical actionability of combined germline and somatic testing

Patient/ cancer	PGV gene(s)	Detected by CGP	Suggestive of driver mutation	Potential therapeutic actionability	Other clinical actionability		
					Clinical trial eligibility	Other cancer risks	Cascade testing/ familial risk
1	*APC*	Y[1]	N	N	N	Y	Y
2-4	*ATM*	Y, Y, N (variant type- intronic)	Y, Y (VAF 0.9, *ATM* loss reported), Unknown (variant not detected by CGP)	N	Y[2]	Y	Y
5-8	*BRCA1*	Y	Y (VAF >0.6 for all)	Y- PARPi	Y	Y	Y
9-10	*BRCA1*	N, N- variant type (deletion, intronic)	Unknown (variant not detected by CGP)	Y- PARPi	Y[3]	Y	Y
11-12	*BRCA2*	Y	Y (VAF 0.7)	Y- PARPi	Y	Y	Y
13	*BRIP1*	Y	N	N	Y	Y	Y
14	*CDKN2A*	N- variant type (non-coding)	Unknown (variant not detected by CGP)	N	N	Y	Y
15-17	*CHEK2*	Y, Y, N- reason unknown	Y (VAF 0.8), N, N, Unknown (variant not detected by CGP)	N	Y[2]	Y	Y
18	*MSH6*	Y	N (MSS)	N (MSS)	Y	Y	Y
19-20	*NF1*	Y	Y (VAF 0.8), N	N	Y	Y	Y
21-23	*PALB2*	Y	Y (VAF 0.8), N, N	N	Y[4]	Y	Y
24-25	*PMS2*	Y, N (CGP unable to disambiguate pseudogene)	N, N (MSS)	N, N (MSS)	Y[5]	Y	Y

Imaging

1430 - Residual Calcifications Are Not a Crime Punishable by Mastectomy

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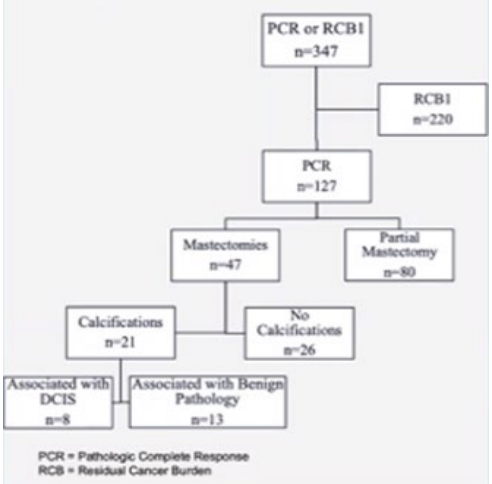
Background/Objective: More patients with breast cancer are undergoing neoadjuvant therapy as systemic therapy has evolved. Preoperative calcifications may decrease after neoadjuvant therapy. However, they often do not completely resolve. Current guidelines designate these residual calcifications on imaging as BIRADS 6 and require additional pathologic work up. We aim to investigate the prevalence of pathologic residual calcifications after neoadjuvant treatment.

Methods: This is a single institution retrospective cohort study from ISPY Clinical Trial between 2011-2022. The cohort comprised of breast cancer patients with initial pathologic calcifications who underwent neoadjuvant therapy and completed mastectomy with PCR. Clinicopathological features were collected. Primary outcome was prevalence of pathologic findings of residual calcifications.

Results: A total of 47 patients with breast cancer who completed neoadjuvant therapy and mastectomy with PCR were identified. 21 patients (44.7%) had calcifications on initial imaging associated with disease. Among the cohort with pathologic calcifications prior to neoadjuvant therapy, 62% (n=13) of calcifications were associated with benign findings and 38% (n=8) were associated with ductal carcinoma in situ (DCIS). Of those with calcifications associated with DCIS, 88% (n=7) had calcifications associated with both DCIS and benign findings and 12% (n=1) had calcifications associated with only DCIS. Among those with benign findings, all patients had calcifications associated with benign ducts (n=13) and 15.4% (n=2) were also associated with tumor bed.

Conclusion: In patients with PCR, most calcifications are associated with benign findings. Residual calcifications after neoadjuvant therapy are not always pathologic and should not be routinely classified as BIRADS 6. More studies are warranted to identify clinical and radiographic characteristics that can better predict pathologic versus benign residual calcifications.

Figure:



1171 - Role of Cone-Beam Breast CT in the Detection and Preoperative Evaluation of DCIS

Heather Richardson[1], David Bodne[2], Rich Reaver[3]

[1]Bedford Breast Center, Los Angeles, CA, [2]Piedmont Hospital, Atlanta, GA, [3]Painless Mammogram, Dallas, TX

Background/Objective: More than 80% of ductal carcinoma in situ (DCIS) cases are detected on mammography through the visualization of microcalcifications[1]. Prior to surgical treatment, many breast centers rely on breast MRI to assess the extent of disease. The combined use of mammography and MRI has guided DCIS treatment planning for decades[2, 3]. Cone Beam Breast CT (CBBCT) has been used in breast cancer diagnosis for a decade. CBBCT acquires images of the breast in the non-compressing prone position within 10 seconds, generating a high-resolution, three-dimensional reconstruction of the entire breast with the radiation dose safe and equivalent to diagnostic mammography exam. Patient comfort is markedly improved by the process[4]. This dual capability may substantially enhance the accuracy and efficiency of DCIS evaluation while reducing the overall burden of patient management.

Methods: Forty-one cases were retrospectively selected from previous CBBCT studies. Each case underwent mammography and non-contrast and/or contrast-enhanced CBBCT imaging within 4 weeks, depending on the patient's condition. All cases were pathologically confirmed as DCIS. The presence of calcifications was compared between mammography and non-contrast CBBCT to assess the agreement in calcification detection. Lesion sizes measured on CE-CBBCT were further compared with the corresponding pathological dimensions obtained from surgical specimens.

Results: Calcifications were identified on mammography in 33 of the 41 cases (80.5%). The presence of calcifications on mammography and CBBCT demonstrated almost-perfect agreement (Gwet's AC1 = 0.91; 95% CI: 0.83–0.98), indicating that non-contrast CBBCT possesses an equivalent capability for calcification detection compared with mammography in patients with DCIS. Fourteen lesions had size measurements available from both CE-CBBCT and pathological specimens. Preliminary analysis compared the largest lesion diameter measured on CE-CBBCT with that obtained from pathology. The mean lesion size was 2.35 ± 1.33 cm on CE-CBBCT and 2.13 ± 1.29 cm on pathology. The mean paired difference was 0.22 cm, which was not statistically significant (p = 0.38).

Conclusion: Our preliminary data suggests that CBBCT is a promising modality for detection and preoperative assessment of DCIS. Prospective, larger-scale studies are warranted to validate these results with sufficient statistical power. References 1. Grimm LJ, Rahbar H, Abdelmalak M, Hall AH, Ryser MD. Ductal Carcinoma in Situ: State-of-the-Art Review. *Radiology*. 2022;302(2):246-255. doi:10.1148/radiol.211839 2. Hwang ES, Kinkel K, Esserman LJ, Lu Y, Weidner N, Hylton NM. Magnetic resonance imaging in patients diagnosed with ductal carcinoma-in-situ: value in the diagnosis of residual disease, occult invasion, and multicentricity. *Ann Surg Oncol*. 2003;10(4):381-388. doi:10.1245/aso.2003.03.085 3. Kuhl CK, Schrading S, Bieling HB, et al. MRI for diagnosis of pure ductal carcinoma in situ: a prospective observational study. *Lancet*. 2007;370(9586):485-492. doi:10.1016/S0140-6736(07)61232-X.

Figure:

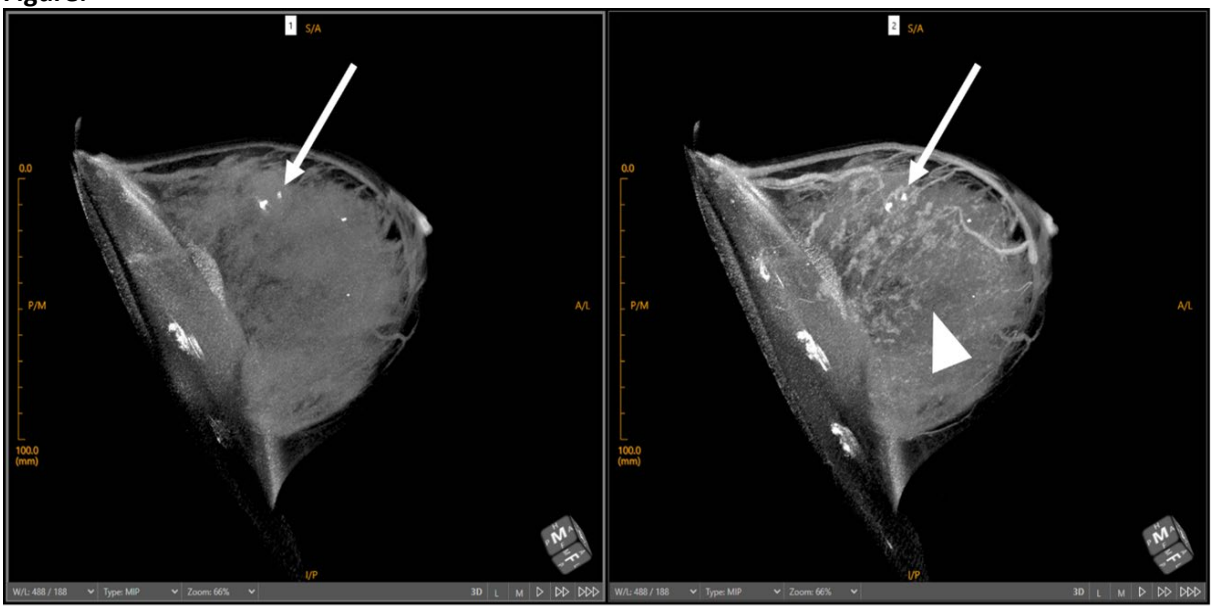


Figure 1. Non-contrast CBBCT (left) demonstrates a microcalcification cluster (arrow). Contrast-enhanced CBBCT (right) simultaneously reveals the calcification cluster and a regionally distributed non-mass enhancement. The enhancing area was pathologically confirmed as an 8 cm ductal carcinoma in situ (DCIS).

1103 - Imaging Overestimates the Local Extent of Breast Tumor After Neoadjuvant Chemotherapy

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Background/Objective: Over the last two decades, MRI has become an established modality in the diagnostic workup of breast cancers. In a prior publication from our institution, the mastectomy rate was 69% after neoadjuvant chemotherapy (NAC). The current study was performed to analyze the contribution of imaging to the mastectomy rate. The hypothesis was that post-NAC imaging overestimated the local extent of tumor in the breast in a significant proportion of patients and contributed to the selection of mastectomy as the definitive surgical procedure.

Methods: A retrospective analysis was performed at a large urban safety net medical center using a single-institution database that included clinical, radiographic, pathologic, and treatment parameters for 274 patients with newly diagnosed non-metastatic and non-inflammatory breast cancer treated with NAC from 2015 through 2023. The imaging characteristics after NAC, including size, extent of non-mass like enhancement (NME), multifocality and multicentricity, were compared to the tumor size on final pathology for patients who did not achieve a radiographic complete response after NAC and had a mastectomy. Imaging overcall and undercall were defined as a size on imaging > 1 cm either greater than or less than the final size on pathology, respectively. Statistical analyses were performed using SPSS v27.0 and Excel v16.102. The institutional review board approved the study.

Results: There were 120 patients who did not achieve radiographic complete response post NAC, of whom 86 had post-NAC MRI. The mean radiographic tumor size was 3.98 cm. There were 46 patients who had NME on MRI, the mean size of which was 4.83 cm. There were 20 patients with multifocal and 28 with multicentric disease. Table 1 describes the radiographic and pathologic T categories post-NAC for 120 patients. There were 21(17%) patients who had residual tumor on imaging, but the final path was ypT0 (false-positive imaging). When ypT=0, the mean radiographic T-size was 2.8 cm. When comparing the T size on post-NAC imaging versus final pathology, the correlation coefficient was 0.556. Radiographic assessment overcalled the final pathology tumor size by >1 cm in 48 (56%) of 86 MRI, 15 (44%) of 34 mammograms/ultrasounds when MRI was not done post-NAC, and in 63 (53%) of 120 patients overall. The rates of overcall > 1 cm were not significantly different according to tumor biomarker status or multi-focality/centricity of tumor, but they were significantly higher on post-NAC imaging for ycT2 (58%, p=0.007) and ycT3 (64%, p=0.003) versus ycT1 (43%, Ref.). Of 46 patients with NME, tumor size was overcalled by >1 cm in 29 (62%).

Conclusion: In this cohort of patients having mastectomy, 26% had T1 cancer on radiographic imaging post-NAC and could conceivably have been candidates for breast conservation surgery. Although there was radiographic downstaging on post-NAC imaging, the final pathology was overcalled by at least 1 cm in about one half of the patients. The larger the tumor on post-NAC imaging, the higher the rate of overcall > 1 cm. For the 21 patients where there was no residual disease on final pathology, the mean radiographic T-category was T2. These results cast uncertainty on the reliability of post-NAC imaging to guide the selection of the operative procedure.

Table 1. Radiographic and pathologic T-categories for 120 patients who did not achieve radiographic complete response post-NAC and had mastectomy.

T-categories	Radiographic	Pathologic (ypT)
T0		21
T1 (≤2.0 cm)	31	47
T2 (2.1-5.0 cm)	53	33
T3 (> 5cm)	36	19

1097 - Preoperative MRI for Pleomorphic Lobular Carcinoma In Situ: Implications for Surgical Management

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Background/Objective: Pleomorphic LCIS (PLCIS), a less common and more aggressive variant of classic lobular carcinoma in situ (CLCIS), has a significantly higher rate of upgrade to invasive lobular or ductal carcinoma on surgical excision compared to initial biopsy results. Unlike CLCIS, which is often mammographically occult, PLCIS more commonly presents with suspicious calcifications or as a mass. Conventional imaging like mammography and ultrasound may still underestimate the true extent of the

disease due to its non-mass-like enhancement pattern. MRI, with its superior sensitivity, may improve delineation of the full extent of the lesion.

Methods: After institutional review board approval, our institutional pathology database was searched for patients with pleomorphic LCIS diagnosed on core needle biopsy (CNB) between 2002 and present who underwent subsequent surgical excision. Utilization of preoperative MRI in this cohort was reviewed including recommendation for additional MRI guided biopsy based on findings. Radiologic and pathology findings were reviewed, and surgical and follow-up patient outcome data were obtained. Descriptive statistics with exact 95% confidence intervals were calculated for proportions. Fisher's exact test was used to assess associations between categorical variables. Bayesian logistic regression was employed to model the relationship between calcification size and malignant upgrade, providing probability estimates and credible intervals appropriate for sample size.

Results: Preoperative MRI utilization was nearly universal; 90.5% (19/21) of patients diagnosed with PLCIS on core needle biopsy underwent preoperative MRI imaging. Of those 57.9% (11/19) required an additional biopsy of which 72.7% (8/11) identified additional LCIS (PLCIS with or without CLCIS), 18.2% (2/11) were benign, and 9.1% (1/11) resulted in upgrade to malignancy. Mammographic presentation of PLCIS was represented by calcifications in 28.6% of patients, mass in 9.5% of patients, both (mass with associated calcifications) 28.6%, and neither in 33.3%. Of those presenting with calcifications, 41.7% (5/12) upgraded to malignancy at surgery. Calcification size demonstrated a positive association with malignant upgrade using Bayesian analysis (OR 1.32 per cm, 95% CrI: 0.68-2.97) with predicted upgrade probability increasing from 35% at 0.5 cm to 52% at 3.0 cm. MRI utilization was significantly associated with breast density, with all patients with dense breasts (category C and D) undergoing MRI compared to 60% with non-dense breasts (p=0.048, Fisher's exact test). The overall upgrade rate of PLCIS on core needle biopsy to malignancy at time of surgery is 42.9% (9/21).

Conclusion: Preoperative MRI utilization in patients diagnosed with PLCIS on core needle biopsy resulted in additional biopsies greater than 50% of the time but identified areas of invasion less than 10% of the time. The majority of subsequent MRI guided biopsies were benign and further identified the extent of the PLCIS. Thus, preoperative breast MRI may help to delineate extent of PLCIS but not necessarily identify areas of invasion. It's unclear if this is associated with decreased margin re-excision rate. Increasing calcification extent on mammography is associated with malignant upgrade. The overall upgrade rate of PLCIS diagnosed on core needle biopsy to malignancy at time of surgery was 42.9%, consistent with prior literature. PLCIS identified on core needle biopsy should be excised due to high upgrade rate, especially in patients presenting with larger areas of calcifications.

Table 1: Patient Characteristics, Imaging Findings, and Outcomes

Characteristics	n (%)	95% CI or Additional Detail
Breast Density Category		
B	5 (23.8)	MRI: 3/5 (60%)
C	14 (66.7)	MRI: 14/14 (100%)
D	2 (9.5)	MRI: 2/2 (100%)
Mammographic Presentation		
Calcification only	6 (28.6)	(11.3, 52.2)
Mass only	2 (9.5)	(1.2, 30.4)
Both	6 (28.6)	(11.3, 52.2)
Neither	7 (33.3)	(14.6, 56.9)
MRI Findings		
Preoperative MRI performed	19 (90.5)	(69.6, 98.8)
Additional biopsy required	11/19 (57.9)	(33.5, 79.7)
MRI Biopsy Pathology		
Malignant	1/11 (9.1)	(1.6, 37.7)
Benign	2/11 (18.2)	(5.1, 47.7)
LCIS	8/11 (72.7)	(43.4, 90.3)
Surgical outcomes		
Malignant upgrade	9/21 (42.9)	(21.8, 66.0)
Margin re-excision	4/18 (22.2)	(6.4, 47.6)
Calcification size*	Predicted Prob	95% CrI
0.5 cm	35.2%	(11.2,67.4)
1.0 cm	38.4%	(14.9, 67.2)
1.5 cm	42.1%	(17.5, 69.7)
2.0 cm	45.4%	(18.9,74.1)
3.0 cm	51.9%	(18.8,85.6)

MRI = magnetic resonance imaging;

* Bayesian logistic regression: OR 1.32 per cm (95% CrI: 0.68-2.97). Predicted probabilities and credible intervals based on n=12 patients with measurable calcification. All confidence intervals are exact 95% confidence intervals unless otherwise specified.

Dense breasts defined as categories C or D. Fisher's exact test: breast density and MRI utilization, p=0.048.

1087 - Toward Differentiating Carcinoma from Dense Breast Tissue for Enhanced Intra-Operative 3D Specimen Assessment with Spectral Micro-CT – A Feasibility Study

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Background/Objective: Accurately assessing surgical margins intra-operatively is important for avoiding re-excisions in breast-conserving surgery. Micro-CT specimen imaging has been developed for real-time true 3D (versus 2D or tomosynthesis) imaging of lumpectomy specimens with excellent contrast between carcinoma and adipose tissues. However, in micro-CT images cancerous and benign fibroglandular tissues have similar intensities, making it challenging to assess tumor extent and margin status for dense breast cases. Recent advancement in spectral CT shows promise of enhancing contrast between cancer and benign tissue. In this work, we evaluate the feasibility of spectral micro-CT for differentiating breast carcinoma and dense fibroglandular tissue.

Methods: Using a modified micro-CT imaging device, we collected standard and spectral micro-CT images from 20 fresh lumpectomy specimens. For each specimen, a breast pathologist selected a gross slice that contains tumor (invasive carcinoma, DCIS, or both) or scar tissue. We subsequently collected a large-format H&E-stained histopathology image from that selected slice. We then identified in micro-CT images the cross-sectional slice that corresponds to the histopathology section. An experienced micro-CT image reader correlated the standard and spectral CT images with the histopathology image qualitatively and quantitatively for tumor size measurement.

Results: Out of the 20 specimens, 16 specimens have tumor, and 4 have only scar tissues and no tumor. For the 16 cases with tumor, standard micro-CT overestimated the tumor size on average by 23%, whereas spectral micro-CT overestimated by 7.9%. For the 4 cases with no residual tumor, standard and spectral micro-CT showed average tumor sizes of 4.8 mm and 0.7 mm, respectively.

Conclusion: Spectral micro-CT has better correlation with histopathology qualitatively and quantitatively in tumor extent measurement than standard micro-CT due to improved differentiation of tumor and normal fibroglandular tissue. Spectral micro-CT shows the potential of further improving margin assessment accuracy during lumpectomy surgery.

Figure:

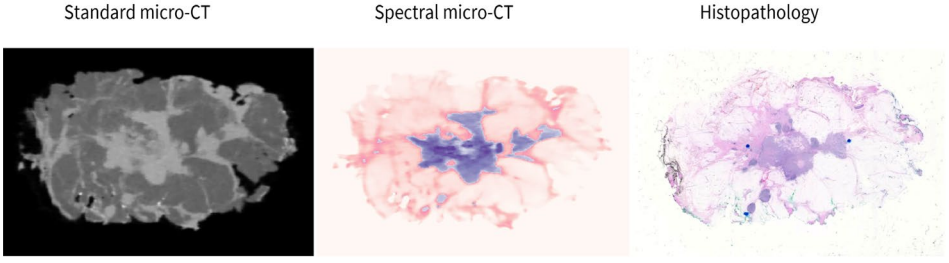

Figure 1. Comparison of standard micro-CT (left), spectral micro-CT (middle), and histopathology (right) image of a lumpectomy specimen with invasive ductal carcinoma within a matching cross-sectional plane. Spectral micro-CT shows enhanced tumor contrast correlated with histopathology.

1049 - Biopsies After Breast Cancer: Characteristics of Those Who Undergo Biopsy and Those Who Have Cancer

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Background/Objective: Breast cancer survivors carry an elevated risk of developing new primary or recurrent breast cancer while also having complicated surveillance imaging due to post-operative changes. This study aims to identify clinical and imaging factors associated with biopsy and evaluate predictors of malignancy on biopsy outcomes amongst breast cancer survivors.

Methods: An IRB- approved, retrospective chart review of female breast cancer survivors who underwent breast surgery from 2016-2023 at a single institution was performed. Patients were stratified on whether they received surveillance imaging at the study institution or elsewhere and further categorized based on whether imaging led to biopsy. Surveillance imaging was divided into 18 – month time intervals. Multivariable generalized estimating equations were used to identify factors associated with incidence of biopsy and malignancy. Symptoms were categorized as none, skin changes, palpable mass, pain, nipple abnormality, or other/multiple symptoms.

Results: Of 1088 patients who met inclusion criteria, 870 (80.0%) underwent surveillance imaging at the study institution and 218 (20.0%) were imaged elsewhere. Among patients imaged at the institution, 706 (81.1%) underwent lumpectomy and 164 (18.9%) underwent mastectomy. Final histopathologic evaluation revealed invasive ductal carcinoma in 628 patients (72.2%), ductal carcinoma in situ in 114 (13.1%), and invasive lobular carcinoma in 91 (10.5%). Median follow up for patients who underwent surveillance imaging was 56 months. A total of 219 biopsies were performed in 189 (21.7%) breast cancer survivors. Within 5 years, 22% had an image guided breast biopsy; 28% of these revealed malignancy. Biopsies occurred in the ipsilateral breast in 134 (62.6%) and in the contralateral breast in 80 (37.4%) patients with no significant association between malignancy and laterality (p=0.892). Seventy-eight patients underwent biopsy within 6-24 months post- surgery;78.2% (n=61) were benign and 21.8% (n=17) were malignant. Although the number of biopsies peaked within this interval, the proportion of malignant results increased with time since surgery. At 5 years, 19 patients underwent biopsies, with 42.1% (n=8) malignant. After 6.5 years, 23 patients underwent biopsy with 60.9% (n=14) malignant. Of 4249 surveillance episodes, 547 (12.9%) were associated with patient-reported symptoms. Symptomatic episodes significantly increased the likelihood of biopsy (RR= 2.73, 95% CI: 2.09, 3.58) and malignancy (p = 0.034). Biopsy rates were highest in those with a new palpable mass (RR=4.23 (95% CI 3.10, 5.79) or skin changes (RR=4.03; 95% CI 2.23, 7.35). Presence of palpable mass (RR=1.90; 95% CI 1.21, 2.98) was the only symptom significantly associated with malignancy at biopsy.

Conclusion: Compared to prior studies, our findings support known recurrence patterns but highlights the correlation of certain breast symptoms with likelihood of a malignant biopsy and thus reinforces the need for symptom-informed surveillance protocols. In addition, this study provides data that demonstrates that biopsies are recommended during the early phase of their surveillance more frequently and that early biopsies have a lower frequency of malignancy than those that are performed during the later phase of surveillance.

1039 - Spiculate Masses: Correlation of Nidus versus Spicules with Pathological Size of Breast Tumors

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Background/Objective: Spicules in breast tumors are thought to indicate desmoplastic reaction or malignancy. However, there is little recent research on whether spicules should be included as part of radiological measurement for spiculated breast masses. Hence, each radiologist will measure a spiculate mass differently. Previous publications have shown conflicting results on whether spicules should be included in the measurement. This is clinically relevant for surgical planning, determining scope of excision. We undertook a retrospective cohort study to determine whether measurement of the nidus or with inclusion of the spicules provide the better correlation with whole tumours size as measured on pathology.

Methods: We undertook a retrospective cohort study using data from the West of Scotland Breast Screening (WOSBS) database. The study included women aged 50-70, with spiculated mass on 2 or more imaging modalities (mammogram/tomogram/ultrasound/MRI) from 2019 to 2022 who had malignancy confirmed on core biopsy and had primary surgery. Patients who received neoadjuvant chemotherapy/hormonal therapy (nCT/HT) or had large volume biopsy (LVES) were excluded. The nidus and spicule sizes were measured by a specialist consultant breast radiographer for tomogram and mammogram. The maximal orthogonal diameter was recorded for MRI. The corresponding whole tumor size (WTS) and histological type was collected.

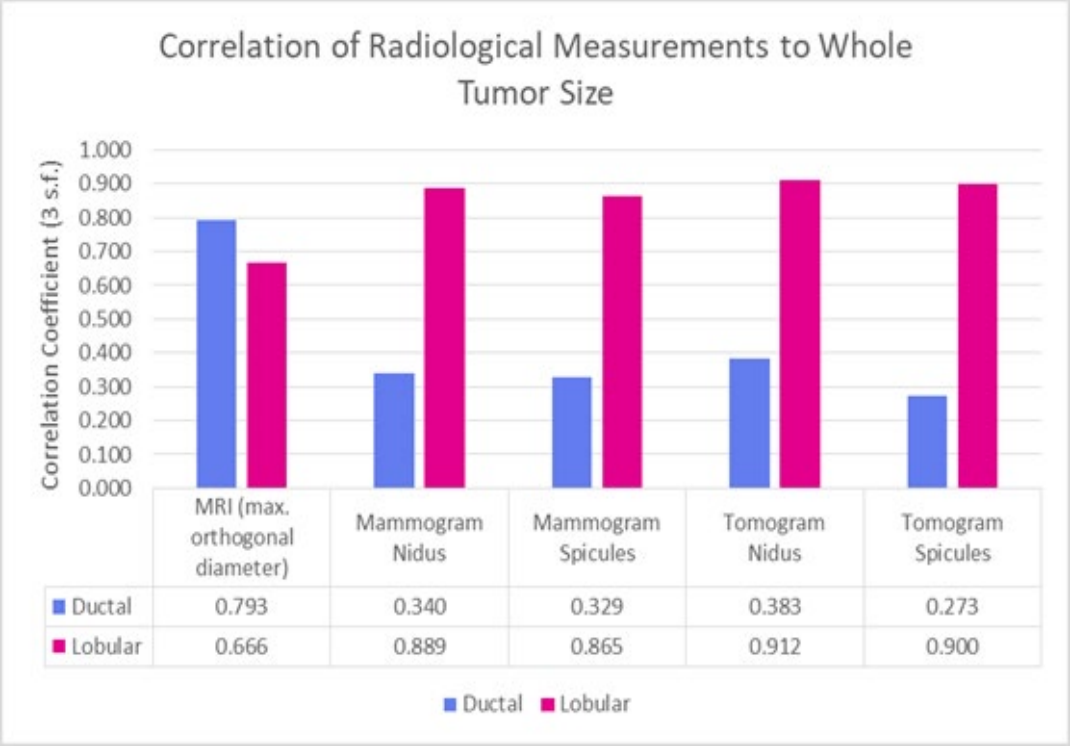
Results: A total of 160 spiculate masses were collected from 146 patients, after exclusions, this yielded 104 spiculate masses. Out of these, 104 spiculate masses had mammogram as well as tomogram, but only 28 had MRI as well. These were split into Lobular (n=17) and Ductal (n=87) cohorts. The nidus size and spicule size on each radiological modality was correlated against WTS, producing a correlation coefficient for both cohorts. Fisher's Z-transform was performed between each correlation coefficient to determine if there was a statistically significant difference.

Results were compared between each cohort (Ductal and Lobular) and each radiological modality (mammogram, tomogram, and MRI). The graph shows that the measurement of the nidus of a spiculated mass had higher correlation coefficients when correlated to WTS and Ductal cohorts, than the corresponding correlation for spicules to WTS in each cohort and radiological modality. The Ductal cohort overall had lower correlation coefficients to WTS across all radiological modalities, compared to Lobular cohort. The difference between correlation coefficients between Lobular and Ductal cohorts across mammogram and tomogram modalities was statistically significant ($p<0.001$). There was no statistically significant difference between correlation of spicule size to pathology versus nidus size to pathology between mammogram ($p=0.94$) and tomogram ($p=0.50$).

Conclusion: This study confirms that nidus of spiculate masses across radiological modalities most strongly correlates to WTS on pathology size, and that spicule size does not significantly contribute to WTS. The study also shows that while mammogram and tomogram closely predict WTS for lobular cancers, they are not accurate in measuring WTS for ductal cancers, and that MRI may be used in these

cases to improve accuracy in surgical planning. To our knowledge, this is the first study to compare spiculate masses between MRI, tomogram, and mammogram. However, consideration must be made to small sample size for MRI data, as well as the fact that only maximal orthogonal distance was taken on MRI as opposed to a nidus and spicule size. Further studies would benefit from a larger sample size on MRI.

Figure:



LRR

1466 - Surgical Management of In-Breast Recurrence with Completion Mastectomy versus Repeat Conserving Surgery: A Retrospective Study

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Background/Objective: Breast-conserving surgery (BCS) followed by adjuvant radiotherapy (RT) provides oncological outcomes equivalent to mastectomy for early breast cancer while offering advantages in morbidity, patient reported outcomes and quality of life. Salvage mastectomy remains the standard approach for ipsilateral in-breast tumour recurrence (IBTR) without metastasis. With advances in oncoplastic techniques and increasing feasibility of repeat RT, repeat BCS is emerging as a potential alternative. Recent meta-analyses suggest that repeat breast-conserving surgery (BCS) for treatment of

recurrence may produce similar oncological outcomes as salvage mastectomy for patients with appropriate tumour size, recurrence interval and biological behaviour provided they are deemed suitable for repeat RT. This study investigated both rates of repeat BCS and compared this with the number of patients who may have been eligible but were not offered it and patterns of further recurrence after second surgery.

Methods: This retrospective study evaluated all patients diagnosed with breast cancer recurrence in a single tertiary unit between 2000 and 2025. Patients were included if they initially underwent BCS and subsequently developed ipsilateral IBTR without distant metastasis. Data collected included type of surgery for recurrence (completion mastectomy or repeat BCS), age at diagnosis of recurrence, primary and recurrent tumour size, radiotherapy after initial and recurrent surgery, interval to recurrence, nodal status, lymphovascular invasion (LVI), and further recurrence during follow-up. The proportion of patients who would meet published eligibility criteria for repeat BCS was compared with the proportion who underwent the procedure.

Results: Of 396 patients with recurrence, 183 (46%) had undergone primary BCS and later developed ipsilateral IBTR. Time to recurrence ranged from 6 to 350 months. Twenty-eight (15.3%) underwent repeat BCS, while 155 (84.6%) had completion mastectomy. The mean age of the repeat BCS group was 49.94 (95% CI 44.91-54.96) and 53.4 (95% CI 50.74-56.23) in the completion mastectomy group. Mean recurrent tumour size was 23.6mm (95% CI 19.53-27.68) in the mastectomy group and 12mm (95% CI 9.15-14.85) in the repeat BCS group. Invasive ductal carcinoma/no special type was the most common sub-type in both cohorts. HER-2 positive disease was identified in 12 (7.7%) recurrences in the completion mastectomy group and 2 (7.1%) % in the repeat BCS group. LVI was present in 34 (22%) completion mastectomy and 4 (14%) of the BCS group tumours. Nodal positivity at re-operation was found in 10 (6.4%) patients after completion mastectomy and sentinel node biopsy and 2 (7.1%) after repeat BCS. Radiotherapy had been administered after initial BCS in 141/183 (77%) patients. After repeat BCS, 25/28 (89%) received radiotherapy; the remaining three required subsequent completion mastectomy for positive margins. Further recurrence occurred in 5/28 (17.8%) patients who underwent repeat BCS (three locoregional, two distant), with recurrence intervals of 5–33 months. Among the mastectomy group, 21/155 (13.5%) developed further recurrence, including dermal, chest wall, nodal, contralateral breast, lung, bone, and within DIEAP reconstruction. Adjuvant radiotherapy did not demonstrate a statistically significant protective effect against further recurrence. Based on contemporary criteria, up to 45% of patients in this cohort may have been eligible for repeat BCS, far exceeding the number who were offered it.

Conclusion: Repeat BCS appears to be a safe and under-utilised option for managing selected cases of ipsilateral IBTR, with rates of subsequent recurrence comparable to those seen after completion mastectomy. These findings suggest that patient- and tumour-specific factors exert greater influence on recurrence risk than the choice of surgical procedure at first recurrence. Clearer guidelines for selecting candidates for repeat BCS are needed to support broader adoption of this approach, which may offer improved recovery and cosmetic outcomes. Enhanced surveillance strategies are also warranted for patients with a history of IBTR.

1363 - Isolated Axillary Recurrence After Breast Cancer: Presentation, Management, and Outcomes in a Modern Cohort

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Background/Objective: Isolated axillary recurrence (AxR) after treatment of an index breast cancer is uncommon but clinically significant. Limited high-level evidence exists to guide management; however earlier reports suggest poor oncologic outcomes. We describe the contemporary treatment approach and outcomes of AxR.

Methods: An IRB approved retrospective review was performed of breast cancer patients with isolated axillary recurrences (10/2008-5/2024). Patients were excluded if they exhibited concurrent local/other regional/distant recurrence, if disease represented a second or greater recurrence, or if AxR was within 3 months of primary breast cancer surgery. Data was extracted pertaining to presentation, treatment, staging, and prognosis. Primary endpoints were distant progression-free survival (DPFS) and overall survival (OS) following AxR surgery and evaluated utilizing the Kaplan-Meier method. The Kruskal-Wallis test was used for descriptive statistics.

Results: 48 patients were identified with a median age at AxR of 60.4 years (IQR 49.9, 72.3), and a median disease-free interval of 4.4 years (IQR 1.5, 10.2). AxR was palpable in 31 patients (64.6%) and found on imaging in the remaining 17 (12- breast cancer surveillance; 5-other surveillance). Approximate receptor subtype of the index cancer was hormone receptor (HR)+ HER2- in 27 (61.4%), HR- HER2- (triple-negative) in 5 (11.4%), and HR+/HR- HER2+ in 7 (15.9%). Similarly, AxR was HR+ HER2- in 31 (64.6%), triple-negative in 9 (18.8%), and HER2+ in 8 (16.7%), with concordance in 75.0% of cases. The index cancer was node positive in 3.8% of patients. Prior axillary surgery was SLN surgery in 32 (66.7%), ALND in 12 (25.0%), and 4 (8.3%) had no prior axillary surgery. Surgical management of the AxR was SLN in 6 (12.5%), and ALND in 42 (87.5%). 41/42 ALNDs were planned, including 2 with clipped node localization; there was 1 unplanned completion ALND due to positive SLN surgery. The median number of nodes retrieved in ALND differed based on the extent of prior surgery: prior ALND (7.5, IQR 6, 15), prior SLN (16.5, IQR 14, 22), and no prior surgery (21.0, IQR 16, 36), p =0.048. In the 7 patients with SLN surgery planned, prior axillary surgery was ALND in 4 (57.1%), SLN in 2 (28.6%), and none in 1 (14.3%). Neoadjuvant chemotherapy was used in 3/7 cases (42.9%). In addition to surgery, radiation therapy (RT) was delivered in 37 patients (77%), which was re-irradiation in 12/37 (32.4%). Chemotherapy was used in 30/46 (65.2%), and given neoadjuvantly in over half (17, 56.7%). Median follow up was 3.8 years following surgical resection (IQR 2.0, 6.1). Overall, 2- and 5-year DPFS was 87.2%/69.5% and OS 97.4%/85.6%. Oncologic outcomes based on approximate tumor biology did not differ (all p =NS, Table 1).

Conclusion: In this contemporary cohort of AxR, most patients underwent multimodal treatment with ALND, RT, and chemotherapy. We demonstrate improved DPFS and OS compared to previous reports. Although a more targeted resection for AxR was infrequently performed, it represents a potential strategy for further investigation in the setting of systemic therapy advances and neoadjuvant platforms.

Table 1. Distant Progression Free Survival and Overall Survival based on approximated biologic subtype

	Distant Progression Free Survival			Overall Survival		
Biologic Subtype	**2-year**	**5-year**	**P-value**	**2-year**	**5-year**	**P-value**
HR+ HER2-	88.14% (75.89, 100.0)	69.37% (48.26, 95.53)	0.95	100.0%	86.15% (67.17, 100.0)	0.22
HR+/HR- HER2+	100.0%	66.67% (35.41, 100.0)		100.0%	100.0%	
HR- HER2-	70.00% (39.55, 100.0)	70.00% (36.21, 100.0)		85.71% (61.83, 100.0)	68.57% (37.81, 100.0)	

1285 - Repeat Breast-Conserving Surgery for In-Breast Tumor Recurrence: Pre-operative Counseling and Oncologic Outcomes

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Background/Objective: Repeat breast-conserving surgery (BCS) is an acceptable management strategy for select cases of locally recurrent breast cancer. This study examines our institutional experience and oncologic outcomes in this population and highlights the multidisciplinary considerations and rationale underlying repeat BCS.

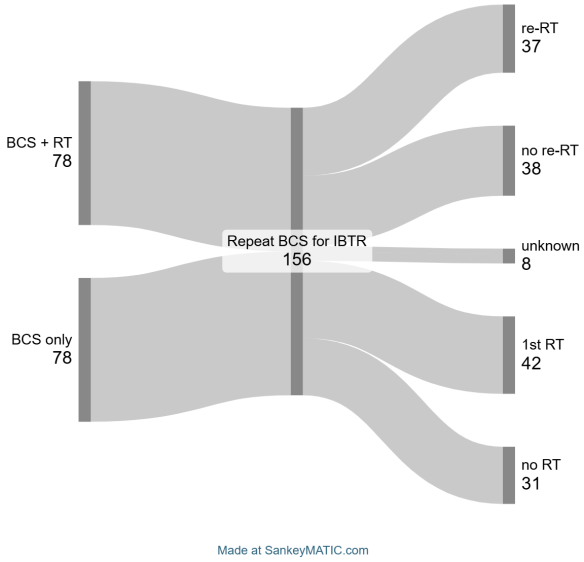
Methods: From an IRB-approved institutional database of patients with local and regionally recurrent breast cancer undergoing surgery from 10/2008-05/2024, we identified patients treated with repeat BCS for a 1st event of in-breast tumor recurrence (IBTR). Patients with prior recurrence, isolated nodal recurrence, or metastatic disease were excluded. Patient demographics and tumor characteristics were collected. The Kaplan-Meier method was used to evaluate overall survival (OS), distant disease recurrence-free survival (DDFS), and disease-free survival (DFS).

Results: A total of 157 IBTR events were identified in 156 patients. The median age at recurrence was 73.3 (IQR 65.6, 81.6) and the median disease-free interval was 4.9 years (IQR 2.4, 12.9). The majority of IBTR events were invasive (132, 84.1%) and approximated biologic subtype was: 113 (86.3%) hormone-receptor+, HER2-; 11 (8.4%) triple-negative; and 7 (5.3%) HER2+. Of the invasive recurrences, 7 (5.3%) were clinically node positive. Seventy-eight breasts (50.0%) with IBTR were previously irradiated for the index cancer, in which 37 (49.3%) had re-irradiation delivered with repeat BCS. For the 78 breasts without prior radiation, radiation was delivered following repeat BCS in 42 (57.5%). Use of radiation and re-irradiation for IBTR is illustrated (Figure). Axillary management included no surgery in 86 (54.8%) patients, sentinel lymph node biopsy in 66 (42.0%), and axillary dissection in 5 (3.2%). Ten patients (6.6%) received chemotherapy for their IBTR, with the majority (70.0%) receiving this in the neoadjuvant setting. A discussion of repeat BCS versus mastectomy at the surgical consultation was documented for

137 patients (87.3%), and 61 (38.9%) had either a formal radiation oncology pre-operative consultation or multidisciplinary case review. In most cases (140, 89.2%), the decision to pursue repeat BCS was driven by patient preference, whereas a medical contraindication to mastectomy was the determining factor in 17 cases (10.8%). Median post-surgery follow up was 3.1 years (IQR 1.1, 5.4). There were 21 second IBTRs at a median of 2.9 years (2.2, 4.3) and 6 patients with subsequent distant disease at a median of 2.9 years (IQR 0.7, 4.3). Five-year local recurrence-free survival was 76.4% (66.0, 87.2) and 5-year distant disease-free survival was 92.7% (95% CI 86.0, 99.2). There were 28 deaths from any cause at a median of 4.0 years (IQR 2.1, 5.6) and 5-year OS was 80.5% (95% CI 72.2, 89.6).

Conclusion: Repeat breast-conserving surgery is a safe and feasible option for carefully selected patients with in-breast tumor recurrence, achieving favorable 5-year survival outcomes. Patient preference over medical comorbidities appears a primary motivation for repeat BCS. Multi-disciplinary discussion should be encouraged to ensure safety and feasibility during pre-operative planning.

Figure:



1215 - Does Recurrence on Endocrine Therapy Impact Extent or Timing of Surgical Treatment for HR+ HER2- Locally Recurrent Breast Cancers?

Emma Donigan[1], Courtney Day[2], Amy Degnim[3], Mary Mrdutt[3]

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Background/Objective: Hormone positive (HR+) locally recurrent breast cancers (LR BC) typically occur after a longer disease-free interval, however a subset occur early and even on endocrine therapy (ET). This population likely represents distinct tumor biology and acquired endocrine resistance, which may drive different therapeutic approaches. We hypothesize the use and proximity of ET relative to a LR may influence the extent and timing of surgical treatment for invasive HR+ LR BC.

Methods: An IRB approved retrospective review of patients with a first event of HR+ HER2- invasive local recurrence (surgery 10/2008-05/2024) was performed. In situ recurrences, isolated nodal recurrences and patients with concurrent metastatic disease were excluded. Demographics, index and LR tumor characteristics, and treatment details were reviewed. Three cohorts were defined based on status of ET treatment for the ipsilateral index cancer: patients who had not taken ET (ET naïve), those having completed ET prior to LR diagnosis (prior ET), and those diagnosed with LR while still taking ET (LR on ET). Chi-square tests were used to assess categorical variables while Wilcoxon rank sum was used for continuous variables. Distant disease-free survival (DDFS) was estimated with the Kaplan-Meier method overall and among the three cohorts defined from index cancer.

Results: 438 eligible LR patients were identified, 91.3% of whom were clinically node negative. 79.4% were post-lumpectomy recurrences, 19.9% post-mastectomy, and 0.7% were an in-breast recurrence after prior axillary surgery for an occult primary. The predominant tumor biology on the invasive index tumors was HR+ (93.3%). Overall disease-free interval (DFI) was a median of 9.6 years (IQR 4.1, 15.2) and median age at LR surgery was 67.8 (IQR 58.7, 76.5).

48.4% (211/436) of patients took ET for index cancer treatment, of whom 26.0% recurred on ET. Thus, the study group was comprised of 225 (51.6%) ET naïve LR, 156 (35.8%) with prior ET, and 55 (12.6%) while on ET. Median DFI differed based on prior ET status: ET naïve 8.2 years (IQR 3.7, 15.7), prior ET 12.4 (8.3, 16.2) and LR on ET 3.6 (1.9, 4.8; $p < 0.001$).

116/348 patients with intact breast underwent repeat BCS. Repeat BCS was highest among the ET naïve group (39.9%) and lower in the LR on ET (29%) and prior ET patients (23%), ($p<0.001$). Within the 397 clinically node negative recurrences, 68.3% underwent axillary surgery (SLN or ALND) with rate not significantly different between the 3 groups ($p=0.082$).

19.1% (82/430) of patients received chemotherapy for LR BC. Chemotherapy use differed among the 3 groups with the highest use in LR on ET (40.7%) and significantly lower use in the ET naïve (20.3%) and prior ET (13.1%) groups (both $p \leq 0.003$). When considering neoadjuvant regimens, 35.8% (29/81) received chemotherapy neoadjuvantly with no difference based on ET status: ET naïve patients 44.8%, prior ET 33.3%, LR on ET 22.3% ($p=0.41$).

Progression to distant disease differed between the ET groups ($p=0.032$) with the lowest 5-year DDFS among those with LR on ET (77.7%; 95% CI 61.2, 94.3). Prior ET had the highest 5-year DDFS at 91.7% (95% CI 84.9, 98.4), followed by ET naïve patients at 87.0% (95% CI 81.1, 93.3).

Conclusion: In a large cohort of HR+ HER2- LR BCs, ET use prior to LR diagnosis appeared to impact use of repeat BCS but not of surgically staging the clinically node negative axilla. Interestingly chemotherapy use was highest in those patients with LR on ET but not specifically with a neoadjuvant approach. Our results highlight the importance of prior ET consideration and multidisciplinary discussion during surgical planning for this population.

1083 - Local-Regional Recurrence in Postpartum Breast Cancer

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Background/Objective: Young women (≤ 45yo) with postpartum breast cancer (PPBC), defined as diagnosis within 5-10 years of last childbirth, have higher rates of lymphovascular invasion and lymph node involvement at diagnosis, as well as a higher risk of metastasis and death compared to matched nulliparous women diagnosed with breast cancer. Data regarding local-regional outcomes specifically in the PPBC population, accounting for these risk factors, is currently lacking. Existing studies have focused on young women's breast cancer as a single group or used a pregnancy-associated breast cancer approach, where breast cancer diagnosed during pregnancy and in the first 1-2 years after childbirth are analyzed as one group and compared to all other young women. This approach is not biologically relevant and obscures results due to the combination of groups with heterogeneous outcomes. Here, we assess the risk of local-regional recurrence (LRR) in women with PPBC compared to nulliparous and later parous women.

Methods: This is a study from the Young Women's Breast Cancer Translational Program. Data were collected from the Colorado Young Women Breast Cancer (YWBC) Cohort, a prospective study conducted with full consent and regulatory approvals. Patients diagnosed with stage 0-III breast cancer at ages 18-65 between the years 2004-2025 were identified. We divided the cohort based on age at breast cancer diagnosis and parity status. The ≤45 age group (YWBC) was divided into women within 5 years of childbirth (PPBC≤5), 5-10 years after childbirth (PPBC 5-10), later parous over 10 years from childbirth (LP), and nulliparous (nulli). The 45-65 age group was divided into nulliparous and parous subgroups. We excluded patients with missing age, parity status, and stage IV at diagnosis. Chi-square or Fisher's Exact test was used for differences in categorical variables, and one-way ANOVA was used for continuous variables. Multivariable Cox proportional hazard models were used to estimate hazard ratios (HR) and 95% confidence intervals (CI) after adjusting for race/ethnicity and histological grade. Kaplan-Meier method and log-rank tests were used to estimate local-regional recurrence-free survival (LRRFS) and time to distant recurrence (TTDR).

Results: 1303 women with breast cancer were included in the study after excluding 747 patients for age >65, stage IV, unknown stage, ER, parity status, or recurrence status. Median follow-up was 67.7 months. 996 (76%) women were ≤ 45 years old (YWBC), with most cases (75%) occurring in the Non-Hispanic White population. Mean BMI (p=0.0037) was significant across our cohort (nulli ≤45 24.9, PPBC ≤5 25.3, PPBC 5-10 26.7, LP 26.8, nulli 45-65 26.3, and parous 45-65 27.8). Amongst the YWBC cohort, significant variables included cancer histology (p=0.012), stage (p=0.005), grade (p=0.005), surgical treatment (p<0.0001), nodal status (0.0002), and chemotherapy (0.002). Ductal histology (87%) and stage II disease (45%) accounted for most of the YWBC cases. 30% of YWBC had mastectomy alone (nulli 29%, PPBC≤5 33.1%, PPBC 5-10 34.8%, LP 19.4%), 26% had breast conserving surgery (BCS) with radiation (nulli 31.7%, PPBC≤5 16.3%, PPBC 5-10 22.8%, LP 35%), and 25% had mastectomy with radiation (nulli 18.6%, PPBC≤5 35%, PPBC 5-10 23.9%, LP 20%). In the 45-65 age group 38% underwent BCS with radiation, 20.8% had mastectomy alone, and 7.8% had mastectomy with radiation. 67% of the YWBC received chemotherapy (Nulli 67.5%, PPBC≤5 75%, PPBC 5-10 60.3%, LP 67.5%), compared to 31.3% in the 45-65 age group (nulli 32.2%, parous 31%). YWBC nodal status at diagnosis was positive in 32% of nulliparous, 47.1% PPBC≤5, 31.5% PPBC 5-10, and 39.1% of LP; this compares to 23.7% in the 45-65 age group. Cancer biomarker subtypes did not show a significant difference between the groups. Both distant recurrence (DR) and LRR did not show significance between the groups; however, PPBC ≤5 was found to have the highest rates of both LRR and DR across our cohort (10.2% and 17.5% respectively). With nulliparous YWBC as reference, LRR in PPBC≤5 had an HR of 1.6 (p=0.075), in PPBC 5-

10 HR of 1.26 (p=0.48), in LP HR of 1.01 (p=0.86), in nulli 45-65 HR of 0.83 (p=0.73), and in parous 45-65 HR of 1.15 (p=0.65).

Conclusion: LRR rates were low across all groups in our cohort. LRR occurred more frequently in patients with grade III tumors, stage II disease, positive lymph node status at diagnosis, triple-negative subtype, as well as in the hormone receptors-negative HER2-positive subtype. Although the PPBC group demonstrated higher rates of LRR, these did not meet statistical significance, likely due to the overall low numbers of LRR events in this cohort. Patients in the PPBC group were more likely to undergo mastectomy with adjuvant radiation as well as chemotherapy, consistent with their increased positive lymph node involvement and advanced disease stage at diagnosis. Despite the increased risk factors associated with LRR in the PPBC group, our data suggest that current treatment paradigms for YWBC are effectively reducing LRR risk in this population. Further evaluation with larger data sets is indicated to determine how to better prevent LRR in YWBC, specifically in relation to their parity status at diagnosis.

Table 1: Multivariate Adjusted Local-Regional Recurrence Risk Hazard Ratios Among Women with Breast Cancer, by Age at Diagnosis and Parity Status

Table. Multivariate Adjusted Local-Regional Recurrence Risk Hazard Ratios in Women with Breast Cancer, by Age at Diagnosis and Parity Status

Group	Subgroup by age/parity	n	LRR (%)	Hazard Ratio	95% CI	p
All cases (n=1303)	Nulliparous ≤ 45yo	338	24 (7.1)	Referent		
	PPBC ≤5y, ≤45yo	314	32 (10.2)	1.62	0.95-2.76	0.075
	PPBC 5-10y, ≤45yo	184	16 (8.7)	1.26	0.67-2.37	0.480
	Later Parous >10y, ≤45yo	160	12 (7.5)	1.01	0.53-2.13	0.866
	Nulliparous 45-65yo	59	4 (6.8)	0.83	0.29-2.41	0.734
	Parous 45-65yo	248	18 (7.3)	1.15	0.63-2.10	0.653

Abbreviations: CI, confidence interval. LRR, local-regional recurrence. PPBC, postpartum breast cancer. y, years postpartum. yo, age years old.

Localization

1507 - An International Randomized Prospective Trial Comparing a Supine MRI-Based Guidance System, The Breast Cancer Locator, to Wire Localization for Breast-Conserving Surgery for Non-Palpable Breast Cancer

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Background/Objective: Positive margins identified on final pathology after breast-conserving surgery (BCS) require an additional surgical procedure, which is a negative patient experience, adds cost to care and delays adjuvant therapy. Pilot trials have shown that a novel guidance system, the Breast Cancer Locator (BCL), can help surgeons localize and safely resect cancers with low positive margin rates. Generated from a supine breast MRI, the BCL consists of two components: (1) an interactive three-dimensional (3D) virtual image of the ipsilateral breast and tumor and (2) a patient-specific, 3D printed bra-like shell that enables the surgeon to intra-operatively place a central wire and up to 4 bracketing wires that define a targeted resection volume that includes the tumor plus surrounding breast tissue.

Methods: This international, prospective, multicenter, randomized, controlled trial was designed to evaluate the effectiveness and safety of the BCL in patients with non-palpable invasive breast cancer or ductal carcinoma in situ (DCIS). Patients with 8 mm or larger cancers enhancing on MRI were randomized (1:1) to BCS utilizing either the BCL or wire localization (WL) with 1 or 2 wires to guide surgery. Randomization was stratified by the histologic diagnosis of the core biopsy (invasive cancer vs. DCIS) and by the treating center. Patients receiving neoadjuvant chemotherapy were excluded. Directed shave excisions were performed at the surgeon's discretion. The primary endpoint was the positive margin rate (PMR) assessed by a blinded pathologist. The primary objective was to evaluate BCL non-inferiority and superiority as compared to the standard of care (WL) in reducing PMR. The primary endpoint was evaluated at a one-sided 2.3% significance level (alpha = 0.023). The statistical analysis plan included additional pre-specified analyses that stratified the overall PMR based on tumor type (invasive cancer vs DCIS) on the core biopsy and lumpectomy and analyzed the PMR in specific subgroups. Other outcomes included re-excision rate, specimen volume, frequency of shave excisions, operative time, surgeon satisfaction and adverse events. At sites without prior BCL experience, the first enrolled patient underwent surgery with the BCL with technical support. These "roll-in" patients were not part of the randomized population and were analyzed separately. Patients were treated by 44 surgeons at 23 sites in 4 countries. The modified intent to treat population consisted of 418 patients who were randomized and underwent surgery: 209 in each group.

Results: Invasive carcinoma was present in 85% of patients; mean tumor size 1.5 cm. Pure DCIS was present in 15% of patients; mean tumor size 2.4 cm, 97% were intermediate or high grade. Tumors were successfully localized and removed in all patients. The PMR was 14.4% (30/209) in the BCL group vs 21.1% (44/209) in WL group. In primary analysis stratified by cancer type on core biopsy the treatment difference (TD) was -7.1% (95.4% CI: -14.3%, 0.1%) in favor of BCL group. Non-inferiority was demonstrated (p=0.011), whereas superiority was not (p=0.025). In the pre-specified sensitivity analysis stratified by cancer type on core biopsy and lumpectomy (invasive cancer vs DCIS), the TD was -7.5% (95.4% CI: -14.7%, -0.3%, p=0.019) significantly lower in the BCL group. In planned sub-group analyses,

the PMR in patients with DCIS was 61% lower using BCL vs WL: 21% (7/34) vs 53% (16/30), (TD -32.8%, (95% CI: -52.1%, -9.1%)). The PMR in patients with invasive cancer was 13% (23/175) using BCL vs 16% (28/179) using WL (TD -2.5%, (95% CI: -9.9%, 4.9%)). The PMR in patients with invasive lobular cancer was 50% lower using BCL vs WL: 13% (7/54) vs 26% (13/50), (TD -13.0%, (95% CI: -28.1%, 2.3%)). The PMR in patients with invasive non-lobular cancer was 11% (13/117) using BCL vs 12% (15/124) using WL (TD -1.0%, (95% CI: -9.2%, 7.4%)). In the BCL group, 12.9% (27/209) underwent re-excision vs 19.6% (41/209) in the WL group (TD -6.7%, (95% CI: -13.7%, 0.3%)). The frequency of shave excision was significantly lower in the BCL group (53.1% vs 63.2%). Total specimen volumes were higher in the BCL group (68 vs 49 ml.) Operative time was longer in the BCL group (median 87 vs 71 minutes). Adverse events rates including hematoma (3% BCL vs 5% WL) and breast infection (5% BCL vs 4% WL) were similar. Ninety-three percent of surgeons responded to survey questions after BCL cases. Surgeons noted that BCL made tumor localization and excision easier and was easy to use in 78%, 70% and 89% of cases.

Conclusion: In this trial involving patients with invasive breast cancer and DCIS undergoing BCS, use of a novel, supine-MRI based guidance system, the BCL, was non-inferior to wire localization. The relative risk of a positive margin in the BCL group was 32% lower than WL for all randomized patients, 61% lower for patients with DCIS and 50% lower for patients with invasive lobular cancer. Re-excisions were 34% less common in the BCL group. Resection volumes were slightly higher using the BCL. The BCL was safe, with adverse event rates similar to WL. Surgeons described the BCL as easy to use and found that it facilitated both tumor localization and resection.

1257 - Role of an Indocyanine Green–Hyaluronic Acid Mixture (LuminoMark™) in Localization of Robot-Assisted Breast-Conserving Surgery: Initial Experiences

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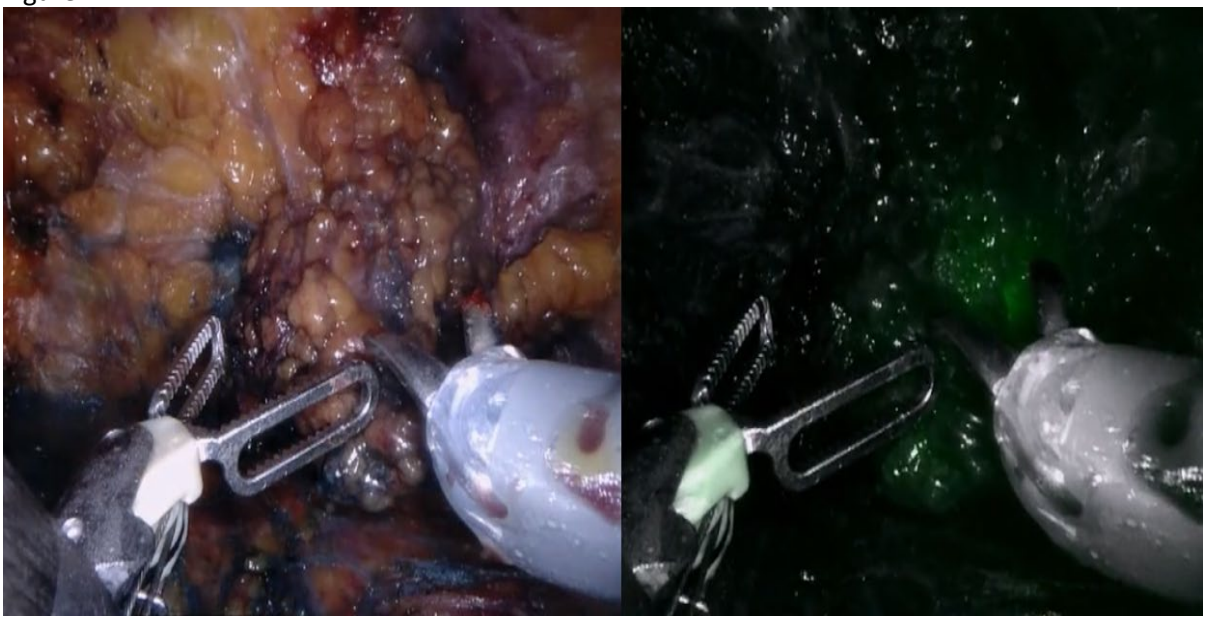
Background/Objective: Surgical excision is the definitive treatment for breast cancer patients. Precise localization for surgery is challenging, especially for robot-assisted breast-conserving surgery (BCS). We investigated localization and safe resection margins for breast cancer patients undergoing robot-assisted BCS using ultrasound-guided LuminoMark™ marking.

Methods: From Jan. 2023 to Oct. 2024 we enrolled 12 patients who underwent robot-assisted BCS using ultrasound-guided LuminoMark™. Patient demographics, pathologic features, and operation results were reviewed. All surgical procedures were performed in concordance with traditional BCS operation.

Results: The median patient age was 47.76 years, and BMI was 22.67 kg/m². There were Invasive breast cancer in 9 cases and DCIS in 3 cases. SLNBx. was performed in 8 cases, and ALND was performed in 3 cases. Mean tumor size was 0.8cm. The LuminoMark™ identification rate was 100% (12/12). The mean approach time for resection of the lesion ICG-F using group was about 13 min. The positive rate of

frozen resection margins was 8.3% using ICG-F. The rate of final positive resection margins was 0%. The rate of re-operation was none. At follow-up after the operation, there was no recurrence.

Conclusion: 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.
Figure:



1139 - DUAL-LOC: A Pilot Trial of Patient and Surgeon Reported Outcomes of Preoperative and Intraoperative Localization for Breast-Conserving Surgery

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Background/Objective: Annually, thousands of patients undergo breast-conserving surgery (BCS), for biopsy-proven benign or malignant disease. However, after initial biopsy, many patients undergo localization procedures prior to BCS, which may be burdensome and distressing for them. Surgeon-performed ultrasound-guided intraoperative localization (IOL) for appropriately selected lesions can potentially eliminate these added patient burdens. In this pilot trial of dual localization (DUAL-LOC), patients with ultrasound-visible, non-palpable lesions undergo standard preoperative radiology-performed localization with wireless radar devices followed by BCS with IOL during which surgeons are instructed to only use the radar device for lesion localization if needed. The primary aim of this mixed-methods study is to categorize the type and degree of burden patients experience when undergoing preoperative localization (POL). The secondary aim is to identify lesion characteristics most amenable to IOL.

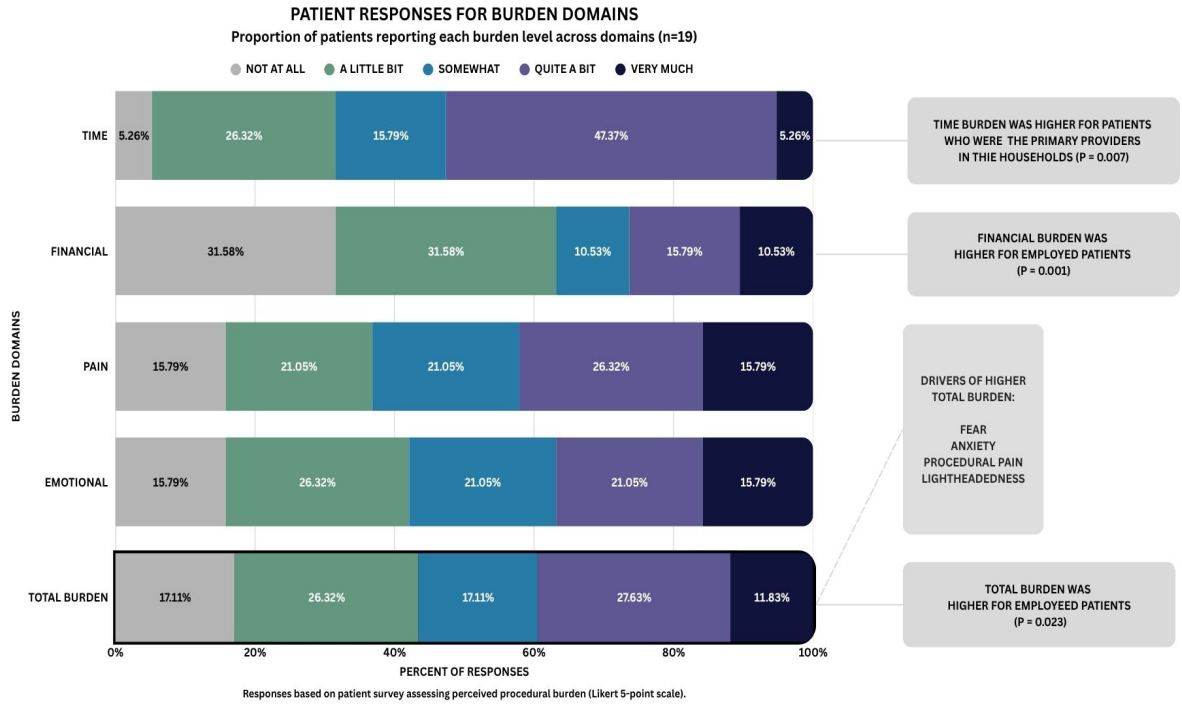
Methods: Patients with unifocal, nonpalpable benign or malignant breast lesions and planned POL for BCS were prospectively enrolled. Patients were excluded if they had multifocal lesions on preoperative imaging or were undergoing planned level two oncoplastic procedures. All patients underwent institutional-standard radiologist-performed POL with wireless radar devices. At time of BCS, surgeons were instructed to perform IOL with wire placement and only utilize the radar localization device if needed. Surgeons were required to have performed a minimum of 5 IOL cases prior to enrollment. Postoperatively, patients completed a standardized survey developed and validated by our Population Health Research Core team assessing the burden of the POL process across four domains: time, financial, emotional, and pain. Burden domains were scored on a 5-point Likert scale and summed to generate a total burden score (TBS) on a scale of 0-16, with higher scores having worse burden. Additionally, each burden domain had optional sub-categories (i.e. commuting time >20 min, loss of work, anxiety, etc.) that could be selected. Patients were also asked hypothetically if they would prefer POL vs IOL for localization if given a choice. Surgeons completed a corresponding post-operative survey assessing perceived difficulty, duration, success, and preference for IOL, POL, or dual localization per case. Both surveys included optional free-text comment sections reviewed to provide context to quantitative findings. Demographic, clinical, and lesion pathology data were collected. Nonparametric tests were used to compare patient burden scores across demographic groups and surgeon survey responses across lesion characteristics (Mann-Whitney U, Kruskal-Wallis, and Spearman correlations). Multiple linear regression identified independent predictors of TBS.

Results: Twenty-one cases performed by four surgeons were included. The patient cohort was predominantly White and largely composed of well-educated, high-income women with a median age of 64yrs (range 35–92). On final pathology, 81.0% (n=17) of lesions were malignant and 19.0% (n=4) were benign. Median lesion size was 9mm (range 1–35 mm) and median excised tissue weight was 9.5g(range 4–24g). There were 19 (90.5%) completed patient surveys. Notably, 73.7% (n=14) of patients reported pain during POL and procedure-related anxiety (Fig 1). Overall, 47.4%(n=9) required time off work, and 36.8% (n=7) incurred transportation-related expenses for POL. Median TBS was 8 (range 2–15). TBS and financial burden were higher among employed vs unemployed patients (p=0.023 and 0.001, respectively). In a multivariate model, education level (p<0.001) and primary provider status (p=0.004) independently predicted higher TBS. Qualitative data reinforced quantitative findings regarding patient burdens associated with POL, and most patients preferred IOL over POL (84.2% vs.15.8%). Surgeon survey response rate was 100% (21/21). IOL with wire placement was performed in 20/21 cases (91.5%) and completed in <10 minutes in all 20 cases (range 3-9min). In one case, superficial lesion location deemed wire placement unnecessary. IOL was rated easy in 61.9% (n=13) of cases, moderate in 14.3% (n=3), and difficult in 19.0%(n=4). In considering localization preference for individual cases, surgeons chose IOL alone in 52.4% (n=11) of cases and dual localization in 47.6% (n=10), with no case-preference for POL alone. Larger lesions were associated with less surgeon-reported difficulty (p=0.045) while malignancies were associated with more difficulty (p=0.036) and a trend toward dual localization preference (p=0.19). Surgeon feedback supported IOL as a more efficient and flexible alternative. In cases when dual localization was preferred, it was noted to be a reassuring back-up modality for smaller lesions.

Conclusion: As localization procedures for BCS evolve, patient burden and surgeon skill need to be considered. DUAL-LOC is the first study to capture and quantify the varying degrees of patient burden associated with POL while providing surgeons with a potential localization alternative. All patients experienced some added burden from POL, with pain and anxiety being most frequent. Surgeons reported that a majority of lesions could be localized with IOL alone. Dual localization presented as a useful alternative, potentially serving as a bridge to IOL alone. Future studies should assess the role of

dual localization as a training method for IOL skill development and focus on methods to decrease patient burden.

Figure:



Lymphedema

1429 - Economic Value of Prophylactic Lymphovenous Bypass Following Axillary Dissection for Breast Cancer

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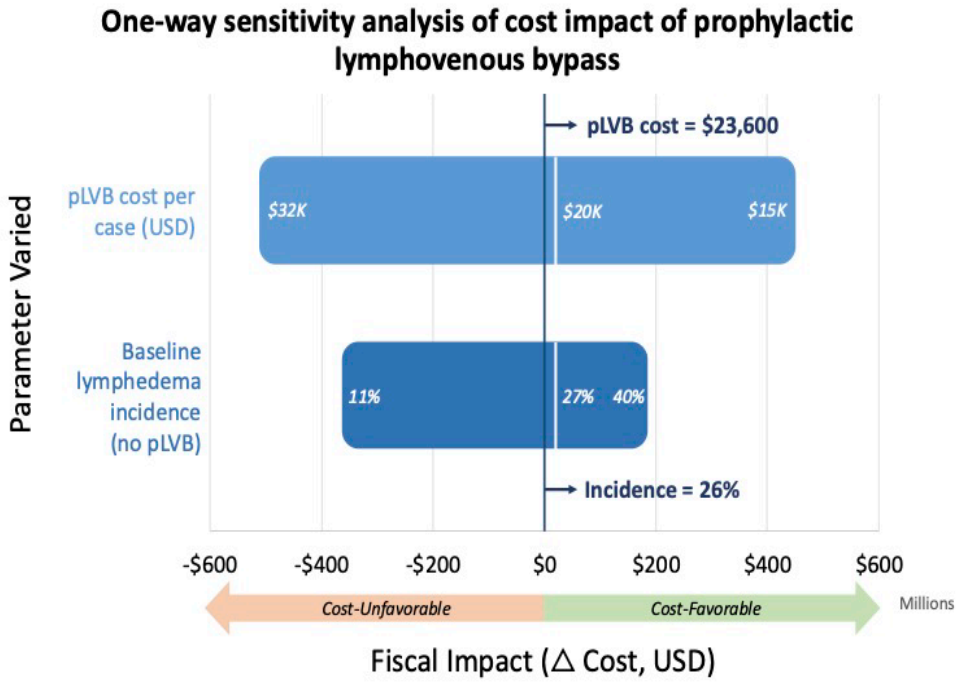
Background/Objective: Lymphedema remains a frequent and costly morbidity after axillary lymph node dissection (ALND) for breast cancer, contributing to long-term functional limitation and reduced quality of life. Prophylactic lymphovenous bypass (pLVB) has demonstrated clinical efficacy in reducing lymphedema risk, but the balance between its procedural cost and the long-term economic burden of treating lymphedema remains uncertain. We developed a cost model to compare the procedural cost of pLVB with the downstream financial burden of lymphedema.

Methods: We developed a cost model comparing two hypothetical breast cancer cohorts undergoing ALND: one in which all patients received pLVB and one in which none did. National ALND volume was derived from National Cancer Database data from 2022. Lymphedema incidence with and without pLVB was estimated from published studies. pLVB costs were based on Medicare reimbursement rates. Lymphedema-related resource utilization, including therapy visits and compression garments, was estimated from institutional data to calculate 5-year total and incremental costs. Associated costs were assigned using Medicare payment schedules, and wage data from the Bureau of Labor Statistics were used to estimate productivity loss. Lymphedema-related costs were discounted at 3% annually over a 5-year horizon to reflect present value in United States dollars (USD). One-way sensitivity analyses varied pLVB procedural cost and post-procedure lymphedema incidence across literature-based ranges to define thresholds for cost favorability.

Results: In 2022, 30,931 U.S. patients underwent ALND. The estimated 5-year cost of managing lymphedema was $103,568 per patient, excluding therapeutic surgical procedures. The projected national cost of universal pLVB was $869M, compared with $891M for lymphedema management without pLVB – an estimated $22.1 million reduction in 5-year lymphedema-related costs, or approximately $714 saved per patient. Because pLVB is a relatively new technique with evolving costs and reimbursement patterns, we performed sensitivity analyses to define thresholds for cost favorability. pLVB remained cost-favorable as long as the procedure cost was ≤$23,600 per case (Figure). To assess how underlying lymphedema risk influences value, we varied baseline lymphedema incidence after ALND (without pLVB) across published ranges. With pLVB cost held at $20,000, pLVB remained cost-favorable when baseline lymphedema incidence was ≥26% (Figure).

Conclusion: After modeling clinically realistic assumptions, pLVB is a cost-favorable strategy that not only reduces long-term lymphedema-related expenditures but also meaningfully lessens the physical and emotional morbidity of lymphedema. Because our model did not account for lymphedema complications, surgical interventions for lymphedema, or broader psychosocial and functional effects, these estimates likely understate the true benefit of pLVB. Expanding access to pLVB, particularly for patients at highest risk for lymphedema, may maximize both clinical and economic benefit.
Figure:



1164 - A Practical Ipsilateral Approach to Arm Lymphedema Detection: Eliminating the Need for Contralateral Arm Comparison

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Background/Objective: Lymphedema, a common sequela of breast cancer treatment, is a chronic condition associated with physical and psychosocial dysfunction and often leads to poor quality of life. Once established, reversing this condition is challenging. Therefore, early detection and intervention are key in preventing lymphedema from becoming chronic. There is evidence supporting the potential of bioimpedance spectroscopy (BIS) to detect lymphedema in its subclinical stage, particularly in unilateral arm lymphedema, using the interarm impedance ratio or its linear form, the lymphedema index (L-Dex). However, it relies on the unaffected contralateral arm to calculate the interarm ratio, precluding its use in the monitoring of patients at risk of bilateral arm lymphedema. This study aimed to investigate a practical ipsilateral approach to arm lymphedema detection and eliminate the need for contralateral arm comparison.

Methods: This retrospective cross-sectional observational study of patients who were measured using BIS (SOZO, Impedimed Ltd.) was conducted in two stages. In the first stage, we explored a method to calculate R0 (resistance of extracellular fluid) and L-Dex from one of the measured ipsilateral BIS parameters: Ri (Resistance of intracellular fluid) and Rinf (Resistance of total fluid), using control participants without lymphedema. These R0 and L-Dex values, calculated using the "ipsilateral method", were then compared with the R0 and L-Dex calculated using the existing "contralateral comparison method". Additionally, the accuracy of the ipsilateral method for detecting arm lymphedema was

evaluated across two datasets with at-risk or known lymphedema, and a diagnostic threshold was established. In stage 2, the clinical validation stage, new control participants were included and the diagnostic accuracy of the ipsilateral method for detecting arm lymphedema was evaluated using a dataset of patients confirmed with lymphedema using indocyanine green lymphography (ICGL).

Results: A total of 239 healthy participants (128 female, mean age 45.8±14.8) and clinical data from 40 participants with lymphedema were included in stage one. R0 predicted from Ri using the ipsilateral method demonstrated the best performance with very good area under the curve (AUC = 0.92; 95% CI = 0.83 to 0.97; $p<0.0001$) compared to the contralateral comparison method, with an optimal threshold of 7.5 L-Dex leading to 92.3% sensitivity and 87.3% specificity. A total of 164 (mean age 57.4±12.0) female participants with ICG confirmed lymphedema, and 132 healthy participants (107 female, mean age 43.9±17.7) were included in stage two. R0 predicted from Ri using the ipsilateral method demonstrated very good AUC (0.89; 95% CI = 0.85 to 0.92; $p<0.0001$) compared with the ICG diagnosis, with an optimal threshold of 4.5 L-Dex, yielding 72.5% sensitivity and 91.6% specificity. For comparison, the contralateral comparison method using a threshold of 6.5 L-Dex units also demonstrated a very good AUC (0.89, 95% CI = 0.84 to 0.92; $p<0.0001$) and a sensitivity of 74.0% and specificity of 93.5%.

Conclusion: This new ipsilateral approach to detecting arm lymphedema could be used in clinical settings when a healthy contralateral arm measurement is not feasible. It demonstrates equivalent performance to the current contralateral comparison method in a clinical validation population. The approach provides a method of using BIS for detecting and monitoring arm lymphedema in individuals at risk or with bilateral arm lymphedema.

Figure:

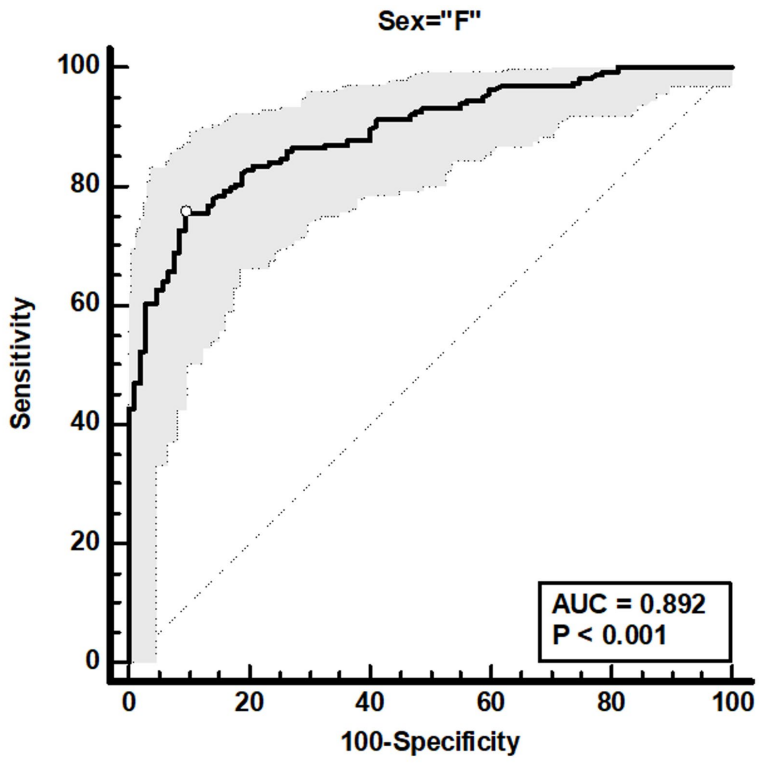

Figure 1: ROC curve demonstrating the performance of the ipsilateral method in distinguishing unilateral arm lymphedema from controls in female participants, with an AUC of 0.892, indicating high diagnostic accuracy

1089 - Lymphedema After Axillary Surgery: Still a Problem in the Modern Era

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Background/Objective: The marked reduction in morbidity, particularly lymphedema, seen with sentinel lymph node biopsy (SLNB) vs axillary lymph node dissection (ALND) has limited attention to this problem. While risk factors for lymphedema development after ALND are well described, less is known about risk factors after SLNB. This study assessed risk factors for lymphedema in a large cohort of breast cancer patients treated with SLNB or ALND at a single institution over a 10-year period.

Methods: We identified patients with stage I-III breast cancer from a prospectively maintained database. A diagnosis of lymphedema was determined using ICD codes. Cumulative incidence of lymphedema was assessed overall and stratified by type of axillary surgery. Risk factors for lymphedema after SLNB or ALND were assessed on univariate and multivariable (MV) analysis.

Results: From 1/2010-12/2020, we identified 20,010 breast cancer patients treated with SLNB (n=16,221) or ALND (n=3789). Median age was 55 years (IQR 47, 65); median BMI was 25 kg/m2 (IQR 21.9, 29.2). Most patients (73%) were White; 9% Asian, 9% Black, and 7% Hispanic. The majority (71%) had HR+/HER2- cancer; 19% received NAC, 14% received nodal RT (Table). At a median follow-up of 5.2 years, 1988 patients (10%) developed lymphedema. 5-year lymphedema incidence was 10.2% (CI 9.7-10.6%), with a significantly higher incidence after ALND (31.3%) vs SLNB (5.3%, p<0.0001). After SLNB, on MV analysis, Black race and Hispanic ethnicity (HR 1.73, CI 1.4-2.1, p<0.001 and HR 1.33, CI 1.03-1.7, p=0.03, respectively), higher BMI (HR 1.04, CI 1.02-1.05 per 1-unit increase, p<0.001), higher number of nodes removed (HR 1.04; CI 1.01-1.08, per 1-node increase, p=0.018), higher number of positive nodes (HR 1.29, CI 1.17-1.42 per 1-node increase, p<0.001), and receipt of NAC (HR 1.43; CI 1.11-1.85, p=0.006) were associated with increased risk of lymphedema. Similar findings were observed for ALND, with higher BMI (HR 1.03, CI 1.01-1.04, p<0.001), higher number of positive nodes (HR 1.01; CI 1.00-1.02, per 1-node increase, p=0.03), and receipt of NAC (HR 1.28; CI 1.1-1.48, p=0.001) associated with higher lymphedema risk, although race was not significant, with similarly high rates of lymphedema observed across racial groups. Triple-negative subtype (HR 1.57, CI 1.18-2.09, p=0.002) and receipt of nodal RT (HR 1.2, CI 1.05-1.36; p=0.006) were also associated with increased lymphedema risk after ALND.

Conclusion: SLNB carries a lower but not insignificant risk of lymphedema compared with ALND, with similar risk factors for both, although notable racial differences exist in the SLNB cohort. Given the large number of SLNB procedures performed in the modern era, this translates to morbidity for a significant number of breast cancer survivors. Rapid adoption of recent findings demonstrating the safety of SLNB omission in postmenopausal patients with small HR+/HER2- breast cancer will improve survivorship, particularly among Black and Hispanic patients.

Table: Clinical characteristics of the cohort stratified by type of axillary surgery

Characteristic	Overall N = 20,010	SLNB N = 16,221	ALND N = 3789	p-value
Age, years	55 (47, 65)	56 (47, 65)	51 (44, 61)	< 0.001
BMI, kg/m²	25 (21.9, 29.2)	25.1 (22, 29.3)	24.6 (21.5, 28.8)	< 0.001
Race/Ethnicity				< 0.001
Asian	1723 (9)	1376 (9)	347 (10)	
Black	1779 (9)	1310 (8)	469 (13)	
Hispanic	1391 (7)	1088 (7)	303 (8)	
White	14,072 (73)	11,628 (75)	2444 (67)	
Other	265 (2)	198 (1)	67 (2)	
Histology				< 0.001
IDC	17,037 (85)	13,820 (85)	3217 (85)	
ILC/mixed	2555 (13)	2020 (12)	535 (14)	
Other	418 (2)	381 (2)	37 (1)	
Receptor Subtype				< 0.001
HR+/HER2-	14,178 (71)	11,661 (72)	2517 (66)	
HR+/HER2+	2246 (11)	1701 (10)	545 (14)	
HR-/HER2+	1065 (5)	827 (5)	238 (6)	
HR-/HER2-	2516 (13)	2027 (13)	489 (13)	
Clinical T Stage				< 0.001
0	893 (5)	827 (6)	66 (2)	
1	11,854 (63)	10,636 (71)	1218 (33)	
2	4741 (25)	3113 (21)	1628 (45)	
3	808 (4)	372 (3)	436 (12)	
4	378 (2)	77 (0.5)	301 (8)	
Clinical N Stage				< 0.001
0	15,451 (83)	13,990 (93)	1461 (41)	
1	2632 (14)	903 (6)	1729 (48)	
2	315 (2)	95 (0.5)	220 (6)	
3	266 (1)	73 (0.5)	193 (5)	
Breast Surgery				< 0.001
BCS	12,193 (61)	11,254 (69)	939 (25)	
Mastectomy	7815 (39)	4967 (31)	2848 (75)	
No. Nodes Removed	3 (2, 6)	3 (2, 4)	18 (14, 24)	< 0.001
No. Positive Nodes	0 (0, 1)	0 (0, 0)	2 (1, 5)	< 0.001
Chemotherapy	10,450 (52)	7059 (44)	3391 (90)	< 0.001
NAC	3866 (19)	2134 (13)	1732 (46)	< 0.001
HER2 Therapy	2770 (15)	2062 (14)	708 (20)	< 0.001
Endocrine Therapy	15,390 (78)	12,464 (78)	2926 (78)	0.8
Radiation Therapy	13,134 (68)	10,157 (65)	2977 (79)	< 0.001
Nodal RT	2724 (14)	1224 (8)	1500 (40)	< 0.001

Continuous variables reported as median (IQR) and categorical variables as frequency (N, %). Unknowns not included in percentage calculations. Abbreviations: SLNB, sentinel lymph node biopsy; ALND, axillary lymph node dissection; BMI, body mass index; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; BCS; breast-conserving surgery; NAC, neoadjuvant chemotherapy; RT, radiation therapy

Male Breast Cancer

1229 - The Role of Gene Expression Assays in the Management of Male Breast Cancer: Utilization and Influence on Adjuvant Chemotherapy

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Background/Objective: Male breast cancer (MBC) is rare, comprising less than 1% of all breast cancer cases, and management strategies are largely drawn from female populations, such as utilizing gene

expression assays. However, the use and predictive value of gene expression assays in men, such as the 21- or 70-gene recurrence score assay, remain poorly defined. This study aimed to evaluate the utilization and influence of gene expression assays on adjuvant chemotherapy decision-making in MBC patients.

Methods: A retrospective review was performed to identify male patients with HR+/HER2-, early-stage breast cancer diagnosed from 2017 to 2025, treated at our institution. Data collected included demographics, clinicopathologic features, gene expression assay utilization (Oncotype DX and MammaPrint), recurrence score distribution, and adjuvant treatments. Descriptive statistics and chi-square tests were performed.

Results: Fifty-one male patients with HR+/HER2-, early-stage breast cancer were identified; 23 (45%) underwent Oncotype DX testing (21-gene assay) and 4 (8%) underwent MammaPrint testing (70-gene assay). The median age was 70 years, and median follow-up was 32 months. All patients included underwent total mastectomy. Regarding axillary management, 19 (70%) had a sentinel lymph node biopsy and 4 (15%) an axillary lymph node dissection, while 4 (15%) underwent mastectomy alone. Six (22%) received adjuvant radiation therapy. Among Oncotype-tested patients, 11 (48%) had low-risk scores, 7 (30%) intermediate, and 3 (13%) high. Adjuvant chemotherapy was administered to 1 (4%) low-risk, 4 (57%) intermediate-risk, and 1 (33%) high-risk patient. Intermediate and high-risk patients were significantly more likely to receive chemotherapy compared to low-risk patients ($p=0.038$). All 23 Oncotype-tested patients received endocrine therapy, with 19 (83%) prescribed tamoxifen. Among MammaPrint-tested patients, 2 were low risk (no chemotherapy) and 2 were high risk (1 received chemotherapy). There were no documented recurrences during the follow-up period.

Conclusion: Over half of MBC patients with HR+/HER2-, early-stage tumors underwent gene expression assays at our institution. The distribution of Oncotype DX scores was comparable to that historically reported in female cohorts, with most patients falling into the low and intermediate risk categories, and higher recurrence scores were significantly associated with chemotherapy use. These findings support the potential clinical relevance of gene expression assays in MBC and underscore the need for continued evaluation of the utility of these assays in this underrepresented population.

1148 - Can Axillary Sentinel Lymph Node Surgery Be Omitted in Clinically Node-Negative Male Breast Cancer?

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Background/Objective: Male breast cancer (MBC) accounts for less than 1% of all breast cancers, and current management recommendations are largely extrapolated from female study cohorts. As de-escalation of axillary surgery becomes more prevalent in females – supported by recent data from SOUND and INSEMA cohorts – sentinel node surgery omission in men, even per SSO Choosing Wisely guidelines, remains as low as 13.3%. In comparison to the SOUND and INSEMA cohorts, this study aims to evaluate the feasibility of omitting sentinel node surgery by evaluating the pathologic nodal findings at surgery and investigating the long-term outcomes in male breast cancer patients undergoing primary surgery.

Methods: This study is a single institution, retrospective review of males patients with stage I-III clinically node negative (cN0) breast cancer treated between 2005-2023. Patients with stage IV disease and those treated with neoadjuvant therapy were excluded. Patient demographics, perioperative imaging findings, treatment characteristics, final pathology, and recurrence data were obtained. Data obtained was analyzed using descriptive statistics including mean, median, and ranges.

Results: A total of 209 male patients were identified, and 86 met inclusion criteria. Median age was 69.5 years (36-89). All patients were cN0; 74 patients (86%) underwent preoperative axillary ultrasound evaluation and were node negative by imaging. The majority of patients had cT1 (60.5%, n=52) or cT2 (37.2%, n=32) tumors, and were grade II (60.5%, n=52) or grade III (32.6%, n=28). Eighty-four (97.6%) tumors were estrogen positive, 15 (17.4%) were HER2 positive, and 82 (95.4%) tumors were invasive ductal carcinoma. Eleven patients (12.8%) underwent partial mastectomy, 75 (87.2%) underwent mastectomy, and all underwent axillary sentinel node surgery. Pathological tumor sizes were: pT1 in 58 (67.4%), pT2 in 25 (29.4%), pT3 in 1 (1.2%), and pT4 in 2 (2.3%). Most patients were found to be pN0 at surgery (n=76, 88.4%) followed by pN1 in 7 (8.1%), pN1mic in 2 (2.3%), and pN2 in 1 (1.2%). An average of 2.8 sentinel nodes (SN) were obtained overall. Of 10 patients (11.6%) with nodal metastases, 70% had only 1 positive node on final pathology. Four of these patients underwent completion axillary lymph node dissection yielding: no additional positive nodes in 1 patient; 1 additional node with micrometastasis in 1 patient; 1 additional node with isolated tumor cells in 1 patient; and 5 additional nodes with macrometastases and 1 micrometasatasis in 1 patient. Fifteen (17.4%) patients were treated with adjuvant systemic therapy, 70 (81.3%) with endocrine therapy, and 13 (15.1%) with adjuvant radiation therapy. At a median follow-up of 64 months (5.3 years), two patients experienced distant recurrences at 4 and at 5 years after initial surgery. One patient, with a BRCA2 mutation, developed a contralateral breast cancer. No patients had axillary recurrences.

Conclusion: In early-stage, clinically and imaging node negative MBC, the rate of nodal metastases (11.6%) and recurrence (2.3%) is comparable to those reported in female de-escalation trials. These findings suggest that in appropriately selected male patients with negative clinical exam and axillary ultrasound, sentinel lymph node biopsy may be safely omitted. The role of de-escalation of axillary surgery in MBC warrants further investigation in larger prospective studies.

Table 1. MBC, SOUND, INSEMA Sentinel Node Surgery Cohort Comparison			
Characteristics	Male Breast Cancer (MBC, n=86)	INSEMA (per-protocol) Sentinel Lymph Node Surgery Cohort (n=3896)	SOUND Sentinel Lymph Node Surgery Cohort (n=708)
Age (years) Median	69.5	62	60
Pathological Tumor Stage pT1-2	83 (96.5%)	3838 (98.5%)	708 (100%)
Pathological Nodal Status pN+	10 (11.6%)	579 (15%)	97 (13.7%)
Follow-Up (months) Median	64	73.6	68.4
Contralateral Breast Cancer	1 (1.2%)	25 (0.6%)	5 (0.7%)
Distant Recurrence	2 (2.3%)	104 (2.7%)	13 (1.8%)

1059 - Beyond Node Count: The Prognostic Impact of Nodal Ratio in Male Breast Cancer

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Background/Objective: Given the rarity of male breast cancer (MBC), which accounts for less than 1% of all breast malignancies, recommendations for axillary management are largely extrapolated from female cohorts. However, men frequently present with more advanced nodal disease, which combined with variation in surgical approach (sentinel lymph node biopsy versus axillary lymph node dissection) and pathologic evaluation, can complicate interpretation of nodal burden. The nodal ratio (NR), defined as the proportion of positive to examined lymph nodes, accounts for differences in the extent of nodal sampling and may provide a more accurate reflection of disease burden than absolute node count alone. Prior studies in female cohorts have demonstrated NR to be a strong prognostic indicator, but its relevance in MBC has not been well characterized. We aimed to evaluate the prognostic significance of NR for overall survival (OS) in MBC using a contemporary national dataset.

Methods: We performed a retrospective cohort study using the National Cancer Database from 2010 to 2021, including men older than 17 years with invasive breast cancer, clinical stage T1-T3 who underwent surgery and nodal evaluation. We excluded patients with stage IV or in situ disease, unknown clinical T stage, clinically node-positive presentation, cases with missing key covariates, no nodal evaluation, or

fewer than 30 days of follow-up. The NR was defined as the number of positive lymph nodes divided by the number of examined regional nodes and categorized as 0, less than 0.20, 0.20–0.49, and 0.50 or higher. Patients with NR equals 0 had all nodes negative. Kaplan–Meier analysis with log-rank testing compared OS across NR groups.

Results: Among 6,942 eligible patients, 71.1% had NR equal to 0. Kaplan–Meier analysis demonstrated progressively worse OS with increasing NR (Figure 1; log-rank $p < 0.0001$). Five-year OS was 85.4% (NR equal to 0), 81.5% (less than 0.20), 80.0% (0.20–0.49), and 74.7% (greater than or equal to 0.50). When dichotomized (NR equal to 0 vs NR greater than 0), any nodal involvement predicted significantly worse survival (log-rank $p < 0.0001$). Trends were consistent when stratified by extent of axillary surgery (SLNB- vs ALND-proxy) and by nodes-examined categories, supporting that NR provides discrimination beyond absolute positive-node count or extent of dissection. This report reflects unadjusted survival comparisons with p-values derived from log-rank tests. Stratified cox proportional hazards modeling adjusted for NR0, age, race, insurance, comorbidity, grade, clinical T stage, and receipt of hormone therapy, and radiation.

Conclusion: Our study shows that nodal ratio is a meaningful and independent predictor of survival in men with breast cancer, performing better than simply counting the number of positive lymph nodes. The nodal ratio reflects the extent of nodal involvement relative to the number of nodes examined, offering a more standardized and comparable measure of disease burden. Using nodal ratio may help clinicians better assess recurrence risk, support treatment discussions, and tailor adjuvant therapy decisions. As evidence continues to grow, integrating nodal ratio into staging or prognostic frameworks could help improve the precision of care for men with this rare disease.

Figure:

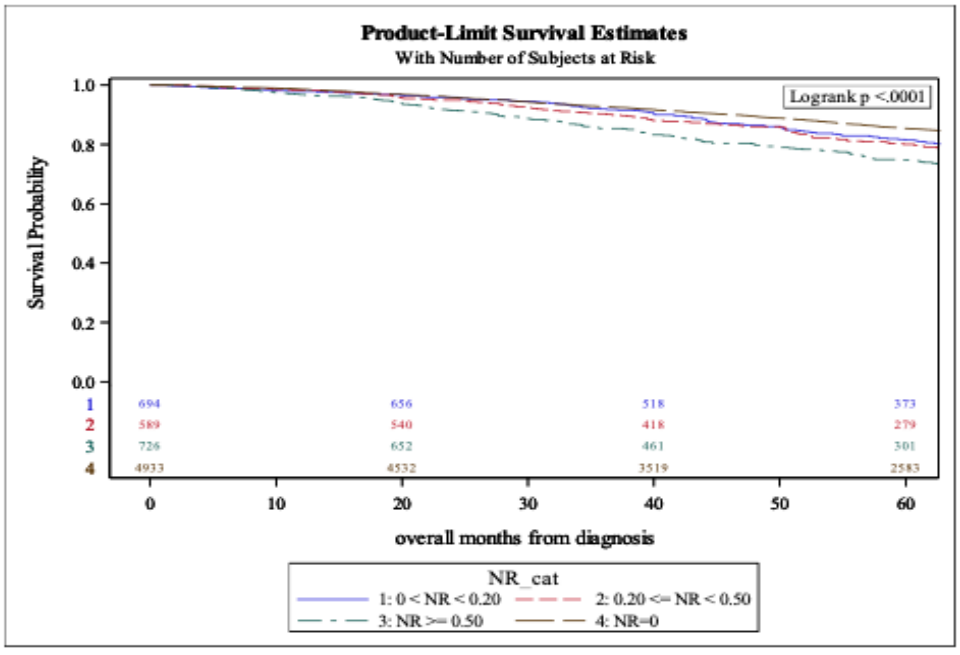

Figure 1. Kaplan–Meier overall survival by nodal ratio (NR) category among 6,942 men with invasive breast cancer from the NCDB (2010–2021). Increasing NR correlated with progressively lower survival (log-rank $p < 0.0001$).

1040 - The Impact of BRCA Status on Clinical Presentation and Management of Male Breast Cancer: A Single-Institution Study

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Background/Objective: BRCA pathogenic mutations, particularly BRCA2, are known risk factors for male breast cancer (MBC). Treatment of MBC, especially those with pathogenic germline variants, remains poorly understood. This study aims to assess the association between BRCA status and clinical presentation and management of MBC.

Methods: The breast tumor and male BRCA registries were queried to identify all males diagnosed with stage 0-III breast cancer at our institution. Data were collected on demographics, clinicopathologic features, genetic testing, and treatment for all patients. Patients with a positive BRCA1 or BRCA2 pathogenic variant were classified as BRCA-positive (BRCA+). Those with negative genetic testing or non-BRCA mutations were classified as BRCA-negative (BRCA-). Patients who never underwent genetic testing were categorized as unknown. TAILORx cutoffs were used for Oncotype risk category: low (recurrence score [RS] 0-10), intermediate (RS 11-25), and high (RS > 25). Pearson's Chi-square test, Fisher's exact test, and Kruskal-Wallis rank sum tests were used to analyze differences in clinical presentation, treatment, and outcomes across all cohorts.

Results: Of the 196 MBC patients who sought care at our institution from 1993 to 2025, 119 (60.7%) underwent genetic testing, and 77 (39.3%) did not. 26 patients were BRCA+, of which 3 were BRCA1 carriers, and the remaining 23 were BRCA2+. Follow-up time was 66 months for BRCA+ patients (IQR 34-181), 58 months for BRCA- patients (IQR 36-105), and 66 months for unknown patients (IQR 42-119, p = 0.51). Age at diagnosis was 59 for BRCA+ patients (IQR 54-70), 65 (IQR 56-71) for BRCA- patients, and 70 for unknown patients (IQR 59-79, p = 0.005). Compared to BRCA- patients, BRCA+ patients presented with higher grade, lower PR, and higher RS (all $p < 0.05$). Our cohort included 13 patients with HER2-positive cancers, none of whom were BRCA+. Only one patient in the entire cohort had a triple negative breast cancer, who was BRCA2+. Mastectomy rates did not differ amongst the 3 groups (p = 0.069). 3/26 (11.5%) BRCA+ patients underwent contralateral prophylactic mastectomy, which is slightly higher than reported rates (4-8%) in the literature. 50% of BRCA carriers underwent Oncotype testing vs. 40.9% of BRCA- patients and 28.6% unknown patients (p = 0.09). Of the 13 BRCA+ patients who underwent Oncotype testing, 50% were high-risk (i.e. RS >25, median RS 27 [IQR 20-34]), compared to only 13% of BRCA- patients (median RS 11 [IQR 6-15]), and 9% of unknown patients (median RS 14 [IQR 9-22], $p<0.001$). Chemotherapy administration was highest in BRCA+ patients (65.4% vs. 34.4% vs. 28.6%, p = 0.003). No difference in receipt of CDK4/6 inhibitors was seen across all cohorts (p = 0.49). 3 (11.5%) BRCA+ patients were administered PARP inhibitors, all given in the setting of metastasis. 7 patients in the total cohort (3.6%) developed locoregional recurrence (LRR), most of whom (85.7%) underwent total mastectomy for their initial cancer. Only 1 patient who developed LRR was BRCA+. 30.8% of BRCA carriers are deceased vs. 15.1% of BRCA- patients and 29.9% of unknown patients (p = 0.04).

Conclusion: Compared with BRCA- patients, BRCA carriers more often presented with advanced tumor characteristics and chemotherapy. A minority of BRCA+ patients were offered contralateral prophylactic mastectomy and PARP inhibitors. Of those who did not undergo germline testing, rate of death was

higher than that of BRCA- patients and similar to that of BRCA carriers, suggesting potentially missed opportunities for additional treatment. Further research is needed to determine how genetic mutation status may help inform treatment strategies and prognosis in MBC.

Table:

	BRCA Status				
	Positive N = 26[1]	**Negative** N = 93[1]	**Unknown** N = 77[1]	**Total** N = 196[1]	p-value[2]
Race/Ethnicity					0.46
NH White	23 (88.5%)	65 (69.9%)	54 (70.1%)	142 (72.4%)	
NH Black	2 (7.7%)	18 (19.4%)	16 (20.8%)	36 (18.4%)	
Other	1 (3.8%)	10 (10.8%)	7 (9.1%)	18 (9.2%)	
Median Age at Diagnosis	59 (54-70)	65 (56-71)	70 (59-79)	66 (56-75)	0.005
Histology					0.13
IDC	23 (88.5%)	76 (81.7%)	62 (80.5%)	161 (82.1%)	
ILC	2 (7.7%)	5 (5.4%)	0 (0%)	7 (3.6%)	
DCIS	1 (3.8%)	6 (6.5%)	7 (9.1%)	14 (7.1%)	
Other	0 (0%)	6 (6.5%)	8 (10.4%)	14 (7.1%)	
PR Status					0.02
Positive	21 (80.8%)	90 (96.8%)	67 (87.0%)	178 (90.8%)	
Negative	4 (15.4%)	3 (3.2%)	7 (9.1%)	14 (7.1%)	
Unknown	1 (3.8%)	0 (0%)	3 (3.9%)	4 (2.0%)	
Molecular Subtype					0.061
Luminal A	24 (92.3%)	87 (93.5%)	68 (88.3%)	179 (91.3%)	
Luminal B	0 (0.0%)	6 (6.5%)	7 (9.1%)	13 (6.6%)	
TNBC	1 (3.8%)	0 (0.0%)	0 (0.0%)	1 (0.5%)	
Unknown	1 (3.8%)	0 (0.0%)	2 (2.6%)	3 (1.5%)	
Clinical Stage					0.47
0	1 (3.8%)	9 (9.7%)	10 (13.0%)	20 (10.2%)	
1	15 (57.7%)	44 (47.3%)	32 (41.6%)	91 (46.4%)	
2	7 (26.9%)	35 (37.6%)	29 (37.7%)	71 (36.2%)	
3	1 (3.8%)	4 (4.3%)	5 (6.5%)	10 (5.1%)	
Unknown	2 (7.7%)	1 (1.1%)	1 (1.3%)	4 (2.0%)	
Grade					<0.001
1	0 (0%)	7 (7.5%)	7 (9.1%)	14 (7.1%)	
2	7 (26.9%)	50 (53.8%)	36 (46.8%)	93 (47.4%)	
3	13 (50.0%)	31 (33.3%)	16 (20.8%)	60 (30.6%)	
GX	6 (23.1%)	5 (5.4%)	18 (23.4%)	29 (14.8%)	
Surgery					0.07
Mastectomy	24 (92.3%)	81 (87.1%)	59 (76.6%)	164 (83.7%)	
Lumpectomy	1 (3.8%)	11 (11.8%)	11 (14.3%)	23 (11.7%)	
None	1 (3.8%)	1 (1.1%)	7 (9.1%)	9 (4.6%)	
Radiation	12 (46.2%)	36 (38.7%)	15 (19.5%)	63 (32.1%)	0.007
Endocrine Therapy	23 (88.5%)	76 (81.7%)	58 (75.3%)	157 (80.1%)	0.30
Oncotype Testing	13 (50.0%)	38 (40.9%)	22 (28.6%)	73 (37.2%)	0.09
RS Category					0.002
Low/Intermediate	6 (46.2%)	33 (86.8%)	20 (90.9%)	59 (80.8%)	
High	7 (53.8%)	5 (13.2%)	2 (9.1%)	14 (19.2%)	
Median RS	27 (20-34)	11 (6-15)	14 (9-22)	14 (8-22)	<0.001
Chemotherapy	17 (65.4%)	32 (34.4%)	22 (28.6%)	71 (36.2%)	0.003
CDK4/6 Inhibitor	0 (0%)	3 (3.2%)	1 (1.3%)	4 (2%)	0.49
Anti-HER2 Therapy	0 (0%)	6 (6.5%)	6 (7.8%)	12 (6.1%)	0.35
Median Follow-up[3]	66 (34-181)	58 (36-105)	66 (42-119)	64 (37-113)	0.51
LRR[4]	1 (3.8%)	2 (2.2%)	4 (5.2%)	7 (3.6%)	0.24
Vital Status					0.04
Alive	18 (69.2%)	79 (84.9%)	54 (70.1%)	151 (77%)	
Deceased	8 (30.8%)	14 (15.1%)	23 (29.9%)	45 (23%)	

[1]N (%); Median (Q1, Q3)

[2]Fisher's exact test; Kruskal-Wallis rank sum test; Pearson's Chi-square test

[3]Time in months

Abbreviations: NH, non-Hispanic; RS, recurrence score; LRR, locoregional recurrence

Margins

1486 - Performance of Pegulicianine Fluorescence-Guided Evaluation of Lumpectomy Cavities Following Primary Tumor Excision

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Background/Objective: Lumicell Direct Visualization System is a newly FDA-approved method designed to intraoperatively assess a lumpectomy cavity for residual cancer. Prior multi-center trials implemented pegulicianine fluorescence guidance (PFG) following the excision of the tumor and standard-of-care (SOC) margins at the surgeon's discretion. This study aimed to evaluate the performance of the PFG system immediately following the primary tumor excision before additional surgeon directed (SD) shave margins are excised.

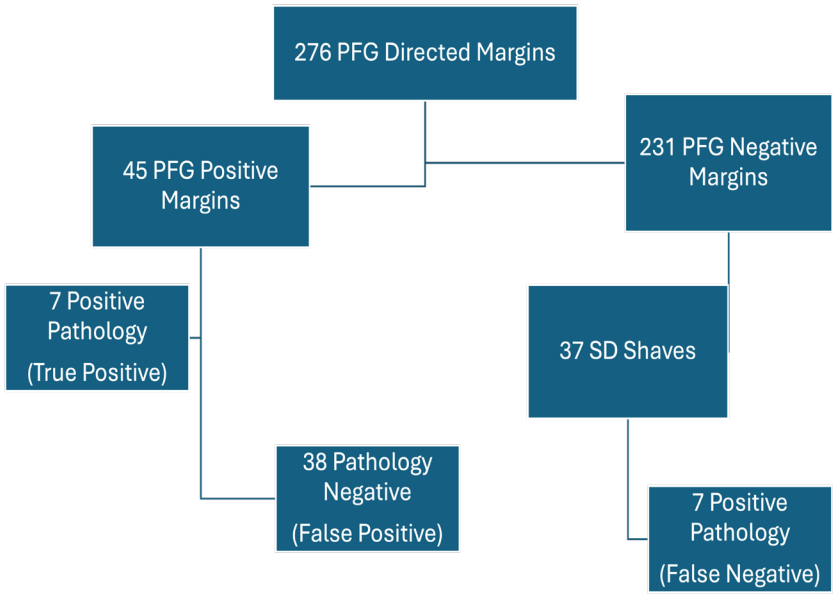
Methods: We prospectively evaluated the first 46 consecutive patients at our institution who underwent lumpectomy with intraoperative PFG guidance following FDA approval. All patients received standard lumpectomy, after which the PFG system was employed to interrogate the cavity margins before any SD margin excisions. If additional SD margins were deemed necessary, these were excised after PFG margins were excised. A positive margin was classified if there was invasive cancer or DCIS at specimen edge, or if <2 mm for DCIS alone. Final pathology results were noted and the diagnostic performance of the PFG system was analyzed.

Results: Mean patient age was 59.9 years (range 36–81). The majority underwent primary surgery, while 12 patients (25%) received neoadjuvant therapy, including 4 with complete pathological response. Histological subtypes included invasive ductal carcinoma in 38 patients (81.3%), invasive lobular carcinoma in 1 patient, and ductal carcinoma in situ (DCIS) in 7 patients (2 with microinvasion). Hormone receptor-positive disease was observed in 39 patients (84.7%), with 2 cases of triple-negative and 5 of HER2-positive breast cancer. Mean interval from preoperative pegulicianine administration to surgery was 3 hours and there were no adverse events reported. Each lumpectomy has six margin orientations. Therefore, for the 46 patients, there were a total of 276 lumpectomy margins in our analysis. Twenty (7.2%) of those margins were pathologically positive. Interrogation of the lumpectomy cavity after tumor excision led to PFG excision of 45 shave margins. Seven of these were found on final pathology to contain tumor cells and were thus defined as a true positive. Strikingly, 4 of these PFG shaves, 6.25% of the total cases) were associated with lumpectomy negative margins, where occult disease was detected that would not have been otherwise discovered. There were 231 negative lumpectomy cavity margins assessed. Additional SD shaves were taken in 37 instances corresponding to the fluorescent negative orientations. Seven of these shaves contained cancer (PFG falsely negative) and 30 were negative on pathology. The negative predictive value (NPV) was calculated to be 97% with a specificity of 85.5% and a positive predictive value (PPV) of 15.6%.

Conclusion: Our sequencing of intraoperative PFG system immediately following lumpectomy to interrogate the cavity was comparable to reported values when PFG surgery was performed following SOC margins1. This increased the PPV from previously reported 9.2% to 15.6%. PFG system is a valuable adjunct in lumpectomy surgery to improve on real time excision of clinically occult disease. 1 Smith BL,

Hunt KK, Carr D, et al. Intraoperative fluorescence guidance for breast cancer lumpectomy surgery. *NEJM Evid*. 2023;2(7):EVIDoa2200333. doi:10.1056/EVIDoa2200333

Figure:



1405 - Is Fluorescence-Guided Breast Cancer Margin Detection the Future?

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Background/Objective: Positive margins in breast-conserving surgery remains a critical challenge with a global average re-excision rate of 20-37%. 5-aminolevulinic acid (5-ALA)-induced-protoporphyrin (PpIX) fluorescence accumulates in malignant cells, but it remains unknown if this can be used to guide breast-conserving surgery (BCS). This study investigated whether breast tumours could be distinguished from healthy breast tissues using 5-ALA, as the first step towards intra-operative margin assessment.

Methods: In a prospective, observational study of 33 breast cancer patients undergoing BCS (72.7%) or mastectomy (27.3%), 28 patients received oral 5-ALA (20mg/kg) and 5 were controls. 91 intra-operative core biopsies were obtained, freshly frozen, and cut into 1,444 sections. A total of 7,525 fluorescent images were registered in spectral range 600-900 nm using excitation at 400-410 nm via modified fluorescence microscope (Olympus IX71). Mean fluorescent intensity (MFI) per image was calculated (ImageJ) and used as diagnostic metrics. Statistical comparisons were performed on Graphpad Prism 10.6.1; paired and unpaired t-tests, Wilcoxon, and Mann–Whitney tests. Diagnostic accuracy was assessed using receiver operating characteristic (ROC) curve analysis.

Results: Administration of 5-ALA led to a significant increase in MFI in tumour compared to healthy tissue (225.1 ± 22.9 a.u. vs 208.1 ± 21.1 a.u.; p = 0.0014, 95% CI –27.07 to –6.71 a.u.), indicating greater PpIX accumulation in malignant tissue. This analysis included both invasive carcinoma and pre-invasive tumours. When analysis was restricted to invasive tumours, the difference remained statistically significant (p = 0.0031). The majority of tumours were invasive ductal carcinoma (82%), with 12% lobular and 6% mixed histology as shown in Table 1 and were predominantly oestrogen (ER)+ (88 %), progesterone (PR)+ (76 %), and Herceptin receptor (HER2)- (84%). ROC analysis demonstrated diagnostic accuracy (AUC = 0.73, 95% CI 0.60–0.86; p = 0.0017) with 76% sensitivity and 69% specificity at the optimal cut-off. When values were averaged across the tumour biopsies per patient and compared to healthy tissue, MFI remained higher (225.1 ± 22.9 vs 208.1 ± 21.1 a.u.; mean paired difference 17.0 ± 9.1 a.u. however, this did not reach significance (p = 0.0717). In control patients, no difference in fluorescence was observed between tumour and healthy tissue (210.9 ± 22.8 vs 217.3 ± 16.8 a.u.; p = 0.31).

Conclusion: 5-ALA significantly increased tumour fluorescence compared with healthy breast tissue supporting the potential application of 5-ALA-induced PpIX fluorescence for intra-operative margin assessment and reducing the need for re-excisions.

Table:

Patient demographics		**n = 33**	**%**
Age range (median)		41-80 (60)	
Weight range (median) / kg		41-122 (69.8)	
Tumour size range (median) / mm		11-93 (20)	
Tumour weight range (median) / g		9-2430 (43)	
Breast density	A	4	12.1
	B	5	15.2
	C	14	42.4
	D	6	18.2
	Unclear	4	12.1
Procedure	BCS	24	72.7
	Mastectomy	9	27.3
Dose of 5-ALA range (median)		27-81 (46)	
Time from 5-ALA ingestion to imaging range (median) / mins		77- 548 (284)	
Lymph node	Positive	7	21.2
	Negative	26	78.8
Hormone status			
ER	Positive	26	78.8
	Negative	5	15.2
	N/A	2	6.1
PR	Positive	22	66.7
	Negative	9	27.3
	N/A	2	6.1
HER-2	Positive	4	12.1
	Negative	27	81.8
	N/A	2	6.1
Tumour histology	Adenoid cystic	1	3.0
	IDC	17	51.5
	Mixed	8	24.2
	ILC	3	9.1
	Micropapillary	1	3.0
	Only in situ disease	2	6.1
	No tumour	1	3.0
Grade	1	7	21.2
	2	18	54.5
	3	6	18.2
	N/A	2	6.1
Positive margins		9	27.3
Re-excision		6	18.2
Tumour in re-excised margin		3	9.1

1355 - Advancing Margin Assessment: Intraoperative 3D Imaging Leads to Reduced Margin Positivity Compared with 2D Imaging in Breast-Conserving Surgery

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Background/Objective: Achieving negative margins remains a key determinant of oncologic safety in breast-conserving surgery (BCS) for both invasive ductal carcinoma (IDC) and ductal carcinoma in situ (DCIS). Positive as well as close margins are associated with increased local recurrence risk and often necessitate re-operation, adversely affecting both patient outcomes and healthcare efficiency. Intraoperative specimen imaging is a critical adjunct for margin assessment, yet studies comparing 2D and 3D modalities remain limited. This study aims to compare intraoperative 2D versus 3D specimen imaging in patients undergoing BCS for IDC and DCIS, focusing on rates of positive or close margins and the need for re-operation.

Methods: A multicenter retrospective cohort study was conducted of consecutive patients with IDC or DCIS who underwent BCS from 2021 to 2025. Exclusion criteria included multifocal or multicentric disease. Patients with IDC with or without DCIS were categorized as IDC while patients with DCIS only pathology were categorized as DCIS. Patients were then grouped according to 2D (Hologic BioVisionTM) versus 3D (Clarix Imaging VSI-360TM) intraoperative specimen imaging modality. Margin positivity was defined as tumor present at the inked margin for IDC as well as DCIS. Close margin was defined as <1 mm for IDC and <2 mm for DCIS from the inked margin. Clinicopathological features and perioperative outcomes were compared using Fisher's exact test or Chi-squared test for categorical variables, and Mann-Whitney test for continuous variables.

Results: 448 patients were included in the study with 372 in the IDC group and 76 patients in the DCIS group. In the IDC group, 201 patients had intraoperative 2D imaging and 171 patients had 3D imaging. Patients that underwent 3D imaging were older, though this was not statistically significant (p = 0.36). While patients had a smaller median tumor size (9.0 [3.0 – 16.0] vs. 12.0 [6.0 – 20.0] cm; p = 0.0220) in the 3D imaging group, there was no meaningful difference in tumor stage (p = 0.20). Patients that underwent 2D imaging were more likely to have lymphovascular invasion (13.4% vs. 7.0%, p = 0.0607); however, that was no difference in the presence of nodal disease (12.4% vs 9.9%, p = 0.51). Intraoperative 3D imaging resulted in a significant reduction in positive or close margins (20.5% vs. 34.3%, p = 0.0043), with a statistically significant difference in positive margins (8.8% vs. 15.4%, p = 0.0485). This likewise resulted in a reduction in re-operation rates (7.6% vs. 16.4%, p = 0.0157) with an emphasis on decreased re-excision rates (6.4% vs. 13.4%, p = 0.0404).

In the DCIS group, 35 patients had intraoperative 2D imaging and 41 patients had 3D imaging. Similarly, patients that underwent 3D imaging were older (p = 0.0032). There was no difference in tumor size (p = 0.89). Intra-operative 3D imaging resulted in a similar >10% reduction in positive or close margins (36.6% vs. 48.6%, p = 0.41). Analysis of margin positivity alone demonstrated a substantial 17% reduction using 3D imaging (2.4% vs. 20.0%, p = 0.0209). This difference was similarly noted with the rates of re-operation (4.9% vs. 37.1%, p = 0.0005), again with an emphasis on decreased re-excision rates (4.9% vs. 31.4%, p = 0.0044).

Conclusion: Intraoperative 3D specimen imaging for margin assessment during breast-conserving surgery was associated with >10% decrease in positive or close margins compared to 2D imaging. Margin positivity was markedly decreased for both cohorts using 3D imaging. This improvement translated to lower re-operation rates, with a significant reduction in re-excision rates for both IDC and DCIS. Greater emphasis should be placed on integrating intraoperative 3D specimen imaging to improve patients' outcomes. Validation in multi-institutional prospective cohorts will be essential to confirm these findings.

Table:

Invasive Ductal Carcinoma	2D imaging (n = 201)	3D imaging (n = 171)	p-value
Age (years)	66.0 [57.0 – 74.0]	69.0 [58.0 – 75.0]	0.36
Tumor Size (mm)	12.0 [6.0 – 20.0]	9.0 [3.0 – 16.0]	**0.0220**
Tumor Stage			0.20
T0	22 (10.9%)	21 (12.3%)	
T1/T2	175 (87.1%)	150 (87.7%)	
T3/T4	4 (2.0%)	0	
Positive / Close Margins	69 (34.3%)	35 (20.5%)	**0.0043**
Positive	31 (15.4%)	14 (8.8%)	**0.0485**
Close	38 (18.9%)	21 (12.3%)	0.11
Re-operation	33 (16.4%)	13 (7.6%)	**0.0157**
Re-excision	27 (13.4%)	11 (6.4%)	**0.0404**
Mastectomy	6 (3.0%)	2 (1.2%)	0.30
Ductal Carcinoma in Situ	**2D imaging (n = 35)**	**3D imaging (n = 41)**	**p-value**
Age (years)	60.0 [55.0 – 68.0]	68.0 [62.0 – 73.0]	**0.0032**
Tumor Size (mm)	16.0 [8.0 – 24.0]	15.0 [8.0 – 24.0]	0.89
Positive / Close Margins	17 (48.6%)	15 (36.6%)	0.41
Positive	7 (20.0%)	1 (2.4%)	**0.0209**
Close	10 (28.6%)	14 (34.2%)	0.78
Re-operation	13 (37.1%)	2 (4.9%)	**0.0005**
Re-excision	11 (31.4%)	2 (4.9%)	**0.0044**
Mastectomy	2 (5.7%)	0	0.21

1206 - The Impact of Neoadjuvant Therapy Type on Positive Margin Rates in Patients with Invasive Lobular Carcinoma in the National Cancer Database

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Background/Objective: Invasive lobular carcinoma (ILC) exhibits unique histopathological characteristics including a diffuse growth pattern that can negatively impact surgical outcomes. Positive margins at surgical excision are common, leading to higher rates of re-excision and completion mastectomy compared to invasive ductal carcinoma. Neoadjuvant therapy may help reduce positive margins, but the optimal type remains unclear. Studies suggest lower response rates to neoadjuvant chemotherapy (NAC) in those with ILC, possibly due to low molecular risk in most ILC cases, reflected in the high proportion of hormone receptor-positive (HR+)/HER2- disease. However, ILC often presents at higher stages due to reduced sensitivity of mammography. Consequently, it is unclear whether preoperative systemic therapy should employ neoadjuvant endocrine therapy (NET) or NAC. Our

primary goal was to compare positive margin rates in patients with HR+/HER2- ILC who received NET versus NAC.

Methods: We identified all patients with HR+/HER2- ILC who received neoadjuvant therapy with either NET or NAC from the 2004-2021 Participant User Files of the National Cancer Database (NCDB). Patients who did not undergo surgery after neoadjuvant therapy and those who received both NET and NAC were excluded (n=359,284). Variables included type of surgery (breast-conserving surgery [BCS] versus mastectomy), clinical T, pathologic T and N stage, histologic grade, age, and presence of lymphovascular invasion (LVI). Clinicopathologic characteristics between the NET and NAC cohorts were compared using t-tests and chi-square tests. Multivariable logistic regression models adjusted for pre-specified covariates (clinical T stage, pathologic N stage, grade, age, and LVI) were used to compare odds of positive margins by neoadjuvant treatment strategy. In order to minimize confounding by indication, a restriction approach was implemented and subgroup analyses were restricted to patients with comparable disease stage and tumor characteristics, stratified by type of surgery.

Results: Among 15,706 patients with HR+/HER2- ILC, 6,118 (39%) received NET and 9,588 (61%) received NAC. Patients in the NET cohort were older than those in the NAC cohort (mean age 66 versus 55 years) and had more clinical T0/1 tumors (33% versus 17%), node-negative disease (49% versus 28%), grade 1 tumors (27% versus 17%), and less LVI (69% without LVI versus 54%) (all $p<0.001$). Additionally, patients who received NET were more likely to undergo BCS versus mastectomy compared to those receiving NAC (39% versus 19%, $p<0.001$). Overall, 1,694 (11%) patients had positive margins. Compared to those with negative margins, patients with positive margins were significantly older (mean age 63 versus 59 years), had more clinical T3/T4 tumors (45% versus 34%), node-positive disease (45% versus 43%), and higher rates of LVI (25% versus 17%), and underwent more BCS compared to mastectomy (32% versus 26%) (all $p<0.001$). On unadjusted analysis, positive margins occurred in 11% of patients who received NET (12% among BCS patients and 10% among mastectomy patients), and in 11% of patients receiving NAC (13% among BCS patients, and 10% among mastectomy patients). On multivariable analysis in the full cohort, NET and NAC were associated with similar odds of positive margins (OR 1.08, 95% CI 0.96-1.21, $p=0.19$). However, subgroup analyses revealed that NET was associated with higher odds of positive margins among patients with T3/T4 tumors particularly after mastectomy (OR 1.29, 95% CI 1.02-1.64, $p=0.03$), node-negative disease after BCS (OR 1.46, 95% CI 1.02-2.09, $p=0.04$), and in patients ≥50 years (OR 1.20, 95% CI 1.07-1.36, $p=0.002$).

Conclusion: Among patients with HR+/HER2- ILC, positive margin rates were comparable between patients treated with NET and NAC overall. However, NET was associated with higher odds of positive margins in selected subgroups, including patients with larger tumors, node-negative disease, and older age. These findings may reflect the infiltrative growth pattern of ILC and its non-concentric response to NET, which can make complete excision challenging. Importantly, these findings also suggest that certain subgroups within ILC may benefit from NAC. The use of molecular assays might identify these patients and will be explored in future analyses. Identifying factors that can guide treatment selection is an unmet need for those with ILC, both in regards to optimizing surgical outcomes and to prevent recurrence.

NAC

1487 - Pathologic Complete Response After Neoadjuvant Therapy for Breast Cancer: Outcomes from a Rural Community-Based Academic Setting

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Background/Objective: Pathologic complete response (pCR) following neoadjuvant therapy (NAT) is associated with improved outcomes in high-risk breast cancer. Pembrolizumab for triple-negative breast cancer (TNBC) and dual HER2 blockade for HER2-positive ($HER2^+$) disease have improved pCR rates in trials. Real-world results from rural community-based academic centers remain limited.

Methods: Retrospective chart review of breast cancer patients who received NAT between 2015-2025 at a rural community-based academic center. Collected variables include demographics, receptor status, chemotherapy regimen, pCR (ypT0/is, ypN0), residual cancer burden (RCB), surgical management, recurrence, and death. Subtype-specific cohorts were analyzed as TNBC and $HER2^+$. TNBC regimens: Doxorubicin and cyclophosphamide followed by a taxane (AC-Taxane) or dose-dense doxorubicin/cyclophosphamide followed by paclitaxel (ddAC-T) ± carboplatin; pembrolizumab was incorporated for eligible patients after July 2021 following FDA approval (KEYNOTE-522 protocol). $HER2^+$ regimens: Docetaxel, carboplatin, and trastuzumab (TCH); docetaxel, carboplatin, trastuzumab, and pertuzumab (TCHP); or anthracycline-taxane sequences (e.g., doxorubicin/cyclophosphamide followed by paclitaxel or docetaxel) ± trastuzumab ± pertuzumab (AC-TH/AC-THP). Breast procedures were categorized as breast-conserving therapy (BCT), unilateral mastectomy, or bilateral mastectomy. Axillary procedures were classified as sentinel lymph-node biopsy (SLNB) or axillary lymph-node dissection (ALND). Statistical analyses were performed using chi-square or Fisher's exact tests, with significance defined as $p \leq 0.05$.

Results: 153 patients with TNBC (n = 68) or $HER2^+$ (n = 85) disease were analyzed. Each subtype was further divided by treatment era to reflect the adoption of pembrolizumab (TNBC) and pertuzumab ($HER2^+$). When analyzed by treatment era, response trends reflected the adoption of pembrolizumab for TNBC and pertuzumab for $HER2^+$ disease, aligning with the enhanced pCR rates reported in the KEYNOTE-522 and NeoSphere/Tryphaena studies. TNBC: Among 68 TNBC patients, 39 received standard anthracycline–taxane regimens prior to 2021 (pre-Keynote) and 29 were treated with pembrolizumab-based (post-Keynote). The pCR occurred in 46% of pre-Keynote patients and 52% post-Keynote ($p = 0.81$). The rate of low residual burden (RCB-0/I) rose from 54% to 69% ($p = 0.22$), reflecting a directional improvement in pathologic response. Extensive residual disease (RCB-III) decreased modestly (23% to 17%). BCT increased from 31% to 55% ($p = 0.39$). Recurrences were numerically lower post-Keynote (10% vs 3%; $p = 0.31$), follow-up in the immunotherapy era was shorter. One death occurred in the pre-Keynote group; none occurred post-Keynote. $HER2^+$: Of 85 $HER2^+$ patients, 17 received trastuzumab alone (pre- pertuzumab) and 68 received dual blockade with trastuzumab + pertuzumab. The pCR was achieved in 47% pre- pertuzumab and 43% with dual blockade ($p = 0.79$). Rates of low residual burden were nearly identical (56% vs 57%; $p = 1.00$). BCT was performed in 53% and 40%, respectively ($p = 0.88$). Recurrence rates 12% vs 7%, respectively ($p = 0.62$), and no deaths occurred. Comparative patterns across subtypes: Across both molecular groups, observed pCR rates (46–52% in TNBC; 43–47% in $HER2^+$) mirrored those reported in KEYNOTE-522 (64.8% TNBC) and NeoSphere (45.8% $HER2^+$). RCB class distribution suggested that TNBC patients had a higher proportion of extensive residual disease

(RCB-III) than HER2⁺ (20.6% vs 7.1%). Axillary dissection was required in 27.9% of TNBC vs 0% of HER2⁺ patients.

Conclusion: In this rural community-based academic center, NAT produced pCR rates in TNBC and HER2⁺ breast cancer comparable to those reported in pivotal trials. The adoption of pembrolizumab for TNBC was associated with higher rates of complete or near-complete pathologic response, aligning with the improved outcomes demonstrated in KEYNOTE-522. In contrast, HER2⁺ patients treated with dual HER2 blockade achieved pCR rates similar to those historically observed with trastuzumab-based regimens, consistent with the NeoSphere and Tryphaena trials. The higher axillary dissection rate in TNBC versus HER2⁺ disease (27.9% vs 0%) suggests differing patterns of nodal involvement between subtypes. Recurrence events were largely confined to patients with residual disease, rather than those who achieved pCR. Achieving a pCR correlated with excellent short-term prognosis across both subtypes, emphasizing its clinical value as a surrogate for long-term outcomes. These findings demonstrate that high-quality neoadjuvant outcomes traditionally achieved at large academic centers can also be replicated in community-based academic programs, where such care is more accessible to the population at large. In these settings, patients do not need to seek treatment at tertiary centers to receive high-quality neoadjuvant therapy; comparable outcomes can be attained locally, reinforcing the importance of equitable access to modern systemic therapies and advancing health equity through accessible, community-delivered care.

Table 1. Comparison of triple-negative breast cancer vs. HER2-positive cohorts after neoadjuvant therapy (NAC).

TNBC Cohorts			
Variable	**Pre-Keynote (TNBC) (n = 39)**	**Keynote-like (+ Pembro) (TNBC) (n = 29)**	***p-value***
Age (mean ± SD, y)	57.4 ± 12.4	53.0 ± 13.1	0.17
Race n (%)	White 0 (0%) • Black 0 (0%) • Asian 0 (0%) • Hispanic 37 (95%) • Other 2 (5%)	White 1 (3%) • Black 0 (0%) • Asian 0 (0%) • Hispanic 28 (97%) • Other 0 (0%)	—
Hormone receptor (ER/PR) status n (%)	ER– / PR– / HER2– (100%)	ER– / PR– / HER2– (100%)	—
Regimen type n (%)	ddAC-T 9 (23%) • AC-T 31 (79%) • +Carbo 0 (0%) • KEYNOTE-522 0 (0%)	ddAC-T 1 (3%) • AC-T 1 (3%) • +Carbo 0 (0%) • KEYNOTE-522 29 (100%)	—
pCR (ypT0/is ypN0) n (%)	18 (46%)	15 (52%)	0.81
Residual Cancer Burden class (0 / I / II / III) n (%)	RCB-0 19 (49%) • I 2 (5%) • II 9 (23%) • III 9 (23%)	RCB-0 17 (59%) • I 3 (10%) • II 4 (14%) • III 5 (17%)	0.58
RCB Group n (%): Low (0/I) vs High (II/III)	Low (RCB-0/I) 21 (54%) • High (RCB-II/III) 18 (46%)	Low (RCB-0/I) 20 (69%) • High (RCB-II/III) 9 (31%)	0.22
Breast surgery n (%)	BCT 12 (31%) • UMx 25 (64%) • BMx 6 (15%)	BCT 16 (55%) • UMx 17 (59%) • BMx 5 (17%)	0.39
Axillary surgery n (%)	ALND 11 (28%) • SLNB 28 (72%)	ALND 8 (28%) • SLNB 21 (72%)	1.00
Recurrence n (%)	1 (3%)	3 (10%)	0.31
Death n (%)	1 (3%)	0 (0%)	1.00
HER2⁺ Cohorts			
Variable	**Pre-Perjeta (H only) (n = 17)**	**Dual Blockade (H + P) (n = 68)**	***p-value***
Age (mean ± SD, y)	56.2 ± 13.7	55.0 ± 10.5	0.74
Race n (%)	White 0 (0%) • Black 0 (0%) • Asian 1 (6%) • Hispanic 15 (88%) • Other 1 (6%)	White 0 (0%) • Black 0 (0%) • Asian 0 (0%) • Hispanic 63 (93%) • Other 5 (7%)	—
Hormone receptor (ER/PR) status n (%)	HR+ 11 (65%) • HR- 6 (35%)	HR+ 53 (78%) • HR- 15 (22%)	0.35
HR-positive (ER and/or PR ≥1%)	11 (65%)	53 (78%)	—
ER+ / PR+	9 (53%)	38 (56%)	—
ER+ / PR-	2 (12%)	15 (22%)	—
ER- / PR+	0 (0%)	0 (0%)	—
HR-negative (ER<1% and PR<1%)	6 (35%)	15 (22%)	—
Regimen type n (%)	TCH 2 (12%) • AC-TH 9 (53%) • TCHP 0 (0%) • AC-THP 0 (0%)	TCH 0 (0%) • AC-TH 24 (35%) • TCHP 42 (62%) • AC-THP 5 (7%)	—
pCR (ypT0/is ypN0) n (%)	8 (47%)	29 (43%)	0.79
Residual Cancer Burden class (0 / I / II / III) n (%)	RCB-0 7 (44%) • I 2 (12%) • II 6 (38%) • III 1 (6%)	RCB-0 31 (46%) • I 7 (10%) • II 24 (36%) • III 5 (7%)	0.99
RCB Group n (%): Low (0/I) vs High (II/III)	Low (RCB-0/I) 9 (56%) • High (RCB-II/III) 7 (44%)	Low (RCB-0/I) 38 (57%) • High (RCB-II/III) 29 (43%)	1.00
Breast surgery n (%)	BCT 9 (53%) • UMx 12 (71%) • BMx 2 (12%)	BCT 27 (40%) • UMx 43 (63%) • BMx 9 (13%)	0.88
Axillary surgery n (%)	ALND 0 (0%) • SLNB 17 (100%)	ALND 0 (0%) • SLNB 68 (100%)	1.00
Recurrence n (%)	2 (12%)	5 (7%)	0.62
Death n (%)	0 (0%)	0 (0%)	1.00

1. Age: mean ± SD at diagnosis (one decimal); Welch's t-test.
2. Race n (%): Categories shown as White, Black/African American, Asian, Hispanic (from Spanish/Hispanic Origin field, overriding race), and Other (includes multiracial, Native American/Alaska Native, Pacific Islander, unknown/unreported). Pearson chi-square (5×2).
3. Hormone receptor (ER/PR): IHC per ASCO/CAP 2020; positivity defined as ≥1% nuclei. TNBC = ER−/PR−/HER2−.
4. pCR (ypT0/is ypN0): Fisher's exact (two-sided).
5. Residual Cancer Burden (RCB) class: 0 = RCB-0 (no residual invasive cancer; pCR), I = minimal residual disease (near-pCR), II = moderate residual disease, III = extensive residual disease. Class distribution (0/I/II/III) compared with Pearson chi-square (4×2).
6. RCB Group: 0 = Low burden (RCB-0/I), 1 = High burden (RCB-II/III); compared with Fisher's exact (2×2).
7. Surgery abbreviations: BCT = breast-conserving therapy; UMx = unilateral mastectomy; BMx = bilateral mastectomy. Axillary: ALND = axillary lymph node dissection; SLNB = sentinel lymph node biopsy.

1364 - Schwann Cell Score Associates with Immune-Enriched Tumor Microenvironment and Better Response to Neoadjuvant Therapy in Triple-Negative Breast Cancer

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Background/Objective: Multiple landmark studies in recent years have demonstrated that the peripheral nerves in the tumor microenvironment play an active role in cancer initiation and progression. Schwann cells, the most abundant glial cells in the peripheral nervous system, ensheath axons with myelin sheaths to protect them and enable saltatory conduction. In pancreatic and gastrointestinal cancers, increasing evidence has suggested that Schwann cells modulate the tumor microenvironment and promote cancer progression. However, their role in breast cancer remains unknown. In this study, we hypothesized that Schwann cells are associated with characteristic tumor microenvironment and response to therapies in triple-negative breast cancer (TNBC), the most aggressive breast cancer subtype.

Methods: Transcriptomic and clinical data were obtained from the TCGA-BRCA cohort (n = 1081), METABRIC cohort (n = 2509), and Scan-B cohort (n = 3409) as a validation cohort. For treatment response analysis, publicly available neoadjuvant chemotherapy cohorts (GSE194040, GSE25066, GSE163882, GSE123845, GSE20271, GSE230881 and GSE41998) were utilized. Signature genes for Schwann cells were obtained from Tabula Sapiens portal using OnClass, and the GSVA score using the signature genes was defined as Schwann cell (SC) score. Cohorts were divided to high and low SC score groups by the median. Associations of the SC score with clinicopathologic variables, genomic features, immune landscape, treatment response, and prognosis were evaluated.

Results: The SC score was highest in TNBC among the subtypes, and it positively correlated with Schwann cell marker gene expressions including S100B, MBP and EGR2, but not with the expression of pan-neuronal marker genes such as TUBB3 and NEFL. Although the SC score was positively associated with histological grade, it showed no association with MKI67 expression nor with Hallmark cell proliferation-related pathways in GSEA in TNBC of any of the cohorts. There was no association between the SC score and genomic instability, including mutation burden, homologous recombination deficiency, implicating that innervation of tumor is not linked with genomic characteristics of cancer cell in patients. In contrast, many Hallmark immune response-related pathways such as interferon gamma response, interferon alpha response, inflammatory response, allograft rejection, IL6 and IL2 signaling and TNF alpha signaling were enriched to SC score- high group. Consistently, there were significant infiltration of CD8+ T cells, B cells, Dendritic cells and macrophages in the SC score- high group, suggesting that a high SC score associates with an immune active tumor microenvironment. To validate this association, we analyzed TNBC cohorts treated with neoadjuvant chemotherapy (NAC). In the cohort in which patients received NAC with immune checkpoint inhibitor, the SC score was higher in patients who achieved pathological complete response (pCR). Consistently, in the anthracycline-based NAC cohorts, the SC score was higher in pCR patients. Despites previous reports suggesting the association of Schwann cells and poor prognosis in other solid tumors, the SC score associated with favorable prognosis in TNBC.

Conclusion: Schwann cell score was associated with immune-enriched tumor microenvironment, better response to neoadjuvant therapy, and better survival in triple-negative breast cancer.

1338 - Update on Upstaging from cT1 to pT2 in Triple-Negative and HER2-Positive Breast Cancer After Implementation of 15mm T1C Threshold for Primary Surgery

Madyson Riddell[1], Jessica Bensenhaver[1], Ena Muhamedovic[1], Hemi Thaker[1], Christine Joliat[1], Theresa Schwartz[1], Anna Lehrberg[1], Laura Dalla Vecchia[1], Saul Nathanson[1], Laura Susick[1], Lindsay Petersen[1], Haythem Ali[1]

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Background/Objective: The use of neoadjuvant chemotherapy (NAC) is considered for all subtypes of BC ≥T2 or >N0. In TN and Her2+ BC cases, this decision is also driven by the availability of adjuvant therapies for patients with residual disease post NAC, which have been shown to impact survival. Primary surgery is the standard approach for cT1N0 TN and Her2+ BC. However, pathologic stage may be discordant with clinical stage, revealing pT2 or higher that would have benefited from NAC had they been identified as cT2. We previously defined our pT2 upstage rate as 13.5%. Further, we identified that utilizing a cT1 size threshold of <15 mm for upfront surgery would result in a lower rate of upstage to pT2 (4.4%). This was implemented in 2023. We aim to evaluate our primary surgery upstage rate from cT1 to pT2 based on implementation of the 15 mm threshold.

Methods: Our institutional IRB approved prospective breast cancer database was queried for all cT1N0 TN or HER2+ cases undergoing primary surgery from 2023 to 2024. Patient demographics, clinical characteristics, tumor biology, and clinical/pathologic staging were recorded. All analyses were performed using Staistica.

Results: We identified 112 cT1 cases, 9 were excluded by defined criteria, leaving 103 for analysis. Based on diagnostic breast imaging, 12 were cT1a, 35 were cT1b, and 56 were cT1c. Six cases (5.8 %) were upstaged from cT1 to pT2. Of these, 5 (83%) were cT1c, 2 (33%) of these cT1c cases were ≥ 15 mm based on preoperative imaging, and 3 (50%) had lobular histology. On univariate analysis, the only significant predictor of pT2 upstaging for the entire population was size (<0.001). Using a threshold for cT1 cases of < 15 mm rather than ≤20 mm for primary surgery in our population has decreased our pT2 upstage rate for primary surgery cases from 13.5% to 5.8% (p<0.0001). Of note lobular histology was present in 3 of the 6 cases that were upstaged to pT2. Our study is limited by the inability to know which of our cT1c ≥ 15 mm cases who received NAC would have been pT1c.

Conclusion: Improved identification of the cT1 TN or Her2+ BC cases that are likely to upstage to pT2 is critical, as it has the potential to significantly impact survival outcomes due to the improved pathologic complete response rate with NAC for T2 tumors and the ability to salvage patients with residual disease with adjuvant therapy. Identifying and implementing a cT1 size threshold of <15 mm for upfront surgery decreased our primary surgery pT2 upstage rate from 13.5% to 5.8%, resulting in appropriate implementation of NAC for patients who would have otherwise lost the impact on survival associated with identification of suboptimal response to therapy. We believe consideration of NAC for cT1c cases ≥ 15mm may significantly impact outcomes. Further studies are needed to better predict pT-stage in cT1c cases as well as further characterizing the histopathological features closely associated with clinical/pathological discordance of T stage.

Figure:

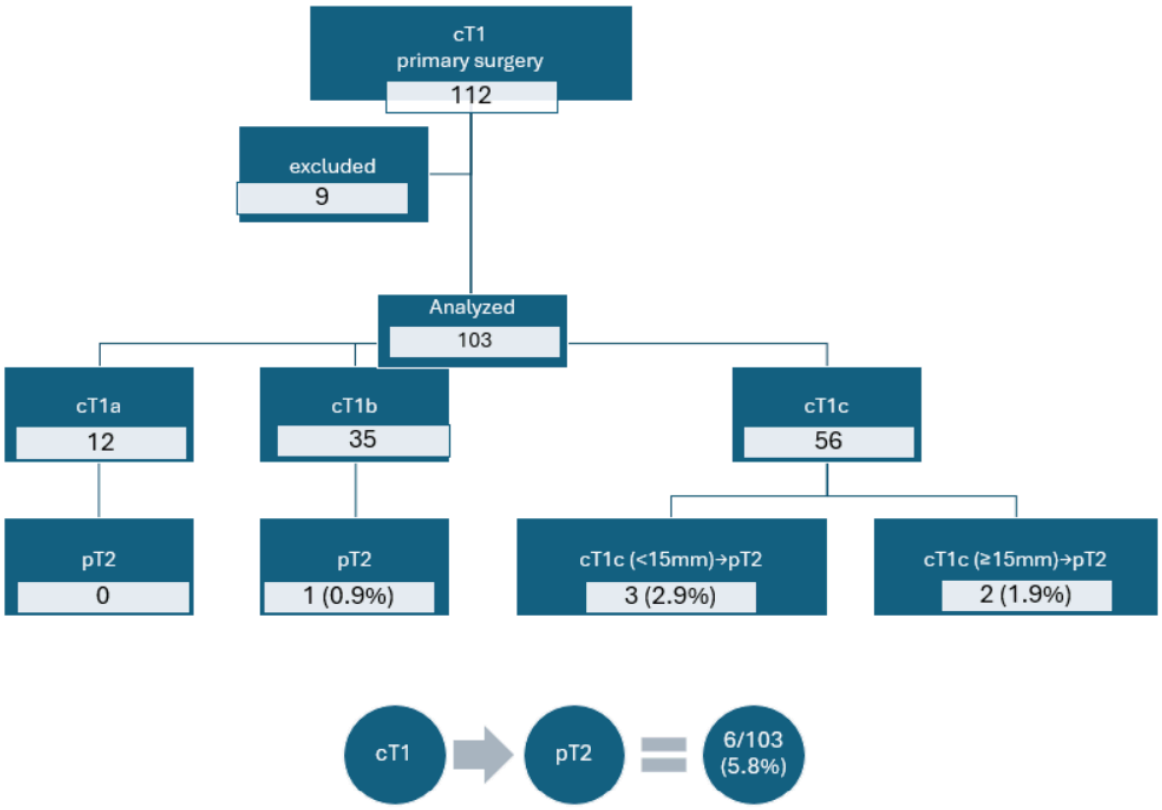

Figure 1: cT1 cN0 triple negative and Her2-positive patients treated with primary surgery

1226 - Oncological Outcomes of Breast-Conserving Surgery Versus Mastectomy Following Neoadjuvant Chemotherapy in a Single Centre

Dorsa Mousadoust[1], Rebecca Warburton[2], Jin-Si Pao[2], Carol Dingee[2], Amy Bazzarelli[2], Jieun Newman-Bremang[2], Melina Deban[2], Elaine McKevitt[2]

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Background/Objective: Neoadjuvant chemotherapy (NAC) has been used to downsize tumors, expanding eligibility for breast-conserving surgery (BCS). However, concerns remain regarding higher rate of positive margins and locoregional recurrence (LRR), particularly in patients initially planned for mastectomy who convert to BCS after NAC. The objective of this study was to evaluate the recurrence and survival outcomes in women undergoing BCS vs mastectomy following NAC in a contemporary single-centre cohort of patients.

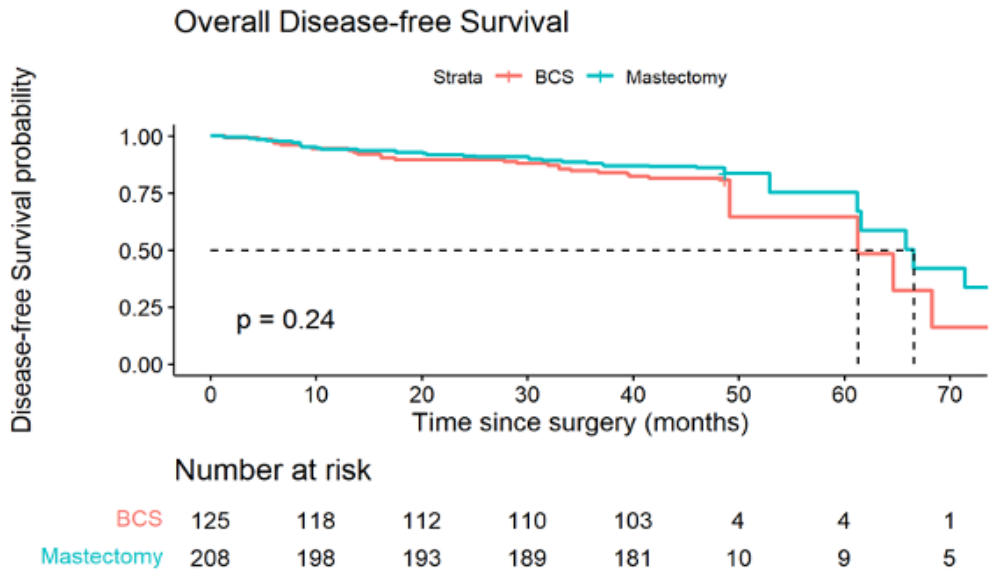
Methods: A retrospective review identified patients who underwent BCS or mastectomy following NAC between 2012-2020. Patients with prior breast cancer, inflammatory breast cancer or incomplete NAC

were excluded from the study. Clinicopathology characteristics, pathologic compete response (pCR), and oncologic outcomes were compared between groups using chi-square and Kaplan-Meier analyses.

Results: A total of 333 patients were included: 125 (37.5%) underwent BCS and 208 (62.5%) mastectomy. Patients in the mastectomy group were younger and more likely to be clinically node-positive pre-NAC (76.4% vs 58.4%, p=0.0019). Total and breast pCR rates did not differ, although axillary pCR was higher in the BCS group. Positive margins were more frequent after BCS (14.4% vs 1%, p< 0.001). After a mean follow up of 56.2 months, LRR and DR rates were comparable between mastectomy and BCS (3.4% vs 6.4%; p=0.20 and 14.9% vs 13.6%; p=0.74, respectively). Of the 8 LRR events after BCS, 6 were ipsilateral breast and 2 axillary. Disease-free survival (DFS) did not differ between BCS and mastectomy groups among patients achieving breast or nodal pCR. Overall DFS and breast cancer-specific survival were also similar between groups.

Conclusion: This study demonstrated that, in a contemporary cohort of patients receiving NAC, BCS provides comparable recurrence and survival outcomes and represents a safe alternative to mastectomy. Despite higher rates of margin positivity, LRR rates were not increased, consistent with other recent institutional and multicenter studies. These findings support ongoing efforts to individualize and de-escalate breast surgery in appropriately selected patients achieving good response to NAC.

Figure:



1197 - Patterns of Surgical Management and Immunotherapy Use in Triple-Negative Metaplastic Breast Cancer: A Single-Institution Retrospective Analysis

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Background/Objective: Our study sought to examine rates of pCR in the breast and axilla and conversion to BCS eligibility among patients with TN MpBC treated with NACI compared with NAC alone. Given the chemoresistant nature of TN-MpBC and the established benefit of the KEYNOTE-522 regimen in conventional triple-negative breast cancer, we hypothesized that NACI may improve pCR and BCS rates in TN-MpBC compared with NAC alone.

Methods: A retrospective review was conducted of TN-MpBC patients treated at a single institution from 2015–2025. Patients with de novo stage IV disease and those with incomplete data were excluded. Clinicopathologic details and treatment details were collected. The primary endpoint was rate of pCR after NACI vs. NAC. The secondary endpoint was BCS rate. Disease progression was defined as worsening disease based on radiologic or clinical assessment. Statistical analyses were performed using Fisher's exact and chi-square tests.

Results: Fifty patients with TN-MpBC were included; 16 patients (32%) were treated with neoadjuvant systemic therapy and 34 (68%) underwent upfront surgery. Patient and tumor characteristics were well-balanced across the two groups. The majority of patients were grade III (88%), tumor histology included the following: spindle cell (22%); squamous cell (20%); and matrix-producing variants (20%). Patients treated with neoadjuvant systemic therapy presented with higher clinical stage compared with those undergoing upfront surgery, including greater nodal involvement (N1: 12% vs. 0%; p=0.023) and larger T2 lesions (31% vs. 15%, p= 0.21). Among those treated with neoadjuvant systemic therapy, 6 patients (37.5%) received NACI and 10 patients (62.5%) NAC alone. The overall pCR rate was 12.5%, with no difference between the NACI and NAC groups (17% vs. 10%; p>0.99). Disease progression occurred in 33% vs. 50%, respectively (p=0.633). Recurrence occurred in 33% of patients treated with NACI and 0% of those treated with NAC (p=0.125). BCS was achieved in 38% of those treated with neoadjuvant therapy compared with 25% of the primary surgery group (p=0.538). No associations were observed between pCR and demographic or tumor characteristics.

Conclusion: Compared with NAC, NACI used in the treatment of TN MpBC did not result in an increase in pCR or BCS rates and a third of patients developed disease progression during treatment. These results underscore the chemoresistant nature of TN MpBC. These findings highlight the persistent chemoresistant nature of TN-MpBC and contrast the robust responses seen in conventional triple-negative breast cancer within the KEYNOTE-522 trial, suggesting that the benefits of chemo-immunotherapy may not extend to this histologic subtype. Continued efforts are critically needed to accurately distinguish exceptional responders from non-responders using novel radiomics and molecular based assays.

Table 1. Comparison of outcomes between patients treated with neoadjuvant chemotherapy (NAC) vs. neoadjuvant chemoimmunotherapy (NACI)

Treatment	NACI n= 6	NAC n=10	p-value
Breast surgery			0.587
Mastectomy	5 (83%)	6 (60%)	
Lumpectomy	1 (17%)	4 (40%)	
pCR	1 (17%)	1 (10%)	>0.99
Completed treatment	3 (50%)	7 (70%)	0.606
Disease progression	2 (33%)	3 (30%)	0.633
Recurrence	2 (33%)	0 (0%)	0.125

1194 - Recent Trends of Neoadjuvant Chemotherapy in HER2-Positive and Triple-Negative Breast Cancer: A Population-Based Study

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Background/Objective: Neoadjuvant chemotherapy (NAC) has been shown to offer a disease-free and overall survival advantage in patients with HER2 positive (HER2+) and triple-negative breast cancer (TNBC) that achieve a pathologic complete response (pCR). The aim of this study was to examine trends in NAC over time for these breast cancer subtypes and identify potential barriers.

Methods: A population-based retrospective cohort study was conducted using linked provincial health administrative data accessed through ICES, an independent, non-profit research institute funded by an annual grant from the Ontario Ministry of Health (MOH) and the Ministry of Long-Term Care. Our cohort included female patients diagnosed with HER2+ or TNBC in Ontario, Canada between January 1, 2017 and December 31, 2022, and with indications for NAC (clinically T1 node positive or T2-T4 disease). Patients were identified using the Ontario Cancer Registry. Patients were excluded if they were less than 18 years of age, if they had clinically T1 node negative or stage IV disease, or if they did not receive treatment (surgery or chemotherapy) within 6 months of their cancer diagnosis. Additionally, patients receiving chemotherapy first were required to have received surgery within 1 year of chemotherapy to exclude patients who had become metastatic or were deemed inoperable. The outcomes of interest were first treatment received (surgery or NAC) and receipt of medical oncology consultation from two months prior to cancer diagnosis to date of first treatment. Descriptive analyses were used to define baseline demographic and clinical characteristics stratified by first treatment. Clinical stage was determined according to the AJCC cancer staging manual. Categorical variables were reported as absolute numbers (n) and proportions (%). Absolute differences between proportions were reported. A two-sided Cochran-Armitage trend test was used to determine if values changed significantly over time, where a p-value of <0.05 was deemed to be statistically significant. Continuous variables were presented as means and medians (Q1-Q3). Between-group comparisons were made using standardized differences (SD). A SD of ≥ 0.10 represented a significant difference between groups.

Results: Overall, 7908 patients were included in this study and analyzed. Of these patients, 4045 patients received NAC (51.2%), whereas 3863 received upfront surgery (48.8%). The patients receiving NAC were younger than those receiving upfront surgery (mean age 53.3 vs. 63.3 years, SD 0.73), and had higher stage disease (38.5% vs. 61.0% stage IIA disease in NAC vs. surgery first groups, SD 0.46). There was no difference in receptor types between groups (57.6% vs. 59.1% HER2+ disease in NAC vs. surgery first groups, SD 0.03). When categorized by year, the percentage of patients receiving NAC significantly increased over time, from 36.7% in 2017 to 67.3% in 2022 ($p<0.0001$). The percentage of patients referred to a medical oncologist also significantly increased, from 43.9% in 2017 and up to 70.9% in 2022 ($p<0.0001$). Of those referred to a medical oncologist, over 80% consistently received NAC, with a small increase seen over time (81.7% vs. 90.4% in 2017 and 2022, respectively, $p<0.0001$). When categorized by age, the greatest increase in patients receiving NAC was seen in the 51-60 year age group, with a 37.7% absolute difference from 2017-2022 ($p<0.0001$). In contrast, the 81+ age group demonstrated the smallest increase, with only a 9.7% absolute difference over same timeframe and this was not deemed to be statistically significant ($p = 0.10$). In terms of stage, stage IIA had the greatest increase in NAC rates over time, with a 41.6% increase ($p<0.0001$). Overall trends in NAC rates were similar between HER2+ and TNBCs, with an absolute increase in 28.6% in HER2+ breast cancers and 33.1% in TNBCs from 2017 to 2022 ($p<0.0001$).

Conclusion: The overall management of breast cancer has evolved significantly over the past 10 years, with several studies demonstrating a disease-free and overall survival benefit for HER2+ and TNBCs that achieve a pCR following NAC. The National Comprehensive Cancer Network (NCCN) 2025 guidelines state that any HER2+ or TNBC patients with clinically T2 or greater and/or clinically node positive disease should be considered for NAC. In addition, the KATHERINE and CREATE-X trials demonstrated a disease-free and overall survival benefit of adding adjuvant T-DM1 or capecitabine to the management of HER2+ or TNBCs that did not achieve a pCR. NAC is also prognostic, as patients with progressively worse residual cancer burden in the KEYNOTE-522 trial demonstrated progressively worse event free survival. Not offering NAC deprives these patients of the potential survival benefit associated with achieving a pCR, as well as the option for additional adjuvant therapies if a pCR is not achieved.

Overall, NAC rates for HER2+ and TNBCs nearly doubled from 2017 to 2022. Interestingly, this upward trend continued steadily during the COVID-19 pandemic and was demonstrated across almost all age groups and stages. Rates of referral to a medical oncologist mirrored the increased rates of NAC during this time period, suggesting that the largest barrier to receiving NAC may be referral to medical oncology. Of patients seen by a medical oncologist, more than 80% of patients consistently received NAC across all years. While the increased rates of NAC are promising, more work is required to examine surgeon knowledge regarding indications for NAC, to identify barriers to medical oncology referral, and to support upfront multidisciplinary care, thus ensuring guideline concordant breast cancer management to improve patient outcomes.

Figure:

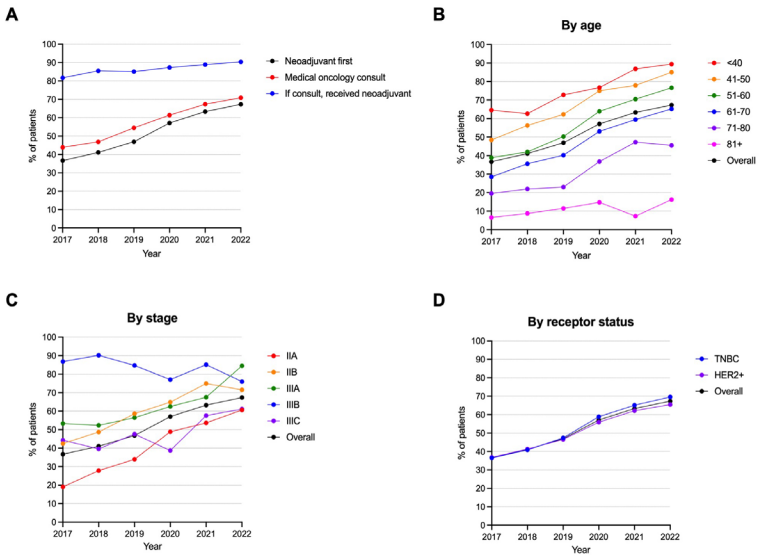

Figure 1. Trends in neoadjuvant chemotherapy (NAC) rates over time. (A) Proportion of total patients receiving NAC as the first treatment, proportion of total patients receiving a medical oncology consult, and proportion of patients receiving NAC after a medical oncology consult, over time. (B-D) Proportion of patients receiving NAC over time categorized by age (B), stage (C), and receptor status (D).

1152 - First Do No Harm: Patterns of Immune-Related Adverse Events Among Women with Triple-Negative Breast Cancer Treated with KEYNOTE-522 Regimen

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Background/Objective: The KEYNOTE-522 immunochemotherapy regimen has become the standard of care in stage II-III triple-negative breast cancer (TNBC); however, the immunotherapy component of this regimen, Pembrolizumab, is associated with immune related adverse events (irAE) including endocrine irAE. There is a limited understanding of these irAE in breast cancer management. The objective of this study was to assess incidence, severity, and treatment of irAEs.

Methods: A single institution retrospective study of all women diagnosed with Stage II-III TNBC 2019-2022 who underwent neoadjuvant therapy and subsequent surgery was completed. Sociodemographic and as well as tumor characteristics were collected. Among those who received KEYNOTE-522, the incidence of irAE and endocrine irAE (defined as hypothyroid, hyperthyroid, adrenal insufficiency, diabetes, and hypophysitis) was collected. We recorded irAE management patterns and the frequency of irAE resolution.

Results: During this study period, there were 240 patients with TNBC and 86 were treated with KEYNOTE-522 included in the final cohort. Median age of the cohort was 54 years old and median age of those who developed an irAE was 53.5 years old; patients were followed for an average of 3.1 years. Overall, 45 patients (52%) experienced at least one irAE and of these, 21 patients (24%) experienced at least one endocrine irAE. The majority of patients (n=28) experienced only one irAE. Neutropenia (n=17), hypothyroidism (n=11), and adrenal insufficiency (n= 9) were the three most common irAEs. Patients with irAEs received Pembrolizumab for an average of 223 days and Pembrolizumab was stopped indefinitely in 49% (n=22) of those who experienced an irAE. Pharmacologic management (i.e., steroids, levothyroxine, antibiotics, etc.) was required for 76% (n=52) of all irAEs. An attempt to wean

was associated with coming off treatment for the irAE (OR 11.9 [95% CI 1.85, 75.8, P=0.012]). Of those irAE that resolved, median time to resolution was 45 days. Those with more than one irAE were not less likely to reach resolution of their irAEs (OR 0.53 [95% 0.16, 1.74, P=0.27]). For endocrine irAEs, patients were managed by endocrinologists. An attempt to wean steroids or thyroid supplement was performed for 46% (n=11) of endocrine irAEs and was successful for 17% (n=4) of endocrine irAEs.

Conclusion: We found that endocrine irAEs account for a significant number of the total irAEs patients experienced with KEYNOTE-522 and if a patient experienced an irAE, it often disrupted their Pembrolizumab treatment indefinitely. Active management with attempts to wean off treatment may play a role in getting patients back to their baseline. As more women receive Pembrolizumab for breast cancer care, it will be important to understand the patterns of developing and resolving irAEs to better prepare patients for their treatment course.

NSM

1459 - Training the Next Generation: High-Fidelity Knowledge Donor Simulation to Enhance Proficiency in Minimally Invasive Nipple-Sparing Mastectomy

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[1]Valleywise Health Medical Center, Phoenix, AZ, [2]Creighton University Phoenix, Phoenix, AZ, [3]St. Joseph's Hospital and Medical Center, Phoenix, AZ

Background/Objective: Minimally invasive nipple-sparing mastectomy (NSM) techniques are increasingly utilized for their minimally invasive benefits and improved cosmetic outcomes around the world. However, opportunities for hands-on training remain limited due to operative complexity, case availability, and cost. High-fidelity donor models offer a valuable educational platform for trainees to acquire and refine technical skills in a controlled environment. This study describes the development and implementation of a cadaveric high-fidelity simulation for teaching minimally invasive NSM to surgical trainees and evaluates its perceived educational value and feasibility.

Methods: A single-institution Institutional Review Board conducted a review and issued a non-research determination for a structured training program. This program utilized high-fidelity, whole-body, cadaveric donor models, known as Knowledge Donors (KDs), prepared to simulate the anatomic planes and tissue characteristics encountered during NSM. One whole-body KD model was used, with a single breast serving as the training site for sequential completion of the procedure: first utilizing robotic technique (by an attending) and then laparoscopic technique (by a trainee with attending supervision) on the same breast. The session emphasized identification of anatomic landmarks, exposure within limited working space, and use of fluorescence imaging for anatomic assessment and spatial orientation. The steps completed included incision and dissection of the breast pocket, tumescence, insufflation of the breast pocket (creation of pneumobreast), identification of anatomic landmarks, dissection of the planes, and completion of the mastectomy. Following the session, participants and observers completed a structured evaluation assessing platform realism, anatomical fidelity, educational value, technical feasibility, and clinical applicability using Likert scales.

Results: Seven participants completed the evaluation (3 attending surgeons, 3 trainees, 1 observer) following a single-case demonstration. All participants (7/7, 100%) rated the KD platform as "highly suitable" to substitute conventional training models. Among operators and assistants (n=6), mean technical performance scores were: instrument reach 4.5/5 (range 4-5), visualization quality 4.7/5 (range 4-5), and comfort of ergonomics 3.8/5 (range 2-5). Participants reported that complete glandular dissection through single-incision access was achieved, with feasible specimen retrieval. Half of respondents (3/6, 50%) noted technical limitations, primarily pneumobreast maintenance, robotic arm collisions, and constrained Gelpoint access. Training impact was substantial: 71% (5/7) reported the experience "significantly changed my perspective" and 14% (1/7) "somewhat influenced my thinking." Intent for future training was high, with 71% (5/7) "very likely" and 14% (1/7) "likely" to pursue additional experience. All participants (100%) identified five key training advantages: practice of novel techniques, reduced patient learning curve, team-based training, realistic anatomy, and error tolerance. Technical challenges identified included pneumobreast insufflation with multiple robotic ports,

instrument collisions, and setup inefficiencies. Recommendations included optimized port placement, enhanced robotic preparation, bleeding models for hemostasis training, and extended session duration. Technical challenges related to instrument collision and insufflation were improved with the laparoscopic approach.

Conclusion: Endoscopic breast surgery, including minimally invasive NSM, is increasingly recognized for its improved cosmetic outcomes, precise dissection, and compatibility with immediate reconstruction. While its adoption has expanded globally, widespread use remains limited by the steep learning curve, specialized equipment needs, and variable training opportunities. High-fidelity simulation with KDs offers a practical solution, providing residents with a realistic and reproducible platform to develop technical proficiency, understand complex anatomy, and gain confidence. Integrating simulation into residency and fellowship curricula can bridge the gap between innovation and competency, shorten the learning curve, and prepare trainees to perform advanced procedures safely while staying at the forefront of evolving breast surgery practice.

Image:

1322 - Long-Term Outcomes of 3000 Nipple-Sparing Mastectomies

Kate Lloyd[1], Tyler Shern[1], Logan Holt[1], Victoria Chamberlain[1], Michelle Specht[1], Michele Gadd[1], Francys Verdial[1], Rebecca Kwait[1], Tolga Ozmen[1], Barbara Smith[1]

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Background/Objective: Nipple-sparing mastectomy (NSM) preserves the nipple–areola complex (NAC) and offers superior cosmetic and psychosocial outcomes. However, concerns remain about long-term oncologic safety and technical complications. We evaluated long-term outcomes in a large, single-institution NSM cohort, focusing on positive nipple margin rates, nipple loss, and recurrence patterns.

Methods: Consecutive NSMs performed between 2007 and 2019 at a single institution were identified from a prospectively maintained IRB approved database. Patient, tumor, and surgical procedure characteristics, as well as breast cancer–specific outcomes, were abstracted from the electronic medical record. Patients with less than 12 months of follow-up were excluded. Outcomes included positive nipple margin, nipple loss, reconstruction complications, locoregional recurrence (LRR), distant recurrence, and breast cancer mortality.

Results: A total of 3,090 NSMs performed in 1,798 women were eligible. Median age was 48 years (range 42-55), and median BMI 23.6 kg/m² (range 15.3-46.4). NSM was performed for known cancer in 1,562 (50.6%) breasts and for risk reduction in 1,528 (49.4 %). Among 1,649 breasts with cancer on final pathology, histology included 963 (58.3%) invasive ductal carcinoma, 189 (11.5%) invasive lobular carcinoma, 422 (25.5%) ductal carcinoma in-situ, and 74 (2.4%) other histology; 337 (20.4%) were node-positive. Systemic therapy was administered to 840 (50.9%) women with cancer, including 256 (15.5%) receiving neoadjuvant chemotherapy. Postmastectomy radiation was delivered to 373 (22.6%) breasts. Positive nipple margins occurred in 109 (7.0%) breasts with known cancer at the time of NSM. Nipples were removed in 140 (9.0%) breasts with known cancer; the most common reasons being positive margins (98, 3.6%), ischemic complications (17, 1.1%), or cosmetic revision (18, 1.2%). At a median follow-up of 93 months, tumor had recurred in the nipple in 9 (0.5%) patients. Among 1,528 NSMs performed for risk-reduction, cancer was found in 87 (5.7%) breasts. Positive nipple margins occurred in 5 (0.3%) breasts and nipple loss occurred in 51 (3.3%) breasts. There were no nipple recurrences in breasts where the primary indication was risk-reduction. In the entire cohort, estimated ten-year rates of LRR-free survival, disease-free survival, and overall survival were 93.5%, 89.5%, and 93.5%, respectively.

Conclusion: In this large NSM cohort with long-term follow-up, nipple recurrence was exceedingly rare, and nipple or NAC loss was infrequent. Long-term oncologic outcomes were excellent. These findings support the oncologic safety of NSM with immediate reconstruction for treatment and risk reduction.

Table:

Outcome by Breast	**All Breasts N = 3090**	**Cancer N = 1562**	**Risk Reduction N = 1528**
Positive Nipple Margin	114 (3.7%)	109 (7.0%)	5 (0.3%)
Nipple Loss	191 (6.2%)	140 (9.0%)	51 (3.3%)
Skin Flap Necrosis	90 (2.9%)	49 (3.1%)	41 (2.7%)
Cancer on Surgical Pathology	1,648 (53.3%)	1,561 (99.9%)	87 (5.7%)
Outcome by Patient	**All patients N = 1798**	**Cancer N = 1482**	**Risk Reduction N = 316**
Any Recurrence	162 (9.0%)	158 (10.7%)	4 (1.3%)
Locoregional Recurrence only	65 (3.6%)	65 (4.4%)	0 (0.0%)
Nipple Recurrence	9 (0.5%)	9 (0.6%)	0 (0.0%)
Distant Recurrence only	66 (3.6%)	64 (4.3%)	2 (0.6%)
Locoregional and Distant Recurrence	31 (1.7%)	29 (2.0%)	2 (0.6%)
Breast Cancer-related death	66 (3.7%)	65 (4.4%)	1 (0.3%)

1216 - Oncologic Outcomes Following Nipple-Sparing Mastectomy Compared with Skin-Sparing Mastectomy and Breast-Conserving Surgery in BRCA1/2 Mutation Carriers with Breast Cancer

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[1]*Mayo Clinic, Rochester, MN*

Background/Objective: The oncologic safety of nipple-sparing mastectomy (NSM) in patients with breast cancer who have germline BRCA1/2 pathogenic variants remains uncertain. We aimed to evaluate local, regional, and distant recurrence outcomes following NSM in comparison to total mastectomy/ skin-sparing mastectomy (TM/SSM) and breast-conserving surgery (BCS), hypothesizing that NSM would demonstrate recurrence rates comparable to other surgical approaches.

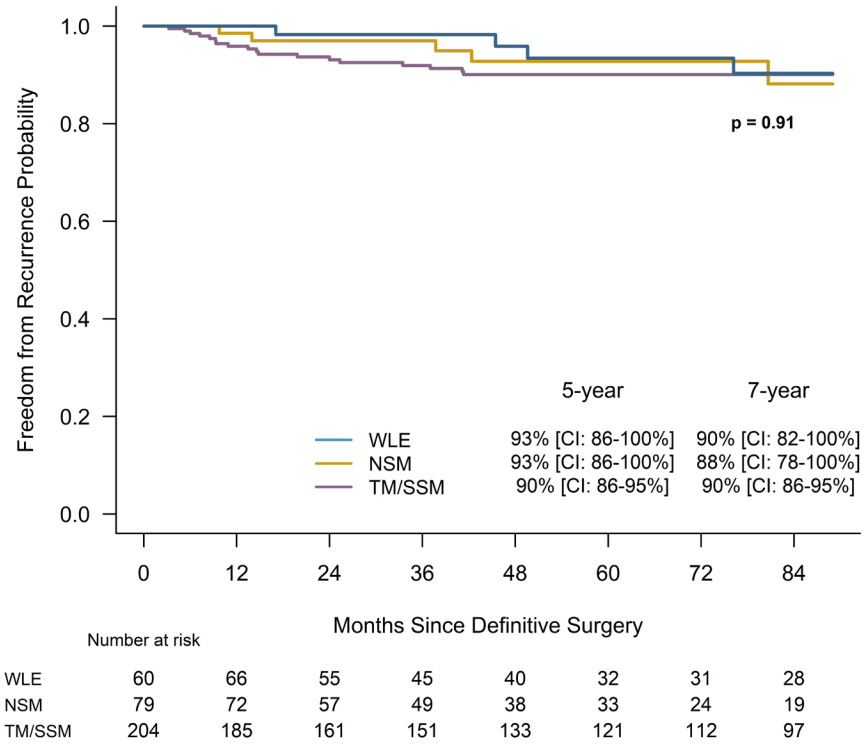
Methods: With IRB approval, we conducted a retrospective cohort study of women with germline BRCA1 or BRCA2 pathogenic variants who underwent therapeutic breast surgery for invasive breast cancer or ductal carcinoma in situ (DCIS) at a single institution from 2008–2025. Patients with prior breast cancer, surgery performed elsewhere, non-BRCA pathogenic variants, VUS in BRCA1/2 or prophylactic mastectomies were excluded. Clinical stage was defined using AJCC 7th edition. Analyses were performed on a per-breast basis to account for bilateral cancers; for cases of distant recurrence in patients with bilateral cancer, the distant recurrence was attributed to the side with highest stage at baseline. Freedom-from-recurrence was estimated for each surgery type and compared across surgery types using Cox proportional hazards regression for univariate and multivariable analysis.

Results: 343 breasts with cancer among 314 patients (309 female, 5 male) with BRCA1/2 mutation (159 BRCA1, 155 BRCA2) were included. Median age at earliest breast cancer diagnosis was 46 years (range 21–83). Twenty-six patients (8%) had bilateral cancer at index surgery, including 5 with occult contralateral malignancy found on pathology; 3 additional patients later developed asynchronous contralateral cancer. Tumor biology for the 343 cancers included 155 (45%) HR+/HER2-, 116 (34%) TNBC, 32 (9%) HER2+, 30 (9%) HR+ DCIS, and 10 (3%) HR- DCIS. Among 287 breasts with invasive preoperative diagnosis, 99 (34%) were clinically node-positive (68 cN1, 31 cN2–3). T-category distribution was 2 (1%) cT0, 122 (43%) cT1, 100 (35%) cT2, 47 (16%) cT3, and 16 (6%) cT4. Overall, 186/343 (54%) received neoadjuvant systemic therapy (179 chemotherapy, 7 endocrine). NSM was performed on 79 breasts (73 patients), compared with 204 TM/SSM and 60 BCS. NSM was associated with higher clinical stage at diagnosis than BCS (42% vs 68% stage 0–I, p=0.008), while stage distribution in NSM was similar to TM/SSM (42% vs 42% stage 0–I, p=0.20). Tumor biology differed across procedures, with TNBC more common in the NSM group (46%) than SSM (32%) and BCS (22%, p=0.004). With a median follow-up of 45 months, 5 recurrences occurred after NSM (1 local first, later distant; 4 distant first), resulting in a 5-year freedom-from-recurrence estimate of 93% (95% CI: 86–100%). In comparison, 5-year estimates were 90% (95% CI: 86–95%) for TM/SSM (20/204 recurrences) and 93% (95% CI: 86–100%) for BCS (6/60), p=0.91 [Figure 1]. On multivariable analysis adjusted for age, stage, and subtype, recurrence rates did not differ significantly across NSM, SSM/TM, and BCS (p=0.25). Focusing on local and regional recurrence freedom from local regional recurrence rates at 7 years were 96% (95% CI: 87-100%) for NSM, 97% (95% CI: 95-100%) for TM/SSM and 94% (95% CI: 87-100%) for BCS.

Conclusion: Nipple-sparing mastectomy is an oncologically safe approach for appropriately selected patients with breast cancer who have BRCA1/2 pathogenic mutations. Pathogenic variant should not be

a contraindication to nipple-sparing approach and decision for surgical approach for mastectomy should be driven by tumor factors and other patient factors.

Figure:



1129 - Patient Satisfaction with Robotic Nipple-Sparing Mastectomy: A Prospective Study of Patient-Reported Outcomes Using BREAST-Q

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Background/Objective: Nipple-sparing mastectomy (NSM) has long been associated with improved patient satisfaction and equivalent oncologic safety compared to traditional mastectomy techniques. With the advent of the single-port robotic nipple-sparing mastectomy (SPrNSM), there is growing interest in understanding its impact on patient-reported outcomes. This study prospectively evaluated satisfaction and health-related quality of life following SPrNSM using the BREAST-Q questionnaire.

Methods: From 2022-2025, 50 women undergoing SPrNSM with immediate reconstruction for risk reduction or early-stage, node-negative breast cancer completed the BREAST-Q preoperatively, postoperatively, and at six months. Domains analyzed included psychosocial, sexual, and physical well-being, and satisfaction with breasts. Results were compared with published open NSM BREAST-Q data. Continuous variables were analyzed using Student's t-test and reported as mean ± SD.

Results: Among 50 participants, 29 (58%) underwent surgery for risk reduction and 21 (42%) for cancer treatment; 48 (96%) had bilateral procedures. Median breast cup size was B and median BMI 22.7 (17.1-35.2). All patients received immediate reconstruction- 46 (92%) with tissue expanders and 4 (8%) with immediate profunda artery perforator (PAP) flap reconstruction. At six months, psychosocial well-being remained stable (79.5 ± 13.2 vs 80.3 ± 12.9, p = 0.66), while sexual well-being (70.3 ± 14.8 vs 64.3 ± 15.7, p = 0.17), physical well-being (89.8 ± 11.5 vs 68.3 ± 10.9, p < 0.0001), and satisfaction with breasts (71.2 ± 15.3 vs 64.3 ± 16.1, p = 0.06) declined slightly. Compared with published open NSM BREAST-Q data, SPrNSM demonstrated higher six-month postoperative psychosocial (80.3 vs 64.9), sexual (64.3 vs 51.5), physical (71.0 vs 62.2), and breast satisfaction (69.5 vs 51.8) scores.

Conclusion: Single-port robotic nipple-sparing mastectomy preserves psychosocial well-being and yields superior short-term patient-related outcomes compared with open NSM. Factors contributing to improved satisfaction- such as minimal scarring, enhanced cosmesis, and potential sensory preservation- warrant further investigation. Ongoing longitudinal assessment will clarify the durability of quality-of-life benefits after SPrNSM.

1007 - Minimally Invasive versus Conventional Nipple-Sparing Mastectomy: BREAST-Q Outcomes from a Pilot Study

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Background/Objective: Minimally invasive nipple-sparing mastectomy (NSM), including robotic-assisted (RNSM) and endoscopic (ENSM) techniques, was developed to improve cosmetic and quality-of-life outcomes while maintaining oncologic safety. RNSM offers enhanced three-dimensional vision and instrument precision, whereas ENSM provides a less costly minimally invasive alternative. However, evidence comparing these approaches using validated patient-reported outcomes (PROs) remains limited. This pilot study compared BREAST-Q outcomes and complications following RNSM, ENSM, and conventional NSM (CNSM) with direct-to-implant (DTI) reconstruction.

Methods: We conducted a retrospective analysis of prospectively collected clinical data and PROs using BREAST-Q from women who underwent NSM with immediate subpectoral DTI reconstruction with acellular dermal matrix between January 2023 and April 2025. Eligible patients had small to medium breasts and either early-stage cancer or prophylactic indications with pathogenic germline mutations. Patients were allocated to three groups: RNSM (n=10), ENSM (n=10), and CNSM (n=20). Minimally invasive NSM employed a single lateral chest wall incision (4 cm for RNSM and 6 cm for ENSM), while CNSM used a 10-15 cm inferolateral incision. PROs were assessed at 3 and 6 months using BREAST-Q v2.0 modules, converted to 0-100 Rasch scales. The primary endpoint was satisfaction with breasts at 6 months; secondary endpoints included other BREAST-Q domains, complications, and changes over time (3 vs 6 months). Statistical analyses included one-way ANOVA with Tukey's post-hoc test, paired t-tests, and Fisher's exact test.

Results: At 6 months, satisfaction with breasts was significantly higher in the minimally invasive groups (RNSM 86.0 ± 3.7, ENSM 84.6 ± 3.8) compared with CNSM (80.5 ± 4.7, p=0.004). Similar advantages

were observed for psychosocial well-being (84.6 ± 7.9 and 83.3 ± 4.6 vs 77.3 ± 4.0, p=0.001), physical well-being: chest (80.7 ± 5.7 and 81.1 ± 5.5 vs 75.0 ± 4.9, p=0.005), and sexual well-being (71.0 ± 5.2 and 71.8 ± 5.0 vs 66.7 ± 4.6, p=0.014), while impact on work did not differ significantly (p=0.314). Post-hoc analysis confirmed the superiority of RNSM and ENSM over CNSM, with no significant differences between minimally invasive techniques. Complications were minor and comparable; partial nipple-areola necrosis occurred in 20% of each group, partial skin flap necrosis in 10% of CNSM, and hematoma in 10% of ENSM and CNSM, all managed conservatively. Over time, CNSM patients reported significant improvement between 3 and 6 months in satisfaction with breasts (p=0.012) and psychosocial well-being (p=0.002), while minimally invasive groups showed smaller, non-significant gains.

Conclusion: Minimally invasive NSM, either robotic or endoscopic, was associated with higher BREAST-Q outcomes at 6 months compared with CNSM. Complications were infrequent and managed conservatively. Although CNSM outcomes improved over time, they remained lower across several domains. This study suggests that minimally invasive NSM can enhance patient experience without increasing risk, underscoring the need for larger prospective studies to validate long-term oncologic and quality-of-life outcomes.

Table. Baseline characteristics, operative outcomes, and BREAST-Q scores at 3 and 6 months

Variable	CNSM (n=20)	ENSM (n=10)	RNSM (n=10)	p-value
Baseline Characteristics				
Age, mean ± SD (years)	51.8 ± 8.42	52.4 ± 9.03	44.4 ± 5.38	0.044
BMI, mean ± SD (kg/m²)	20.2 ± 1.70	19.9 ± 1.29	19.1 ± 1.05	0.179
ASA I–II, n (%)	20 (100.0%)	10 (100.0%)	10 (100.0%)	1.000
Indication				0.150
Cancer, n (%)	18 (90.0%)	9 (90.0%)	6 (60.0%)	
Prophylactic with germline mutations, n (%)	2 (10.0%)	1 (10.0%)	4 (40.0%)	
Procedure type				<0.001
Unilateral, n (%)	16 (80.0%)	7 (70.0%)	0 (0.0%)	
Bilateral, n (%)	4 (20.0%)	3 (30.0%)	10 (100.0%)	
Postoperative Outcomes				
Complication, any, n (%)	8 (40.0%)	3 (30.0%)	2 (20.0%)	0.530
Operative time, mean ± SD (min)	91.2 ± 22.1	282.5 ± 50.7	372.0 ± 51.3	<0.001
Hospital stays, median (IQR), days	7 (7–7)	5 (4–5)	6 (6–6)	<0.001
Patient-Reported Outcomes (BREAST-Q) at 3 months				
Satisfaction with breasts (0-100)	75.7 ± 4.7	80.5 ± 6.3	81.8 ± 6.2	0.011
Psychosocial well-being (0-100)	72.9 ± 4.4	78.7 ± 5.7	80.0 ± 5.4	0.001
Physical well-being (0-100)	75.5 ± 5.5	81.1 ± 5.5	79.8 ± 6.0	0.028
Sexual Well-being (0-100)	66.4 ± 4.1	71.5 ± 6.2	73.5 ± 4.9	0.001
Impact on Work (0-100)	75.7 ± 6.3	77.2 ± 6.2	76.0 ± 4.4	0.801
Patient-Reported Outcomes (BREAST-Q) at 6 months				
Satisfaction with breasts (0-100)	80.5 ± 4.7	84.6 ± 3.8	86.0 ± 3.7	0.004
Psychosocial well-being (0-100)	77.3 ± 4.0	83.3 ± 4.6	84.6 ± 7.9	0.001
Physical well-being (0-100)	75.0 ± 4.9	81.1 ± 5.5	80.7 ± 5.7	0.005
Sexual Well-being (0-100)	66.7 ± 4.6	71.8 ± 5.0	71.0 ± 5.2	0.014
Impact on Work (0-100)	74.8 ± 7.3	78.0 ± 6.2	78.2 ± 6.5	0.314

Oncoplastic

1423 - Assessing the Trends in Lumpectomy and Concomitant Oncoplastic Procedures: A National Insurance Database Analysis (2010–2020)

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Background/Objective: Following the National Surgical Adjuvant Breast and Bowel Project (NSABP) B-06 trial, the use of breast conservation therapy has increased. Likewise, reconstructive procedures have evolved to mitigate contour deformities associated with tissue removal and subsequent radiation contracture. Oncoplastic surgical procedures combine cancer removal with plastic surgery related procedures most commonly including adjacent tissue rearrangement, mastopexy and breast reduction. While numerous studies have shown an increasing trend in breast conservation therapy across the United States, trends in oncoplastic surgery approaches have been less clear. In this study we aim to evaluate temporal trends and demographic patterns in post-lumpectomy reconstruction procedures from 2010–2020 using a large national insurance dataset.

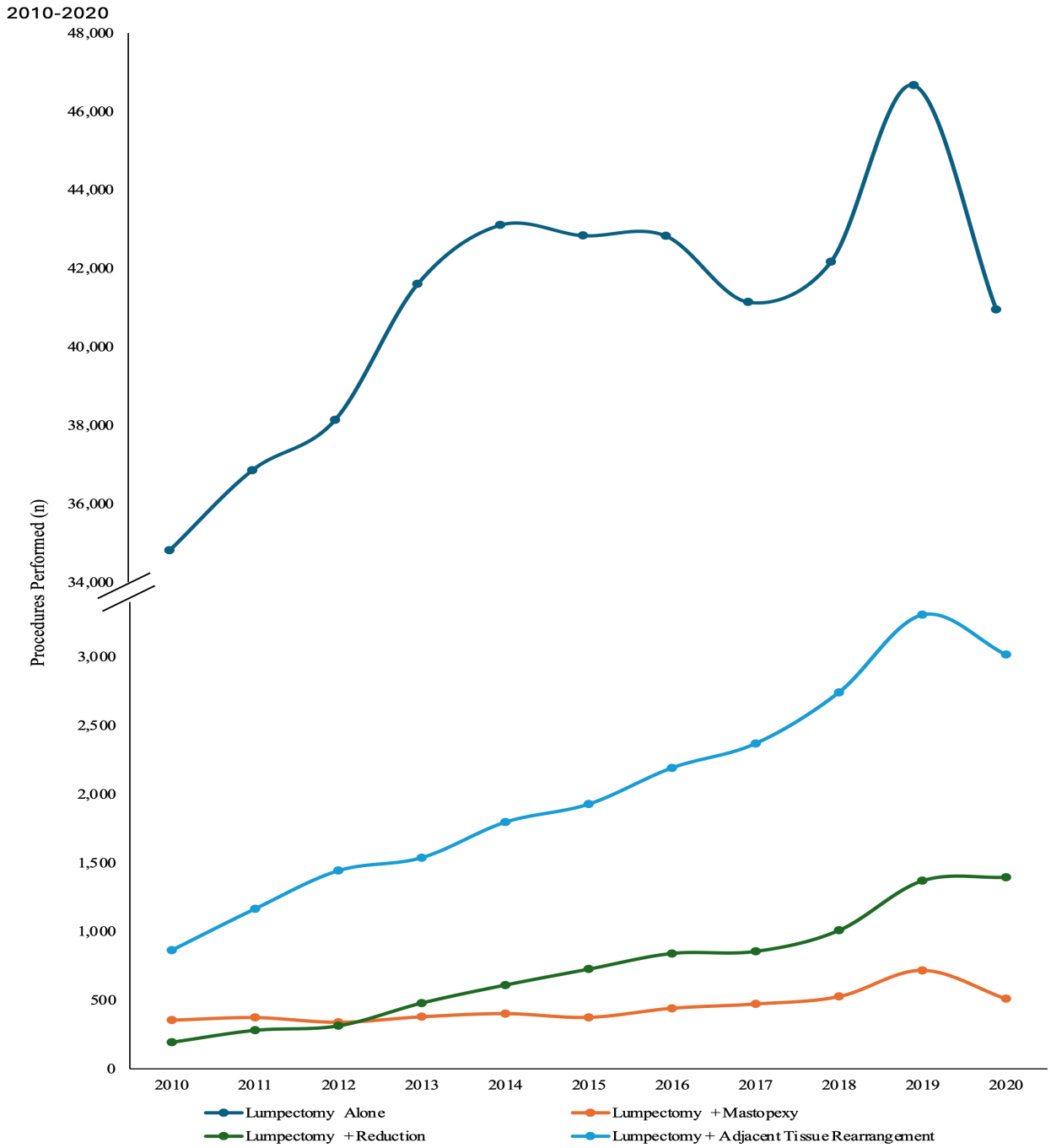
Methods: Data were obtained from the Pearldiver™ national procedural database encompassing cases from 2010 to 2020. Patients who underwent lumpectomy (CPT 19301) were identified and stratified into four groups dependent on the presence of concurrent procedures: lumpectomy alone, lumpectomy with mastopexy (CPT 19316), lumpectomy with reduction mammaplasty (CPT 19318), and lumpectomy with adjacent tissue rearrangement (any of the following codes: CPT 14301/14302/19366). The primary outcomes were yearly case volumes (2010-2020) and proportional trends relative to all lumpectomies and to all reconstructive procedures. Associations between procedure subtype and patient demographics, comorbidities, and insurance status were analyzed. Chi-square testing and Welch's ANOVA were used to determine statistical significance in this study, which was defined as $p < 0.05$.

Results: A total of 486,368 patients underwent lumpectomy between 2010-2020. Of these, 451,053 (92.3%) underwent lumpectomy alone, while 22,359 (4.6%) underwent LATR, 8,068 (1.6%) with LR, and 4,888 (1.0%) LM. Within the LATR patient group, the frequency of CPT-14301 was 64%, CPT-19366 was 37%, and CPT-14302 was 15%. The mean age across groups ranged from 61.9±12.0 years (lumpectomy alone), 60.4±11.7 (LATR), 59.0±11.3 (LM), to 57.3±10.2 years (LR). A Welch's ANOVA demonstrated a significant difference in mean patient age among the four procedure groups ($p< 0.001$). Hypertension (54.2%), diabetes mellitus (22.6%), coronary artery disease (11.3%), COPD (8.8%), chronic kidney disease (6.8%), and coagulopathy (4.5%), were highest in patients undergoing lumpectomy alone. Alternatively, obesity (35.5%), and tobacco use (21.3%) were more prevalent in patients undergoing LR. The type of insurance (commercial, governmental, Medicare, Medicaid) differed significantly between the lumpectomy subgroups ($p < 0.001$). The prevalence of commercial (85.1%), Medicaid (4.5%), and governmental (1.3%), were highest in patients undergoing LM. Medicare (21.7%) had the highest prevalence in patients undergoing lumpectomy alone.

Conclusion: The oncoplastic surgery approach in the setting of breast conservation has steadily increased over the past decade, driven primarily by rising adoption of adjacent tissue rearrangement techniques. Although less common, more complex procedures, such as breast lifts and breast reductions

are also increasing. These findings may reflect a growing emphasis on aesthetic outcomes and breast symmetry preservation as integral components of breast-conserving therapy. Additional analysis is needed to assess postoperative outcomes, patient satisfaction, long term stability, access to care, and cost implications of this evolving reconstructive paradigm.

Figure:



1336 - One-Team, One-Stage: Establishing a Breast-Surgeon-Led Oncoplastic Model Using Chest Wall Perforator Flaps — A Feasibility and Workflow Innovation from China

Houpu Yang[1], Miao Liu[1], Lin Cheng[1], Shu Wang[1]

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Background/Objective: Volume replacement using local perforator flaps effectively restores breast contour and extends the indications for conservation, even in large-tumor cases. However, the technique demands advanced flap-handling skills and multidisciplinary support, which remain limited in many centers. To overcome these barriers, we developed a breast-surgeon-led model integrating tumor resection and immediate partial breast reconstruction.

Methods: Between June 2024 and November 2025, Peking University People's Hospital Breast Center, a Chinese breast surgery team performed both oncologic resection and immediate partial breast reconstruction using local chest wall perforator flaps, including lateral thoracic artery perforator (LTAP), intercostal artery perforator (ICAP), thoracodorsal artery perforator (TDAP) and superior epigastric artery perforator (SEAP) flaps. All procedures were independently completed by breast surgeons following structured oncoplastic training without plastic surgery collaboration. Data were collected on patient demographics, tumor features, flap type, operative time, complications, aesthetic evaluation, and patient satisfaction (BREAST-Q).

Results: A total of 46 patients underwent breast-conserving surgery with immediate local perforator flap reconstruction. The mean age was 48 years (IQR 42–57) and mean BMI 24.1 ± 3.2 kg/m². The mean tumor size was 2.9 ± 1.1 cm, and median operative time 130 minutes (IQR 84–166) with an average blood loss of 34 ml. LTAP and LICAP were the most frequently used flaps (45.6%), followed by AICAP, TDAP, and SEAP. All flaps survived completely. Minor complications occurred in 4 patients (seroma, fat necrosis and wound dehiscence). Analysis of operative time across consecutive cases showed no significant downward trend, suggesting early procedural stabilization and consistent technical reproducibility. Aesthetic evaluation rated 89% of outcomes as "good" or "excellent" and mean postoperative BREAST-Q satisfaction score reached 87.

Conclusion: The breast-surgeon-led oncoplastic model using chest wall perforator flaps is feasible, safe, and adaptable. It provides a sustainable framework for promoting oncoplastic breast-conserving surgery and advancing patient-centered care in settings where reconstructive collaboration is limited.

1119 - Chest Wall Perforator Flaps: One Centre's Review on Utilisation, Oncological Safety, and Patient Satisfaction

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[1]University of Glasgow, Glasgow, Scotland, [2]Gartnaval General Hospital, Glasgow, Scotland, [3]Glasgow Royal Infirmary, Glasgow, Scotland

Background/Objective: Chest wall perforator flaps (CWPF) are an example of oncoplastic breast surgery, integrating breast-conserving surgery (BCS) with plastic surgery techniques to ensure complete tumour resection whilst achieving a positive cosmetic outcome. CWPF utilise perforator branches from either the intercostal arteries or the lateral thoracic artery to supply a fasciocutaneous flap to replace the excised tissue. This study evaluated CWPF technique relating to tumour geometry, surgical margins and patient satisfaction.

Methods: This study included 54 patients who underwent BCS followed by CWPF reconstruction from February 2021 to April 2024 in one centre. Data was collected retrospectively from electronic records, including CWPF technique, histopathological tumour characteristics and surgical margins. The voluntary patient satisfaction questionnaire received 30 responses.

Results: Mean patient age was 58.2 (35-79) years, and the mean follow-up was 77 (1-166) weeks. Over a third (35.2%) of the women were screen detected and less than a fifth (16.7%) underwent neoadjuvant chemotherapy. The mean whole tumour pathological size was 34.8mm (7-70mm) and the preoperative mammography size was 32.6mm (8-71mm). More than a third (35.2%) had multifocal disease and most tumours were grade 2 or 3. Lateral intercostal artery perforator (LICAP) flaps (61.0%) were most utilised for tumours located in the upper outer quadrant (66.6%). The medial intercostal artery perforator flaps (MICAP, 13.0%) and anterior intercostal artery perforator flaps (AICAP, 9.3%) were suited for lower pole tumours (31.5%). The additional CWPF types included lateral thoracic artery perforator flaps (LTAP, 14.8%) and thoracodorsal artery perforator flaps (TDAP, 1.9%). Half of the LTAP flaps were combined with a LICAP, since using multiple pedicles reduces the flap necrosis risk. LICAP and LTAP flaps favoured larger tumour volumes, averaging 36.9mm (19-70mm) compared to 21.9mm (7-55mm) for MICAP and AICAP flaps. In terms of postoperative complications, 1.9% had seroma requiring aspiration, 3.7% had haematoma requiring evacuation and 5.6% had postoperative infections. There were no cases of wound dehiscence or flap failure. The re-excision rate was 29.6%, of which 62.5% were attributable to DCIS. There were two cases of a two-stage CWPF, which were used in borderline cases to ensure clear margins before moving onto reconstruction. Despite a higher re-excision rate, this study only had one completion mastectomy. At one-year mammography follow-up, there were no cases of local disease recurrence. There was one death (1.9%) attributed to distant metastasis. The patient survey revealed a satisfaction rate of 97% for size, 86% for shape and 79% for overall breast appearance.

Conclusion: CWPF provide an excellent solution for disproportionately large resection requirements. Historically, these patients would be ineligible for breast-conserving surgery. The flap technique is determined based on tumour geometry in relation to the nearest supplying perforator artery. LICAP flaps favoured upper outer defects compared to MICAP and AICAP flaps offering a solution for lower pole tumours to reduce deformity risk. Despite higher re-excision rates, this study achieved complete tumour excision whilst restoring breast cosmesis and aiming to avoid mastectomies. The patient questionnaire highlights the incredible volume replacement achieved using CWPF for partial breast

reconstruction. The positive satisfaction rates highlight the approved cosmetic result, possibly improving both physical and psychological recovery after breast cancer.

1108 - Extreme Oncoplasty: Redefining the Boundaries of Breast-Conserving Surgery

Jenna Capuano[1], Nirav Savalia[1], Sadia Khan[1], Elizabeth Kraft[1], Melvin Silverstein[2]

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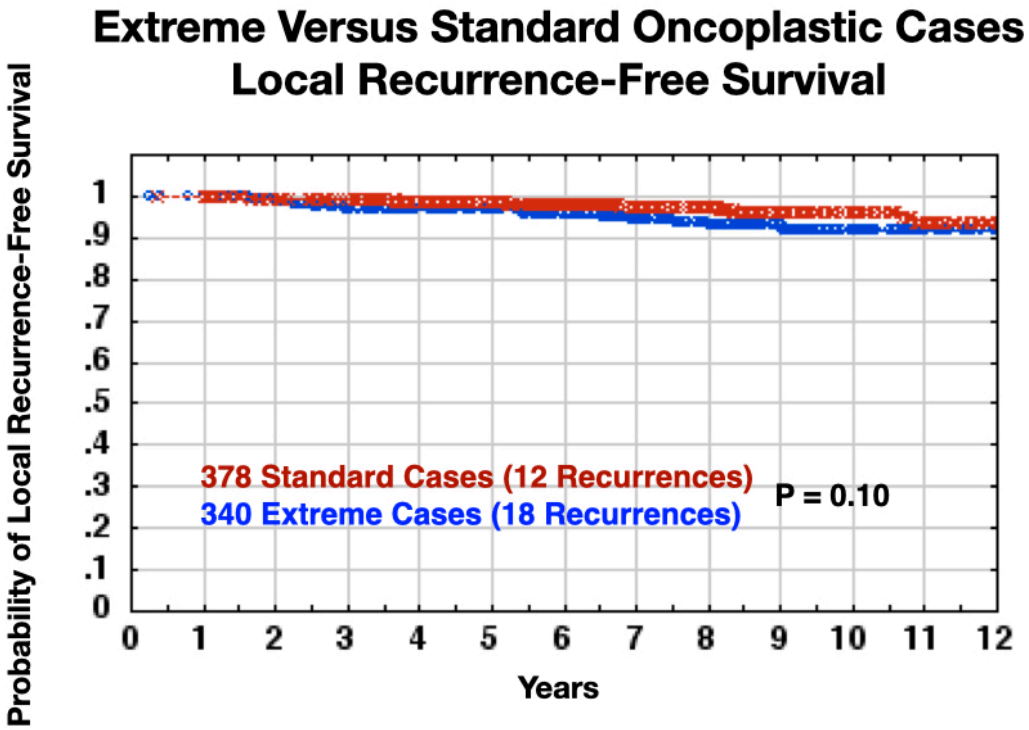
Background/Objective: Oncoplastic breast surgery aims to achieve complete oncologic resection while preserving or restoring the natural shape, symmetry, and function of the breast. Extreme oncoplasty extends the boundaries of breast conservation to include patients traditionally recommended for mastectomy due to large, greater than 50 mm multifocal/multicentric tumors (extreme cases). This study compares the oncologic outcomes of patients with extreme tumors to those with smaller, less than or equal to 50 mm (standard) tumors. All included patients were treated with oncoplastic excision and postoperative whole-breast irradiation. This study presents the largest series of extreme oncoplastic cases reported to date.

Methods: From a prospective oncoplastic database accrued between 2008-2025, 340 patients with extreme tumors were compared with 378 standard patients. The two groups were biologically matched for tumor grade, histologic subtype, hormone receptor status, and molecular profile. All patients underwent oncoplastic breast-conserving surgery followed by whole-breast irradiation. Preoperative workup included digital mammography, ultrasound, and breast MRI for all patients. Endpoints included local recurrence, distant recurrence, breast cancer–specific survival and overall survival. All outcomes were estimated using Kaplan–Meier analysis and compared by log-rank testing.

Results: Negative margins as defined by no ink on tumor were achieved in 97% of standard and 93% of extreme cases ($p = 0.01$). Margins greater than or equal to 1 mm were achieved in 88% of standard and 73% of extreme cases ($p < 0.001$). Mean tumor span was 26.3 mm for standard and 74.3 mm for extreme cases ($p < 0.001$). Re-excision rates were 5.6% and 10.9%, for standard and extreme cases, respectively ($p = 0.01$). Tumor grade, SBR score, Nottingham grade, ER/PR status, and Luminal A subtype distribution were statistically similar between groups (all p = NS). Median follow-up was 7.54 years. Five-year local recurrence probability was 1.44% for standard cases versus 3.37% for extreme cases ($p = 0.1$). Distant recurrence, breast cancer-specific survival, and overall survival did not differ significantly.

Conclusion: Extreme oncoplasty followed by whole-breast irradiation allows safe breast conservation in selected patients with large, greater than 50 mm, multifocal/multicentric tumors, achieving local and distant recurrence and survival outcomes comparable to standard oncoplastic cases. When technically feasible, breast conservation with extreme oncoplastic reconstruction should be considered a valid alternative to mastectomy in appropriately selected patients.

Figure:



Other

1427 - Predicting Pathologic Complete Response Across Breast Cancer Subtypes Using Artificial Intelligence and Digital Pathology Imaging

Jad Abdelsattar[1], Frederick Howard[2], Piotr Wysocki[3], Agnieszka Przywara[3], Joanna Szpor[3], Carlo Bifulco[4], Brian Piening[4], Jan Witowski[1], Krzystof Geras[1], Jungkyu Park[1]

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Background/Objective:

Determining whether a patient should undergo surgery first or receive neoadjuvant therapy (NAT) remains a fundamental decision in the management of early-stage breast cancer. Current NAT selection relies on cancer stage, receptor subtype and clinicopathological features. Though genomic assays are available, they are exclusive for HR+/HER2- breast cancer and are not validated for use in determining sequence of systemic therapy and surgery. Ataraxis Breast NEO ("ATX NEO") is a multimodal arterial intelligence (AI) test that integrates complex morphological and spatial features of routine hematoxylin & eosin (H&E) breast cancer slides through computational pathology with baseline clinical variables to better predict pathologic complete response (pCR). Herein, we evaluate the performance of ATX NEO across all breast cancer subtypes (HR+/HER2-, TNBC and HER2+) using diverse, real-world cohorts.

Methods:

We retrospectively analyzed 563 patients with invasive breast cancer treated with NAT across four international centers (UChicago Medicine, Providence Cancer Institute, Jagiellonian University and IMPRESS) with available baseline clinical data and pre-treatment digitized H&E slides. The ATX NEO multimodal scores were generated using a locked model previously trained on datasets to predict pCR. The ATX NEO model has not yet been calibrated. The model was trained using data from Ataraxis AI's multicenter real-world database, including 589 NAT-treated patients from one UK and three US-based institutions. The primary endpoint was pCR. Model performance was evaluated using area under the receiver operating characteristic curve (AUROC) and odds ratios (OR) with 95% confidence intervals. Pooled AUROC and ORs were calculated using random-effects models. Multivariable logistic regression assessed the independent association between ATX NEO and pCR after adjusting for clinical covariates. To evaluate clinical risk stratification, patients were divided into quartiles based on ATX NEO score (predicted pCR likelihood). pCR rates were then compared across quartiles overall and within each of the three molecular subtypes of breast cancer using the Cochran-Armitage trend test. Statistical significance was defined as $p<0.05$.

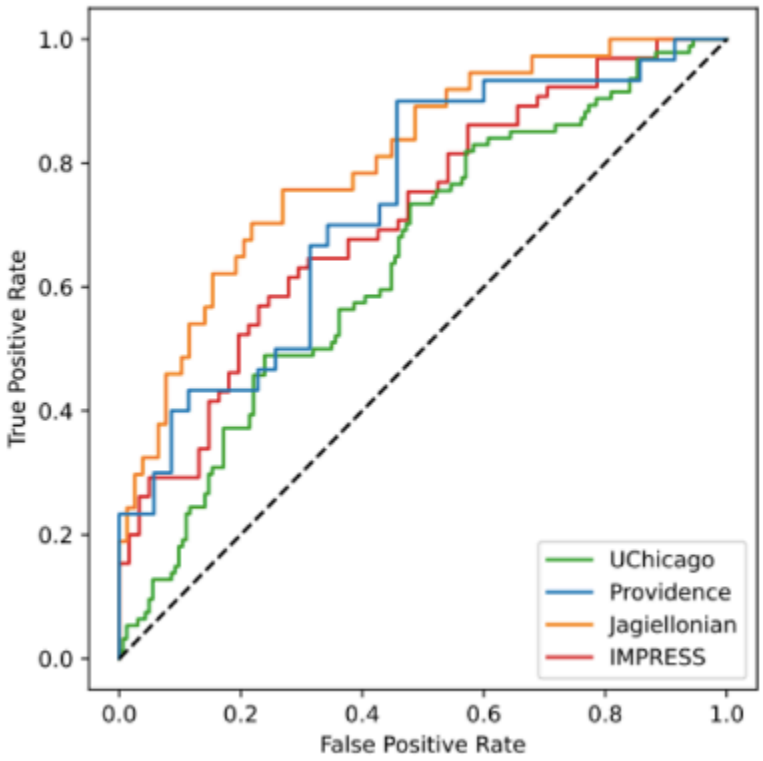
Results:

563 patients were included (TNBC n=190; HER2+ n=197; ER+/HER2- n=164; HER2-unknown n=12). pCR rates were 44.2% (TNBC), 53.8% (HER2+), and 20.7% (ER+/HER2-). In continuous variable analysis, ATX NEO score was significantly associated with pCR (OR per 1-SD increase=2.26; 95% CI: 1.46-3.51; $p<0.01$). Multivariable logistic regression confirmed ATX NEO remained independently predictive of pCR after adjusting for molecular subtype, TNM staging, patient's age and tumor grade (adjusted OR=1.54, 95% CI: 1.27-1.88, $p<0.01$). Overall model discrimination was good (AUC 0.721; 95% CI: 0.65-0.80). Performance by subtype was 0.68 (0.60–0.75) in TNBC, 0.63 (0.49–0.78) in HER2+ disease, and 0.69 (0.58–0.80) in HR+/HER2– disease. Quartile stratification demonstrated a progressive and stepwise increase in pCR rates, rising from 16% in the lowest ATX NEO quartile to 64% in the highest ($p<0.01$). Similar incremental trends were observed across subtypes: TNBC: 29% → 63% ($p<0.01$), HER2+: 39% → 74% ($p<0.01$) and HR+/HER2-: 12% → 32% ($p=0.02$).

Conclusion:

ATX NEO, a multimodal Artificial Intelligence model that extracts morphological features from H&E-stained slides and integrates clinical data, was able to predict pCR across all breast cancer subtypes in real-world data. ATX NEO may help refine the selection of NAT and treatment sequencing. Prospective validation and calibration studies are warranted.

Figure: ROC curves for pCR prediction in four external evaluation datasets.



1490 - Managing Competing Data Priorities in Loco-Regional De-Escalation in Care and in Trials

Kirithiga Ramalingam[1], Sarah Hartman[1], Laura Esserman[1], Michael Alvarado[1]

[1]*University of California San Francisco, San Francisco, CA*

Background/Objective: Trials of de-escalation of locoregional treatment of breast cancer, including omission of sentinel lymph node biopsy (SLNB) and minimizing/omitting radiation, provide the opportunity to reduce the comorbidities associated with breast cancer treatment. The challenge is to determine which patients are best suited for de-escalation with the omission of SLNB, radiation, or both. Nodal status is not only important for adjuvant systemic therapy decisions but also essential for guiding enrollment in other locoregional de-escalation clinical trials, such as the PROSPECT and DEBRA trials, which evaluate outcomes after the omission of adjuvant radiation in low-risk early breast cancer. In practice, clinicians and patients need to know how to prioritize which of these de-escalation approaches, if any, should be applied. This study aimed to identify a particular cohort of older patients with ultra-low-risk, early-stage disease who could safely avoid SLNB and still enroll in radiation de-escalation.

Methods: We conducted a retrospective analysis utilizing our institutional database spanning from 2012 to 2025. The study cohort was defined by strict criteria: patients aged over 60 years with small tumors (T1a/T1b, < 1cm) and favorable receptor status (Estrogen Receptor-positive, HER2-negative disease). The primary outcome examined was the rate of pathological lymph node positivity in this highly select population.

Results: Out of 1,194 patients identified with T1, ER+, HER2- disease, 639 patients (53.3%) were aged 60 years or older. Among this older subset, 305 patients (47.7%) had tumors measuring <1 cm. In the final target cohort with <1cm tumors, the overall rate of lymph node positivity was exceptionally low: 2% for grade 1 tumors (3 out of 144 patients) and 3% (5 out of 161 patients) for grade 2 tumors.

Conclusion: Our institutional data demonstrates that lymph node positivity is extremely rare (2-3%) in patients aged over 60 years with Stage 1a or 1b, Grade 1-2, ER+, HER2- breast tumors, and would be good candidates for both de-escalation of SLNB and radiation. The exceptionally low rate of node positivity strongly suggests that risk-adapted treatment can be used to inform eligibility for de-escalation of radiation in clinical trials and practice. While RCTs establish the non-inferiority of de-escalation using stringent criteria, robust observational data are also crucial in guiding clinical decision-making.

1483 - Comprehensive Ultrasound-Guided Breast Aspiration Curriculum Utilizing Over-the-Counter Realistic Breast Model Improves Trainees' Procedural Confidence and Technical Performance

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Background/Objective: Ultrasound (US)-based techniques are the cornerstone of minimally invasive procedures utilized for patients with a variety of breast pathologies. The ability to learn, practice and successfully perform US-based procedures such as breast abscess aspiration or core needle biopsy of breast lesion is important to obtain not only during general surgery residency but also during breast surgical oncology fellowship. Furthermore, with a rising interest in US-guided cryoablation breast therapies the appropriate ultrasound skills for surgery trainees becomes even more relevant. Prior studies have shown that well-structured curriculum utilizing either cadaveric or chicken breast phantom models improve trainees' US-based technique performance. In this study we sought to create and evaluate the effectiveness of our comprehensive US-guided breast abscess aspiration curriculum utilizing a less morbid, over-the-counter, cost-effective, realistic breast model to simplify and standardize the curriculum.

Methods: Surgery residents consented and participated in a 30-minute curriculum lecture on US use and ultrasound specific breast imaging findings to familiarize themselves with general breast tissue appearance and differences between various breast lesions on US. Following, residents underwent a 30 minute hands-on session as a part of the curriculum using either Butterfly iQ Portable US (Butterfly, Burlington, MA, USA) or standard US (GE HealthCare, Chicago, IL) to learn how to optimize US setting for adequate visualization and safe aspiration as well as to learn steps of the procedure. An over-the-counter phantom model (Kyoto Kagaku Ultrasound, Japan) was used in this curriculum and consisted of advanced opaque breast model containing hyper and hypoechoic targets ranging from 6-10 millimeters. All residents participated in a multichoice questionnaire (10 questions), survey and assessment of technical skills pre and post curriculum. Statistical analysis was done by McNemar's test with significance ($p<0.05$).

Results: A total of 15 general surgery residents (PGY1-PGY3) responded to a multichoice questionnaire with average 51 +/- 15% correct answers on pre- and 81 +/- 6% on post-assessment (p<0.001). In 6 out of 10 questions residents significantly improved their knowledge following the curriculum (p=0.003-0.025). Total of 10 residents (PGY1) successfully performed only 2.1 +/- 1.66 steps out of 7 steps of simulated US-guided breast abscess aspiration utilizing breast model prior to the curriculum including hands-on training compared to successfully and safely completing all 7 steps by all participants post curriculum (p<0.001). Only 5 residents correctly identified the targeted lesion (simulated abscess collection) compared to all 10 residents successfully targeting the simulated abscess post-curriculum (50% vs 100%, respectively; p=0.03). Fifty percent of residents reports prior US training with only 14% residents having previous breast specific US teaching experience. Only 1 resident (7%) felt confident to describe and perform a US guided breast abscess aspiration prior to the curriculum compared to significantly higher number of residents expressing confidence in describing (14 residents, 100%; p=0.003) and performing (13 residents, 93%, p=0.0005) breast abscess aspiration procedure. All residents reported the over-the-counter breast model to be realistic and rated overall curriculum experience with highest score.

Conclusion: In conclusion, following our comprehensive US-guided breast aspiration curriculum utilizing over-the-counter, realistic breast model to allow for a simplified and standardized curriculum, residents reported significantly improved confidence in performing the procedure, showed significantly improved breast ultrasound knowledge and safely and successfully performed significantly more steps of the simulated breast abscess aspiration.

1477 - Mastectomy Provides No Survival Advantage Over Partial Mastectomy for Invasive Lobular Carcinoma of the Breast: An NCDB Analysis

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Background/Objective: Background: Invasive lobular carcinoma (ILC) is a distinct subtype of breast cancer with unique biological behavior. Traditionally, mastectomy has been favored due to concern about subclinical tumor spread. The survival benefit compared to breast-conserving surgery (BCS) remains uncertain, especially for larger, high-grade tumors. Objective: To compare overall survival outcomes between mastectomy and partial mastectomy in patients with ILC using the National Cancer Database.

Methods: Methods: A retrospective analysis of the NCDB of adult women diagnosed with stage I–III ILC undergoing upfront surgery between 2010 and 2020 was performed. Patients were stratified by surgical treatment: mastectomy without post-mastectomy radiation (M-PMRT) versus BCS with adjuvant radiation (BCS+RT). Multivariable Cox proportional hazards models adjusted for demographics, tumor, and treatment factors were used. Inverse probability of treatment weighting (IPTW) and weighted Kaplan–Meier survival analyses were performed.

Results: Among 69,949 patients, 31,208 underwent M-PMRT, and 38,741 underwent BCS+ RT. BCS+RT patients were found to have significantly improved overall survival (OS) compared to M- PMRT (p< 2e-

16) (Fig 1). Subgroup analyses revealed the OS advantage persisted for T3 (p=3.83e-12), as well as high-grade tumors (p=2.45e-15) (Fig 2 a-b). Patients with higher grade and T3 tumors were more likely to undergo mastectomy in our cohort (p<0.001).

Conclusion: Conclusions: In this analysis, M-PMRT had a lower survival compared to BCS+RT in patients with ILC. Even among patients with T3 tumors, BCS+RT may offer superior survival, and the increasing adoption of BCS over time reflects a shift toward de-escalation of surgical management for ILC.

Figure 1. OS comparing M-PMRT BCS+RT

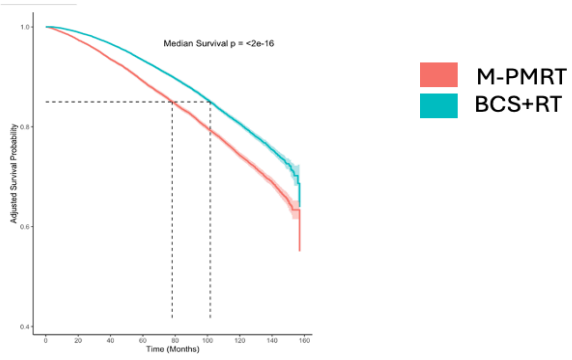
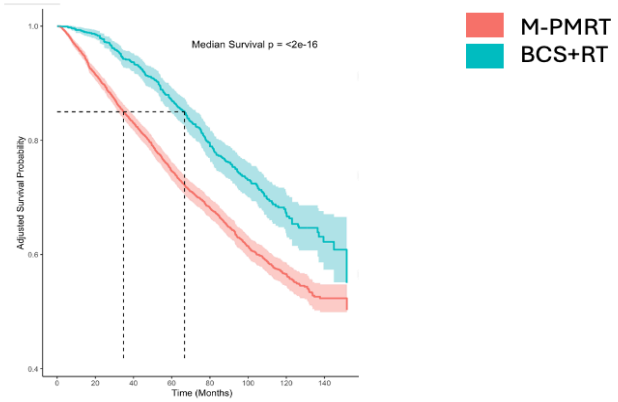
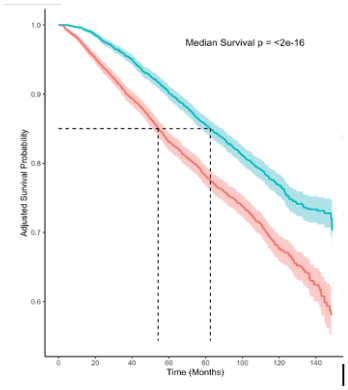


Figure 2. OS comparing mastectomy versus partial mastectomy with adjuvant RT for T3 (a) and high-grade (b) tumors.

a.)



b.)



1472 - Levonorgestrel Intrauterine Devices and Cancer Risk: A Systematic Review and Meta-Analysis of Breast, Endometrial, and Ovarian Cancer Outcomes

Allison Gelfond[1], Marlynn Lopez[2], Laya Krishnan[2], Arnav Kacker[2], Ifrah Hammad[2], Ajita Nair[2], Lauren Sargeant[2], Megan Hutchraft[3], Nicholas Rawson[3], Laya Krishnan[2]

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Background/Objective: The systemic bioavailability of levonorgestrel released from an intrauterine device (LNG-IUD) poses questions regarding its long-term effects on hormone-sensitive tissues such as the breast, endometrium, and ovaries. One previous meta-analysis by Conz et al. (2020) noted a mild significant increase in breast cancer incidence among LNG-IUD users (OR 1.16, 95% CI 1.06–1.28), while Silva et al. (2020) found a nonsignificant association when stratifying similar studies by their design. However, both of these previous meta-analyses included studies that introduced additional heterogeneity into their results. We aimed to conduct an up-to-date quantitative synthesis focusing on the association between LNG-IUD use and breast cancer risk, with additional analyses of endometrial and ovarian cancer risk.

Methods: PubMed, Scopus and Embase were searched from inception through August 2025 for studies comparing incidence of breast, endometrial and ovarian cancer between LNG-IUD users and non-users. We included seventeen studies (N = 9,325,887), with quantitative synthesis of 10 studies (N = 3,472,467). The Newcastle-Ottawa Scale was utilized for assessment of bias. DerSimonian-Laird or Hartung-Knapp-Sidik-Jonkman (HK) adjustments were applied to the random effects model to estimate the appropriate pooled effect size depending on included study designs. Pooled odds ratios were used for the breast cancer analysis and relative risk ratios were used for both endometrial and ovarian cancer analyses. Heterogeneity was assessed using I^2 and τ^2 statistics. Duration of use (<5 years vs ≥5 years) and association with each cancer was assessed in subgroup analyses.

Results: Synthesis of seven studies suggested a 15% increased odds of developing breast cancer in LNG-IUD users compared to those without (OR=1.15, 95% CI: 1.06-1.23). Subsequent HK adjustment revealed a stable effect size with a nonsignificant association (OR 1.15, 95% CI: 0.90-1.46, I2 =100%). We also found a decreased risk of developing ovarian cancer by 27% (RR = 0.73, 95% CI: 0.64-0.82, I2=98.1%), which was further confirmed with a pooled adjusted OR of 0.71 (95% CI: 0.68-0.74, I2=0.0%). The risk of developing endometrial cancer trended downwards for LNG-IUD users, but was consistently nonsignificant (RR = 0.57, 95% CI: 0.23-1.44). LNG-IUD duration-stratified analyses showed non-significant associations after conservative adjustment.

Conclusion: When compared to a previous breast cancer meta-analysis, we found no significant increase in risk of breast cancer in LNG-IUD users compared to those without, regardless of duration. However, there is strong evidence of a 27 to 29% decreased risk of ovarian cancer. Further research is warranted to assess the association of LNG-IUDs in the presence of known risk factors for breast cancer. Considering our results were limited by extreme between-study heterogeneity, caution should especially be taken when recommending an LNG-IUD in patients with a high baseline risk of breast cancer.

1471 - Clinical and Pathologic Predictors of Contralateral Breast Cancer Development in the General Population: A Systematic Review and Meta-Analysis of Adjusted Hazard Ratios

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Background/Objective: Each year, 1 in 3 women are diagnosed with breast cancer and the affected women go on to face a lifetime risk of developing a second primary tumor in the other breast that also increases with time. Screening mammograms and ultrasounds typically detect breast cancer before metastasizing, which allows approximately 9 in 10 women to live more than 5-years after their initial diagnosis. However, the average annual risk of contralateral breast cancer (CBC) is approximately 0.4% and unfortunately increases to a cumulative risk of approximately 10% after 20 years from their diagnosis. Through a systematic review and meta-analysis, we aimed to identify predictors of CBC among women without known high risk gene mutations.

Methods: PubMed, Scopus and Embase were searched from January 2010 through August 2025. Eligible studies focused their analysis on adult patients with unilateral breast cancer and recorded subsequent incidence of CBC within the cohort. Patient-level factors, tumor characteristics, or treatment types for both the unilateral breast cancer group and CBC group were also required. The Newcastle-Ottawa Scale was utilized for assessment of bias. Hartung-Knapp-Sidik-Jonkman (HK) adjustments were applied to the random effects model to estimate the pooled adjusted hazard ratios with associated 95% confidence intervals. Heterogeneity was assessed using I^2 and τ^2 statistics.

Results: We included 103 studies overall, and 22 studies (N = 1,197,500) were eligible for the quantitative synthesis of adjusted hazard ratios. CBC was diagnosed in 5.4% of patients (n=64,632). The median range for the follow-up period varied from 34 to 192 months across studies. We found that individuals with ER-negative primary breast cancers were associated with a 41% higher risk of CBC development (HR=1.41; 95% CI: 1.23,1.63; I2=46.6%). When compared to a ductal breast cancer, both lobular and mixed histology were associated with an increased risk of CBC by 17% (HR=1.17; 95% CI: 1.09, 1.26; I2=0.0%) and 29% (HR=1.29; 95% CI: 1.25, 1.33; I2=0.0%), respectively. Family history of breast cancer or ovarian cancer in first- and second-degree relatives resulted in an increased risk of CBC by 46% (HR=1.46; 95% CI: 1.09, 1.26; I2=0.0%). In contrast, both endocrine and chemotherapy were associated with a significant reduction in the risk of CBC by 36% (HR=0.64; 95% CI: 0.48, 0.85; I2=96.6%) and 22% (HR=0.78; 95% CI: 0.63, 0.96; I2=60.7%), respectively. When examining the effect of tamoxifen alone, the heterogeneity became negligible and the risk of CBC decreased even further to 53%, confirming variable effects between tamoxifen and aromatase inhibitors (HR=0.47; 95% CI: 0.40, 0.56; I2=0.0%).

Conclusion: We performed the first large-scale meta-analysis exclusively pooling adjusted effect sizes for multiple predictors of CBC in the general population. Our review of over 1 million patients confirmed an increased risk associated with certain tumor characteristics and family history. We also corroborated the beneficial effects of endocrine and chemotherapy. Although risk of CBC is not dependent on solely one factor, this comprehensive synthesis provides Level 1 evidence that can be utilized in personalized CBC risk counseling and used to guide surveillance intensity.

1469 - Clinicopathologic Characteristics and Treatment Differences by Menopausal Status in Patients with Invasive Lobular Carcinoma: A Single-Institution Cohort Study

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Background/Objective: Invasive lobular carcinoma (ILC) is the second most common type of breast cancer with unique characteristics when compared to invasive ductal carcinoma (IDC). ILC tumors are predominantly hormone receptor (HR) positive and human epidermal growth factor receptor (HER) 2 negative, tend to have lower proliferation rates, and are diagnosed at older ages than those with IDC. While recent data suggests that rates of ILC are increasing, the etiology of ILC and role of co-morbid conditions that impact systemic estrogen such as obesity and insulin resistance are poorly understood, especially regarding menopausal status. Given the paucity of data on ILC in pre-menopausal women, we evaluated a large single institution cohort of patients with ILC to determine the prevalence of pre-menopausal status, and to compare clinicopathologic and treatment characteristics by menopausal status.

Methods: We analyzed a prospectively maintained institutional database of 1001 patients with ILC, in whom there were 1029 ILC tumors that we analyzed as independent observations, of which 934 had menopausal status available. Cohort characteristics were described using frequencies for categorical variables and mean (standard deviation [SD]) for continuous variables. These variables included menopausal status (determined from documentation in medical oncology notes), age, T category, N category, tumor receptor status, and treatment received. The presence or absence of the following co-morbid conditions were determined by chart review and based on documentation of clinical diagnosis: hypertension, hyperlipidemia, diabetes, hypercholesterolemia, and BMI. Differences in characteristics between groups were tested using chi-square tests for categorical variables, t-tests for continuous variables, and log-rank tests for recurrence and mortality. All time-to-event variables used in survival analyses were administratively censored 15 years from the diagnosis date. Hypothesis tests were two-sided, and the significance threshold was set to 0.05. Statistical analysis was performed using SAS version 9.4.

Results: Of 934 ILC patients with menopausal status available, we found that 630 patients were post-menopausal (67%) and 304 were pre-menopausal (33%). Patients in the post-menopausal group were significantly older than those in the pre-menopausal group (65 years versus 46, $p<0.001$). T category differed significantly by menopausal status. For pre-menopausal patients, 42.0% had T1, 31% had T2, and 27% had T3 tumors, compared to 49%, 31%, and 20% in post-menopausal patients ($p=0.034$). Distribution of N category differed by menopausal status with N0 status in pre-menopausal patients occurring 62.5% versus 72.7% of post-menopausal patients, $p=0.018$). Tumor receptor subtype differed by menopausal status ($p<0.001$); for example, hormone receptor-positivity ER+PR+HER2- subtype occurred in 82% of pre-menopausal cases versus 68% of post-menopausal patients. Locoregional therapy differed significantly between groups. Comparing pre- and post-menopausal patients, 4% versus 18% underwent BCS alone, 34% vs 41% underwent BCS with radiation, 37% vs 30% had mastectomy, and 25vs 12% had mastectomy with post-mastectomy radiation ($p<0.001$). Systemic therapy also differed, with significantly higher rates of both adjuvant chemotherapy and neoadjuvant chemotherapy

in pre-menopausal patients compared to post-menopausal patients (31% versus 16% and 21% versus 10%). There was a significant difference ($p<0.001$) in receiving adjuvant chemotherapy in HR+ tumors within pre-and post-menopausal groups (31% versus 20%). There were significant differences noted for receiving neoadjuvant chemotherapy in both groups (15% versus 9%, $p <0.05$). All the co-morbidities were significantly more common in post-menopausal patients ($p<0.001$) with greater prevalence of hypertension (43% vs 13%), hyperlipidemia (14% vs 5%), diabetes (12% vs 5%), and hypercholesterolemia (30% vs 9%) and elevated BMI ($p<0.05$). There was no difference in local recurrence free survival or distant recurrence free survival by menopausal status.

Conclusion: Although ILC is traditionally thought to be a tumor type that impacts older women, we found that one third of patients in this large cohort with ILC were pre-menopausal. Additionally, tumor biology appeared to differ by menopausal status, and pre-menopausal women appear more likely to be diagnosed with larger, node=positive tumors. Understanding the drivers of ILC development and improved methods for screening young women, particularly in the setting of high breast density, are important for improving the care of patients with ILC. Finally, both locoregional and systemic therapy appeared more aggressive in pre-menopausal patients with ILC; whether the equivalent recurrence outcomes that we observed occurred because of this or would have occurred without such aggressive treatment is unknown and deserves further exploration.

1455 - Optimizing Long-Term Survivorship Care Within Routine Breast Cancer Follow-Up

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Background/Objective: More than 4 million breast cancer survivors are living in the United States, and that number continues to grow every year. As this population increases, so does the need for comprehensive, long-term care that addresses their complex needs. Effective survivorship care goes beyond routine examinations and screenings, focusing on the unique physical, emotional, and psychosocial needs of survivors. In 2024 NAPBC updated its standards to include ongoing assessment of late and long-term effects throughout cancer surveillance. Currently, our center provides a comprehensive survivorship visit at six months post-surgery to address these concerns, but we do not have a protocol for long-term monitoring. Incorporating a structured survivorship care protocol into routine breast cancer surveillance visits using standardized screening will increase the frequency with which the key survivorship concerns of emotional distress, fatigue, sexual health, and sleep disturbances are assessed and managed.

Methods: The Plan-Do-Study-Act (PDSA) template was utilized to design and complete this quality improvement project. Random chart audits were conducted at multiple breast care offices from patients seen in 2022, 2021, and 2020. 60 charts were reviewed as to whether emotional distress, fatigue, sexual health, and sleep disturbances were being evaluated by providers during routine breast cancer surveillance appointments. An online survey was sent to five breast care providers with ten questions evaluating how often they ask about key survivorship concerns, barriers to care, knowledge, and the frequency of specialty referrals used to address symptoms. Validated survey tools, patient education, and resource handouts were created for symptom assessment and management. The health

history form used at every routine cancer follow-up was updated to include assessment of emotional distress, fatigue, sexual health and sleep disturbances. If a patient noted a survivorship concern, a more detailed symptom survey/assessment was completed, educational handouts were provided to the patient, and they were offered appropriate specialty referrals. All surveys were collected for data analysis. This intervention started on 03/17/2025 and concluded on 09/10/2025. A 60-chart audit and provider survey were repeated post-intervention. Data was analyzed using frequencies and percentages to compare pre- and post-intervention practices.

Results: The initial provider survey data indicates that providers felt they were assessing survivorship concerns 40-60% of the time at routine follow-up visits. Lack of time was cited to be the top barrier for assessing these symptoms. A retrospective review of 60 charts from 2020, 2021, and 2022, noted 6 total evaluations of emotional distress, fatigue, sexual health, or sleep disturbances with no specialty referrals placed. Post-implementation data collection was completed through a 60-chart audit and review of patient-completed surveys. Overall, there was a 70% compliance with using the updated health history form that assessed survivors for fatigue, emotional distress, sleep disturbances, and sexual health. A total of 192 survivorship concerns were detected throughout the entire intervention period. Multiple specialty referrals were generated, including 3 referrals to Pastoral Care, 11 referrals to Sleep Medicine, 2 referrals to Sexual Health Clinic, 21 referrals to Integrative Oncology, 2 referrals to Dietitian, 2 referrals to Social Work, 2 referrals to Behavioral Health, and 29 patients reported interest and plan to utilize local exercise programs. A post-implementation survey was sent to breast care providers who participated in the study. 83.3% of providers felt that this QI project had a positive impact on our breast cancer survivors. 100% of survey responders would like further education on the local resources for our breast cancer survivors. Lack of time continued to be the number one barrier to assessing survivorship concerns at routine surveillance visits.

Conclusion: There was a clear increase in the detection of late and long-term effects of breast cancer following the incorporation of a structured survivorship care protocol into routine breast cancer surveillance visits. A significant number of specialty referrals were also placed to address these symptoms, supporting more comprehensive and timely management. This structured evaluation and referral system meets the national accreditation standards for survivorship and surveillance care. While existing research supports the idea that early detection and management of survivorship concerns improve quality of life, a post-intervention patient survey would be necessary to accurately assess the impact of this project within our own population. Future projects to address barriers, including lack of time, are needed to continue to expand upon the integration and optimization of survivorship care into long-term routine breast cancer surveillance.

1437 - Expanding Access to Breast Cancer Early Detection in LMICs with Limited Access to Mammography Through Ultrasound Screening in Rural Mongolia

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[1]National Cancer Center of Mongolia, Ulaanbaatar, Mongolia, [2]University of Utah, Salt Lake City, UT, [3]Senior Expert Service Germany, Bonn, Germany, [4]The Mongolia National University of Medical Sciences, Ulaanbaatar, Mongolia

Background/Objective: In 2021, 332,051 women in Mongolia underwent clinical breast examination (CBE) for early detection, resulting in three diagnoses of malignant breast cancer (0.009 per 1,000), highlighting the limited sensitivity of CBE as a stand-alone screening tool in Mongolia. This low detection rate prompted the National Cancer Center of Mongolia (NCCM) to explore low-cost strategies to strengthen national screening capacity. In rural regions, where mammography is unavailable and there are no breast specialists, opportunities for early breast cancer detection remain extremely low. Zavkhan province, located over 1,300 kilometers west of Ulaanbaatar, requires up to two days of travel to reach the nearest mammography unit. By comparison, organized mammography programs in the United States detect an average of 4-6 cancers per 1,000 women screened. Handheld ultrasound, when paired with CBE, may provide a practical and scalable alternative for population screening in settings without mammography access.

Methods: A cross-sectional early detection program was conducted across 21 of 24 districts of Zavkhan province, Mongolia, during September 2025. Zavkhan was selected for its geographic isolation, limited diagnostic infrastructure, and lack of mammography services. Women were enrolled according to Mongolia's national breast cancer screening recommendations, which align with WHO and international early detection guidelines. Eligibility included women aged 40-69 years for routine screening and younger women at elevated risk determined by a questionnaire adapted from the Gail model. Recruitment occurred through coordinated public health outreach, social media campaigns, and community town hall meetings organized with local health departments. Each participant underwent a standardized clinical breast examination followed by bilateral handheld ultrasound, regardless of symptom status. Examinations were performed by NCCM-trained breast imaging physicians using portable ultrasound units available at each site. Findings were categorized according to BI-RADS criteria, and data were prospectively recorded in an electronic form capturing demographics, symptoms, risk factors, family history, prior screening history, and follow-up recommendations. The study received approval from the Institutional Review Board of the Mongolian National University of Medical Sciences.

Results: Across all districts, 2,460 women were screened, with an average of 117 women per site. The mean age was 45 years (range 20-84). A total of 1,722 (72%) participants had never undergone prior breast cancer screening, and 197 (8%) reported a family history of cancer. Ultrasound findings were predominantly normal or benign, with 2,331 examinations categorized as BI-RADS 1, 64 as BI-RADS 2, 55 as BI-RADS 3, and 9 as BI-RADS 4. Fifty-three women were referred for mammography and diagnostic evaluation at the NCCM in Ulaanbaatar, of whom 47 (89%) completed follow-up. Thirteen women underwent core needle biopsy based on imaging findings, of which 10 were benign. Three women (0.16%) were diagnosed with breast cancer following confirmatory imaging and biopsy; two presented with Stage I disease and one with Stage II disease. Two underwent surgical resection and one received neoadjuvant chemotherapy (Figure 1).

Conclusion: Clinical breast exam combined with ultrasound examination for breast cancer proved feasible and effective in reaching women who otherwise had no access to imaging in rural Mongolia. Among women presenting with palpable findings, ultrasound reclassified the majority as benign (BI-RADS 1), providing reassurance to patients and reducing the need for unnecessary referral to the capital. A small but clinically meaningful proportion required further evaluation, and confirmed cancers were identified at an early stage. Clinical breast exam combined with breast ultrasound performed by physicians trained in breast cancer identification and BI-RADS interpretation using handheld ultrasound and integrated within provincial health systems, expands equitable access to breast cancer detection in Mongolia and other rural regions where mammography is unavailable. Future efforts should focus on

structured follow-up, diagnostic yield assessment, and cost-effectiveness analysis to inform national scale-up.

Figure:

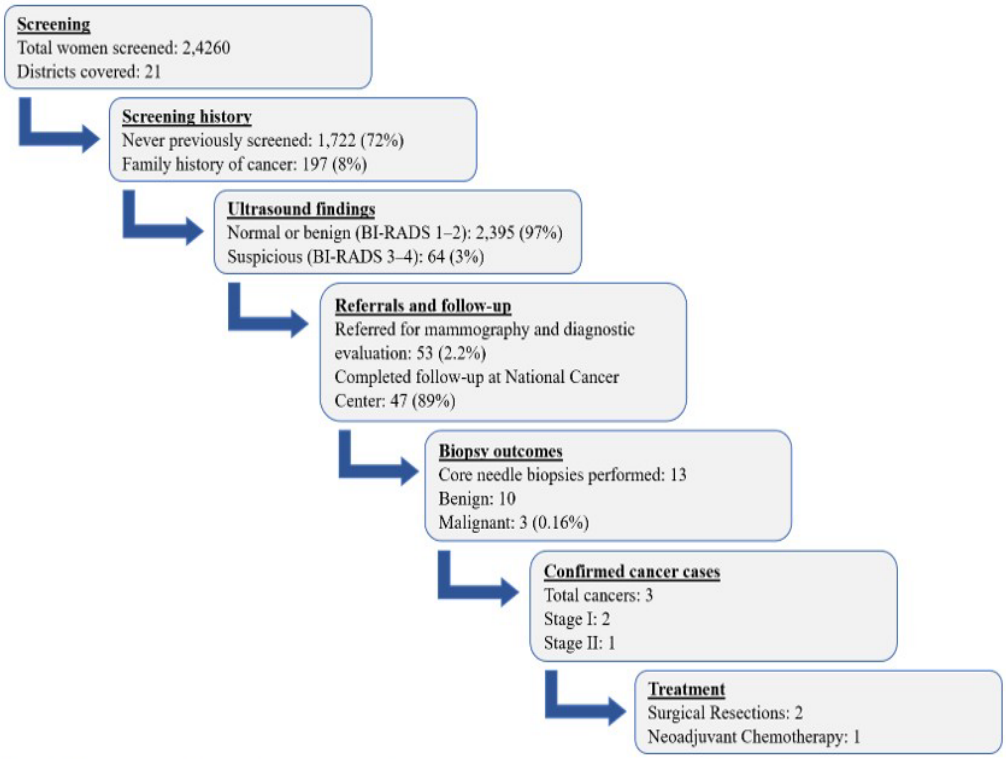

Figure 1. Screening and diagnostic pathway for handheld ultrasound breast cancer screening in Zavkhan, Mongolia.

1426 - Creation of a Multi-Institutional Human Biospecimen Repository to Investigate the Molecular Pathophysiological Basis of Idiopathic Granulomatous Mastitis

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Background/Objective: Idiopathic Granulomatous Mastitis (IGM) is a chronic inflammatory breast disease that primarily affects women of reproductive age, especially from racial and ethnic minority populations. The pathogenesis of IGM remains unclear, with autoimmune, infectious, and hormonal mechanisms proposed. Major gaps remain in understanding IGM's molecular mechanisms, and the lack of reliable biomarkers limits accurate diagnosis and targeted treatments. Emerging evidence implicates prolactin (PRL) signaling, particularly the macroprolactin (macroPRL) isoform, as a potential autoimmune pathway involved in IGM's immunopathogenesis. PRL and macroPRL may promote inflammatory Th1/Th17 lymphocyte activity and cytokine release, contributing to persistent granulomatous inflammation. Our hypothesis is that IGM represents a systemic autoimmune-hormonal inflammatory disorder driven by dysregulated PRL and cytokine signaling, resulting in distinct immune and molecular profiles in blood and affected breast tissue.

Methods: To our knowledge, we created the first U.S.-based multi-institutional IGM biorepository under an approved human biological materials IRB protocol. Informed consents are available in English and Spanish. Investigators include a multidisciplinary team of breast surgeons, breast pathologists, immunology scientists, autoimmune dermatologists, and rheumatologists. Adult women with histologically confirmed IGM are prospectively enrolled under this protocol. Matched healthy controls undergoing non-cancerous elective breast procedures are enrolled for comparison. After obtaining informed consent, blood and archived formalin-fixed, paraffin-embedded (FFPE) breast tissue samples are collected for systemic and local molecular and immunologic analyses. Serum and peripheral blood mononuclear cells (PBMCs) are isolated and cryopreserved according to standardized protocols. Multiplex ELISA assays were performed to quantify PRL and macroPRL. Histologic evaluation of breast tissue specimens included hematoxylin and eosin (H&E) staining and assessment for granulomatous inflammation.

Results: From July to November 2025, 12 patients with biopsy-confirmed IGM and 5 healthy controls were accrued to our protocol (Figure 1A). The mean age was 36.9 ± 8.8 years. Among them, 58.3% were Hispanic, 33.3% non-Hispanic White, and 8.3% African American. The most common presenting symptoms included painful, erythematous unilateral breast masses, with 33% developing abscesses and fistulae (Figure 1B). Recurrent disease flares occurred in 50% of patients. At the time of enrollment, 83% of patients had active IGM flares and 17% were in remission. All patients received corticosteroids (oral or intralesional), 25% were treated with methotrexate, and 8% with azathioprine (Figure 1A). Histopathologic evaluation demonstrated benign breast parenchyma with lobulocentric chronic inflammation, epithelioid histiocytes forming non-caseating granulomas, multinucleated giant cells, and lymphoplasmacytic infiltrates, consistent with granulomatous mastitis (Figure 1C). No evidence of malignancy was observed. Serum and PBMCs were successfully isolated from all 12 patients and 5 healthy controls and cryopreserved for future studies. Preliminary serum ELISA results revealed same PRL levels, but a trend toward higher median serum macroPRL levels in IGM patients compared with healthy controls (1,031 pg/mL vs 600.8 pg/mL, $p = 0.11$), although the difference did not reach statistical significance due to the limited sample size (Figure 1D).

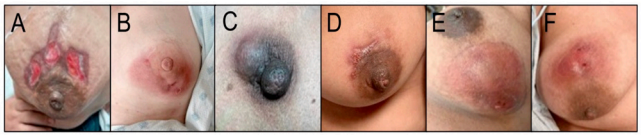
Conclusion: These early data demonstrate the feasibility of IGM patient recruitment, standardized biospecimen collection, and laboratory workflows to support IGM research. Establishing this multi-institutional prospective cohort and biobank provides a strong foundation for translational studies aimed at defining the pathophysiological underpinnings of IGM and guiding future biomarker diagnostic and therapeutic strategies. Our group welcomes collaboration from additional U.S. and international institutions to further expand this biorepository.

Figure 1

A

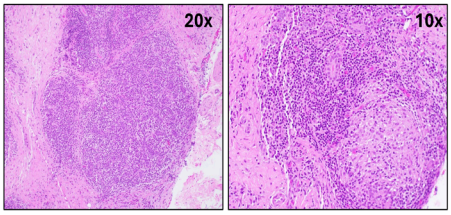
Characteristic	% or mean ± SD
Age (years)	36.9 ± 8.8
Race / Ethnicity	
Hispanic	58%
Non-Hispanic White	33%
African American	8%
Clinical Presentation	
Pain	100%
Erythema / swelling	100%
Abscess	33%
Lesion Side	
Unilateral	92%
Bilateral	8%
Recurrent flare	50%
Disease Status	
Active	83%
Remission	17%
Treatment Received	
Corticosteroids (oral or intralesional)	100%
Methotrexate	25%
Azathioprine (AZA)	8%

B



A: 34 year-old Hispanic female with right breast IGM, August 2021; **B:** 46 year-old White female with left breast IGM, October 2022; **C:** 34 year-old Hispanic female with left breast IGM, May 2023; **D:** 40 year-old Hispanic female with right breast IGM, October 2023; **E:** 28 year-old Hispanic female with left breast IGM, June 2024; **F:** 26 year-old Hispanic female with right breast IGM, August 2024.

C



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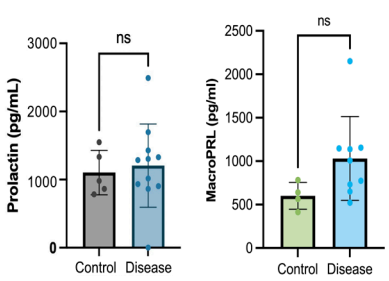


Figure 1. Initial overview of multi-institution IGM biorepository cohort and preliminary data. **A.** Baseline clinical and demographic characteristics of 12 IGM patients; **B.** Representative breast images from IGM patients seen at UNMC in Dr. Santamaria's and Dr. Medlin's clinics; **C**. Representative histopathologic findings showing lobulocentric non-necrotizing granulomatous inflammation composed of lymphocytes, plasma cells, and multinucleated giant cells (H&E, magnifications 10x-20x); **D** Serum macroprolactin levels in controls (n = 5) and IGM patients (n = 12), $p = 0.11$ ns by t-test.

1404 - Agreement Between ChatGPT-5 Plus and the St. Gallen 2025 International Consensus on Breast Cancer Management

Paulina Bajonero-Canonico[1], Eduardo Torres-Cisneros[1], Guillermo Peralta Castillo[1]

[1]*Hospital Ángeles Centro Sur, Queretaro, Mexico*

Background/Objective: Artificial intelligence (AI) models-particularly large language models (LLMs) such as ChatGPT-are increasingly being explored as decision-support tools in oncology. Early studies show promising accuracy in reproducing evidence-based recommendations, but their behavior in complex, real-world clinical situations remains largely unexplored. The St. Gallen International Consensus, which presents highly nuanced cases that require expert judgment beyond guideline algorithms, offers an opportunity to examine how AI performs in this context. Objective: To assess the agreement between responses generated by ChatGPT-5 Plus and the voting outcomes of the St. Gallen 2025 International Consensus Conference on Early Breast Cancer, and to examine how concordance varies by consensus strength and clinical domain.

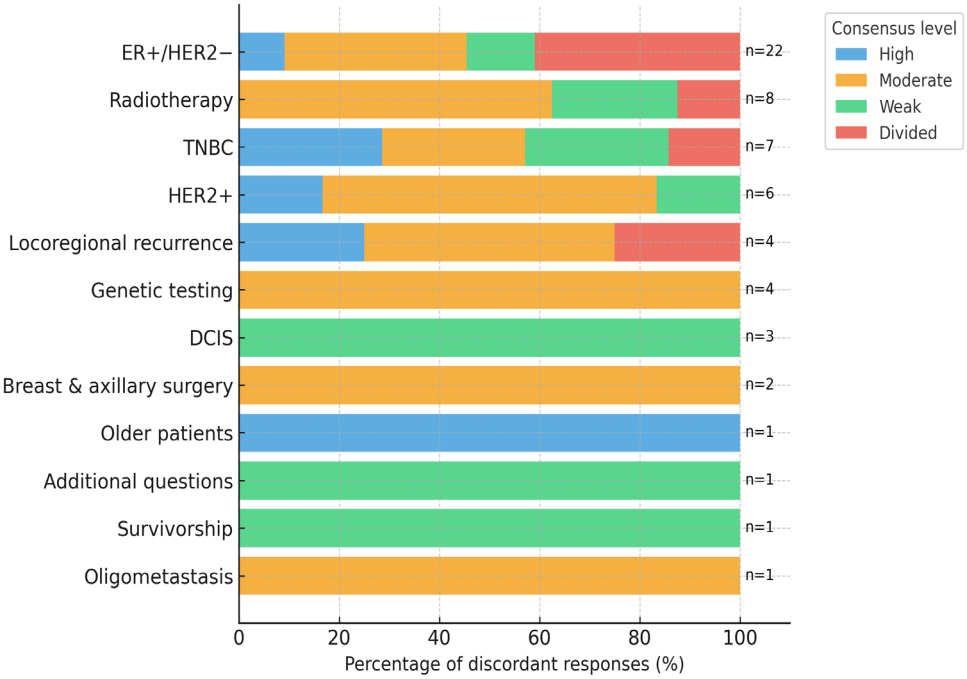
Methods: A total of 206 questions were extracted from the St. Gallen 2025 panel voting sessions. Three were excluded because they were not voted by the panel and one for addressing personal experience, leaving 203 questions across 12 clinical categories (genetic testing, DCIS, surgery, radiotherapy, systemic therapy, survivorship, older patients, recurrence, oligometastatic disease, and additional items). ChatGPT-5 Plus (Auto mode, OpenAI) was instructed to act as an international breast-cancer specialist and was fed with evidence from 14 international guidelines (NCCN, ESMO, ASBrS, ASTRO, ASCO, etc.), representing the most updated versions available to panel members at the time of the consensus.

All questions-identical to those answered by the St. Gallen 2025 panel-were then administered. The model was asked to select one single answer among the provided options and to generate a concise justification (50–100 words) integrating clinical reasoning and evidence.
AI responses were compared with the panel's most-voted answers. Agreement was classified as Yes (same option) or No (different). Panel consensus strength was categorized as: High (>70%), Moderate (50–69%), Weak (35–49%), Divided (<35% or tie).

Results: Among 203 questions, 60 (29.6%) differed between ChatGPT-5 Plus and the expert panel. Discordances occurred most frequently in systemic-therapy domains, particularly ER-positive/HER2-negative and triple-negative disease. Panel consensus distribution was: High (77), Moderate (72), Weak (34), Divided (20). Among discordant responses, 7 (9%) occurred in high-consensus items, 28 (35%) in moderate, 13 (16%) in weak, and 12 (15%) in divided questions (Figure 1). A chi-square test demonstrated a significant association between consensus level and disagreement ($\chi^2(3)=28.63$, $p<0.001$), with discordance increasing as expert consensus weakened.

Conclusion: ChatGPT-5 Plus demonstrated strong alignment with the St. Gallen 2025 expert panel when consensus and evidence were clear, but greater variability in areas of moderate or divided expert agreement. Given the inherent complexity of St. Gallen scenarios-many of which represent gray zones and nuanced decisions in breast cancer care-these findings suggest that AI outputs, although frequently reasonable, should be interpreted with caution, particularly where evidence is limited or expert opinion diverges. Beyond accuracy, this study illustrates that AI models, when properly prompted, can mirror expert reasoning in evidence-based settings while exposing their limitations in ambiguous ones. These analyses may inform the safe and responsible integration of AI into oncology practice and remind clinicians that AI-generated recommendations require the same scrutiny applied to any expert opinion.

Figure 1. Distribution of Discordant Responses by Clinical Domain and Consensus Level



1400 - Surgical and Adjuvant Management of Pleomorphic and Florid LCIS: A Systematic Review and Meta-Analysis with Pooled Upgrade Rates

Reema Gowda[1], Deepti Sudhakar[1], Nishita Kumar[1], Kaitlin Farrell[1]

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Background/Objective: The management for non-classic lobular carcinoma in situ (LCIS), specifically pleomorphic (PLCIS) and florid (FLCIS) variants, remains inconsistent due to limited data on malignancy potential, variable upgrade rates, and unclear recommendations for both surgical excision and adjuvant therapy. This systematic review and meta-analysis aimed to quantify the overall pooled upgrade rates by LCIS subtype (PLCIS and FLCIS) and to qualitatively synthesize data on patterns of local recurrence, specific management strategies, and adjuvant therapy used.

Methods: A systematic review and meta-analysis were conducted in accordance with PRISMA guidelines. PubMed, Embase, and Scopus databases were searched for studies reporting upgrade rates after a core biopsy of either pure pleomorphic or florid variants of LCIS. Studies were excluded if they were review articles, lacked upgrade rates, included classic LCIS, or presented biopsies concomitant with DCIS or invasive carcinoma. The final data extracted from studies included LCIS subtype, sample size of LCIS variants, number of upgraded cases, management approach, adjuvant therapy, and local recurrence percentages. Subgroup analyses were performed by non-classic LCIS subtype (pleomorphic vs. florid) to evaluate differences in upgrade risk. Both pooled upgrade proportions were calculated using a Freeman–Tukey double arcsine transformation and a random-effects model (DerSimonian–Laird method). Between-study heterogeneity was assessed with the Cochran Q and I^2 statistics.

Results: In total, 74 studies were included with 56 pleomorphic and 18 florid lobular carcinoma in situ cohorts. For pleomorphic LCIS (k = 56; N = 2,134; events = 555), the pooled upgrade rate to malignancy was 32.2% (95% CI, 24.3%–40.6%). For florid LCIS (k = 18; N = 489; events = 155), the pooled upgrade rate was 30.9% (95% CI, 22.8%–39.6%), with substantial heterogeneity (Q = 47.4; df = 14; I^2 = 70.5%; τ^2 = 0.08). Management of both pleomorphic and florid LCIS was ultimately surgical. Nearly 85-95% of cases were managed with excision to negative margins and 10-20% underwent mastectomy due to multifocal or extensive disease. For adjuvant therapies, post-excisional therapy was reported in 25-40% of patients and adjuvant radiation in 10-15%. Radiation was primarily used when either variant had close margins upon excision. In total, local recurrence rates ranged from 5-20%, typically when patients declined or were not offered endocrine therapy in their overall management.

Conclusion: Pleomorphic and florid LCIS consistently demonstrated higher rates of upgrade and recurrence relative to classic LCIS rates present in the literature. This supports the management with surgical excision and the selective use of adjuvant endocrine therapy for risk reduction. To the author's knowledge, this is the first systematic review and meta-analysis to comprehensively quantify upgrade rates and management strategies across non-classic LCIS variants, specifically in both pleomorphic and florid subtypes, with a focus on adjuvant therapy utilization and local recurrence. Currently, surgical excision remains the mainstay of management as per NCCN guidelines, but considerable variation exists in adjuvant therapy use, underscoring the need for standardized treatment algorithms and prospective studies to clarify the role of adjuvant therapy and optimize long-term outcomes. Given the increasing

number of contemporary studies and larger patient cohorts, future research should leverage this data to define risk-based management pathways and refine follow-up strategies for non-classic LCIS.

1381 - Communicating the Journey: Designing Visualizations of Predicted Longitudinal Quality-of-Life Outcomes in Breast Cancer Surgery

Sarah Leslie[1], Elizabeth O'Brien[2], Elise Tsai[3], Gabriella Canty[3], Madeline Higgins[3], Jakob Durden[1], Sarah Tevis[1]

[1]University of Colorado, Aurora, CO, [2]Quinnipiac University Frank H. Netter MD School of Medicine, North Haven, CT, [3]University of Colorado Anschutz Medical Campus, Aurora, CO

Background/Objective: Lumpectomy and mastectomy, two surgeries commonly performed to treat breast cancer, have similar survival rates, but long-term treatment side effects impact patients' quality-of-life (QoL) across different domains. Tools such as the BREAST-Q are validated patient-reported outcome measures (PROMs) used to track patient QoL throughout care and survivorship. Despite growing use of PROMs, their integration into clinical decision-making remains limited, often buried in electronic health records or designed primarily for clinicians. Much existing literature on communicating numbers and outcomes to patients centers on risk probabilities, rather than the predicted QoL journey. The primary aim of this study is to support the design of patient-centered PROM displays for use in tailored clinical decision aids to enhance patient understanding, promote informed decision making, and help patients more accurately anticipate their own future QoL outcomes.

Methods: We conducted a qualitative co-design study using focus groups and iterative prototyping to elicit patient perspectives and refine longitudinal PROM displays for breast cancer decision aids. Focus groups were held in July and August 2025 with breast cancer survivors at least one year post-surgery. Four BREAST-Q domains were used to create example displays: Breast Satisfaction, Chest Comfort, Psychosocial Well-Being, and Sexual Well-Being. We explored patient interpretation of each domain, using qualitative analysis concurrent with co-design, thematic development, and preference ranking. A light-touch thematic mapping approach was used to capture recurring ideas and preferences.

Results: Four 90-minute focus groups were conducted with a total of 18 patients. On average, participants were 71.8 years old (±10 years), predominantly White (72.2%), and most had undergone unilateral lumpectomy surgery (72.2%). Patient preferences for visual displays included simple numerical representations, line graphs with time-interval markers, and digestible graphics using colors with easily recognizable meanings, like speedometer or stoplight visuals. Patients emphasized the importance of seeing predicted QoL journey over time, including fluctuations, rather than static snapshots. They also expressed interest in stratified data based on diagnosis and treatment variables, and the inclusion of datapoints past one year.

Conclusion: This co-design study highlights patients' preference for simple, personalized, and actionable PROM displays that reflect the non-linear nature of recovery. Survivors want tools that help them visualize their QoL trajectory, anticipate challenges, and feel more prepared for the future. Integrating survivor-informed visualizations into decision aids can enhance value-aligned decision-making, foster empathy, and support patients and caregivers in navigating the emotional and physical complexities of survivorship.

1367 - Bridging the Gap: Predictors of Risk-Reducing Endocrine Therapy Counseling and Uptake Among High-Risk Women

Nathan Wong[1], Alexandra Haraczy[1], Mimi Lyang[1], Richard Caplan[1], James Laughery[1], Claudine Jurkovitz[1], Christopher Verdone[1], Shayla Modi[1], Natalie Garver[2], Valerie Staradub[1]

[1]Christiana Care, Newark, DE, [2]Roper St. Francis, Summerville, SC

Background/Objective: Randomized trials have demonstrated that use of risk-reducing endocrine therapy (RRET), which includes selective estrogen receptor modulators and aromatase inhibitors, can lower the incidence of estrogen receptor–positive breast cancer (BCa) in high-risk women (HRW) by approximately 40–65%.[1-4] National guidelines recommend that clinicians discuss these agents with HRW, yet the factors influencing which patients receive counseling about the benefits of RRET or go on to initiate therapy remain incompletely defined.[5] This study characterizes predictors of documented provider counseling and RRET initiation among eligible HRW and identifies factors contributing to underuse.

Methods: We conducted a single-institution retrospective cohort study of women aged ≥35 years evaluated between January 2019 and December 2024 who met criteria for HRW designation. HRW status was defined by a ≥20% lifetime risk on validated models, presence of a pathogenic germline mutation (GM) conferring ≥20% lifetime risk, or biopsy-proven high-risk lesion (RL), including atypical ductal hyperplasia, atypical lobular hyperplasia, or lobular carcinoma in situ. Women with prior BCa, deleterious BRCA1/2 mutations, or insufficient data to calculate risk were excluded. Our primary outcome was documentation of provider counseling and RRET initiation, and our secondary outcome was the rate of subsequent BCa diagnosis. Outcomes were compared across demographic and clinical variables including age, menopausal status, family history, biopsy history, and risk category. Random-forest analysis and separate multivariable logistic regression models were used to estimate associations with documented RRET counseling and with initiation among those counseled.

Results: Among 399 HRW, 128 (32%) had documentation in the medical record of RRET counseling by a provider and 59 (14.7%) initiated therapy. Women with biopsy pathology demonstrating a RL were more likely to have documentation of counseling about benefits of RRET (41.8% vs. 18.6%, $p<0.001$) and were more likely to initiate RRET (51.5% vs. 29%, $p=0.029$).

On multivariable analysis, biopsy-confirmed RL was most strongly associated with counseling (OR 2.78, 95% CI 1.65–4.76, $p<0.001$), while family history of a first degree relative with BCa showed a negative association for counseling (OR 0.64, 95% CI 0.40–1.02, $p=0.058$). Among women counseled, older age was positively associated with acceptance (OR 1.05 per year, 95% CI 1.01–1.10, $p=0.026$), whereas family history was negatively associated with uptake (OR 0.36, 95% CI 0.16–0.80, $p=0.013$). Although precision was limited by sample size, random-forest analysis identified any breast biopsy, family history of a first degree relative with BCa, and age as the most consistent predictors across models.

Twenty-two breast cancers (5.5% of the cohort) were diagnosed at a mean of 1.6 years after designation of high risk. All occurred among women who did not initiate RRET (22/340, 6.5%). Most of these patients did not have documented counseling about RRET (18/22), and a small number declined once counseled.

Hormone receptor data were available for 19 of 22 cancers; all were hormone receptor positive. No cancers occurred among women who initiated RRET (0/59, 0%).

Conclusion: RRET remains markedly underutilized among HRW, with initiation closely linked to documented counseling by their provider and to biopsy-confirmed RL. Women whose risk was primarily due to a pathologic diagnosis of RL were more than twice as likely to be counseled and to initiate RRET. This suggests that a concrete pathologic finding may heighten risk perception and motivation amongst patients and/or act as a specific prompt for counseling by the provider. Within the counseled group, older women were more likely to initiate therapy, while those with a first-degree relative with breast cancer were less likely both to receive counseling and to initiate RRET. These patterns suggest that clinicians may emphasize lesion-based indications to discuss RRET. Women with a close familial experience of breast cancer may be more hesitant to pursue endocrine therapy for risk reduction, potentially reflecting preconceived concerns of treatment-related side effects or differing perceptions of benefit. Notably, all subsequent breast cancers occurred among non-initiators and all tumors with available data were ER/PR-positive, consistent with endocrine-responsive disease and reinforcing the effectiveness of endocrine prevention. Collectively, these findings reveal a gap between recognition and action: clinicians and patients appear to respond more readily to biopsy-proven risk than to modeled or familial risk, leading to underuse of proven preventive therapy. Bridging this divide will require shifting RRET counseling from a reactive discussion triggered by pathology to a proactive component of standardized risk-stratified patient care.

1365 - Trajectory and Career Outcomes of Oral and QuickShot Presenters at the American Society of Breast Surgeons Annual Meeting, 2009–2025

Lina Adwer[1], Diana Jaen[1], Erik Whiting[2], Kimberly Helseth[1], Paige Harwell[1], Janelle-Cheri Millen[1], Juan Santamaria-Barria[1]

[1]University of Nebraska Medical Center, Omaha, NE, [2]University of Nebraska-Lincoln, Lincoln, NE

Background/Objective: The American Society of Breast Surgeons (ASBrS) Annual Meeting serves as a prominent forum for trainees and breast surgeons across all career stages. It remains unknown whether early presentation at the ASBrS Annual Meeting predicts subsequent subspecialty training in breast surgery or continued academic and leadership involvement. We sought to determine whether early participation, particularly among medical students and residents, is associated with future academic engagement or pursuit of breast/surgical oncology training. This study examined presenter characteristics and long-term career outcomes among oral and quickshot ASBrS presenters from 2009 through 2025.

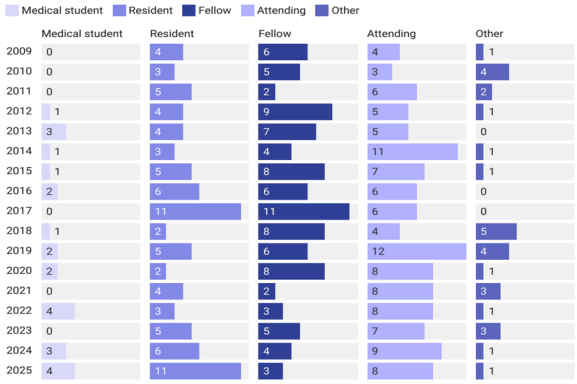
Methods: All first-author presenters for oral and quickshot presentations from publicly available ASBrS annual meeting proceedings (2009–2025) were reviewed. Presenters were categorized by training level at the time of presentation: medical students, residents, fellows, and attending surgeons. Institutional affiliations, repeat presentations, demographics, fellowship completion, nature of practice, and leadership in academic institutions were collected through open-source online verification. Associations were evaluated using Fisher's exact and chi-square tests, with significance defined as $p < 0.05$.

Results: Among 350 presenters analyzed (mean 20.6 ± 4.2/year), attendings comprised 33.5%, fellows 27.7%, residents 23.7%, and medical students 6.9%. Other groups included PhD (3.1%), international postdocs (2.9%), undergraduates (0.9%), U.S. postdocs (0.6%), genetic counselors (0.6%), and pharmacists (0.3%). Presenters varied across years (χ^2=213.0, df = 160, p=0.003) but remained relatively stable overall, with isolated peaks from PhD and genetic counselors contributing to heterogeneity. Residents, fellows, and attendings remained consistent (Fig. 1A). We identified 24 medical student presenters from 18 institutions, most from Duke (4), UCSF (3), and Missouri (2); 3 (12.5%) were repeat presenters and 3 (12.5%) international. Of 11 with known outcomes, 2 (18.2%) pursued breast/surgical oncology fellowships. There were 83 resident presenters from 45 institutions, most from Mayo (n=12), NorthShore/UChicago (8), Loma Linda (6), and UCSF (4); 20 (24.1%) were repeat presenters and 5 (6.0%) international. Of 52 with known career outcomes, 26 (50%) pursued breast/surgical oncology fellowships, mainly at MSKCC (5), MD Anderson (5), Dana-Farber/BWH (4), and Moffitt (2). Among 97 fellows, 6 (6.2%) were international (Canada 5, Saudi 1) and 18 (18.6%) repeat presenters. Fellowships were concentrated at MD Anderson (15), Mayo (11), MSKCC (10), Dana-Farber/BWH (9), Cleveland Clinic (6), Anne Arundel (5), Arkansas (4), and Toronto (4). Eighty-eight (90.7%) completed breast surgical oncology fellowships; 47 (53.4%) entered academic and 41 (46.6%) non-academic practice. Of the 47 academics, 12 (25.5%) held leadership roles (chair/chief/director; Fig. 1B). Among 117 attendings, 93 were U.S. and 24 international (notably Canada 5, Netherlands 3, Japan 3, Germany/Pakistan/UK 2 each). U.S. attendings were more often repeat presenters (51/93 vs 4/24; p=0.001, OR 6.07) and fellowship-trained (52/93 vs 5/24; p=0.002, OR 4.82). Leadership roles were held by 32 U.S. and 7 international attendings.

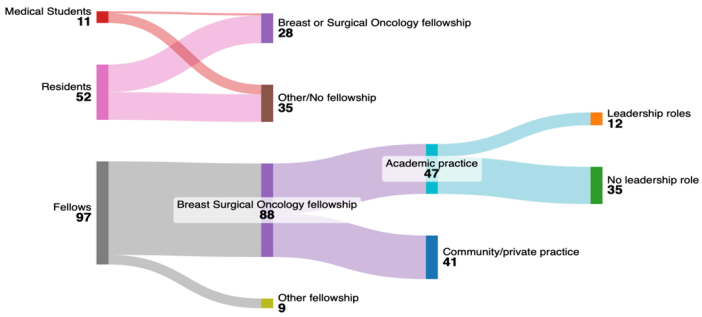
Conclusion: Across the last 17 years of ASBrS oral presentations, early presentations in the Annual Meeting, particularly among residents and fellows, was associated with subsequent pursuit of breast surgical oncology subspecialty training and sustained academic and leadership involvement. These findings highlight the ASBrS as a key platform for fostering academic, community, and private-practice breast surgeons, and for supporting professional development across all training levels.

Figure 1

A. Distribution of Oral and Quick-Shot Presenters by Role, 2009-2025



B. Career Trajectories of Early-Career ASBrS Oral and Quick-Shot Presenters, 2009-2019



1362 - Patient-Reported Outcomes After Precision Breast Intraoperative Radiation Therapy versus Whole-Breast Irradiation for Early-Stage Breast Cancer

Emily Ninmer[1], Ruyun Jin[1], Hong Zhu[1], Shayna Showalter[1], Max Meneveau[1]

[1]*University of Virginia, Charlottesville, VA*

Background/Objective: For patients with early-stage breast cancer undergoing breast-conserving therapy, whole breast irradiation (WBI) is the standard radiation therapy (RT) modality. However, patient compliance to WBI may be limited by time commitments for daily treatments and acute toxicities. Intraoperative radiation therapy (IORT) is an alternative to WBI designed to maximize patient convenience and minimize adverse effects of RT on healthy tissue. We developed Precision Breast IORT (PB-IORT) to deliver a single fraction of high-dose-rate brachytherapy to the lumpectomy bed. We previously found that PB-IORT was associated with minimal negative impact on patient-reported health-related quality of life (HRQoL) and cosmesis outcomes. However, that study was limited by lack of a comparator group. In this study, we compared patient-reported outcomes after PB-IORT to WBI. We hypothesized that PB-IORT would have less negative impact on HRQoL and result in fewer poor cosmetic outcomes.

Methods: Women with early-stage breast cancer treated with either PB-IORT as part of a prospective single-arm trial (NCT02400658) were compared to a similar cohort who underwent WBI (NCT03567044). The presently analyzed PB-IORT patients are a subgroup from the trial, prespecified for comparison to

the WBI patients. All patients completed the European Organization for Research and Treatment of Cancer (EORTC) questionnaires for general HRQoL (QLQ-C30) and breast-related QoL (QLQ-BR23). Both were completed at baseline prior to RT and at multiple time points after completion of RT. The Harvard 4-point Likert scale was used to capture patient reported cosmetic outcomes after RT. Linear mixed effects modeling was performed to compare HRQoL over time by treatment. Post-treatment standardized scores were evaluated, with RT group, time, and their interaction as fixed effects, baseline standardized score as a covariate, and patient as a random effect. Cosmesis measures by RT group were compared at 6-, 12-, and 24-months post-RT using Fisher's exact test.

Results: A total of 100 patients were evaluable (70 PB-IORT, 30 WBI). The median age was 62 years (range: 45-79). Most (71%) had invasive carcinoma, all node-negative. All tumors measured ≤ 3 cm: 53% were < 1 cm, 37% were 1–2 cm, and 10% were > 2 cm. Nearly all tumors (93%) were ER+. There were no differences in baseline characteristics by treatment group. Results for selected HRQoL functional and symptom scales are shown in Figure 1. Overall quality of life (QL) was reported as high for most patients and there were no significant post-treatment differences by group. Social functioning (SF) was significantly lower for WBI patients compared to IORT patients at 6 months, but this difference did not persist at later time points. Physical (PF), role (RF), emotional (EF), and cognitive (CF) functioning were similar post-treatment for both RT groups. With respect to general symptoms, post-treatment pain (PA) trended higher over time in WBI patients versus IORT patients, reaching statistical significance at 24 months. WBI patients had significantly worse dyspnea (DY) at 6 and 12 months compared to IORT patients, with resolution of this difference by 24 months. Regarding breast-specific symptoms, WBI patients reported significantly worse breast symptoms (BRBS) at 6 and 12 months compared to IORT patients, with resolution of this difference at 24 months. WBI patients reported significantly worse arm symptoms (BRAS) through 24 months compared to IORT patients. Post-treatment breast-specific body image (BRBI) and future perspective (BRFU) were similar by RT group. Post-treatment cosmetic outcomes were either "excellent" or "good" (E/G) for the majority of patients. Over 85% of patients reported E/G cosmetic scores at 6, 12, and 24 months in both RT groups, with no significant differences in scores by treatment.

Conclusion: This study examined the differences in patient-reported HRQoL and cosmetic outcomes after PB-IORT compared to the current standard of care, WBI. Overall, we found few differences in functional scales, but there were notable differences in symptoms, including those that were breast specific. While differences in some symptom scales resolved by 24 months, pain trended worse over time in WBI patients and arm symptoms were persistently worse in the WBI group. One possible explanation for the finding that social functioning was lower among WBI patients is the significant social burden that daily fractions of RT places upon patients, something avoided with IORT. Cosmetic outcomes were largely excellent and not different between the groups. Taken together, these data suggest that PB-IORT results in a lower breast-specific symptom burden and less pain with fewer off-target effects (persistent arm symptoms) than WBI and may therefore be a more convenient, less taxing alternative to WBI.

Figure:

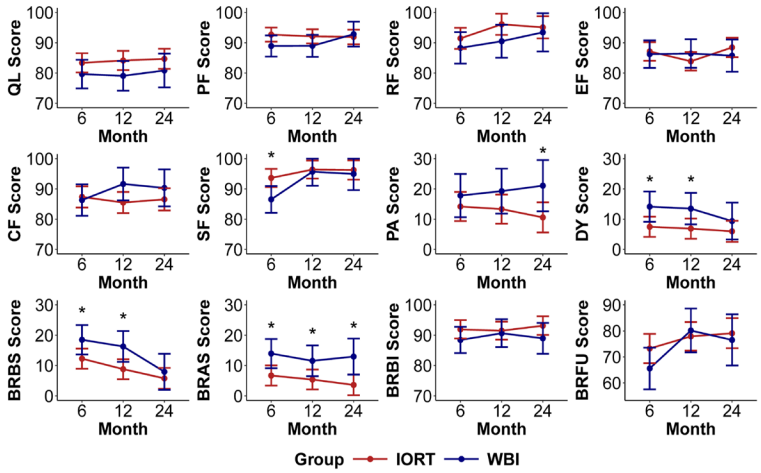


Figure 1. Post-treatment health-related quality of life scores. Linear mixed effects modeling of QLQ-C30 and QLQ-BR23 scale scores after treatment, adjusted for baseline score. Plots show estimated marginal means with 95% CI, with comparisons by radiation group at 6-, 12-, and 24-months post-treatment (* , $p < 0.05$). For overall quality of life and functional scales, higher scores represent higher quality of life and better functioning. For symptom scales, higher scores represent worse symptoms. QL, global health status/quality of life; PF, physical functioning; RF, role functioning; EF, emotional functioning; CF, cognitive functioning; SF, social functioning; PA, pain; DY, dyspnea; BRBS, breast-specific breast symptoms; BRAS, breast-specific arm symptoms; BRBI, breast-specific body image; BRFU, breast-specific future perspective.

1357 - Impact of Surgical De-escalation and Pathologic Response on Disease-Free Survival in Patients with Inflammatory Breast Cancer: A Single-Institution Study

Anna Vertido[1], Yanying Chen[1], Astrid Quirarte[1], Natalie Kim[2], Jackelyn Moya[1], Sarah Choi[1], Elisabeth Abeles[1], Julia Chandler[1], Julia Ye[1], Yunn-Yi Chen[1], Rita Mukhtar[1]

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Background/Objective: Inflammatory breast cancer (IBC) is an aggressive form of breast cancer traditionally treated with neoadjuvant chemotherapy, modified radical mastectomy (MRM) without immediate reconstruction, and post-mastectomy radiation. The necessity of this aggressive approach for all patients, particularly those who respond well to neoadjuvant therapy, is debated. We examined whether de-escalation of locoregional therapy affects disease-free survival (DFS) after accounting for pathologic complete response (pCR).

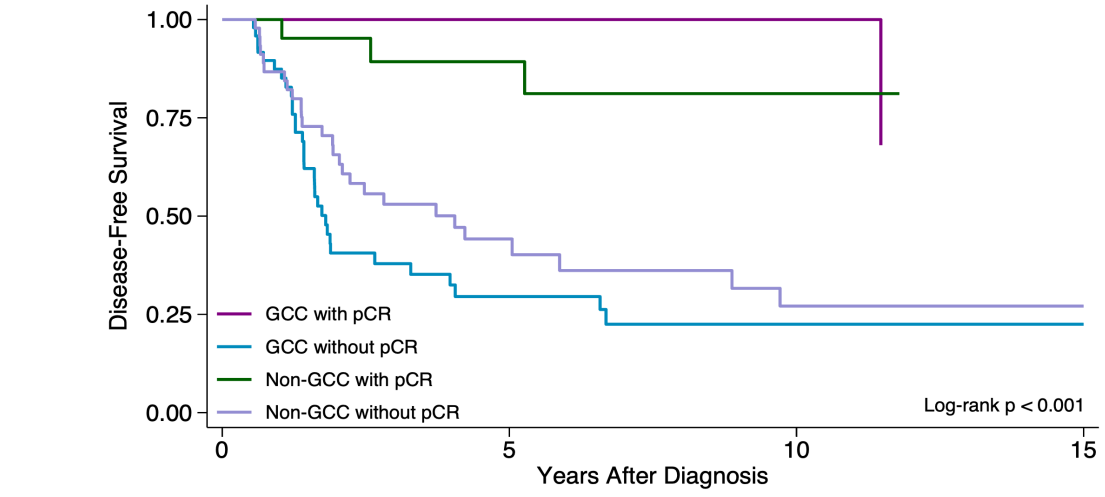
Methods: We conducted a single-center retrospective analysis of patients treated for IBC between 1995 and 2025. With consultation from our institution's Academic Research Services, electronic medical record keyword search was performed to identify potential IBC cases. Additional cases were identified from our institutional pathology database by querying for patients who underwent punch biopsy of the breast. All potential cases were subsequently confirmed through detailed chart review, requiring clinical documentation of an IBC diagnosis in oncology provider notes. Patients were excluded if they had stage IV disease or did not undergo neoadjuvant therapy or surgery. Demographic, clinicopathologic, and treatment characteristics were collected. Patients were categorized by pathologic response (pCR versus no pCR) and receipt of locoregional treatment modalities. Individual treatment modality categories included MRM, simple mastectomy, axillary lymph node dissection (ALND), immediate reconstruction, and adjuvant radiation. We also combined MRM + adjuvant radiation + no immediate reconstruction to define guideline concordant care (GCC), with other locoregional approaches considered non-GCC.

Continuous and categorical variables were compared using t-tests, chi-square, or Fisher's exact tests. DFS by treatment modality was estimated using the Kaplan-Meier method and compared by log-rank test. We compared 4 groups (GCC with pCR, GCC without pCR, non-GCC with pCR, and non-GCC without pCR). Cox proportional hazards modeling was used to estimate hazard ratios (HRs), adjusting for age, receptor subtype, and grade.

Results: After reviewing 1550 records, we identified 126 patients with a diagnosis of IBC. At diagnosis, 84 (66.7%) presented with breast erythema, 55 (43.7%) with edema, and 26 (20.6%) with peau d'orange. Among 50 (39.7%) patients who underwent a skin biopsy, carcinoma was identified in 37 (74.0%) and dermal lymphatic invasion in 29 (58.0%). The median age was 55 years (range 23-81). Mean clinical tumor size was 6.0 cm, and most were clinically node-positive (68.3%) and grade 3 (66.4%). Tumor receptor subtype was hormone receptor-positive/HER2- in 37.9 %, HER2+ in 35.5%, and triple negative in 26.6%. All patients received neoadjuvant therapy, and pCR was achieved in 22.2% of patients. Overall, 44.7% of patients received GCC and 55.4% did not. Of those who received non-GCC, 23.0% had a skin-sparing mastectomy or lumpectomy, 23.0% did not have ALND, 34.9% had immediate reconstruction, and 12.4% did not have radiation. At a median follow-up of 80 months, the median DFS for the cohort was 49 months (95% CI 48-71). When comparing DFS between those who received GCC versus non-GCC, we found no difference in DFS. However, when considering locoregional treatment and pCR, we found that DFS differed significantly across all combined treatment-response groups (log-rank $p<0.001$) and was primarily driven by pCR status. Compared with GCC + pCR, significantly worse outcomes were observed in GCC + no pCR (HR 10.8, 95% CI 1.4-83.3) and non-GCC + no pCR (HR 8.2, 95% CI 1.1-63.5), but not in non-GCC + pCR. Among patients achieving pCR, DFS did not differ by extent of surgery or receipt of adjuvant radiation. In those without pCR, de-escalated surgery was associated with improved DFS, including non-MRM approaches (HR 0.5, 95% CI 0.2–0.9) and skin-sparing mastectomy or lumpectomy (HR 0.2, 95% CI 0.1–0.6). Immediate reconstruction was also associated with improved DFS (HR 0.5, 95% CI 0.3–1.0). DFS did not differ by receipt of ALND or radiation in patients without pCR.

Conclusion: This study demonstrates that DFS in IBC is primarily driven by response to neoadjuvant therapy rather than the extent of locoregional treatment. Among patients achieving pCR, de-escalation of guideline-concordant procedures did not compromise DFS. For patients without pCR, less extensive breast surgery and immediate reconstruction were associated with improved DFS, suggesting appropriate patient selection for less extensive therapy. Conversely, ALND and post-mastectomy radiotherapy did not improve DFS in those without pCR, suggesting that more aggressive surgical management does not overcome poor response to neoadjuvant therapy. To our knowledge, this represents one of the largest single-institution analyses comparing DFS by extent of locoregional treatment for IBC and supports tailoring treatment to response instead of routinely recommending MRM without immediate reconstruction.

Figure 1. Disease-free survival stratified by receipt of guideline concordant care (GCC) and pathologic response in patients with inflammatory breast cancer



Number at risk

GCC with pCR	6	3	2	0
GCC without pCR	48	9	5	2
Non-GCC with pCR	21	12	1	0
Non-GCC without pCR	46	11	6	2

1356 - Trends in Locoregional Treatment of Inflammatory Breast Cancer (1995-2025): A Single-Institution Study

Anna Vertido[1], Yanying Chen[1], Astrid Quirarte[1], Sarah Choi[1], Elisabeth Abeles[1], Natalie Kim[2], Jackelyn Moya[1], Julia Chandler[1], Julia Ye[1], Yunn-Yi Chen[1], Rita Mukhtar[1]

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Background/Objective: Inflammatory breast cancer (IBC) is an aggressive form of breast cancer traditionally treated with neoadjuvant chemotherapy, modified radical mastectomy (MRM) without immediate reconstruction, and post-mastectomy radiation. We evaluated temporal trends in surgical and adjuvant radiation treatment for IBC over three decades.

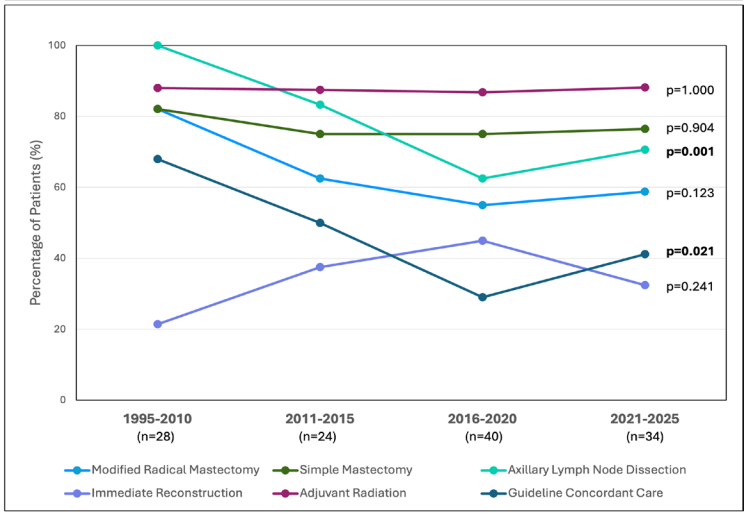
Methods: We conducted a single-center retrospective analysis of patients treated for IBC between 1995 and 2025. With consultation from our institution's Academic Research Services, electronic medical record keyword search was performed to identify potential IBC cases. Additional cases were identified from our institutional pathology database by querying for patients who underwent punch biopsy of the breast. All potential cases were subsequently confirmed through detailed chart review, requiring clinical documentation of an IBC diagnosis in oncology provider notes. Patients were excluded if they had stage IV disease or did not undergo neoadjuvant chemotherapy or surgery. Demographic, clinicopathologic, and treatment characteristics were collected. We determined what type of locoregional treatment patients received, including extent of breast and axillary surgery, and timing of reconstruction and radiation. Patients who underwent MRM with adjuvant radiation and without immediate reconstruction were categorized as receiving guideline concordant care (GCC). Those who had any other form of locoregional therapy were considered to have non-guideline concordant care (non-GCC). Trends in the

use of each locoregional treatment modality were analyzed by year of surgery (1995-2010, 2011-2015, 2016-2020, and 2021-2025). Continuous and categorical variables were compared using t-tests, chi-square, or Fisher's exact tests. Temporal trends were assessed using the Cochran-Armitage or Cuzick test.

Results: After reviewing a total of 1550 records, we identified 126 patients with a confirmed diagnosis of IBC. At diagnosis, 84 (66.7%) patients presented with breast erythema, 55 (43.7%) with edema, and 26 (20.6%) with peau d'orange. Most patients (52.4%) exhibited one of these clinical features, while 35.7% had two and 2.4% demonstrated all three. A skin biopsy was performed in 50 (39.7%) patients, of whom carcinoma was identified in 37 (74.0%) and dermal lymphatic invasion in 29 (58.0%). The median age was 55 years (range 23-81). Mean clinical tumor size was 6.0 cm, and most tumors were clinically node-positive (68.3%) and grade 3 (66.4%). Tumor receptor subtype was hormone receptor-positive/HER2-negative in 37.9%, HER2+ in 35.5%, and triple-negative in 26.6%. All patients received neoadjuvant therapy. In total, 44.7% of patients received GCC, with the remaining 55.4% receiving non-GCC. Among 46 (36.5%) patients who did not undergo MRM, 29 (63.0%) underwent a breast procedure other than a simple mastectomy and 29 (63.0%) did not have an ALND. Of those who did not have a simple mastectomy, 96.6% underwent a skin-sparing mastectomy (SSM) and 3.5% had a lumpectomy. Non-ALND approaches included sentinel lymph node biopsy (SLNB) in 86.2%, targeted axillary biopsy in 6.9%, and no axillary surgery in 6.9%. Immediate reconstruction was performed in 34.9%, and adjuvant radiation was omitted in 12.4%. When evaluating locoregional treatment patterns over time, we found a significant decreasing trend in utilization of ALND (100% in 1995-2010, 83.3% in 2010-2015, 62.5% in 2016-2020, 70.6% in 2021-2025, p=0.002) and GCC locoregional treatment (68.0% in 1995-2010, 50.0% in 2010-2015, 29.0% in 2016-2020, 41.2% in 2021-2025, p=0.018; Figure 1). The proportion of patients who received MRM, simple mastectomy, immediate reconstruction, and adjuvant radiation remained stable over time.

Conclusion: Over three decades, there has been a shift away from traditional GCC treatment patterns in IBC, particularly in reduced ALND utilization, reflecting increased surgical de-escalation and adoption of more individualized locoregional strategies. To our knowledge, this represents one of the largest single-institution analyses evaluating long-term trends in IBC management. Future studies correlating treatment patterns with oncologic outcomes are warranted in this high-risk population.

Figure 1. Temporal trends in locoregional treatment of inflammatory breast cancer from 1995–2025 at a single institution



1353 - Streamlining the Abstract Selection Process for the ASBrS Annual Meeting by Utilizing Large Language Models

Lauren Cohen[1], Drake Seibert[1], Thomas Kosten[1], Nathan Wolfrath[1], Zahraa Al-Hilli[2], Olga Kantor[3], Puneet Singh[4], Mediget Teshome[5], Sarah Blair[6], Tina Hieken[7], Lee Wilke[8], Anai Kothari[1], Chandler Cortina[1]

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Background/Objective: National academic medical conferences receive an increasing number of abstract submissions annually. Submitted abstracts for the ASBrS annual meeting are reviewed and scored by the Annual Meeting Scientific Committee (AMSC). Limitations of manual review include time, human bias and error, and possible underappreciation of the breadth of all abstracts submitted. We hypothesized that artificial intelligence (AI) large language models (LLMs) could be utilized to evaluate abstracts and therefore aimed to compare the AI scores generated to those by AMSC members to explore if AI review is a plausible preliminary abstract screening process.

Methods: Abstracts published in the official proceedings from the 2025 ASBrS meeting were anonymized and placed in text-only forms and assessed with 3 LLMs: 1) OpenAI's GPT4-o (GPT), 2) Meta's Llama-3.1-405b (Llama) and 3) DeepSeek's DeepSeek-V3 (DeepSeek). Abstracts were analyzed using both 1) zero-shot (ZS) input, which included the 2025 ASBrS scoring rubric (0–35) and the accepted abstracts and 2) few-shot (FS), which also added an example of a AMSC high- and low-scoring abstract to the LLM scoring prompt. Scores generated by the LLMs were compared to mean scores generated by the AMSC, which consisted of manual review by ASMC members grading the abstract using the 2025 0–35 ASBrS scoring rubric. Model inference was evaluated using spearman rank correlation, quartile accuracy, and mean absolute error. 95% CIs were calculated using bootstrap resampling.

Results: A total of 378 abstracts were included from the published 2025 proceedings. The AMSC generated a median abstract score of 21.2 (IQR: 6.0) while median scores were higher among all AI-LLM platforms for both the ZS and FS approaches ($p<0.001$ for all). For the ZS approach, GPT, DeepSeek, and Llama medians were 29.7 (IQR: 2.0), 28.3 (IQR: 1.7), and 29.0 (IQR: 2.3), respectively, while for the FS approach, median scores were slightly lower at 27.3 (IQR: 1.7), 28.0 (IQR: 2.9), and 27.3 (IQR: 1.9), respectively.

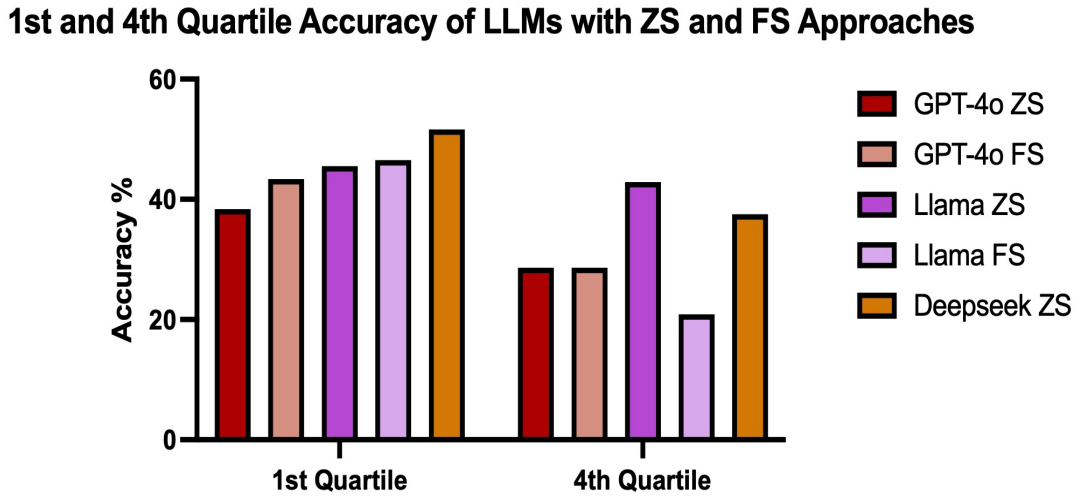
Spearman values with the ZS approach for GPT, DeepSeek, and Llama were 0.24, 0.29, and 0.31, respectively ($p<0.001$ for all) and for the FS approach were 0.37, 0.35, and 0.27, respectively ($p<0.001$ for all). Mean absolute error in the ZS approach was best for DeepSeek (7.39, 95% CI: 7.04–7.80) while it was best for Llama (5.90 95% CI: 5.57–6.27) in the FS approach.

Regarding accuracy of classifying abstracts into the top/4th quartile (orals, quickshots, and top posters) vs bottom/1st quartile (exclusively posters) using the ZS approach, DeepSeek ranked the bottom/1st quartile correctly with the highest accuracy of 51.6%, while GPT and Llama correctly placed 38.4% and 45.5% of abstracts, respectively. Llama ranked the top/4th quartile correctly with the highest accuracy of 42.9%, while GPT and DeepSeek correctly placed 28.6% and 37.5% of abstracts, respectively. The FS

approach modestly improved GPT and Llama's bottom/1st quartile accuracy; however, FS decreased Llama's top/4th quartile accuracy. Notably, in the FS approach, DeepSeek scored in a narrow bimodal distribution that was unsuitable for quartile analysis.

Conclusion: LLMs showed statistically significant rank correlation with AMSC-generated ASBrS abstract ranking. DeepSeek had the best accuracy in identifying abstracts in the lowest/1st quartile while Llama had modest accuracy in identifying abstracts in the top/4th quartile. Thus, DeepSeek and Llama LLMs may be useful as a preliminary screening tool to prioritize reviewer effort toward higher-quality abstract submissions. Future work to enhance LLM scoring accuracy and quartile rank correlation may include incorporating rejected abstracts and refinement of LLM parameters.

Figure:



LLMs: Large Language Models; ZS: Zero-shot; FS: Few-shot

1351 - Depression and Anxiety Disorders Present at Breast Cancer Diagnosis Reduce Quality of Life Scores Across Multiple Domains

Jakob Durden[1], Sakthi Asokan[1], Sarah Leslie[2], Laura Helmkamp[2], Thomas Gebrewold[3], Hannah Parris[3], Erin Baurle[1], Lauren Zimmaro[1], Sarah Tevis[1]

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Background/Objective: Patient reported outcomes (PROs) capture quality of life (QoL) insights throughout breast cancer (BC) treatment and survivorship and are impacted by clinical characteristics such as stage, surgery type, and adjuvant therapies. Psychiatric diagnoses, especially depression and anxiety disorders, have been associated with reduced PROs in survivorship. We examined the impact of preexisting psychiatric diagnoses on BC patients from preoperative baseline through three years postoperatively, hypothesizing that patients with psychiatric diagnoses would report lower PROs and demonstrate slower return to baseline.

Methods: Female BC patients presenting for surgical care at an academic medical center between June 2019 and July 2024 were invited to join a longitudinal PRO study. Participants completed BREAST-Q modules assessing satisfaction with breasts (SwB), psychosocial wellbeing (PsyW), physical wellbeing (PhW), and sexual wellbeing (SxW) throughout treatment and survivorship. Demographic and clinicopathologic data were also collected; retrospective chart review identified preexisting psychiatric diagnoses categorized as depressive, anxiety, substance use, stress, bipolar, and personality disorders. Analyses were limited to participants who completed preoperative and at least one annual post-operative survey. Bivariate analyses were performed within each surgical cohort comparing patients with and without a depressive or anxiety disorder using chi-square tests or Fisher exact test as appropriate for categorical variables and Wilcoxon-Mann-Whitney tests for continuous variables.

Results: Of 431 participants, 215 (119 lumpectomy, 96 mastectomy) qualified for inclusion. 85 patients (39.5%) had at least one psychiatric diagnosis at baseline. The prevalence of depressive and anxiety disorders was 27.4% (n=59) and 25.6% (n=55), respectively, with 14.8% (n=32) patients diagnosed with both disorders. Lumpectomy participants with a psychiatric diagnosis were less likely to be married or in a relationship (55.8% vs 78.9%, $p<0.01$) and mastectomy participants with a psychiatric diagnosis were more likely to receive adjuvant chemotherapy (57.1% vs 35.8%, $p=0.04$) – there were no other significant differences in demographics. Results of these bivariate analyses are shown in table 1. Among lumpectomy patients, both depression and anxiety were associated with significantly reduced SwB scores at two years after surgery, with one-year scores also trending lower. Interestingly, the only significant difference in PsyW scores within the lumpectomy cohort was seen between patients with and without depression at baseline, although scores trended lower throughout survivorship as well. Anxiety was associated with significantly higher PhW scores two and three years after surgery, whereas depression had no effect. Contrastingly, baseline depression significantly reduced SxW scores from baseline through two years after surgery, whereas anxiety had no effect. Among mastectomy patients, both depression and anxiety were associated with significantly reduced SwB at one and two years after surgery. Significant reductions in PsyW scores were seen from baseline throughout survivorship associated with both depression and anxiety disorders, whereas no impact was seen in PhW scores. Sexual wellbeing scores were significantly lower at baseline in patients with depression and anxiety disorders, but there were no significant differences by two years postoperatively.

Conclusion: Preexisting depressive and anxiety disorder diagnoses impact pre- and postoperative PROs, although effects vary by timepoint, BREAST-Q domain, and surgery type. Patients undergoing mastectomy with preexisting depressive or anxiety disorders demonstrated more pervasive reduction in multiple BREAST-Q domains compared to those undergoing lumpectomy. Due to difficulties with long-term follow-up, three-year postoperative outcomes may be affected by smaller sample sizes. The higher proportion of mastectomy patients with psychiatric diagnoses who received adjuvant chemotherapy may influence PRO scores. Other factors known to affect PROs such as BMI are not accounted for in this bivariate analysis, but future directions include using mixed linear models to mitigate confounding variables, as well as determining the cumulative impact of additional psychiatric disorders. These results emphasize the importance of identifying and addressing pre-existing psychiatric diagnoses at time of initial breast cancer intake, such as automatic referrals to supportive services.

Table 1. Summary of BREAST-Q Scores by surgery type, QoL domain, and timepoint, compared between patients with or without depression and anxiety disorders.

		Lumpectomy						Mastectomy					
		Depressive Disorder			Anxiety Disorder			Depressive Disorder			Anxiety Disorder		
Breast-Q Domain	Time of Survey	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Satisfaction with Breasts (SwB)	Pre Op	50.5	58.0	0.07	58.0	58.0	0.79	53.0	58.0	0.20	53.0	58.0	0.19
	1 Year Post Op	67.0	73.5	0.13	66.0	75.0	0.10	**53.0**	**58.0**	**<0.01**	**53.0**	**58.0**	**<0.01**
	2 Years Post Op	**60.0**	**75.0**	**0.01**	**59.0**	**75.0**	**<0.01**	**48.0**	**58.0**	**<0.01**	**53.0**	**58.0**	**<0.01**
	3 Years Post Op	65.0	78.0	0.55	77.5	76.5	0.89	48.0	58.0	0.10	53.0	58.0	0.46
Psychosocial Wellbeing (PsyW)	Pre Op	**63.0**	**80.0**	**<0.01**	64.0	78.5	0.27	**58.0**	**64.0**	**0.03**	**53.0**	**64.0**	**<0.01**
	1 Year Post Op	78.5	96.5	0.07	93.0	87.0	0.65	**52.0**	**67.5**	**<0.01**	**56.0**	**67.5**	**<0.01**
	2 Years Post Op	96.5	100.0	0.54	100.0	100.0	0.61	**56.0**	**64.0**	**<0.01**	**58.0**	**64.0**	**0.02**
	3 Years Post Op	93.0	100.0	0.20	93.5	100.0	0.74	**52.5**	**69.0**	**0.05**	58.0	65.0	0.10
Physical Wellbeing (PhW)	Pre Op	82.5	85.0	0.20	96.0	85.0	0.08	85.0	85.0	0.79	80.0	92.0	0.14
	1 Year Post Op	76.0	78.0	0.49	89.0	76.0	0.21	72.0	72.0	0.61	72.0	72.0	0.89
	2 Years Post Op	89.0	89.0	1.00	**100.0**	**89.0**	**0.03**	80.0	74.0	0.28	76.0	80.0	0.85
	3 Years Post Op	89.0	89.0	0.73	**100.0**	**85.5**	**0.04**	80.0	80.0	0.82	80.0	80.0	0.44
Sexual Wellbeing (SxW)	Pre Op	**49.0**	**62.0**	**0.01**	53.0	60.5	0.20	**48.0**	**59.0**	**0.05**	**48.0**	**59.0**	**0.02**
	1 Year Post Op	**51.5**	**66.0**	**0.01**	59.0	66.0	0.13	**36.5**	**46.0**	**0.01**	37.5	46.0	0.16
	2 Years Post Op	**62.0**	**66.0**	**0.04**	62.0	66.0	0.19	43.5	48.0	0.53	41.0	48.0	0.32
	3 Years Post Op	59.0	66.0	0.09	66.0	66.0	0.72	39.0	48.0	0.12	42.0	46.0	0.72

1335 - Comparison of Clinical and Pathological Tumour Staging Following CDK4/6 Inhibitor-Based Neoadjuvant Therapy in HR+/HER2− Breast Cancer

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Background/Objective: CDK4/6 inhibitors have become an established component of systemic therapy for hormone receptor-positive (HR+)/HER2− breast cancer, demonstrating high efficacy when combined with endocrine therapy in both advanced and early-stage disease. Their role in the neoadjuvant setting is of growing interest, particularly for patients where chemotherapy may be less favourable or unnecessary. The objective of this study was to evaluate the impact of CDK4/6 inhibitor-based neoadjuvant therapy on clinical to pathological tumour stage conversion, as well as to assess biological subtype modulation before and after treatment.

Methods: This retrospective analysis reviewed 92 patients, including four with multifocal or bilateral disease (total tumours = 96), treated at a high-volume multidisciplinary breast unit. All patients received a CDK4/6 inhibitor in combination with endocrine therapy, most commonly aromatase inhibitors ± GnRH agonists, as part of their neoadjuvant systemic management. Tumour biology was classified using standard immunohistochemistry for ER, PR, and HER2, and molecular subtype categorisation followed St Gallen 2019 criteria. Clinical staging (Initial T) and final pathological staging (Final T) were compared to assess downstaging effects. Treatment regimens were recorded as follows: Abemaciclib in 38.04% of patients, Palbociclib in 7.61%, and Ribociclib in 7.61%; however, treatment data were incomplete for 46.74% due to external referrals and incomplete record transfer. Two patients were assigned Tx staging due to biopsy or excision specimen limitations.

Results: Pathological complete response (pCR) was observed in five patients (5.2%), including one breast in a bilateral case. Prior to treatment, Luminal B was the predominant molecular subtype (53.13%), followed by Luminal A (41.67%), and HER2-equivocal cases accounted for 5.2%. After therapy, there was a clear biological shift with Luminal A increasing to 76.0% and Luminal B decreasing to 11.5%, indicating significant tumour differentiation and endocrine responsiveness. One Luminal B tumour converted to a triple-negative phenotype. HER2-equivocal cases (n = 6) persisted without further SISH confirmation. On the core biopsy 10 patients had a Ki-67 proliferation index of 6% and below. Following neoadjuvant therapy, a significant decrease in Ki-67 was observed on the final pathology with a total of 53 patients displaying a low Ki-67.4 patients had Ki-67 of below 1%, 30 patients with 1%, 15 patients with 2% & 4 patients with 3% Ki-67 proliferation index. A parallel reduction in tumour size and stage was observed, with the majority of cases demonstrating a downward T-stage shift (e.g., from T3–T4 to T1–T2). These findings collectively support the biological and morphological efficacy of CDK4/6 inhibitor-based therapy in promoting measurable regression.

Conclusion: This study demonstrates that CDK4/6 inhibitor-based neoadjuvant therapy can achieve meaningful tumour downstaging and biological subtype modulation in HR+/HER2− breast cancer, particularly within Luminal subtypes. The observed conversion from Luminal B to Luminal A reinforces the cytostatic and differentiation-driven mechanisms of these agents. While pCR rates remain modest compared to cytotoxic chemotherapy, the consistent pattern of tumour regression and subtype reclassification highlights CDK4/6 inhibition as a viable, lower-toxicity alternative or complement to chemotherapy in selected patients. Ongoing prospective evaluation and integration of proliferative

indices (e.g., Ki-67 dynamics) and nodal status will further refine patient selection and clinical applicability. The post treatment reduction in the Ki-67 proliferation index; from an initial baseline of only 10 patients with 6% and below on the core biopsy to a final pathology count of 53 patients with a low Ki-67 of less 3%,is a direct demonstration of the cystostatic mechanism of action of CDK/4/6 inhibitors. These agents primarily function by blocking the phosphorylation of the Retinoblastoma[Rb] protein by the Cyclin D- CDK4/6 complex. This critical phosphorylation is necessary for the cell to progress past the G1- to S phase checkpoint in the cell cycle. By preventing this step, the therapy induces a robust G1 cell cycle arrest, halting proliferation and thereby causing the substantial consistent decrease in the expression of the proliferation marker Ki-67.

1330 - Potential Opportunity for De-Escalation of Axillary Surgery in Patients with Occult Primary Breast Cancer

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Background/Objective: Occult primary breast cancer (OPBC) is a rare clinical entity, representing <1% of all breast cancer cases. It is characterized by axillary lymph node metastases in the absence of an identifiable primary tumor in the breast, even after comprehensive imaging, including MRI. Given the lack of consensus and limited prospective data, optimal locoregional therapy for OPBC remains controversial, prompting evaluation of whether de-escalation approaches can provide equivalent survival outcomes compared to traditional surgical interventions.
The purpose of this study was to evaluate the surgical management of patients with OPBC undergoing upfront surgery versus those who received neoadjuvant chemotherapy (NAC). The objective was to evaluate whether sentinel lymph node biopsy (SLNB), rather than axillary lymph node dissection, may be appropriate for select patients with limited axillary disease burden and those who achieve a pathologic complete response (pCR) following NAC.

Methods: The National Cancer Database (NCDB) was queried to identify adult patients ages 18-70 diagnosed with OPBC (cT0, cN1-3) who had at least one lymph node surgically excised from 2012-2022. Patients with any pT+ disease, M1 disease, and those receiving neoadjuvant endocrine therapy (NET) were excluded, as were those with missing/unknown TNM data (clinical or pathologic). Patients with unknown survival information, as well as missing chemotherapy timing, were also excluded. Differences across groups were evaluated using the chi-square test or Fisher's exact for categorical variables and independent t-tests or Mann Whitney tests for continuous variables dependent on distribution. Temporal trends in SLNS vs. ALND were assessed annually. The Kaplan-Meier method was used to estimate overall survival (OS), and log-rank tests were used to test for differences in survival between groups.

Results: A total of 713 patients were included; the median age was 57 years old (IQR 49-63). Of these patients, 17.8% (n=127) underwent upfront surgery and 55.4% (n=395) underwent NAC. In the upfront surgery group 65.4% (n=83) underwent mastectomy, 26.8% (n=34) underwent lumpectomy, and 7.9% (n=10) had no breast surgery. In NAC group 79.0% (n=312) underwent mastectomy, 19.5% (n=77)

underwent lumpectomy, and 1.5% (n=6) had no breast surgery. Most patients were female (99.2% [n=707]), age >50 years old (72.7% [n=518]), and predominantly non-Hispanic White (67.2% [n = 468]). The tumor biomarker subtype distribution differed significantly between the treatment groups. Of those underwent upfront surgery, 55.7% (n=68) was HR+/HER2-, 22.1% (n=27) triple negative (HR-/HER2-), 22.1% (n=27) HER2+ compared to NAC group with 37.0% (n=136) triple negative, 35.1% (n=129) HER2+, and 28.0% (n=103) HR+/HER2-. Overall, 77.1% (n=165) of patients had grade 3 disease. Most 65.9% (n=470) had cN1 disease (81.9% [n=104] in the upfront surgery group and 58.0% [n=229] in the NAC group, p<0.001). In the overall cohort, 75.0% [n = 535] of patients were pN0/pN1 with 59.1%, (n=75) pN1 in the upfront surgery group and 60% (n=237) achieved pCR (ypN0) and 22.8% (n=90) ypN1 in the NAC group. Nearly all patients received chemotherapy at some time (94.8%, n=674)), and 77.2% (n=511) received radiation. Axillary lymph node dissection (ALND) was performed in 89.0% (n = 636) of patients: 94.5% in the upfront surgery group compared to 84.3% among patients who underwent NAC (p= 0.005). The median number of positive lymph nodes for the entire cohort was 2.0 (IQR 1.0-5.0) with 3.0 (IQR 1.0-5.0) in the upfront surgery group compared to 2.0 (IQR 1.0-5.0) in the NAC group. Temporal trends in SLNS vs. ALND were assessed annually showing increasing SLNS; however, the majority still underwent ALND. (Figure) There was no association with OS noted between surgery first vs. NAC, or the type of axillary surgery.

Conclusion: Patients with OPBC are treated with ALND in the majority of cases; however, three quarters of patients had pathologically limited nodal disease at the time of surgery. The rates of positive lymph nodes in both NAC and upfront surgery were low, and the pCR rate was high in the NAC group. There may be an opportunity for de-escalation of ALND in OPBC. NAC is increasingly utilized in breast cancer patients tailored based on tumor stage and subtype, as it may enable de-escalation of axillary surgery in patients demonstrating favorable responses, paralleling evolving management of non-occult, node-positive disease.

Figure: Yearly trend of axillary lymph node surgery in patients with cT0 N1-3 disease in the NCDB.

1323 - Ki-67 Expression and Rates of Pathologic Complete Response in T1cN0M0 Triple-Negative Breast Cancer: A National Cancer Database Analysis

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Background/Objective: Controversy remains over the sequence of treatment interventions in T1cN0M0 triple-negative breast cancer (TNBC). No significant improvement in overall survival (OS) has been established from the use of neoadjuvant chemotherapy (NACT) over adjuvant chemotherapy (ACT), but pathologic complete response (pCR) after NACT has been employed as an early, positive prognostic indicator. Factors associated with pCR, and a therefore greater likelihood of benefit from NACT, have not been fully elucidated. In this study, we seek to evaluate the impact of Ki 67 expression on the rate of pCR in the T1cN0M0 TNBC population.

Methods: The National Cancer Database (NCDB) was queried for all female patients ≥18 years of age with T1N0M0 TNBC who underwent chemotherapy and surgery between 2018-2022. Patients were classified into NACT and ACT groups based on the sequence of treatment. The retrospective NACT and ACT cohorts were matched using inverse probability of treatment weighting (IPTW) to adjust for confounding variables. Cox multivariate analysis was employed to calculate hazard ratios (HR) for demographic factors and tumor characteristics in OS. Subsequently, the NACT group was divided secondarily into pCR and non-pCR groups. Multivariable logistic regression was used to calculate odds ratios (OR) for prognostic factors in achieving pCR. A ROC curve was created for Ki 67 expression in the setting of pCR and the maximum Youden Index was utilized to establish a threshold value.

Results: A total of 8831 patients with mean age of 60.0±11.9 years were obtained from the NCDB, 3563 (40.35%) patients in the NACT group and 5268 (59.65%) patients in the ACT group. After IPTW, a pseudo-population of 2666 (38.95%) patients undergoing NACT and 4177 (61.05%) patients undergoing ACT was established. Kaplan-Meier analysis exhibited no significant difference in OS between the NACT and ACT groups. Multivariate analysis demonstrated that lymphovascular invasion (LVI) HR 2.48 (95%CI 1.82-3.38, p<0.001) and invasive lobular subtype HR 2.32 (95%CI 0.99-5.42, p=0.050) were predictors of worse OS, while radiation HR 0.41 (95%CI 0.26-0.66, p<0.001) was predictive of better OS. The NACT group was further divided into a pCR group with 1359 patients and a non-pCR group with 2204 patients. As compared to the group who achieved pCR, the non-pCR group was found to have worse OS with HR 3.58 (95%CI 1.91-6.71, p<0.001). On multivariable logistic regression, LVI was associated with a decreased probability of pCR OR 0.41 (95%CI 0.25-0.67, p<0.001). All Ki 67 expression above the lowest quintile had an increased rate of pCR with Ki 67 21-40% OR 1.68 (95%CI 1.09-2.59, p=0.018), Ki 67 41-60% OR 3.53 (95%CI 2.33-5.32, p<0.001), Ki 67 61-80% OR 4.09 (95%CI 2.73-6.12, p<0.001), and Ki 67 81-100% OR 4.44 (95%CI 2.94-6.74, p<0.001). Based on the maximum Youden Index, the optimal cutoff for Ki 67 expression was found to be 45.8%, with Ki 67<45.8% having a pCR of 21.8% and Ki 67 ≥45.8% having a pCR of 45.3% (Chi2 p value <0.001).

Conclusion: While OS was not significantly different for NACT and ACT in T1cN0M0 TNBC, pCR following NACT was associated with improved OS compared to non-pCR. Ki 67 expression ≥45.8% was correlated with significantly higher rates of pCR and this value, in addition to the consideration of multiple clinical factors, may aid in selection of TNBC candidates for upfront chemotherapy.

Table 1: pCR Rates by Ki-67 Categories

Ki-67 Expression	pCR	Non-pCR
0-20%	**58 (14.87%)**	**332 (85.13%)**
21-40%	**147 (24.10%)**	**463 (75.90%)**
41-60%	**274 (40.47%)**	**403 (59.53%)**
61-80%	**469 (45.45%)**	**563 (54.55%)**
81-100%	**411 (48.13%)**	**443 (51.87%)**
*Ki-67 cutoff of 45.8% selected based on maximum Youden Index. For Ki-67 <45.8, pCR was 21.8%. For Ki-67 ≥45.8%, pCR was 45.3%. p value <0.001 based on Pearson X^2 test.		

1320 - Breast-Conserving Therapy Is Associated with Improved Survival Compared to Mastectomy in Triple-Negative Breast Cancer: An NCDB Analysis

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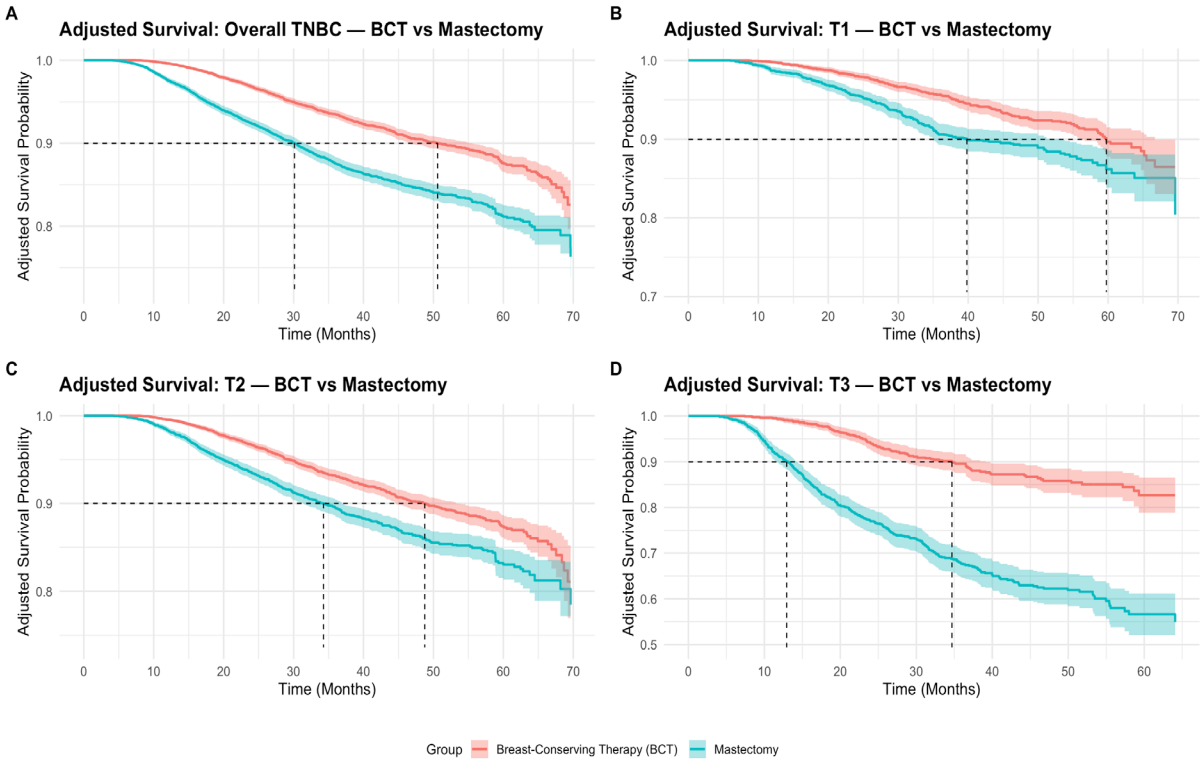
Background/Objective: Triple-negative breast cancer (TNBC) is an aggressive subtype often treated with neoadjuvant chemotherapy (NAC) to improve surgical outcomes and assess response. Whether the type of definitive local therapy-breast-conserving therapy (BCT) or mastectomy-affects long-term survival following NAC remains unclear. This study aimed to compare overall survival (OS) between BCT (partial mastectomy with radiation) and mastectomy without radiation among patients with TNBC who received NAC using a national cohort.

Methods: The National Cancer Database (NCDB) was queried for women diagnosed with stage I–III TNBC between 2010–2022 who received NAC followed by definitive surgery. Patients were categorized as BCT (partial mastectomy with adjuvant radiation) or mastectomy without postmastectomy radiation (excluding partial mastectomy without radiation and mastectomy with radiation). Multivariable Cox proportional hazards and inverse probability of treatment weighting (IPTW)–adjusted Kaplan–Meier analyses were used to evaluate OS, adjusting for age, clinical stage, tumor size, and grade.

Results: Among 31,611 eligible TNBC patients treated with NAC, 17,726 (56%) underwent BCT and 13,885 (44%) underwent mastectomy. After IPTW adjustment, BCT demonstrated significantly improved OS compared with mastectomy (90th-percentile survival 50.6 vs 30.1 months, $p = 4.3\times10^{-16}$ – Figure A). This survival benefit persisted across the T-stage subgroups; T1: 59.8 vs 39.8 months (p = 0.0026 - Figure B), T2: 48.8 vs 34.3 months ($p = 4.7\times10^{-8}$ - Figure C), and T3: 34.7 vs 12.9 months ($p = 4.1\times10^{-11}$ - Figure D).

Conclusion: Among patients with TNBC who received neoadjuvant chemotherapy, mastectomy conferred no survival advantage over breast-conserving therapy. After adjustment for patient, tumor, and treatment factors, BCT consistently demonstrated superior long-term survival across all tumor sizes and grades. These findings support breast conservation as an oncologically sound and potentially advantageous surgical strategy following NAC in appropriately selected TNBC patients.

Figure:



1314 - Transcriptomic Scores that Quantify Circulating Myeloid-Derived Suppressor Cells (MDSCs) Do Not Reflect the Known Characteristics of MDSCs in the Tumor Microenvironment

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Background/Objective: Myeloid-derived suppressor cells (MDSCs) are immunosuppressive cells that promote cancer growth and metastasis. MDSCs inhibit T cells, NK cells, and dendritic cells, while promoting pro-cancerous cells, such as regulatory T cells (Tregs), Th2 cells, tumor-associated macrophages, and stimulating epithelial-mesenchymal transformation (EMT) and angiogenesis. Elevated MDSC levels correlate with increased breast cancer burden and reduced response to chemotherapy and immunotherapy, suggesting that MDSCs may serve as both a prognostic biomarker and therapeutic target. Multiple MDSC scores were developed based on the transcriptomes of circulating MDSCs to quantify their levels. Here, we studied the breast cancer tumor microenvironment using reported MDSC scores and assessed whether they reflect known MDSC biology.

Methods: The breast cancer patients from The Cancer Genome Atlas (TCGA, tumor n =1081, normal n=85) and Molecular Taxonomy of Breast Cancer International Consortium (METABRIC, n = 2509) were analyzed by four MDSC scores (110-gene, 36-gene, gMDSC, and mMDSC). Gene set enrichment analyses (GSEA), x-Cell, and CYT scores were calculated. Nine breast cancer cohorts that underwent neoadjuvant

therapy (I_SPY2 GSE194040, GSE25066, GSE163882, GSE123845, GSE20271, GSE230881, GSE50948, GSE41998, and ICI) were used to examine the relationship between MDSC infiltration and rate of pathologic complete response (pCR).

Results: All four MDSC scores were higher in breast cancer compared to normal breast tissue in TCGA and revealed progressive increase from ER+/HER2- to HER2+, with highest scores in TNBC in both TCGA and METABRIC cohorts. No consistent trends in MDSC scores by menopausal status were identified, but MDSCs increased by grade and nodal stage in METABRIC alone. High MDSCs by all 4 scores uniformly enriched EMT and angiogenesis gene sets, but more profoundly enriched immune response-related gene sets; interferon-ϒ and -α signaling, allograft rejection, inflammation, IL-2 and IL-6 signaling, TNF-α signaling, and complement, regardless of subtypes consistently in both TCGA and METABRIC cohorts. In agreement, high MDSCs by all four scores were associated with infiltration of Tregs but also with CD8+ T cells, Th1 cells, M1 and M2 macrophages, and dendritic cells. These immune cell patterns align with high cytolytic activity regardless of subtypes in both TCGA and METABRIC cohorts. There was no significant difference in disease-free nor overall survival in TCGA and METABRIC cohorts for all four MDSC scores, except for high gMDSC score, which was associated with significantly better disease-free survival (p=0.029) in TNBC of METABRIC. The ratio of achievement of pathological complete response after neoadjuvant therapy was compared by high vs low MDSC infiltrations measured by 4 scores in 9 cohorts. Strikingly, high MDSCs by all four scores were uniformly associated with significantly better response after neoadjuvant chemotherapy except for 110-gene and gMDSC scores for I-SPY2, 110-gene score for GSE25066 cohort, and 36-gene score for GSE50948.

Conclusion: Transcriptomic scores that quantify signatures of circulating MDSCs were associated with breast cancer biology that is opposite to the known characteristics of MDSCs, with exception of their elevation in aggressive breast cancer subtypes, association with EMT, angiogenesis, and infiltration of Tregs. This is consistent with the notion that circulating MDSCs appear to be transcriptionally different from MDSCs in the tumor microenvironment.

1299 - De-Escalation of Axillary Surgery in Occult Breast Cancer

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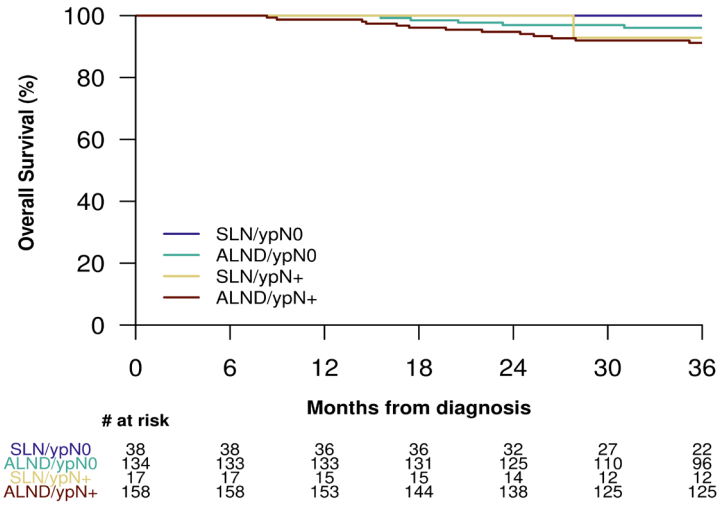
Background/Objective: Occult breast cancer (OBC), where there is no primary breast tumor in the setting of positive nodes, is a rare clinical entity that is not well studied. With improvements in neoadjuvant treatment and the increasing de-escalation of axillary surgery, we sought to assess the changes in axillary surgery and impact on outcomes of patients in OBC across tumor subtypes.

Methods: We utilized the National Cancer Database between 2012-2023 and identified patients with cT0 N+ breast cancer (OBC) who underwent axillary lymph node surgery. Patients with unknown neoadjuvant systemic therapy (NST) use and those who underwent upfront surgery with negative nodes were excluded. Trends of lymph node surgery were evaluated with Cochran-Armitage trends tests overall and among patients undergoing neoadjuvant systemic therapy and those undergoing upfront surgery. The Kaplan-Meier method was used to evaluate overall survival.

Results: We identified 1,817 patients with cT0N+ breast cancer. Breast surgery was: 45% no breast surgery, 41% mastectomy, and 14% breast conservation. Overall, 75% of patients underwent upfront surgery and 25% received NST (24% neoadjuvant chemotherapy and 1% neoadjuvant endocrine therapy). NST use significantly increased from 19.9% in 2012 to 42.4% in 2023 ($p<0.001$). Rates of axillary lymph node dissection (ALND) decreased over time (96% in 2012 to 77% in 2023, $p<0.001$). Most patients who underwent upfront surgery underwent ALND (94% ALND, 6% SLN only), however recently there has been an increase in SLN only in the upfront surgery setting from 4% in 2012 to 18% in 2023, $p<0.001$. Three-year overall survival was similar between SLN and ALND in upfront setting (96% vs 93%, $p=0.12$). In patients treated with NST, rate of ALND decreased from 97% in 2012 to 70% in 2023 ($p<0.001$). This change was largest in HER2+ disease (100% to 64%, $p=0.002$) followed by triple negative breast cancer (88% to 67%, $p=0.001$) and predominantly seen in 2017 onwards. Among ypN0 patients, 26.0% underwent SLN only compared to 9.6% of ypN+ with the highest rates of SLN only among ypN0 in most recent years (2023: 44.4%). Figure 1 shows overall survival was similar between SLN only and ALND for patients with ypN0 disease (3-year Kaplan-Meier estimates 100% vs 96%, $p=0.77$) and between those 2 groups for patients with ypN+ disease (93 vs 91%, $p=0.43$).

Conclusion: Overall, there has been a de-escalation of axillary surgery for patients with occult breast cancer with lower rates of ALND both with upfront surgery and with neoadjuvant systemic therapy. With increase in use of neoadjuvant systemic therapy there has been de-escalation in axillary surgery in occult breast cancer with higher rates of SLN surgery without ALND after neoadjuvant therapy. Furthermore, short term survival data suggests that ALND does not have a survival benefit compared to SLN surgery. Additional studies are required to assess long term survival outcomes and locoregional recurrence prior to changing standard of care.

Figure:



1289 - Utilization and Clinical Impact of HER2 In Situ Hybridization Testing in HER2 Immunohistochemistry-Negative Breast Cancer

Sarah Lawler[1], Catherine Simon[2], Richard Bleicher[3], Mary Pronovost[1], Austin Williams[3]

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Background/Objective: Accurate HER2 classification is critical to guide prognosis and systemic therapy selection in breast cancer. Immunohistochemistry (IHC) is standard for assessing HER2 expression, with in situ hybridization (ISH) reserved for equivocal (IHC 2+) results. The recognition of "HER2-low" disease has renewed interest in a more granular assessment of HER2 status, including the potential role of ISH testing among IHC-negative (0/1+) tumors. However, the prevalence of true HER2 amplification in this group and its therapeutic relevance remain uncertain. We therefore characterized national patterns, diagnostic yield, and clinical impact of ISH testing in HER2 IHC 0/1+ breast cancers.

Methods: From the National Cancer Database, we identified patients with HER2 IHC 0 or 1+ invasive breast cancer treated from 2018 to 2022. The primary outcomes were rates of ISH testing, ISH positivity, and associated treatment patterns. Demographic, clinicopathologic, and treatment characteristics were compared among untested, ISH-negative, and ISH-positive groups. Predictors of ISH testing and ISH positivity were evaluated using multivariable logistic regression. Treatment variables included receipt of surgery, chemotherapy, endocrine therapy, and radiation therapy.

Results: Among 362,846 patients with HER2 IHC 0/1+ breast cancer, 51,731 (14%) underwent ISH testing, which decreased from 16% to 11% over the study period. Tested patients were slightly younger (62.8±12. vs. 62.1±12.5, p<0.001) and more likely to have higher-grade, higher-stage, and HR-negative tumors (p<0.001). ISH testing was performed more frequently among IHC1+ than IHC0 tumors (15.3% vs. 12.7%, p<0.001). Of 79,067 patients with ISH results, 98% were negative, 0.8% equivocal, and 1% positive. While rates were overall very low, HER2 amplification was nearly twice as high in IHC 1+ than IHC 0 tumors (1.3% vs. 0.7%, p<0.001). Treatment patterns differed significantly according to ISH testing status and results. Compared with ISH-negative or untested patients, those with ISH-positive disease were more likely to undergo mastectomy and axillary lymph node dissection (Table, both p<0.001). Adjuvant chemotherapy was administered in 63% of ISH-positive patients versus 23% of ISH-negative and 20% of untested patients (p<0.001). Among HR-positive tumors, endocrine therapy was less frequently administered to ISH-positive patients (77.7% vs. 86% of untested and negative, p<0.001). Adjuvant radiation use followed expected patterns, with 81% of patients receiving radiation after partial mastectomy and 27% after mastectomy; differences across ISH groups were not clinically significant.

Conclusion: We found that a larger-than-expected proportion of patients with HER2 IHC0/1+ breast cancer underwent ISH testing. Although HER2 amplification was rare (<2%), it was more common in IHC1+ tumors, consistent with tumor heterogeneity and a biological continuum between HER2-low and HER2-positive disease. While the diagnostic yield of reflex ISH testing in HER2 IHC 0/1+ cancers is limited, these findings suggest a small subset of IHC-negative tumors harbor HER2 amplification for whom targeted therapy may improve outcomes. Further studies are needed to determine the prognostic and predictive significance of testing these cases, while refining HER2 testing algorithms in order to minimize costs and unnecessary testing.

Table. Comparison of treatment patterns among patients with IHC0 and IHC 1+ breast cancers stratified by ISH testing and results

	No ISH testing or result unknown	ISH negative/equivocal	ISH positive	p
n	311,115	48885	823	
Breast surgery				
Partial mastectomy	221618 (71.2)	32825 (67.1)	505 (61.4)	<0.001
Mastectomy/Unknown	89497 (28.8)	16060 (32.9)	318 (38.6)	
Axillary surgery				
None/Unknown	24573 (7.9)	3420 (7.0)	47 (5.7)	<0.001
SLNB	240649 (77.4)	37583 (76.9)	610 (74.1)	
ALND	45893 (14.8)	7882 (16.1)	166 (20.2)	
Neoadjuvant chemotherapy (≥cT2 and/or ≥cN1)				
Yes	69436 (95.0)	12366 (95.0)	225 (93.8)	<0.001
No	3119 (4.3)	518 (4.0)	12 (5.0)	
Unknown	499 (0.7)	130 (1.0)	3 (1.3)	
Adjuvant chemotherapy				
Administered	62022 (19.9)	11291 (23.1)	518 (62.9)	<0.001
Recommended but not administered	10971 (3.5)	1852 (3.8)	45 (5.5)	
Not recommended/administered	236452 (76.0)	35264 (72.1)	247 (30.0)	
Unknown	1670 (0.5)	478 (1.0)	13 (1.6)	
Adjuvant endocrine therapy (HR+)				
Administered	248150 (86.0)	38703 (86.4)	524 (77.7)	<0.001
Recommended but not administered	14989 (5.2)	2149 (4.8)	33 (4.9)	
Not recommended/administered	20006 (6.9)	3000 (6.7)	94 (13.9)	
Unknown	5462 (1.9)	963 (2.1)	23 (3.4)	
Adjuvant radiation (partial mastectomy)				
Administered	179064 (80.8)	26543 (80.9)	420 (83.2)	<0.001
Recommended but not administered	13912 (6.3)	1913 (5.8)	29 (5.7)	
Not recommended/administered	25695 (11.6)	3822 (11.6)	49 (9.7)	
Unknown	2947 (1.3)	547 (1.7)	7 (1.4)	
Adjuvant radiation (mastectomy)				
Administered	23867 (27.2)	4345 (27.6)	82 (26.3)	<0.001
Recommended but not administered	3323 (3.8)	560 (3.6)	13 (4.2)	
Not recommended/administered	58786 (67.0)	10441 (66.3)	208 (66.7)	
Unknown	1729 (2.0)	393 (2.5)	9 (2.9)	

1274 - Temporal Trends in Endocrine Therapy Use by Age in Early-Stage HR+HER2- Breast Cancer: Are Younger Women Replacing ET with Mastectomy?

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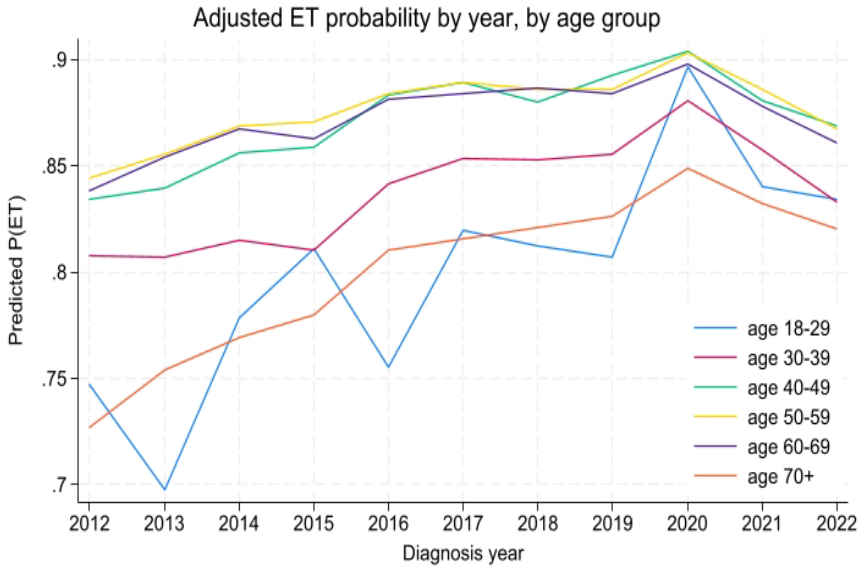
Background/Objective: Endocrine therapy (ET) for HR+/HER2- breast cancer (BC) improves survival but can have detrimental effects on quality of life. In our clinical practice, we have recent anecdotal experience of some pre-menopausal women with early-stage BC questioning the benefit of ET for BC vs. the risk from other health outcomes (i.e., cardiac, vascular, bone, dementia). We evaluated temporal trends in ET use overall and by age and tested whether local therapy was being used as a substitute for ET.

Methods: We analyzed 899,834 women with pT1-2N0 HR+/HER2- BC who underwent definitive surgery in the National Cancer Database 2012-2022. The primary outcome was receipt of ET; patients who received chemotherapy were excluded to identify a lower-risk cohort. We described unadjusted trends overall and by age categories (18-29, 30-39, 40-49, 50-59, 60-69, 70+). We defined four treatment patterns: breast-conserving surgery (BCS)+ET; BCS–ET; mastectomy (unilateral or bilateral)+ET; mastectomy–ET. We modeled ET using logistic regression with facility-clustered robust standard errors, adjusting for age, breast surgery × radiation (RT), race/ethnicity, insurance, facility factors, axillary surgery, tumor size, T category, histology, and comorbidity. We estimated age-specific time trends and predictive margins.

Results: Overall ET use was 84.7% (762,339/899,834) and increased over time through 2020 (unadjusted 2012 80.7% → 2020 87.6%; clustered univariable logistic OR per year 1.024, 95% CI 1.019–1.030, p<0.001). There was a significant decline in ET use from 2020-2022 (87.6% --> 83.5%, p<0.001), particularly in women aged 18-29 (88.9% --> 80.3%, p<0.001). Age-stratified analysis showed increasing ET odds in every group (18-29y OR 1.079, 30-39y 1.029, 40-49y 1.028, 50-59y 1.018, 60-69y 1.013; all p≤0.006). The logistic model adjusted rate of ET use is shown in Figure 1. Across the full cohort, ET use was highest in patients who underwent BCS+RT (573,741/669,592; 85.7%) and lowest in those who underwent BCS-RT (83,528/119,914; 69.7%); the ET rate after unilateral and bilateral mastectomy was 82.2% (168287/204,722) and 80.5% (27,895/34,665), respectively. Among women <50 (N=103,048), patterns were 48.8% BCS+ET, 5.9% BCS–ET, 38.3% Mastectomy+ET, and 7.0% Mastectomy–ET. In the group <50, relative to BCS+RT patients, women who had bilateral mastectomy without RT were less than half as likely to use ET (OR 0.41, 95%CI 0.378-0.453, p<0.001). Overall survival was superior in patients who received ET (vs. those who did not receive ET) regardless of surgery type and RT receipt, and poorest in the group that underwent bilateral mastectomy without adjuvant ET or RT (HR 1.6, 95% CI 1.136-2.319, p=0.008).

Conclusion: For early-stage HR+/HER2- BC patients who did not receive chemotherapy, ET use increased across age groups from 2012 to 2020. Lower ET use after bilateral mastectomy in younger patients and after BCS-RT at any age may reflect patient preference to omit systemic therapy, or ultra-low-risk disease. Clinicians should continue to emphasize ET's survival benefit and help mitigate its adverse effects to address what may be an early trend in ET avoidance from 2021 to 2022.

Figure:



1268 - Implementation of Multi-Disciplinary Guidelines in the Management of Lobular Carcinoma In Situ and Atypical Lobular Hyperplasia: 10-year Outcomes of Selective Surgical Excision

Vibhusha Kolli[1], Jordan Petrick[1], Alea Sabry[1], Heather Neuman[1], Roberta Strigel[1], Lonie Salkowski[1], Lee Wilke[1], Stephanie McGregor[1], Ryan Woods[1], Amy Fowler[1], Elizabeth Burnside[1], Josephine Harter[1], Meeghan Lautner[1], Anand Narayan[1], Ashley Woodfin[1], Laura Bozzuto[1], Mai Elezaby[1], Madhuchhanda Roy[1], Anna Beck[1]

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Background/Objective: Lobular carcinoma in situ (LCIS) and atypical lobular hyperplasia (ALH) are proliferative breast lesions and markers of overall elevated breast cancer risk. The likelihood of identifying invasive or in-situ cancer with complete excision of these lesions has declined over time due to improved breast imaging and biopsy techniques. In 2015, our institution implemented multidisciplinary, evidence-based guidelines to standardize management of high-risk breast lesions. The present study evaluates outcomes for patients with biopsy-proven LCIS and ALH before and after guideline implementation, hypothesizing that those patients with a low risk of upgrade on surgical excision may be safely monitored with imaging surveillance.

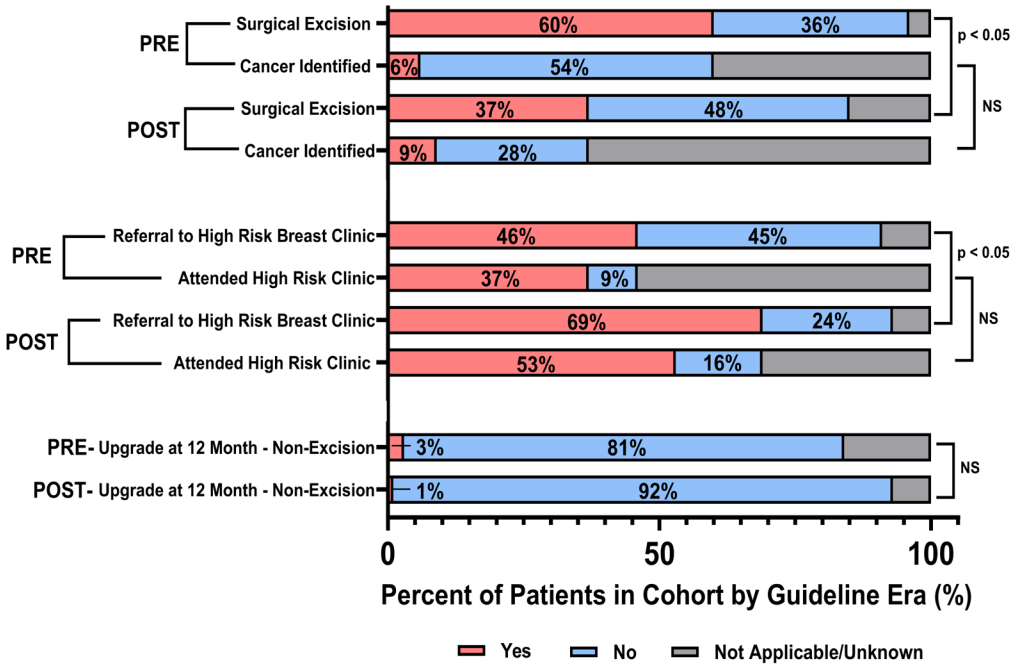
Methods: Following IRB approval, a retrospective review was conducted of consecutive patients ≥18 years with LCIS or ALH diagnosed by image-guided biopsy between February 2009 and December 2024. Patients were identified through an institutional pathology database including patients diagnosed and/or managed at a single academic institution and partnering community sites. Patients with prior or concurrent ipsilateral breast cancer (invasive or in-situ) or atypical ductal hyperplasia were excluded. Medical record data were abstracted using a comprehensive data dictionary. Variables included demographic information, breast cancer risk factors, clinical presentation, imaging findings, histopathology, and management decisions. Primary outcomes included rate of surgical excision, referral to high-risk clinic, and upgrade to invasive cancer or DCIS during 12-month imaging follow-up for those who did not undergo surgical excision. Cases were stratified into pre-guideline (before October 29, 2015) and post-guideline (after October 30, 2015). In the implemented multi-disciplinary guidelines, classic LCIS and ALH with concordant imaging without additional high-risk features were considered for imaging surveillance, whereas discordant lesions, those associated with a mass or calcifications (non-incidental), or any non-classic LCIS subtype (pleomorphic, florid, or apocrine) were considered for excision. Patients managed non-operatively underwent diagnostic mammography at 12 months; follow up imaging of those who underwent surgical excision was per standard guidelines. Referral to a high-risk clinic for counseling was considered for all patients. Data was analyzed using descriptive statistics along with chi-square and Fisher's exact tests to compare guideline eras using Python Version 3.8.8.

Results: A total of 228 patients were identified (LCIS = 103; ALH = 116; concurrent LCIS and ALH = 9) with 78 pre-implementation and 150 post-implementation. Median age at diagnosis was 53.3 years (IQR 46.6-60.8), 52% were postmenopausal (n=120), and 90% were White (n=206), followed by mixed race (n=13, 6%), Black (n=4, 2%), and Asian (n=4, 2%). Screening mammography was the most common initial imaging leading to a diagnosis of LCIS/ALH (n=181, 79%) along with diagnostic mammography (n=28, 12%), MRI (n=5, 2%), and other (n=14, 7%). The majority of patients (208/228, 91%) were referred for a surgical consultation. Surgical excision rates declined after implementation from 60% (47/78) pre to 37% (56/150) post-guideline (p=0.016) with rates for LCIS decreasing from 61% (28/46) to 39% (22/56) and for ALH from 57% (16/28) to 31% (26/84). Excision rates were similar for pleomorphic LCIS (6/6, 100%

pre vs 7/7, 100% post-guideline; p = 0.537), with routine excision recommended. In patients who underwent surgical excision, rate of upgrade to malignancy was similar pre- and post-guideline (5/47, 10% pre vs 13/56, 23% post; p=0.228). Risk management differed pre- and post-guideline with increased referral to a high-risk clinic post-guideline (p=0.008, Figure 1). Of patients who did not undergo surgical excision, 3% (1/31) pre and 1% (1/94) post-guideline were found to have either DCIS or invasive disease at the site of the previously biopsied, non-excised lesion on 12-month follow up imaging (Figure 1); 16% (5/31) did not complete 12-month follow up pre-guideline, decreasing to 7% (7/94) post-guideline. Of patients who underwent excisional biopsy with no immediate upgrade to cancer and had 12-month follow up imaging, an invasive cancer or DCIS was identified in the contralateral breast in 0/37 patients pre and 2/38 patients post-guideline, and in a separate quadrant of the ipsilateral breast in 0/37 patients pre and 3/38 patients post-guideline on 12-month follow up imaging.

Conclusion: Implementation of multi-disciplinary management guidelines for LCIS and ALH at a single institution with 10-year post-guideline management resulted in significantly reduced surgical excision rates without increased rates of malignancy identified on 12-month surveillance imaging in those patients who did not undergo surgical excision. These findings support the effectiveness and short-term oncologic safety of multidisciplinary management recommending selective imaging surveillance versus surgical excision for LCIS and ALH and demonstrate improved engagement in high-risk evaluation and management pathways following guideline adoption.

Figure:



1265 - Who Wants More Training in Breast Surgery Localization? A National Survey of Surgery Residents

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Background/Objective: Breast surgery is a core component of general surgery training, however, resident logged breast-specific cases have declined in recent decades. As breast surgical practices evolve, this trend raises concerns regarding residents' preparedness for successfully achieving oncologically sound resections with breast-conserving strategies. This study aims to determine how future career goals, institution's availability of breast surgeons, and confidence in localizers used in current training programs influence residents' interest for additional training in breast surgical techniques.

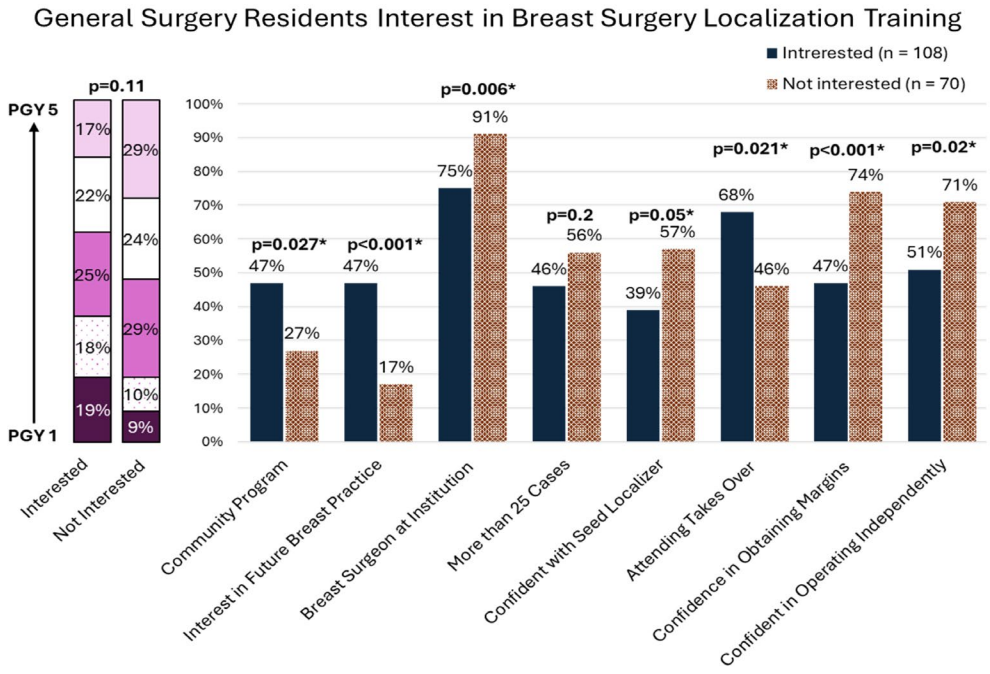
Methods: A 21-item anonymous survey evaluating current resident perceptions and practices in breast surgery training and interest in additional specialized training was emailed to 363 U.S. general surgery programs to circulate to their residents. Participation was voluntary. Multivariate logistic regression assessed whether future career goals, having a breast surgeon within their institution, post graduate year (PGY) level, case volume, or confidence with the localizers used affected desire in receiving additional training in breast surgery.

Results: A total of 178 general surgery residents from 27 states completed the survey. Of the participants, 108 (61%) showed interest in receiving more structured training in partial breast mastectomy localization techniques while 70 (39%) were not interested in additional training. When comparing the characteristics of the two groups, interested residents were more likely to be trainees from community programs (47% vs 27%, p=0.027) compared to academic or hybrid programs. Case volumes did not differ significantly between the two groups. Residents wanting additional training in localization techniques were more likely to anticipate incorporating breast surgery into their future practice (47% vs. 17%, p<0.001). Compared with uninterested residents, interested residents were less confident in performing lumpectomies independently (51% vs. 71%, p=0.02) and less likely to prefer using seed localizers (39% vs. 57%, p=0.05). Among the 53 residents with low confidence in performing lumpectomies, 37 (70%) expressed interest in additional training. Among the 77 residents with high confidence, 38 (49%) also desired further training. At institutions with dedicated breast surgeons, participants were less interested in additional breast surgical training (75% vs 91%, p=0.006) (Figure). On multivariate analysis, PGY level and case volume were not predictive of desire in supplemental training, whereas absence of a dedicated breast surgeon at institution (OR 3.4, 95% CI 1.3-10.4; p=0.021) and lack of confidence with localizer used (OR: 4.1, 95% CI 1.2-17; p=0.035) were independently associated with greater interest in additional training. Residents who were unsure if they would incorporate breast surgery into their future practice (OR 4.6, 95% CI 1.9-12; p=0.001) or who already intended to do so (OR 8.0, 95% CI 3.5-20; p<0.001) were significantly more likely to express interest in additional training compared with those who did not anticipate breast surgery to be part of their career plans.

Conclusion: Despite previously reported trends in decrease of resident logged breast surgery cases, 61% of surveyed residents were interested in receiving more structured training in partial breast mastectomy localization techniques. Nearly half of the residents who reported high confidence in performing lumpectomies independently still wanted additional training, which demonstrates an unmet need in

breast surgery education. Additionally, the absence of a dedicated breast surgeon was independently associated with a 3.4-fold higher likelihood of wanting supplemental training. Understanding the factors that drive residents to want additional breast surgery training can guide the development of an effective curriculum to improve resident confidence, real-world performance, and patient outcomes.

Figure:



1259 - Initial Referral Pattern to New Gynecologic Empowerment for Menopause and Sexual Health (GEMS) Clinic

Alison Coogan[1], Hannah Forristall[1], Madeline Stark[1], Lauren Rynar[1], Andrea Madrigrano[1]

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Background/Objective: Sexual dysfunction is a common consequence of cancer therapy, with up to 90% of women with cancer reporting changes in sexual function. Despite its prevalence, few women discuss these concerns with their providers, and fewer than 40% receive treatment or referral. Symptoms include pain, loss of sensation, altered body image, low libido, fatigue, and psychological distress - recognized sequelae of surgery, radiation, chemotherapy, and endocrine therapy. As cancer outcomes improve, survivorship and quality of life, including sexual health, are increasingly prioritized. However, many clinicians cite inadequate training and limited referral options as barriers to care. To address this unmet need, a high-volume urban cancer center established the Gynecologic Empowerment for Menopause and Sexual Health (GEMS) Clinic to provide specialized evaluation and management for sexual health and menopausal symptoms among oncology patients.

Methods: We conducted a retrospective chart review of all patients referred to the GEMS Clinic during its first six months (January–June 2025). Collected variables included patient demographics, cancer type, stage, grade, hormone receptor status, and treatment history. Referral details such as indication and referring provider specialty were also recorded.

Results: A total of 216 patients were referred to the GEMS Clinic during the study period, with referrals received each month and the highest volume in April 2025 (n=51, 24%). Referrals originated from 48

providers across eight specialties, most commonly gynecologic oncology (n=74, 34%), medical oncology (n=73, 34%), and breast surgery (n=35, 16%). Patients were often referred for multiple concerns; the leading indications were sexual health (n=135, 63%) and menopause management (n=125, 58%), followed by urinary incontinence and abnormal uterine bleeding. The most frequent diagnosis among referred patients was breast cancer or high-risk breast lesions (n=133, 62%). These were predominantly hormone receptor-positive breast cancers (n=111, 83%). Among breast cancer patients, 63 (47%) were premenopausal and 68 (51%) postmenopausal at diagnosis. All underwent surgical treatment-59 lumpectomy (45%) and 73 mastectomy (55%). Endocrine therapy was commonly utilized: 54 patients (41%) received tamoxifen, 65 (49%) an aromatase inhibitor, and 29 (22%) an aromatase inhibitor with ovarian suppression. Several patients received multiple regimens depending on menopausal status and treatment tolerance.

Conclusion: Sexual health concerns are prevalent yet under-addressed in oncology care. Establishing a dedicated referral resource such as the GEMS Clinic facilitates structured assessment and comprehensive management. As anticipated, most referrals originated from breast and gynecologic oncology, reflecting the significant sexual and menopausal sequelae associated with these cancers and their treatments. The dual-provider model-pairing gynecology and psychology at each visit-ensures integrated care addressing physical and psychosocial dimensions of sexual dysfunction. The initial referral patterns to the GEMS Clinic underscore the high demand for survivorship-focused sexual health resources and highlight ongoing gaps in provider training and referral pathways. Continued development of specialized, multidisciplinary programs is essential to improving quality of life for women navigating cancer survivorship.

1253 - Clinical, Imaging, and Pathology Discrepancies in Invasive Lobular Carcinoma without MRI

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Background/Objective: The underestimation of Invasive lobular carcinoma (ILC) following surgery is a known challenge. Despite concerns about its accuracy, mammography and ultrasound (MMG+US) remains the primary imaging modality because MRI accessibility is limited. We therefore investigated the discrepancies in tumor size and stage when comparing clinical assessment and MMG+US findings to the definitive mastectomy pathology. This research will determine whether MMG+US is adequate alone, or if additional imaging is necessary.

Methods: We conducted a retrospective study of ILC patients who underwent mastectomy between 2009 and 2023. Patients were excluded if they underwent breast-conserving surgery, presented with T4 tumors, received neoadjuvant treatment, or had incomplete pathological results. Clinical, radiologic (MMG+US), and pathological tumor characteristics were reviewed. We investigated the discrepancies in tumor size, staging, focality, and nodal status when comparing clinical assessment and MMG+US findings with the definitive mastectomy pathology. Concordance for categorical variables was assessed using Cramer's V, and correlation of continuous variables was evaluated using both the Pearson correlation coefficient and Lin's concordance correlation coefficient (CCC). Bland–Altman analysis was used to assess agreement and proportional bias.

Results: A total of 136 ILC patients were analyzed (median age, 59 years). Most presented with a palpable mass (75%). All three methods (clinical, MMG+US, and combined assessment (clinical + MMG+US)) significantly underestimated tumor size compared with pathology ($p<0.001$ for all). However, the combined approach demonstrated the highest concordance (CCC=0.49; mean underestimation 2.9 mm), which was substantially better than clinical assessment (CCC=0.35; 7.4 mm underestimation) or MMG+US alone (CCC=0.41; 6.4 mm underestimation). Tumor staging was also consistently underestimated across all methods (Cramer's V ranging from 0.30 to 0.47). Additionally, MMG+US alone underestimated multifocality in 44% of cases. Nodal metastasis detection was poor, with nodal discordance observed in 26.8% (Cramer's V =0.52). Bland–Altman analysis confirmed that the combined assessment provided the most consistent agreement with pathology, showing the smallest mean difference and no significant proportional bias.

Conclusion: The combined clinical and MMG+US approach significantly underestimated ILC size and staging less than either method used individually, demonstrating the highest concordance and most consistent agreement with pathology. Given its superior performance, reliance on MMG+US alone for preoperative staging is insufficient. Utilizing this combined approach is necessary to optimize surgical planning for ILC in settings where MRI access is limited. Further studies comparing this approach with MRI and against invasive ductal carcinoma are warranted to optimize preoperative planning.

1238 - Assessing the Knowledge and Awareness of Tamoxifen and Antidepressants Among Primary Care Physicians

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Background/Objective: Women with hormone receptor positive (HR+) non-metastatic breast cancer (BC) are often prescribed endocrine therapy in the adjuvant setting, as it has been shown to reduce the recurrence and mortality rate of BC in both pre- and post-menopausal women. Patients with BC are often prescribed CYP2D6 inhibiting antidepressants (e.g. paroxetine), which are known to limit the metabolism of tamoxifen, possibly altering its efficacy. According to the National Comprehensive Cancer Network, paroxetine and fluoxetine are recognized as having significant interactions with tamoxifen, whereas citalopram does not. Given that primary care physicians (PCPs) frequently prescribe antidepressant therapy to patients with BC, their knowledge on this topic is crucial. The objective of our study is to assess the knowledge and awareness of PCPs on the possible interaction between tamoxifen and antidepressants, as well as understand their management of patients with BC taking tamoxifen.

Methods: We conducted a cross-sectional online survey of PCPs in the state of Wisconsin. The survey consisted of four main multiple-choice sections: (1) demographics, (2) knowledge and awareness of tamoxifen and antidepressant interaction, (3) clinical practices in managing breast cancer patients on both therapies, (4) a case-based clinical question. Questions had various answer formats, with some utilizing a three or five-point Likert scale while others were checklist questions. We received a total of 33 responses out of a total of 229 distributed, with a 14.4% response rate. Data was analyzed using the

Qualtrics statistical analysis software. Modes were used to identify common themes in responses, while proportions and frequences summarized categorical responses.

Results: Among the 33 responses, 66% worked at an academic hospital, while the remaining practiced in community or private hospitals. A total of 66% of physicians had no knowledge or awareness of the interactions between tamoxifen and antidepressants, while 31% were only slightly knowledgeable. Only 4% of respondents were aware of the 2006 FDA label change for tamoxifen, which states that BC recurrence may increase in women concurrently taking tamoxifen and certain antidepressants due to drug interaction and genetic variation. Also, 64% were unsure about the effects of the concurrent use of certain antidepressants with tamoxifen. Respondents identified three antidepressants they believed would most affect tamoxifen's efficacy: paroxetine (25%), fluoxetine (29%), and citalopram (21%). Most respondents remained uncertain about potential interactions across all antidepressants. Respondents were given a case-based scenario of a woman with BC taking tamoxifen diagnosed with depression, and when asked what the appropriate antidepressant is to prescribe, 56% chose sertraline, which is acceptable per NCCN Guidelines.

Conclusion: Our research survey indicates there is a significant gap of knowledge among PCPs with respect to awareness of the interactions between tamoxifen and antidepressants. Most PCPs who answered the survey were not aware of the FDA notice, nor did they recognize potential issues regarding concurrent use of antidepressants and tamoxifen. These findings highlight the need for education within the PCP community to improve prescribing practices of antidepressants to patients with BC on tamoxifen.

1222 - A New Approach to Environmental Exposure: Identifying Local Breast Cancer Clusters with Novel Hydrologic Modeling

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Background/Objective: Breast cancer remains the most common cancer among women. A growing body of literature has investigated the role of environmental exposures, such as air pollutants, in increasing breast cancer risk. However, there is a paucity of data regarding how environmental carcinogens transported through water pathways could contribute. We hypothesize that surface water flow patterns influence the spatial distribution of breast cancer by transporting industrial contaminants downstream, leading to hydrologically related regions with higher breast cancer case rates. By modeling surface flow patterns, comparing hydrologic catchment areas to known breast cancer incidence, and comparing potential contaminant sources with actual industrial site locations, this study aims to identify possible environmental exposure pathways warranting further investigation and that may contribute to an increased risk of breast cancer.

Methods: A retrospective chart review on women aged 20-49 years diagnosed with any breast cancer from 2015-2024 with a residential address at the time of diagnosis in the Ohio River Valley (Kentucky, Ohio, West Virginia) was performed. Residential address and breast cancer subtype were collected from our institutional database. Women living more than 60 minutes from our institution were excluded to

ensure accurate representation of incidence. Addresses were geocoded in a local ArcGIS Pro environment. We integrated 30-m Digital Elevation Model (DEM) data to compute local water surface flow, mapped case data to flow paths and hydrologic catchment areas and produced population estimates using dasymetric application of Nighttime Lights and US Census data to estimate breast cancer rates per catchment area per year. We then compared our findings to local (West Virginia: 43 per 100,000) and national (United States: 74 per 100,000) averages to identify clusters using CDC definition of a cancer cluster, which is defined as greater than expected number of the same or etiologically related cancer cases occurring within a group of people in a geographic area over a specific period of time.

Results: Of 406 women under age 50 diagnosed with any breast cancer, 298 of these women lived in a 60-minute radius to our institution. The hydrologic modeling and special analysis identified 50 unique breast cancer clusters with case rates exceeding the national or local average and not contained within a larger hydrologic cluster. Six clusters showed a strong (95th percentile) preponderance of cancer subtypes, specifically invasive ductal carcinoma and ductal carcinoma in situ, among the 50 unique clusters, whereas other clusters showed heterogeneity in pathologic subtypes.

Conclusion: Hydrologic, geospatial, and temporal modeling coupled with our institutional case data revealed multiple well-defined regions containing rates of breast cancer in young women higher than national and local averages. The coupling of breast cancer epidemiology with hydrologic modeling at scale is novel and represents a meaningful contribution to the field of geospatial epidemiology, vastly improving the efficiency of environmental testing by providing spatial targets for water sampling. Future work will include water sampling at the headwaters of the defined clusters and analysis of surgical tissue specimens from patients possibly affected by these carcinogens to explore potential correlations between contaminant exposure and breast cancer development.

Figure:

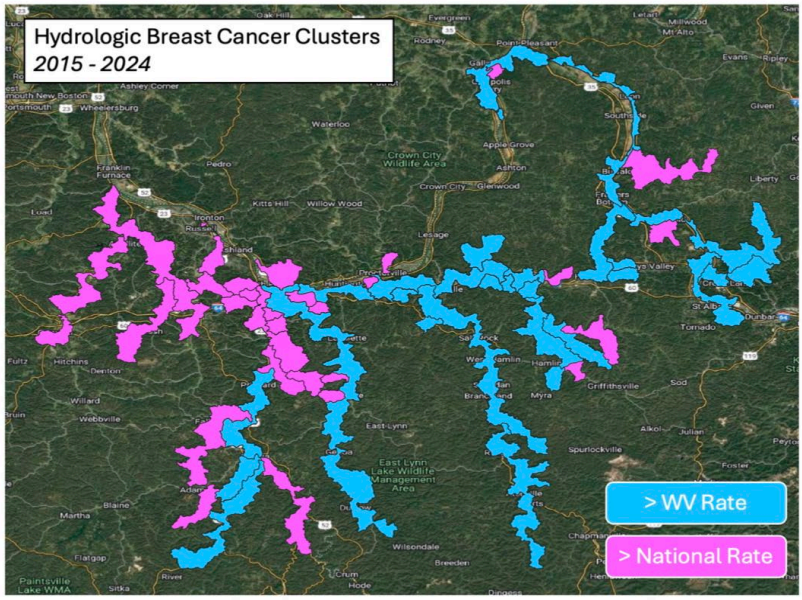

Figure 1: Spatial analysis of breast cancer clusters for women aged 20-49 from 2015-2024 in the Ohio River Valley. Regions outlined in pink indicate case rates exceeding the national (US) average of 74 per 100,000, while areas outlined in blue indicate case rates between the local (West Virginia) average of 43 per 100,000 and the national average. Hydrologic flow modeling was used to delineate cluster regions.

1209 - Glucagon-Like Peptide-1 Receptor Agonists (GLP-1RA) Use During Endocrine Therapy for Breast Cancer

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Background/Objective: Background: Breast Cancer patients often have concomitant issues with obesity and sarcopenia. Treatment for breast cancer can exacerbate these issues and impact on patient well-being and mental health. We developed a clinic for cancer patients to encourage weight loss and improve wellness utilizing Glucagon-Like Peptide-1 Receptor Agonists (GLP-1RA) treatment and tracking their progress using a variety of body composition measurements. Objectives: To report on a pilot study to decrease obesity (BMI ≥30) in breast cancer patients taking endocrine therapy to improve general emotional wellbeing and physical activity over an eight-week period.

Methods: Breast cancer patients referred to the Health and Longevity Clinic who were on endocrine therapy with a BMI of ≥30 were eligible for the pilot study. Assessments of BMI, Skeletal Muscle Mass using bioimpedance spectroscopy (Impedimed, Carlsbad, CA), and physical activity levels via the Rapid Assessment of Physical Activity (RAPA) were made on enrollment. The World Health Organization-Five Well Being Index (WHO-5) was used to assess emotional well-being. Patients who qualified for use of GLP-1RA were started on either semaglutide or tirzepatide and followed. Results were assessed using a repeated measures ANOVA comparing baseline to the 4-and 8-week timepoints.

Results: Ten patients were enrolled in the pilot study. The average age of participants was 60 (43-78). 70% of patients were on aromatase inhibitors with the remainder on Tamoxifen. Baseline BMI average 40.57 kg/m2 (32.7-48). Baseline Skeletal Muscle Mass was 20.3 kg (16.7-22.4) with a Skeletal Muscle Index of 7.92 kg/m2 (6.73-9). BMI decreased on average 1.47kg/m2 (3.62%) over the 8 week period ($p<0.001$). Aerobic exercise trended upwards with average RAPA1 scores increasing from 3.4 to 4.4 but did not reach statistical significance ($p=0.07$), strength and flexibility (RAPA2) also increased from 1.1 to 1.6 but likewise did not reach statistical significance ($p=0.387$), and the WHO-5 assessment of well being significantly increased from 12.3 to 16.2 ($p=0.006$).

Conclusion: GLP-1RA utilization during endocrine therapy can improve both physical and mental wellbeing even in a short period of time and with a small sample size. Even in the short 8-week period of this pilot data collection, BMI decreased over 3% and patients made gains in physical and mental wellbeing assessments. We anticipate that these gains may be maintained or improved over time as the dosage of their GLP-1RA medications increases to their maintenance dose. Further study is indicated for adjuvant use of these medications to monitor for long-term durability of this effect. Integration of GLP-1RA usage into other nutrition and exercise oncology interventions holds significant promise for future gains.

1201 - Abnormalities Detected by Clinical Breast Exam in a Unique, Countrywide Breast Cancer Screening Program in Cameroon

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Background/Objective: Breast and cervical cancers are the two most common female cancers in Sub-Saharan Africa (SSA), with 75% of women presenting with stage III or IV disease. The Women's Health Program (WHP) in Cameroon offers a unique integrated cervical and breast cancer screening program across 15 facilities in 7 regions. This study aims to investigate the characteristics of breast abnormalities found on initial clinical breast exam (CBE), follow-up imaging, or at time of biopsy in women receiving CBE at WHP.

Methods: Routinely collected programmatic data on all WHP patients seen in 2024 was analyzed for a cohort of patients who had documented breast exams and subsequent imaging, pathology, and treatment recommendations. Descriptive statistical analysis was conducted to summarize the distribution of findings across categories in order to characterize the spectrum and prevalence of abnormal clinical breast exam findings and the resulting diagnostic and management pathways.

Results: A total of 7805 patients were seen in 2024. Of those, 1009 (13%) patients were evaluated for specific breast complaints, and 6003 (77%) were asymptomatic presenting for cancer screening. Reason for presentation was not documented in 793 patients. 358 patients with an abnormal CBE had further breast specific data available. The most common abnormal exam finding was a breast mass (n=298, 83%), followed by breast asymmetry (n=91, 25%), breast tenderness (n=74, 21%), and abnormal regional lymph nodes (n=57, 16%). Breast ultrasonography (n=258, 72%) was performed more commonly than mammography (n=38,11%) during diagnostic evaluation. Nineteen biopsies were performed, resulting in six diagnoses of breast malignancy and one diagnosis of atypia. Core needle biopsy was the most frequently performed biopsy technique (n=10). Thirteen patients were referred for surgical evaluation or treatment, and two patients were referred to medical oncology. Other common treatment and supportive modalities included social, spiritual, and supportive care (n=24), antibiotic therapy (n=14), and nonsteroidal anti-inflammatory drugs (n=13). Eight patients were provided with counseling and reassurance and offered continued surveillance (Table 1).

Conclusion: This study is the first descriptive analysis of clinical breast exam findings detected within a large, breast cancer screening program in Cameroon. Our cohort of 358 patients presented with a variety of abnormal exam findings triggering a wide spectrum of diagnostic and treatment pathways. Six cases of biopsy-proven malignancy and one case of atypia were diagnosed in the program in one year. These results demonstrate both the feasibility and the value of implementing a large-scale breast cancer screening program in a resource limited setting. This study also highlights the substantial challenges of monitoring and evaluating a breast cancer screening program in SSA. Missing or incomplete documentation limited our ability to fully characterize presenting symptoms or diagnostic, referral, and treatment patterns in this patient population. The Women's Health Program represents a rare and unique opportunity to examine the implementation and outcomes of an innovative cervical and breast cancer screening program in SSA. Understanding and improving the implementation of this successful

program will inform efforts to develop similar scalable, evidence-based models in the rest of Cameroon and the region.

Table 1*. Summary of abnormal clinical breast exam findings, diagnostic studies and results, and treatment modalities.*

Variable	N= 358
Clinical Breast Exam Findings	
Asymmetry	91 (25%)
Nipple retraction	26 (7.3%)
Discoloration	41 (11%)
Inflammation	51 (14%)
Skin dimpling	22 (6.1%)
Mass	298 (83%)
Regional lymphadenopathy	57 (16%)
Peau d' orange skin changes	23 (6.4%)
Skin Ulceration	7 (2.0%)
Tenderness	74 (21%)
Nipple discharge	32 (8.9%)
Breast Imaging	
Ultrasonography	258 (72%)
Mammography	38 (11%)
Biopsy	19 (5.3%)
Fine needle aspiration	5 (1.4%)
Core needle	10 (2.8%)
Excisional	4 (1.1%)
Pathologic Diagnosis	
Malignancy	6 (1.7%)
Atypia	1 (0.3%)
Treatment	
Surgical consultation or treatment	13 (3.6%)
Medical oncology consultation or treatment	2 (0.6%)
Social, spiritual, or palliative care	24 (6.7%)
Antibiotics	14 (3.9%)
Anti-inflammatory medications	13 (3.6%)
Counseling, reassurance, surveillance	8 (2.2%)

1198 - “Precision in Oncoplastic Radiotherapy” - Defining the Lumpectomy Bed Through Systematic Clip Placement - A Prospective Indian Cohort Study

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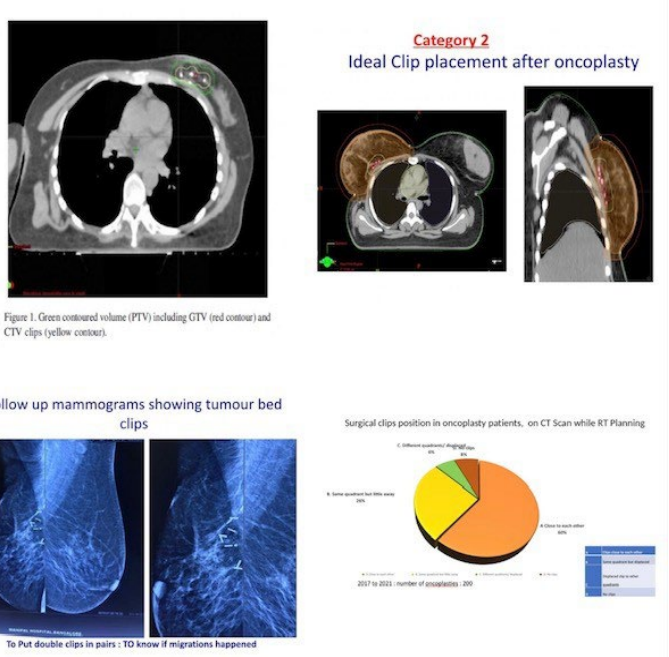
Background/Objective: Volume-displacement oncoplastic breast-conserving surgery (BCS) enhances cosmetic outcomes but complicates tumor-bed identification for radiotherapy. Parenchymal rearrangement and closed lumpectomy cavities risk geographic miss and underdosage. This study prospectively evaluates whether systematic clip placement improves boost planning accuracy in oncoplastic BCS.

Methods: A prospective cohort of 2,065 patients undergoing volume-displacement oncoplastic BCS (2014–2025) was analyzed. Deep and radial titanium clips (≥3, ideally 5) were placed before glandular mobilization. Postoperative CT-based radiotherapy planning assessed tumor-bed delineation, planning target volume (PTV), and incidental dose to heart, lung, and contralateral breast. Patients were categorized into: A) Clips clustered B) Clips dispersed within same quadrant C) Clips displaced across quadrants D) No clips Primary endpoint: boost field accuracy. Secondary endpoints: radiation dose to adjacent structures, clip-related morbidity, and workflow feasibility.

Results: Patients with ≥3 clips demonstrated markedly superior GTV–CTV overlap (28.4% vs 3.1%, $p<0.001$) and optimal boost localization. Inadequate or misplaced clips led to larger boost fields and higher incidental radiation to adjacent organs. The five-clip technique achieved maximum accuracy with no rise in postoperative morbidity and <2 minutes added operative time. Clip migration was rare (<2%) and easily detected when paired clips were used.

Conclusion: Strategic placement of ≥3 (ideally 5) titanium clips during volume-displacement oncoplastic BCS ensures precise lumpectomy-bed localization, minimizes normal-tissue dose, and enhances radiotherapy safety. Routine clip placement should become standard practice to prevent geographic miss and optimize outcomes in oncoplastic breast conservation.

Figure:



1193 - The Prognostic, Mechanistic, and Therapeutic Role of the Androgen Receptor Across Breast Cancer Subtypes

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Background/Objective: Annually more than 300,000 women are diagnosed and over 40,000 die of breast cancer in the United States. Breast cancer is typically classified based on the expression of estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor (HER2). Breast cancer that lacks the expression of these three markers is classified as triple-negative breast cancer (TNBC). Another receptor belonging to the ER, PR family, androgen receptor (AR), has been historically used as a prognostic marker and therapeutic target. AR is activated by androgens and tissue-selective AR modulators (SARMs). The overall objectives of this work are to determine the prognostic and therapeutic roles of AR and to evaluate SARMs and AR N-terminus domain-binding degraders (SARDs) in preclinical models of breast cancer.

Methods: We used preclinical, translational, and clinical specimens and related techniques to elucidate the therapeutic and prognostic roles of AR in breast cancer. We also performed RNA sequencing, chromatin immunoprecipitation sequencing (ChIP-Seq), single cell RNA sequencing (scRNA seq), spatial transcriptomics, cell line and patient-derived xenografts (CDX and PDX, respectively).

Results: AR has opposite roles in ER+ve breast cancer and in TNBC with it functioning as a tumor suppressor in ER+ve breast cancer and as oncogene in TNBC. Over 90% of ER+ve breast cancer and 80% of TNBC express AR. In addition to AR, AR splice variants (AR-SVs) are expressed in over 20% of TNBC,

identifying a new class of AR and AR-SV+ve TNBC subtype. Treatment of ER+ve breast cancer with steroidal androgen dihydrotestosterone (DHT) or SARM reduced the growth of CDX and PDX by reprogramming AR, ER, and FOXA1 cistrome and by enriching the luminal phenotype of the breast cancer. However, sustained treatment of ER+ve breast cancer with SARM resulted in activation of interferon and JAK-STAT signaling, increase in basal subtype markers, and aggressive phenotypic growth. All these can be reversed by a JAK inhibitor, ruxolitinib. AR and AR-SV -positive TNBC subtype exhibited increased expression and activation of JAK-STAT signaling. This subtype was inhibited by N-terminus-binding SARD, but not by ligand binding domain-binding antagonist such as enzalutamide and also a JAK inhibitor.

Conclusion: Collectively, our results strongly support the use of AR as a prognostic marker in both ER-positive breast cancer and in TNBC and to use a tissue selective SARM or a N-terminus domain-binding degrader as a treatment approach. Combining a JAK inhibitor to a SARM will also potentially provide a sustained therapeutic benefit. Using SARM to treat breast cancer also has significant secondary beneficial effects such as increase in bone and muscle mass, libido, and cognition, all associated with long-term use of ER antagonists.

1174 - Predictors of Academic Productivity in Early-Career Breast Oncology Surgeons: A Multi-Institutional Analysis

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Background/Objective: Breast surgical oncology is a field that is constantly evolving with emerging data and updated treatment algorithms. The management of breast cancer treatment is coordinated by a multi-disciplinary team including surgeons, medical oncologists, and radiologists. Since advances in one specialty often influence others, it is vital that surgeons serve as leaders to actively engage in research and incorporate novel findings into clinical practice. When evaluating candidates for breast surgery positions, it is valuable to have predictors of performance in an academic setting. This study aims to review the productivity of newly graduated breast surgeons and assess predictors of their scholarly activity.

Methods: Breast surgical oncology fellowship programs were identified using the Society of Surgical Oncology directory and institutional websites. Program characteristics collected included number of fellowship positions, geographic region, associated general surgery residency, Alliance membership, NCCN status, and NCI designation. Fellowship director metrics-such as age, sex, academic degrees, total publications, citation count, and h-index-were obtained from an existing database. Peer-reviewed publications were collected for 233 fellows graduating from 2021 to 2023 using Scopus, PubMed, Google Scholar, and ResearchGate. Post training publication activity was collected through 2024. Multivariable linear regression was performed to identify predictors of publication output during the first 1-3 years of practice.

Results: Among the 233 recently graduated breast oncology surgeons, 152 published as attendings, while 81 did not. When comparing these two groups, the number of manuscripts published at each

phase of training was an independent predictor of likelihood to publish as an attending. Similarly, the mean and max impact factor (IF) of publications at each phase of training was also predictive of successfully publishing as an attending. Attendings with publications also had a significantly higher number of first author publications during residency and fellowship. However, first author publications before residency were not predictive (Figure 1A). When evaluating the quantity of attending publications, multivariate regression revealed that academic productivity in residency and fellowship predicted attending productivity. In addition, fellowship program director (PD) characteristics were also predictive, specifically PD number of citations, additional degrees, and female gender (Figure 1B).

Conclusion: This study provides the first comprehensive analysis of research productivity among recently graduated breast oncology surgeons. Surgeons who published within their first one to three years of independent practice generated more publications during residency and fellowship; they also had more first author publications during those periods of training. These findings may suggest that the skills required to maintain academic productivity during rigorous surgical training mirror those necessary for productivity in early independent practice. In addition, our findings suggest that certain PD characteristics, specifically research citations, are associated with the future productivity of their graduates. These findings may inform data-driven strategies to anticipate and promote early career scholarly engagement amongst breast surgeons.

Figure 1.

A. Characteristics Associated with Early Career Publication Activity

Publication History	Attendings without Publications [mean (SD)]	Attendings with Publications [mean (SD)]	p-value
Pre-residency publications	0.5 (1.4)	1.0 (2.1)	0.035
Pre-residency mean IF	0.6 (1.7)	1.4 (3.1)	0.015
Pre-residency max IF	0.9 (3.3)	2.1 (5.3)	0.032
Residency publications	1.5 (2.7)	6.0 (7.3)	<0.001
Residency first author publications	0.6 (1.5)	2.3 (3.3)	<0.001
Residency mean IF	1.2 (1.9)	3.3 (4.7)	<0.001
Residency max IF	2.2 (5.2)	8.2 (16.4)	<0.001
Fellowship publications	0.2 (0.5)	1.6 (3.0)	<0.001
Fellowship first author publications	0.05 (0.2)	0.6 (1.0)	<0.001
Fellowship mean IF	1.0 (4.8)	2.7 (8.3)	0.046
Fellowship max IF	1.0 (4.9)	3.9 (11.9)	0.008

B. Multivariate Regression for Number of Attending Manuscripts

Variable	Regression Coefficient	p-value
PD number of citations	0.0001	<0.001
PD additional degrees	1.3	0.005
PD gender (female)	1.2	0.015
Residency first author publications	4.9	<0.001
Residency max IF	0.004	0.033
Fellowship publications	0.6	<0.001
Fellowship first author publications	1.2	0.001
Fellowship max IF	0.2	0.001

1169 - High mRNA Expression of PDL-1, PDL-2, and JAK2 Is Not Dictated by DNA Amplification in Triple-Negative Breast Cancer

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Background/Objective: Immunotherapy has drastically changed the management of triple-negative breast cancer (TNBC). While the introduction of pembrolizumab with KEYNOTE trials 355 and 522 has been a groundbreaking advance, breast cancer mortality still remains the highest in TNBC. Within this subtype, 10-29% of patients harbor an amplification of PDL-1, PDL-2, and JAK2 at locus 9p24.1 (referred to as the PDJ amplicon) that correlates with more aggressive tumors and poorer outcomes. Increased tumor infiltrating lymphocytes (TILs) also suggest heightened immune activation in PDJ-amplified TNBC cases. Here we sought to determine whether DNA amplification of the PDJ correlates with corresponding mRNA expression in TNBC patients using large cohorts. Here we sought to determine the clinical implications of DNA amplification and mRNA expression of the PDJ in TNBC using large patient cohorts.

Methods: Clinicopathological and genomic information was obtained from breast cancer patients in The Cancer Genome Atlas (TCGA) and Molecular Taxonomy of Breast Cancer International Consortium (METABRIC). The patients were grouped based on their copy-number variant for PDJ derived from GISTIC score (Genomic Identification of Significant Targets in Cancer): not-amplified, gain (all three genes exhibiting either low- or high-level gains), amplified (all three genes showing high-level amplification). Gene-set enrichment analysis was performed to compare levels of PDJ amplification to PDJ mRNA expression. Multivariable analysis was done and survival was demonstrated with Kaplan-Meier curves.

Results: Out of the two datasets (TCGA n=1067, METABRIC n=2173), there was a total of 44 patients with PDJ amplification, and a disproportionately high representation of TNBC (50% in TCGA and 73% in METABRIC) when compared to hormone positive or HER2 positive subtypes, $p<0.001$. 270 patients had gain of PDJ and approximately half of those were TNBC cases (46% in TCGA, 52% in METABRIC). Patients with PDJ gain or amplification were younger than those without (median age with amplification was 53 in TCGA, $p=0.047$; 56 in METABRIC, $p =0.004$) and this was statistically significant. There was no correlation between gain/amplification and stage of the tumor. However, PDJ-amplified tumors were more likely to be of higher grade ($p<0.001$). PDJ amplified tumors had higher markers of cell proliferation i.e. MKi67 both in TCGA and METABRIC ($p<0.01$) and this was consistent in the gene-expression data (mRNA) for TCGA ($p=0.02$) but not METABRIC ($p=0.128$). Markers of cell proliferation G2M checkpoint and MYC targets were positively enriched in TNBC in the DNA-based data, however, they exhibited negative enrichment inmRNA expression. Genes of epithelial-mesenchymal transition, angiogenesis, and immune activation were negatively enriched at the DNA level, yet the opposite was true for mRNA in TNBC. Of all immune cells evaluated, TNBC patients with PDJ amplification had higher mRNA expression of Th2 cells in both databases. In TNBC cases with high PDJ expression, there was generalized significantly higher representation and infiltration of a variety of immune cells (B cells, CD4 and CD8 T cells, Thelpers, Tregulators, antigen-presenting cells; $p<0.01$) plus a high cytolytic ($p<0.001$) and immune score ($p<0.001$), suggesting enhanced immune activation. However there was no difference in overall or disease-free survival whether patients had DNA amplification or gain nor high mRNA expression of PDJ.

Conclusion: PDJ amplification is more prevalent in TNBC than other breast cancer subgroups and correlates with higher cell proliferation. High mRNA expression of the PDJ in TNBC is associated with immune activation but has no impact on survival. PDJ DNA amplification does not always dictate that mRNA levels will be elevated, reiterating the complex mechanisms that come into play between the two entities. This study highlights the clinical importance of mRNA expression and its potential implications for future biomarker testing and targeted treatments.

1168 - Erector Spinae Plane Block Versus Surgeon-Administered Local Anesthetic Infiltration in Mastectomy: Differential Effects on Intraoperative and Postoperative Opioid Use

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Background/Objective: The erector spinae plane block (ESPB) is increasingly used in mastectomy surgery, with studies demonstrating reduced opioid use and pain compared with general anesthesia alone; however, its benefits relative to surgeon-administered local anesthetic infiltration remain unclear. As such, this study assessed intraoperative and inpatient opioid use and postoperative pain scores in mastectomy patients receiving ESPB versus surgeon-administered local anesthetic infiltration.

Methods: We conducted a single-institution retrospective cohort study of adult female mastectomy patients from 2021 to 2024. ESPB recipients were compared with patients who received surgeon-administered local anesthetic at case completion. A total of 180 patients were included (117 no-block, 63 ESPB). Indications for surgery were similar between groups, with oncologic cases accounting for 83% of operations. Patient demographics (age and BMI) and surgical factors (laterality, mastectomy type, and reconstruction) were similar between groups (all $p>0.05$). Pain scores were collected at postanesthesia care unit (PACU) arrival and departure and at 6, 12, and 24 hours postoperatively. Logistic regression models were estimated to evaluate whether ESPB was associated with opioid use, and lognormal regression models were estimated to evaluate whether the nerve block was associated with the quantity of opioids received, measured in morphine milligram equivalents (MME). A mixed-effects negative binomial regression model assessed postoperative pain scores.

Results: Patients receiving ESPB had 61% lower odds of receiving intraoperative opioids compared with patients who did not receive a nerve block (ESPB: 67% vs. no-block: 90%, $p<0.001$). Of patients who received opioids, the ESPB group demonstrated a significant reduction in intraoperative MME compared with the local infiltration group (ESPB: 8.8 vs. no-block: 12.2 MME, $p<0.001$). Notably, 13 patients required no opioids perioperatively, including 12 in the ESPB group and 1 in the no-block group ($p<0.0001$). There were no statistically significant differences in inpatient opioid use (ESPB: 18.8 vs. no-block: 20.5 MME, $p=0.60$) or postoperative pain scores ($p=0.24$).

Conclusion: In this study, ESPB was associated with a significant reduction in intraoperative MME compared with local anesthetic wound infiltration. To our knowledge, this is the first study to evaluate ESPB against surgeon-administered local anesthetic in mastectomy. While inpatient opioid use and

postoperative pain scores were similar between groups, patients receiving ESPB had lower odds of requiring any opioids during the entire perioperative period. These data suggest that the primary benefits of ESPB may lie in perioperative, especially intraoperative, opioid-sparing rather than postoperative analgesia. Future studies should evaluate whether optimized block timing, dosing strategies, longer-acting anesthetic formulations, or continuous catheter techniques can enhance postoperative outcomes.

1137 - Sustained Uptake of Breast Ultrasound and Oncoplastic Skills Following a Single-Day Novel Cadaveric Training Course

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Background/Objective: Surgeon use of breast ultrasound (US) and oncoplastic techniques are associated with improved surgical outcomes and patient satisfaction. While these tools are essential for some breast surgeons, uptake of these skills remains low due to lack of training and resources. Here we evaluate immediate and longitudinal effectiveness of our novel, single-day, multimodal cadaveric course designed to teach ultrasound-guided techniques and oncoplastic skills.

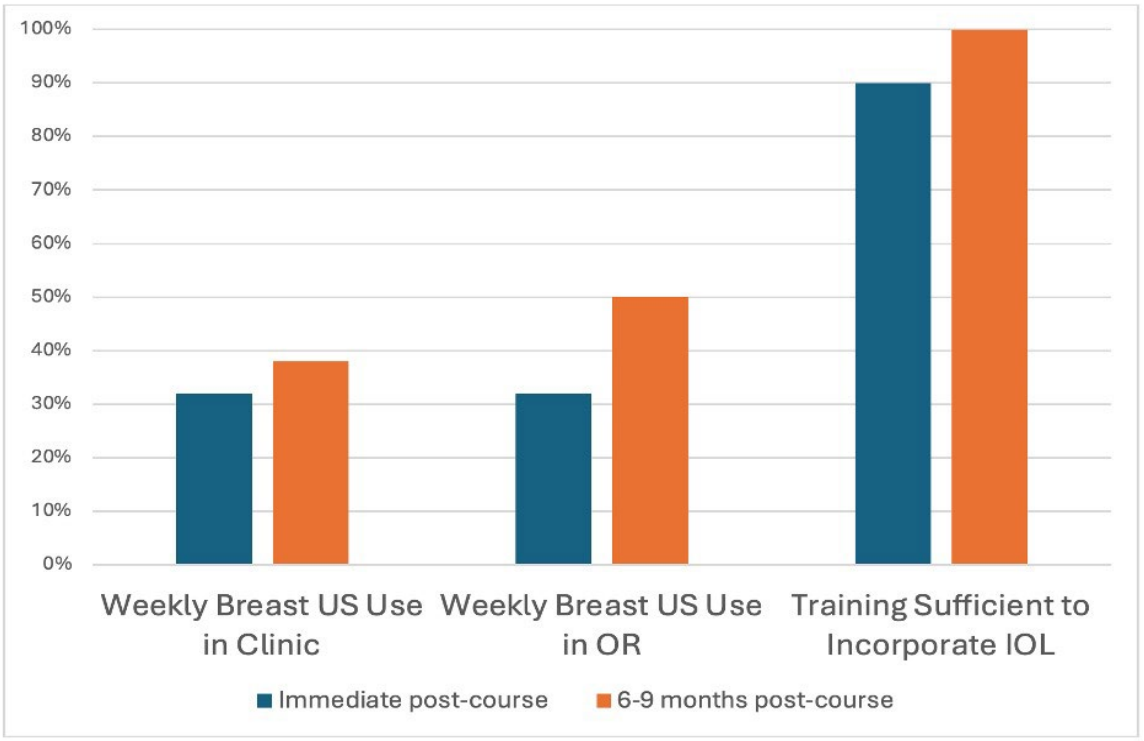
Methods: Practicing surgeons, surgical trainees, and advanced practice providers participated in one of multiple offerings of a single-day, multimodal breast US and oncoplastic training course with lectures and hands-on sessions using fresh cadavers. Pimento olives placed via ior implantation into the breasts and ultrasound-visible biopsy clips percutaneously inserted into the breasts were used as target lesions for US-guided biopsy and localization procedures. A morning session consisted of didactics on breast ultrasound principles and techniques followed by a lab session to practice US-skills. The afternoon session consisted of didactics on oncoplastic techniques also followed by a lab session. The wire-localized lesions from the morning session were then excised with level 1 oncoplastic techniques. Participants completed anonymous surveys immediately following the course and at follow-up 6-9 months after the course to assess perceptions of training effectiveness and impact on skill uptake. Surveys consisted of demographic information, multiple choice background questions about ultrasound and oncoplastic experience, Likert-scale self-assessment questions, and free-text options to describe barriers to skill uptake. Chi-square test and Fisher's exact test were used to compare responses between different groups of participants.

Results: There were 40 course participants over three courses and 34 (85%) completed the immediate post-course surveys. Of respondents, 55.9% had been in practice for 10 years. Only 23.5% (n=8) reported prior formal US training, 32% (n=11) reported weekly use of breast US in the clinic and operating room (OR), and 38.2% (n=13) reported performing crescent or donut mastopexy (two types of level 1 oncoplastic techniques). Most participants (80%) reported that the course was sufficient to begin performing ultrasound-guided intraoperative localization (IOL), and this was more pronounced among those earlier in practice (10 years (94.7% vs 75%, p=0.5). Of 22 eligible participants, 59% (13/22) completed the follow-up survey, and 85% of respondents described increased use of breast US several months after the course and 100% agreed or strongly agreed that the course provided sufficient training

to independently perform IOL (Figure 1). Barriers to ultrasound uptake included access to ultrasound in the clinic and lack of departmental or administrative support to use ultrasound. With regards to oncoplastic procedures, 90% of follow-up survey respondents agreed or strongly agreed that the course provided sufficient training to incorporate oncoplastic techniques into their practice, and 70% reported increased use of oncoplastic techniques after course completion. Limitations to oncoplastic skills uptake included a need for adjusting practice paradigms and plastic surgery collaboration.

Conclusion: A single-day, novel cadaver course in breast US and oncoplastic techniques was associated with sustained confidence in US-guided IOL performance and increased utilization of US and oncoplastic techniques at 6-9 months post-course. Expanding these hands-on training opportunities could support broader integration of surgeon-performed breast US and oncoplastic techniques in clinical practice. Barriers to breast US use and oncoplastic skill uptake need to be further explored.

Figure:



1130 - Applicant Selection and Ranking in Breast Surgical Oncology Fellowships: A National Survey of Program Leadership

Joyce Eum[1], Cara Hannigan[1], Sydney Smilen[1], Susan Boolbol[2], Carinne Anderson[2]

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Background/Objective: Breast surgical oncology (BSO) was the most competitive surgical subspecialty match in 2025, with a record low of 61% of applicants successfully matched. Since its advent in 2003, the

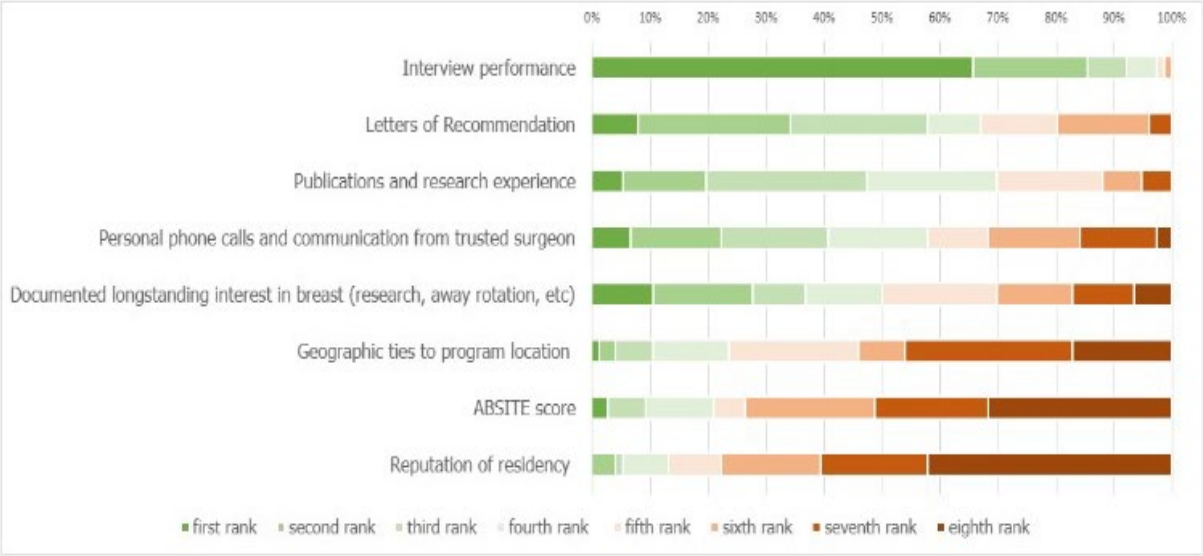
number of BSO fellowships has grown to 65 programs. In 2021, a survey was sent out to BSO program directors (PDs) to evaluate the selection and ranking criteria of candidates. Due to the changing climate of the field, we sought to re-evaluate the characteristics programs valued. Our study is novel in evaluating the perspectives of all BSO program leadership, both PDs and associate program directors (APDs).

Methods: An anonymous, web-based survey was sent to all BSO program leadership. The survey consisted of 24 questions. Multiple choice questions were used to survey applicant screening criteria. Ranking process was evaluated with a Likert scale, rank preference, and multi-answer questions. Participants were also invited to enter a written comment. Survey analysis was performed using descriptive statistics.

Results: Out of 65 programs, 76.9% responded. 50 PDs and 26 APDs participated. Most (61.2%) received 50-100 applications, 32.7%100-149, and 6.1% more than 150. Majority (72%) offered 16-30 interviews, 12% less than 16, 14% 31-45, and 2% more than 45. Similarly, most (72%) reported ranking 16-30 applicants, while 20% ranked less than 16, and 8% 31-45. Over half of programs (57.9%) engaged in holistic review of applicants prior to offering an interview and did not have formal screening criteria. For programs with screening criteria, there was no uniformity among institutions. A pre-requisite ABSITE score was required for interview by 22.4%. More than half (52.6%) had formal research metrics and preferred applicants with clinical research experience. 72.5% reported that timing of research did not impact their decision; the remainder preferred participation during residency. Most programs (85.1%) felt applicants should have at least one publication. Programs were divided on whether first authorship should be expected of applicants. 61.2% preferred those with at least one first author publication. For most programs (84%) additional faculty members contributed to the rank list, and 50% reported that current fellow(s) contributed. The majority (64.5%) did not consider applicants' anticipated career goals as a factor in selection. The applicant qualities with the most positive impact on rank order were US allopathic medical degree, letters of recommendation, and interview performance. Factors with the greatest negative impact were weak personal statements and a non-US international medical degree. When asked the order of importance in rank list formation, interview performance was the most important factor (65.8%). Programs selected letters of recommendation, research experience, personal phone calls, and documented interest in breast as subsequent important factors, but with no clear consensus on order of importance (Figure 1).

Conclusion: Insight into the fellowship application and ranking process is valuable information for those interested in the increasingly competitive field of breast surgical oncology. We found that the majority of BSO programs holistically review fellowship applications. Compared to prior years, BSO fellowship directors reported fewer screening metrics prior to extending an interview. Interestingly, there was no dominant single applicant characteristic consistently valued across programs when deciding to offer an interview. Conversely, in rank list formation there was a strong majority consensus that interview performance has the largest impact. This finding is consistent with existing data in other surgical subspecialties, noting that the interview had the greatest influence on ranking. An improved understanding of the application and rank list process enables both applicants and program directors to better prepare for a successful match.

Figure 1. Rank of Importance of Applicant Factors



1128 - It's a Match: Predictors of Applicant Success in a Growing, Competitive Field

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Background/Objective: The 2025 breast surgical oncology (BSO) fellowship match attracted 171 candidates for 92 positions, making it the year's most competitive surgical subspecialty. In the past three years no programs have gone unfilled. With almost double the number of candidates as available spots, we sought to evaluate the objective qualities of successful applicants. Previous surveys have been conducted on BSO fellowship program director's opinions on successful candidacy of applicants. However, much of fellowship advising remains anecdotal and speculative as no prior studies have analyzed BSO fellowship candidates and the objective characteristics that make them attractive to programs.

Methods: This is a retrospective cohort study based on a review of applicant data on the National Matching Service website that is available to BSO fellowship programs. Data was pooled from two institutions that participated in the 2025 BSO match. The data was de-identified and extracted by two investigators. Applicant characteristics including gender, age, citizenship status, medical degree type (US MD, US IMG, non-US IMG, DO), secondary degrees (MPH, MBA, MS, PhD), residency specialty, malpractice claims, number of preliminary years, change in residency, additional residencies, dedicated research years, careers prior to medicine, time since completion of training, awards, ABSITE scores, board scores (USMLE, COMLEX), away rotations, participation in collegiate sports, military experience, community service involvement, global health involvement, geographic location, research experience, number and authorship of letters of recommendation, and society membership (ASBrS, SSO) were

compared. Multivariable linear regression was used to identify statistically significant factors associated with matching.

Results: A total of 123 applicants (71.9% of total applications) were stratified into three groups: matched (n=59), unmatched (n=54), and withdrawn (n=10). On multivariate analysis, US citizenship was the strongest predictor of matching (p=0.002). Other statistically significant factors included the applicants' number of publications, exclusive of case reports (p=0.003), awards earned in or after residency (p=0.006), number of letters of recommendation (p=0.012), and USMLE STEP 2 score (p=0.019).

Conclusion: Fellowship match success is difficult to predict. Our analysis reveals that US citizenship is the single strongest objective predictor of BSO fellowship match. While citizenship cannot be readily changed, this analysis can aid applicants in assessing and potentially improving their candidacy. Additionally, as applicant numbers increase and holistic application review becomes more challenging, these factors could be useful in applicant screening.

Table 1. Multivariable logistic regression assessing predictors of successful match

Variable	OR (95% CI)	p-value
US Citizenship	17.97 (2.77-116.4)	.002
Number of publications, exclusive of case reports	1.14 (1.05-1.24)	.003
Awards earned in or after residency	4.47 (1.52-13.11)	.006
Number of letters of recommendation	2.56 (1.23-5.31)	.012
USMLE STEP 2 score	1.06 (1.01-1.10)	.019

1127 - Implementing the Tyrer Cuzick Model in a Gynecology Practice to Identify Women Ages 25 - 40 Who Are at a High Risk for Developing Breast Cancer

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Background/Objective: This scholarly project aimed to implement the Tyrer-Cuzick Model (TC) in a gynecology practice to identify women aged 25-40 at high risk for breast cancer in accordance with recent National Comprehensive Cancer Network (NCCN) guidelines. The objectives were (1) to educate physicians, nurses, and medical assistants on the TC Model, (2) to implement the use of the TC Model over 3 months, and (3) to evaluate the implementation of the TC Model.

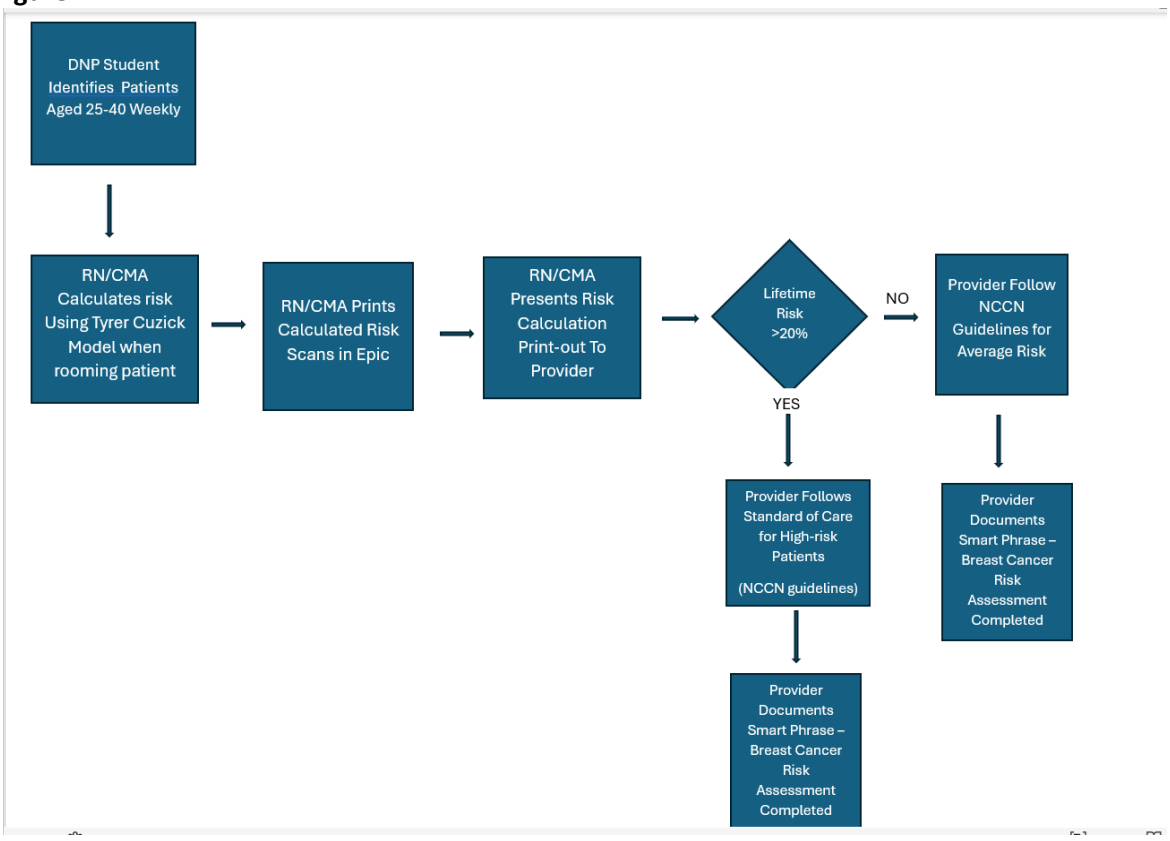
Methods: The patient population was women aged 25-40 presenting for a well-woman visit. Recent National Comprehensive Cancer Network Guidelines (NCCN, 2024) suggest breast cancer risk assessment starting at age 25 and can be completed during a clinical encounter. The quality

improvement project was implemented in a gynecology practice located in Northern New Jersey. The participants included four gynecologists, one nurse practitioner, and four certified medical assistants.

Results: Before implementation, a 3-month chart audit was conducted to determine how many women aged 25-40 presenting for a well-woman visit had a breast cancer risk assessment completed. There was a total of 69 women, none of whom (0%) had a breast cancer risk assessment completed. Following implementation, a total of 128 women met criteria for TC risk assessment, of whom 88 (68%) had a TC risk assessment completed. A total of 77 (88%) of the women had a lifetime risk calculated less than 20%. A total of eleven (12%) of the women identified as high risk with a lifetime risk of developing breast cancer calculated to be greater than 20%. This is a 12% capture rate. All eleven (100%) of the women were referred for high-risk evaluation. A post-implementation acceptability survey was completed by the CMAs (100% response) to assess the convenience of the TC model tool. Descriptive analysis showed that there was overall acceptability.

Conclusion: Completing a breast cancer risk assessment during a clinical encounter plays a vital role in identifying women who may be at high risk for developing the disease. This assessment can be conducted during a well-woman visit in a gynecology practice setting. Breast cancer screening and breast awareness are discussed during the well-woman visit, which is recommended to occur annually. The project shows that a CMA can complete the screening during the well-woman visit. Through early recognition, clinicians can provide patients with insights into their personal risk factors and tools to help modify certain risks. Additionally, identifying high-risk patients may lead to earlier breast cancer screenings, genetic counseling, and or genetic testing, more frequent screening, and, importantly, the potential for earlier detection and improved outcomes.

Figure:



1118 - Residual High Nodal Burden in Inflammatory Breast Cancer: A High-Risk, Chemo-Refractory Population Warranting Caution for Axillary De-Escalation

Caitlyn Balsay-Patel[1], Marina Petsalis[1], Theresa Relation[1], Junmin Whiting[1], Weihong Sun[1], Nicholas Champion[1], Brian Czerniecki[1], Kathrin Dvir[1], Hyo Han[1], Susan Hoover[1], Nazanin Khakpour[1], John Kiluk[1], Laura Kruper[1], Christine Laronga[1], Melissa Mallory[1], David Detz[1], Marie Lee[1]

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Background/Objective: Despite aggressive multimodal treatment, including neoadjuvant chemotherapy (NACT), surgery and locoregional radiation, prognosis for inflammatory breast cancer (IBC) remains poor. Amid growing discussions regarding de-escalation of axillary surgery, the implications for high-risk IBC patients are unclear. This study aimed to address this gap by evaluating outcomes for IBC patients with high pathologic nodal burden (10 positive nodes or greater).

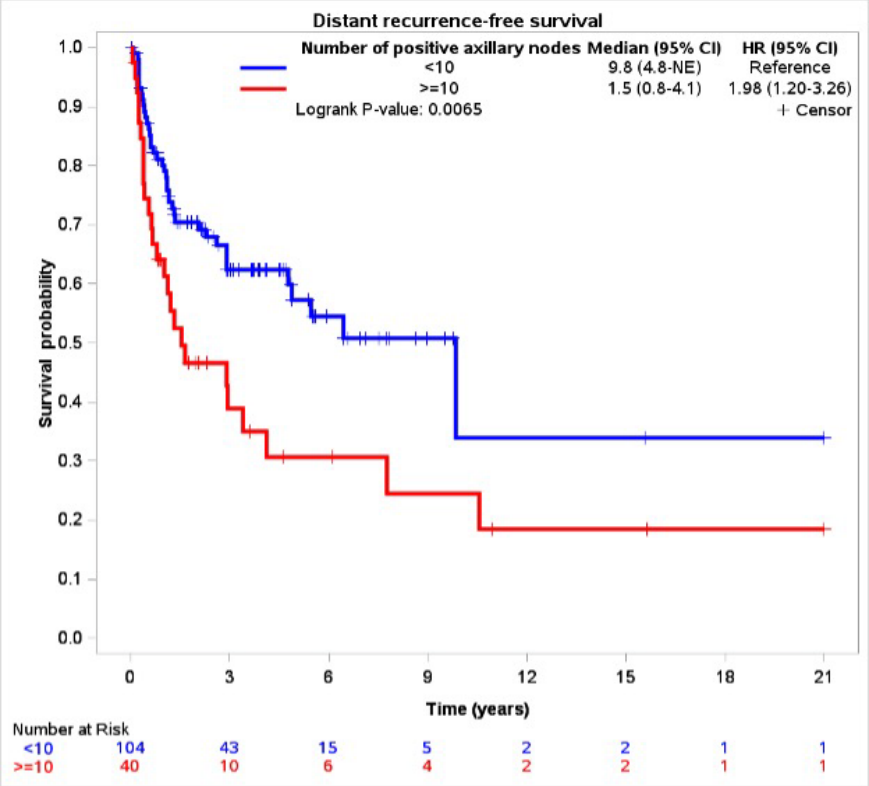
Methods: A retrospective chart review of female pts diagnosed with IBC from 1998-2025 at a single institution was completed. IBC was defined as a clinical diagnosis by a physician as clinical T4d. Pts were identified through institutional tumor registry, tumor board and individual provider databases. Demographics, clinical and pathologic outcome data were collected for analysis. Statistical analyses were performed using SAS version 9.4. Categorical variables were compared using Chi-square or Fisher's exact tests as appropriate, and continuous variables were analyzed using Wilcoxon rank-sum test. Survival outcomes were estimated using the Kaplan–Meier method, with differences between groups assessed by log-rank test. A two-sided p-value <0.05 was considered statistically significant.

Results: 236 pts with IBC were identified. Mean age at diagnosis was 53 years (y) (range 22-92) with median follow up of 45.6 months (range 1-268). 167 of these pts underwent surgery. 23 of the 167 surgical pts had de novo stage IV disease and were excluded from this subanalysis leaving 144 pts undergoing surgery with curative intent. The majority (n=138, 95.8%) underwent modified radical mastectomy (MRM) while 6 pts (4.2%) had mastectomy with sentinel lymph node biopsy. The mean number of nodes examined per pt was 15.4 (range 0-45). 141 pts (97.9%) underwent neoadjuvant chemotherapy. On surgical pathology, 40 pts (27.8%) had 10 or more positive lymph nodes (pN3) and 104 (72.2%) pts had less than 10 (pN0-2). The average number of nodes examined differed between the two groups (21.1 vs 13.3; p<0.001). Clinical nodal status was similar (p=0.143) with both groups having a mix of cN0-3 and the majority being cN1. The groups had similar rates of hormone receptor positivity but pN3 pts were more likely to be HER2 negative (90% vs 52%; p<0.001). While all patients clinical T staging was cT4d given IBC diagnosis, pathologic T staging (pT) was more advanced in pN3 pts (pT3-4: 52.6% vs 20.2%; p<0.001). Additionally, pathologic complete response (pCR) in the breast was rare among pN3 pts (2.6% vs 29.8%, p<0.001). pN3 pts has significantly higher rates of lymphovascular invasion (LVI) (86.8% vs 54.8%; p<0.001), extranodal extension (ENE) (93.8% vs 32.2%; p<0.001) and persistent dermal lymphatic invasion (58.3% vs 37.5%, p=0.031). This translated to higher rates of overall (72.5% vs 47.1%; p=0.006) and distant (65% vs 38.5%; p=0.004) recurrence, though locoregional recurrence was not different. On Kaplan-Meier analysis, pN3 pts had significantly worse distant recurrence-free survival (RFS) (median 1.5y vs 9.8y; p=0.007) (figure I) and worse overall survival (OS) (median 3.7y vs 5.4y; p=0.04).

Conclusion: IBC patients with residual high nodal burden represent a distinct, high-risk population. This group demonstrated poor pathologic response to NACT and extensive high-risk features (LVI/ENE)

resulting in significantly higher distant recurrence and dramatically worse distant RFS despite similar cN staging. These findings suggest that pathologic nodal burden remains a critical prognostic component of care for IBC patients and should be taken into consideration amid ongoing discussions of axillary de-escalation.

Figure:



1112 - Recurrence in Real Time: Rethinking Breast Cancer Follow-Up with Circulating Tumor DNA

Nicole Taylor[1], York Chew[1], Beth Sieling[1], Nicole Sookhan[1]

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Background/Objective: In the surveillance period for many malignancies, tumor markers are trended serially to assess for cancer recurrence. The absence of tumor markers may be reassuring for patients and providers alike. However, there are no active guidelines for serological testing to monitor for the recurrence of breast cancer. In recent years, circulating tumor DNA (ctDNA) has been identified as a possible marker for recurrence. We sought to describe the differences in patient characteristics between those with positive ctDNA and those with negative ctDNA, as well as the workup and treatment in ctDNA positive patients.

Methods: We performed a retrospective chart review of 227 female patients who had undergone surgery for stage I-III breast cancer and completed ctDNA testing through Signatera. Post-operative serum testing was performed on an elective basis at six-month intervals. Patients with a biological sex of male or those with insufficient tissue for testing were excluded. A comparative analysis between the positive and negative patients was performed with a Fisher Exact Test and unpaired T-test. A qualitative analysis was then performed for patients with positive results.

Results: There were 10 out of 227 patients (4.41%) that were identified to have positive ctDNA results in the post-operative period. When comparing patients with negative ctDNA to those with positive results,

the patients with positive results were more likely to have an advanced pathologic stage, axillary nodes with evidence of metastatic disease and to have completed an axillary lymph node dissection. There was no difference in receptor status (ER, PR, HER2), cancer type (invasive lobular carcinoma vs. invasive ductal carcinoma), presence of genetic mutations or Mammaprint risk status. When examining the 10 patients who had positive results, two patients were experiencing symptoms concerning for recurrence prior to positive ctDNA testing. After positive testing, all patients underwent metastatic workup. Seven of the 10 patients had evidence of metastatic disease, and all were started on adjuvant immunotherapy or chemotherapy. In the remaining three patients, initial metastatic workup was negative. One of these patients had a repeat ctDNA six months later and was found to have an increase in the value. A repeat metastatic workup was obtained and was positive for recurrence. The second patient with positive ctDNA and negative imaging was referred for the DARE clinical trial however declined. The patient's medical oncologist advised against further ctDNA draws and will monitor for recurrence clinically. The last patient with negative imaging underwent repeat ctDNA testing, which was found to be negative, consistent with an initial false positive result.

Conclusion: Circulating tumor DNA may be valuable in detecting evidence of metastatic disease prior to patient symptom presentation. There continues to be hesitancy in using ctDNA due to concerns for increasing patient anxiety and the uncertainty from providers for what to do with positive results especially if there is no evidence of disease on PET imaging. Our study described three patients in whom this occurred, one of these patients had a false positive result, one patient developed imaging-confirming recurrence six months later and one patient was advised to monitor clinically by her medical oncologist. In order to better understand the next steps of managing positive results, more data need to be collected. This will require multidisciplinary participation from surgical and medical oncologists alike.

Table:

Variable	ctDNA Negative Patients (n=217)	ctDNA Positive Patients (n=10)	Significance
Age (years)	65.2	59.2	p = 0.069
Cancer Type			p = 0.335
Invasive lobular carcinoma	19 (8.7%)	2 (20%)	
Invasive ductal carinoma	195 (89.9%)	8 (80%)	
Combination IDC/ILC	3 (1.3%)	0	
Hormone Receptor Status			p = 0.567
ER-/PR-/HER2+	9 (4.1%)	0	
ER+/PR+/HER2-	138 (63.6%)	6 (60%)	
ER+/PR-/HER2-	18 (8.3%)	1 (10%)	
ER-/PR-/HER2-	20 (9.2%)	1 (10%)	
ER+/PR+/HER2+	27 (12.4%)	1 (10%)	
ER+/PR-/HER2+	5 (2.3%)	1 (10%)	
Pathologic Stage			**p = 0.015**
Stage I	174 (80.2%)	5 (50)	
Stage II	37 (17.1%)	3 (30%)	
Stage III	6 (2.8%)	2 (20%)	
Nodal Positivity			**p = 0.037**
Yes (N≥1)	24 (11.1%)	4 (40%)	
No (N=0)	193 (88.9%)	6 (60%)	
Surgery Type			p = 0.745
Mastectomy	90 (41.5%)	5 (50%)	
Lumpectomy	127 (58.5%)	5 (50%)	
Axillary Surgery			**p = 0.041**
Sentinel Lymph Node Biopsy	201 (92.6%)	7 (70%)	
Axillary Lymph Node Dissection	16 (7.4%)	3 (30%)	
Mammaprint Testing	n = 58	n = 4	p = 0.610
Low Risk	20 (34.48%)	2 (50%)	
High Risk	38 (65.52%)	2 (50%)	
Genetics			P > 0.999
Testing Performed	207	10 (100%)	
Positive Testing	13 (6.28%)	1 (10%)	

1084 - Incidence of Bilateral Breast Cancer in Patients with Invasive Lobular Carcinoma of the Breast: An Institutional Cohort Study of 998 Patients

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Background/Objective: Invasive lobular carcinoma (ILC) is the second most common type of breast cancer and is characterized by its lack of the adhesion protein E-cadherin, resulting in a diffuse growth pattern. Historically, patients with ILC were thought to have a greater risk of having bilateral breast cancer compared to those with the more common invasive ductal carcinoma (IDC), with some series suggesting that up to 20% of patients with ILC have bilateral disease. While small series have recently countered this finding, the belief that ILC is more often bilateral persists among both patients and physicians, with some physicians even favoring contralateral prophylactic mastectomy for patients with ILC. Given scant and inconsistent evidence, we evaluated a large cohort of patients at a single institution to determine both the incidence and clinicopathologic features of contralateral breast lesions among patients with ILC.

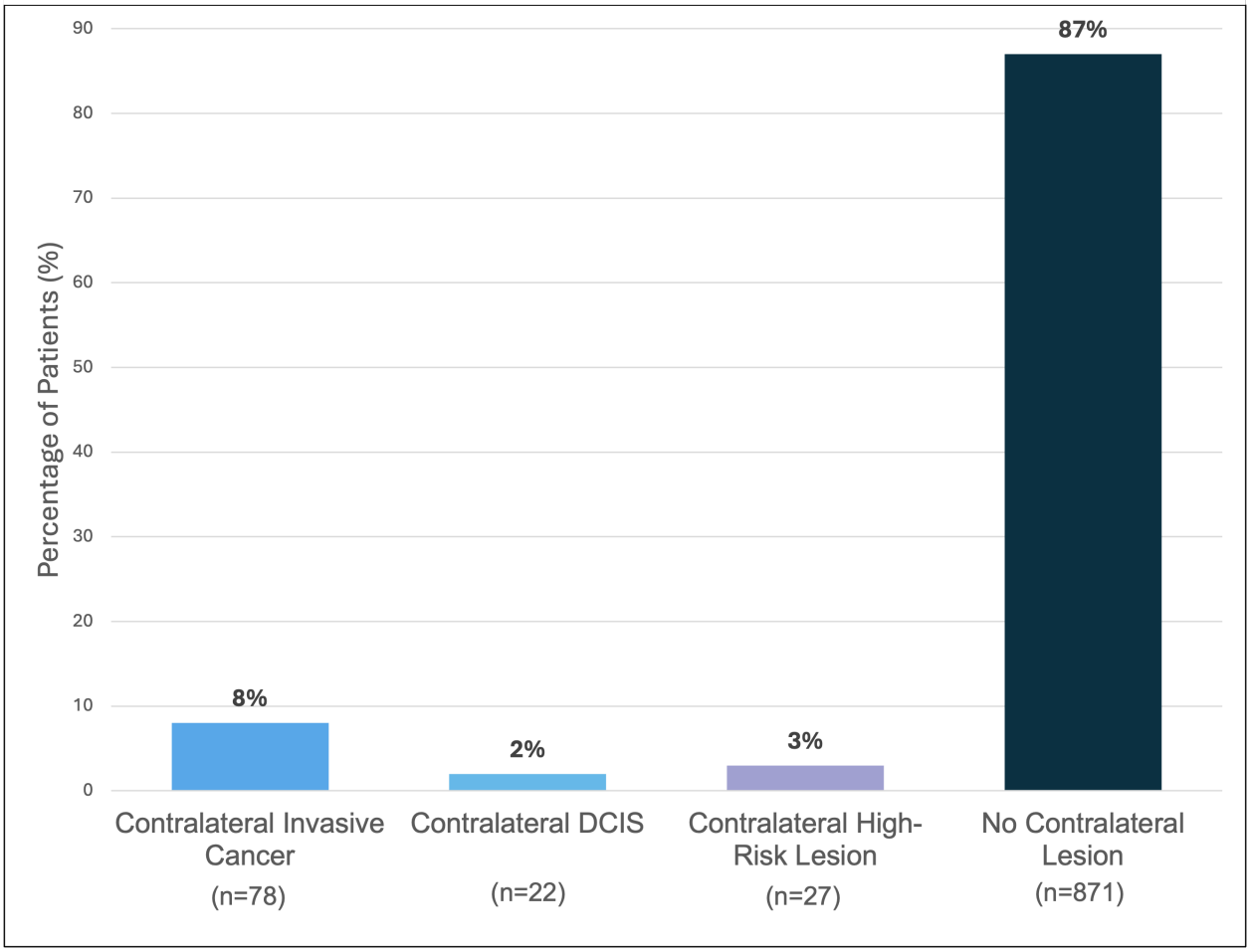
Methods: We analyzed a prospectively maintained institutional database including 998 consecutive patients with stage I-III ILC where contralateral breast findings have been carefully documented via review of imaging and pathology reports. We categorized patients into four groups: (1) those with contralateral invasive breast cancer, (2) those with contralateral ductal carcinoma in situ (DCIS), (3) those with contralateral high-risk lesion, and (4) those with no contralateral breast lesion. Contralateral invasive cancers were categorized as either synchronous (diagnosed within ≤6 months of index ILC) or metachronous (diagnosed >6 months after index ILC). For 6 patients diagnosed with bilateral ILC on the same date, the node-positive or larger tumor was designated as the index cancer. High-risk contralateral lesions included atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), lobular carcinoma in situ (LCIS), flat epithelial atypia (FEA), and radial scar. For those with contralateral invasive cancers, we determined the method of detection via review of the electronic medical record. We compared clinicopathologic characteristics between patients with and without contralateral invasive cancer using t-tests, chi-square, and Fisher's exact tests. Overall survival (OS) between patients with and without contralateral invasive cancer was evaluated using the Kaplan–Meier method and log-rank test.

Results: Of 998 patients with ILC, we found that 78 (7.8%) had a contralateral invasive cancer, 22 (2.2%) had contralateral DCIS, 27 (2.7%) had a contralateral high-risk lesion, and 871 (87.3%) had no contralateral finding. Among those with contralateral invasive cancer, 65 (83.3%) were synchronous cancers and 13 (16.7%) were metachronous cancers. Histologic subtype in these 78 contralateral invasive cancers was IDC in 65.4% with the remaining 34.6% being ILC. Contralateral IDC cases were significantly more likely to be grade 1 tumors than contralateral ILC cases (49% versus 12%, respectively, p=0.003). Patients with contralateral invasive cancer were more likely to have node-positive disease compared to those without contralateral invasive cancer (43.6% versus 31.8%, p=0.033). There was no difference in mean age, tumor size, overall stage, or tumor receptor subtype when comparing those with contralateral invasive cancer to those without. However, patients with contralateral invasive cancer were more likely to undergo bilateral mastectomy compared to those without (46.2% versus 18.3%, p<0.001). For synchronous contralateral invasive cancers, the most common method of detection was mammography (49.2%), followed by magnetic resonance imaging (MRI) of the breast (19.1%), physical

exam (17.5%), and unexpected surgical pathology (14.3%). Of the 9 patients with synchronous contralateral cancer found on surgical pathology such as prophylactic mastectomy or mammoplasty, 77.8% underwent pre-operative breast MRI. OS did not differ significantly between patients with and without contralateral invasive cancer.

Conclusion: In this large institutional cohort of nearly 1000 cases of primary ILC, the incidence of contralateral invasive cancer among patients with ILC was 7.8% and comparable to published rates among patients with IDC. Most contralateral cancers were synchronous and detected on mammography. A small proportion of patients had synchronous DCIS or high-risk lesions, while the vast majority had no contralateral finding. These results highlight that ILC histology alone does not appear to confer particularly higher risk of bilateral breast cancer. However, comparison of the method of detection to patients with other histologic subtypes could provide insight into the optimal pre-operative imaging for patients with ILC. Breast MRI may help identify up to 20% of these cases in patients with ILC, although the absolute incidence of contralateral disease appears modest, suggesting that the adage of routinely recommending bilateral mastectomy for patients with ILC appears unnecessary.

Figure 1. Incidence of contralateral breast findings among patients with invasive lobular carcinoma



1064 - Performance of Bioimpedance Spectroscopy for Estimating Skeletal Muscle Indices Compared with Dual-Energy X-Ray Absorptiometry in Cancer Patients

Steven Chen[1], Tye Galloway[2], Richelle Gaw[2], Marie Smith[3], Gina Franco[3], Joe Stephenson[3]

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Background/Objective: Accurate assessment of skeletal muscle mass is critical for identifying sarcopenia and monitoring treatment-related body composition changes in oncology care. This can be especially true for treatments such as chemotherapy or endocrine therapy and in the perioperative period. Dual-Energy X-ray Absorptiometry (DXA) is the most common reference standard but is costly, non-portable, requires radiation exposure and not routinely accessible in clinical practice. Bioimpedance Spectroscopy (BIS) offers a portable, non-invasive alternative for estimating skeletal muscle indices. This study evaluated the agreement and diagnostic performance of BIS-derived skeletal muscle mass index (SMMI) and appendicular skeletal muscle index (ASMI) compared with DXA ASMI measurements in adults undergoing cancer treatment.

Methods: Data were analyzed from two prospective longitudinal studies conducted at Prisma Health Cancer Institute between Oct 2018 and Aug 2023. "Consenting participants undergoing treatment for various cancers were monitored over the course of treatment using concurrent BIS measurements (SOZO, Impedimed) and (Lunar iDXA, GE Healthcare) assessments at the start and end of the monitoring period. Consenting participants within six months of cancer treatment were monitored for up to 12 weeks. Estimates of skeletal muscle mass (SMM) were derived using manufacturer algorithms and indexed by ht2 to calculate SMMI. Pearson correlation coefficients assessed the linear relationship between BIS and DXA indices. Bland–Altman analyses quantified measurement bias and limits of agreement. Diagnostic performance of BIS-derived indices was evaluated against DXA-defined ASMI cut-off thresholds for low muscle mass using sensitivity, specificity, and overall classification accuracy.

Results: A total of 100 patients (M=26, F=74) were recruited between the two studies (during treatment, n=49, post treatment, n=51) with a mean age of 59.48 (+/- 11.9) years and mean BMI of 29.0 (+/- 5.3) kg/m2. The cancer diagnoses represented were primarily Breast (44%), with the remainder comprising patients with Cervical, Anal, Colon, Prostate, Endometrial, Lung, Esophageal, Leiomyosarcoma, Rectal and Vulvar cancers. Eighty patients were measured at both the start and end of the study duration. The mean SMMI determined by BIS was 7.6 +/- 1.5 kg/m2 and the mean ASMI was 7.1 +/- 1.2 kg/m2 for DXA. BIS-derived muscle indices demonstrated strong correlations with DXA ($r = 0.78$, $p < 0.001$). BIS SMMI showed reasonable sensitivity (78%) and specificity (78%) for detecting low muscle mass as defined by DEXA based on BIS measurement method specific criteria defined by the European Working Group on Sarcopenia in Older People.

Conclusion: Bioimpedance spectroscopy demonstrates strong correlation and acceptable diagnostic performance compared with DXA for assessing skeletal muscle indices in oncology populations including breast cancer. The balanced classification performance of BIS SMMI and the reliable detection of reduced muscle mass, though with potential overclassification of some normal individuals, support its clinical utility. BIS provides a practical, portable, and cost-effective tool for longitudinal muscle monitoring where DXA access is limited. Integration of BIS into oncology care may facilitate early identification of sarcopenia or worrying trends towards muscle loss allowing for the timely implementation of nutrition and exercise interventions, particularly in breast cancer patients whose age

and sex increase risk. Further research should refine BIS predictive algorithms and validate their application across patient subgroups such as sex and age, cancer types and treatment phases .

1029 - Characteristics and Outcomes of Mucinous Breast Carcinoma Compared with Invasive Ductal Carcinoma

Monsinee Sanguankaew[1], Lakkana Adireklarpwong[1], Panuwat Lertsithichai[1], Prakasit Chirappapha[1], Ronnarat Suvikapakornkul[1], Thongchai Sukarayothin[1], Monchai Leesombatpaiboon[1], Yodying Wasuthit[1]

[1]*Ramathibodi Hospital, Mahidol University, Bangkok, Thailand*

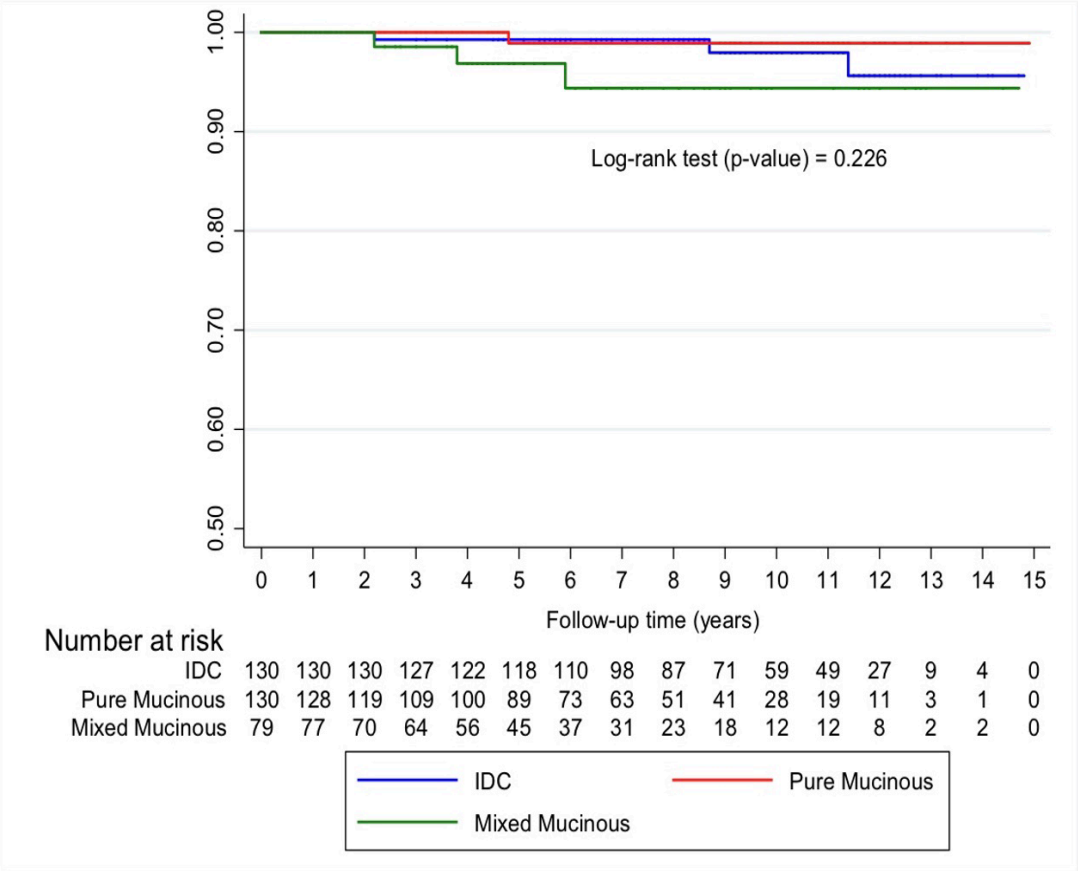
Background/Objective: Mucinous carcinoma is one of rare subtypes of breast cancer, which its data remained limited in existing literature. Prior studies suggest that mucinous carcinoma has more favorable prognosis and lower risk of nodal metastasis compared with invasive ductal carcinoma (IDC). However, distinction between pure and mixed mucinous carcinoma, recurrence and survival remain incompletely understood. This study aims to compare clinicopathological characteristics, recurrence rates and long-term outcomes of pure mucinous carcinoma, mixed mucinous carcinoma and IDC.

Methods: All patients diagnosed with mucinous carcinoma – including both pure and mixed subtypes - treated at a Thai tertiary hospital from 2010 to 2023 were retrospectively reviewed. These cases were matched with IDC patients to analyze. Chi-square and Wilcoxon rank-sum tests were employed to compare clinicopathological characteristics with significance defined as $P < 0.05$.

Results: Among 339 patients, tumor types included pure mucinous carcinoma (38.3%), mixed mucinous carcinoma (23.4%), and IDC (38.3%), with a median age of 60 years. Pure mucinous patients were younger (median 56.5 years) and predominantly cN0/pN0 and cT1-2/pT1-2. In contrast, mixed mucinous carcinoma and IDC showed higher nodal positivity, ALND rates, higher grade, and LVI, though predominantly remained cT1-2/ pT1-2. ER positivity exceeded 90% in both pure and mixed mucinous groups; HER2 positivity was higher in mixed mucinous (15.4%), and TNBC was more frequent in IDC (10%). Adjuvant chemotherapy was given only 13.1% of pure mucinous patients compared with approximately 50% of mixed mucinous and IDC patients, while adjuvant radiotherapy was similar across groups. Ten-year OS was excellent across all groups (98.9% pure mucinous, 94.3% mixed mucinous, 97.9% IDC) and DFS was comparable ranging from 86.8% to 90.8%. Although pure mucinous group showed slightly better outcomes, the difference was not statistically significant.

Conclusion: Our study demonstrated that, despite similar tumor staging, mixed mucinous carcinoma and IDC showed higher rates of nodal metastasis and was associated with more aggressive subtypes, TNBC and HER2+, compared to pure mucinous carcinoma. Reflecting its more aggressive profile, mixed mucinous carcinoma may warrant consideration of more intense adjuvant treatment than pure mucinous carcinoma. Nonetheless, survival outcomes remained comparably excellent across all groups at 10-year follow-ups.

Figure1: Overall survival between pure mucinous, mixed mucinous and IDC



Patient Education

1435 - Improving Readability of Post-Operative Breast Surgery Patient Education Materials Using Artificial Intelligence Across Multiple Languages

Alyssa Greenwood Francis[1], Susan Jao[2], Phillip Hwang[2], Janice Zhang[2], Catherine Qiu[2], Daniela Bresciani-Padilla[2], Anisa Raidah[2], Tammy Ju[2]

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Background/Objective: Clear post-operative instructions are critical for recovery after breast surgery, yet patients with limited English proficiency (LEP) face barriers that can compromise understanding of these instructions and outcomes. Despite federal requirements for language-concordant care, LEP patients often receive inferior discharge instructions compared to English-speaking patients. The National Institutes of Health (NIH) recommends patient education materials (PEMs) be written at or

below a sixth grade reading level to enhance comprehension, but most surgical instructions are written at a high school reading level. To address these disparities, we evaluated a generative pre-trained transformer (GPT) artificial intelligence tool designed to simplify and translate PEMs into different languages (Spanish, Chinese, Korean).

Methods: Institutional excisional breast biopsy post-operative instructions were input into a linguist-reviewed, pre-prompted GPT model. This is a locked-in instruction tool that, without additional user prompting, only reviewed uploaded PEMs without external resources, simplifies them to a 6th-grade English reading level, returns structured outputs in Spanish/Chinese/Korean, and preserves bias checks. Once translated outputs were obtained, medical providers fluent in both English and the target language evaluated the accuracy and grammar of these translations. Readability of each translation was then assessed using language-specific tools: Flesch-Kincaid (English), Fernández Huerta (Spanish), Chinese Readability Index- CRIE (Chinese), and Natmal (Korean).

Results: Readability analysis demonstrated substantial improvement after AI-based simplification and translation of the post-operative excisional biopsy instructions. The original English version had a Flesch-Kincaid reading ease score of 57.2, corresponding to a 10th–12th grade reading level. After simplification to a sixth grade reading level, the score improved to 81.4. Translated versions showed comparable readability: Spanish (Fernández-Huerta) 87.7, Mandarin Chinese (CRIE) 78, and Korean (Natmal) 80.6, corresponding to approximate reading levels of grades 5–7. Each AI translation required minimal editing for grammar. These findings indicate that AI-assisted translation and simplification successfully produced patient education materials across all four languages that meet or approach the NIH-recommended sixth grade reading level for improved comprehension.

Conclusion: AI-driven simplification and translation of post-operative breast surgery instructions can effectively address language barriers in healthcare communication by producing accurate, readable materials across multiple languages. The findings of this study demonstrate that AI-generated translations meet recommended readability standards and thereby has the ability to enhance patient comprehension and promote adherence to post-operative care. By bridging gaps in health literacy, these tools have the potential to reduce disparities and improve surgical outcomes among patients with limited English proficiency. Broader implementation of AI-assisted translation may help promote more equitable and accessible surgical care across diverse patient populations.

1388 - Impact of Pre-Surgical Psychology Referral on Patient Preparedness for Prophylactic Mastectomy: A Pilot Study

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Background/Objective: Breast surgery encompasses a broad spectrum of oncologic and prophylactic procedures with the role of prophylactic risk reducing mastectomy(RRM) increasing as risk prediction tools and genetic testing improve. While the surgical goals of prophylactic procedures may differ from oncologic resections, the personal impact of such procedures is universally significant. Psychological distress is prevalent among breast surgery candidates, regardless of indication, affecting patients sense of self, sexuality, relationships, and overall emotional well-being. The value of formal preoperative

psychosocial assessment is well established in other surgical fields (transplant, bariatric) but has not been explored in the realm of breast surgery. This pilot study aims to determine the effect of a preoperative psychology evaluation and clearance on patient preparedness and decision making prior to undergoing RRM.

Methods: All patients undergoing prophylactic RRM for elevated lifetime risk and/or genetic predisposition at a single academic institution from 1/2024 to 7/2025 were referred to Behavioral Oncology (BO) for preoperative evaluation and clearance. Patients were evaluated by a professional psychologist via telemedicine utilizing a modified version of the Stanford Integrated Psychosocial Assessment for Transplant (SIPAT) for scoring and assessment. BO recommendations were made to proceed without concern, proceed with recommendations, or do not proceed. Post-operatively, patients were provided with an anonymous written survey utilizing a Likert Scale of 1-5 (1 = strongly disagree, 5 = strongly agree) to evaluate the effect of preoperative BO visit on their decision making, comfort level, and post-operative expectations.

Results: Eighteen patients underwent RRM with (16) or without (2) reconstruction during the study period. Sixteen patients (89%) were evaluated by BO preoperatively (2 declined) with all patients cleared by SIPAT criteria to proceed with surgery. 5/16 (31%) patients completed the postoperative survey. Two patients followed with psychology at least remotely prior to the referral. Of the patients surveyed, 80% strongly agreed or somewhat agreed that meeting with psychology played a role in the decision to proceed with mastectomy and helped them to make an informed decision. 100% of patients strongly agreed that the visit helped them feel prepared for surgery by understanding possible psychological impacts associated with the procedure. 80% of patients strongly agreed or somewhat agreed the visit helped them to have realistic post-surgical expectations in risk reduction, sexual functioning/intimacy, aesthetic outcome, and emotional/psychologic impact. Three patients continued to see BO for one or more visits postoperatively.

Conclusion: Overall, preoperative psychological evaluation proved to have a positive impact on patients' experience with minimal time and resources required. Given the high prevalence of psychological distress among breast surgery patients, the enduring impact of surgery on self-image and identity, and strong evidence from other surgical disciplines, formal preoperative psychological evaluation should be considered a standard component of breast surgical workup. A structured preoperative psychosocial screening has the potential to prevent poor postoperative adjustment, enhance shared decision-making, and improve long-term quality of life while helping surgeons to identify patients who may benefit from additional support post-operatively. Although further studies are needed to confirm the optimal role for behavioral health in prophylactic breast procedures, this data reinforces the case for integration of a structured psychological assessment in routine breast surgical practice at our institution and consideration for similar practice at other institutions.

Table:

Please indicate how much you agree with each of the following statements **Meeting with the psychologist…**	Strongly disagree	Somewhat disagree	Neutral (neither agree nor disagree)	Somewhat agree	Strongly agree
1. Played a role in my decision to go through with the mastectomy	1	2	3	4	5
2. Helped me make an informed decision about going through with the mastectomy	1	2	3	4	5
3. Helped me feel prepared for surgery by understanding the possible psychological impacts associated with the procedure (e.g., body image changes, breast cancer-specific anxiety, sexual functioning, and intimacy)	1	2	3	4	5
4. Helped me have realistic post-surgical expectations related to…	Strongly disagree	Somewhat disagree	Neutral (neither agree nor disagree)	Somewhat agree	Strongly agree
• Risk reduction	1	2	3	4	5
• Sexual functioning, intimacy, family planning	1	2	3	4	5
• Aesthetic outcome	1	2	3	4	5
• Emotional and/or psychological impacts (e.g., anxiety, body image concerns, relational issues)	1	2	3	4	5

If a family member or friend were considering this procedure, how likely would you recommend they meet with a psychologist or other behavioral health provider prior to the surgery?

1	2	3	4	5
Extremely unlikely	Unlikely	Neutral	Likely	Extremely likely

Please provide any additional comments or feedback here:

1293 - Accessibility and Accuracy of Google AI Results for Common Surgical Breast Conditions

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[1]Trinity Health Oakland Hospital, Pontiac, MI, [2]Lehigh Valley Health Network, Allentown, PA

Background/Objective: In the modern age of internet and search engines, patients often seek medical information online. Although many medical institutions and national physician associations make efforts to disseminate accurate, accessible medical information, the incorporation of artificial intelligence into search engines makes it difficult to regulate online health materials. As of 2025, Google searches now yield an "AI Overview" at the top of the page, preceding all other results. The goal of this study is to evaluate the accuracy and accessibility of Google AI results for common surgical breast conditions.

Methods: We used Google to search for common benign, high risk, pre-malignant, and malignant surgical breast conditions as well as related terms including breast imaging, reconstructive surgeries, hormone receptors, and genetic testing [Table 1]. The "AI Overview" for each search result was extracted, including sources cited, and compiled into a review document. To evaluate the overall readability, the Flesch Reading Ease Score and the Flesch Kincaid Grade Level were calculated for each Google AI result based on validated formulas utilizing sentence, word, and syllable count. A score of 60-70 and grade level corresponding to 8th grade level reading comprehension is considered accessible to 80% of the general population. Two evaluators used the DISCERN tool, a validated scoring system for judging the quality of written consumer health information and treatments, to score the Google AI results for each term. Out of 80 total possible points, 40 points evaluated reliability, 35 points evaluated quality, and 5 points evaluated overall quality of the written health material.

Results: The Google AI results utilized a median of 18 sentences (range 12-31), 276 words (219-420), and 483 syllables (389-698). Each Google AI result utilized a median of 31 total sources (6-56) with 22 sources (3-45) originating from reliable medical institutions or associations. The median Flesch Reading Ease Score was 41.1 (23.6-53.1) and the median Flesch Kincaid Grade Level was 11.4 (8.9-15.8) [Table 1]. The averaged DISCERN scores ranged from 55.5 to 71.5 with 48.4% rated "Good" (score between 51-62) and 51.6% rated "Excellent" (score between 63-80).

Conclusion: The incorporation of artificial intelligence into search engines has made health information more readily available to patients. This study demonstrates that Google AI generates good to excellent quality health information that utilize numerous and often reliable sources. However, the overall readability of these "AI Overviews" is poor, without any result meeting the reading comprehension level of 80% of the general population. Google AI has great potential in generating accurate health information about surgical breast conditions, but it is written at a high reading level that may limit its accessibility to most patients.

Table:

Search Term	Total Sources	Reliable Sources	Sentences	Words	Syllables	FRES	FKGL
Benign Breast Pathologies							
Fibrocystic Breast Disease	31	16	16	296	542	33.1	13.2
Mastitis	31	16	19	233	389	53.1	8.9
Breast Fibroadenoma	27	21	18	279	484	44.3	10.9
Intraductal Papilloma	29	15	14	239	447	31.3	13.1
Phyllodes Tumor	41	20	26	266	480	43.8	9.7
High Risk/Pre-Malignant Breast Pathologies							
LCIS (Lobular Carcinoma In Situ)	27	20	18	271	483	40.8	11.3
Atypical Ductal Hyperplasia (ADH)	12	7	13	276	478	38.8	13.1
Atypical Lobular Hyperplasia (ALH)	41	33	17	298	533	37.7	12.4
Malignant Breast Pathologies							
DCIS (Ductal Carcinoma In Situ)	28	24	24	284	516	41.1	10.5
Invasive Ductal Carcinoma (IDC)	42	34	16	268	483	37.4	12.2
Invasive Lobular Carcinoma (ILC)	43	36	26	265	466	47.7	9.1
Inflammatory Breast Cancer (IBC)	30	25	17	234	414	43.2	10.7
Paget's Disease of the Breast	36	29	18	247	420	49.1	9.8
Breast Surgery-Related Terms							
Breast Cancer	48	45	31	242	447	42.6	9.3
Breast Cancer Surgery	45	39	13	219	400	35.2	12.5
Lumpectomy	31	28	19	296	518	43	11.1
Mastectomy	45	33	20	296	532	39.8	11.4
Sentinel Lymph Node Biopsy	40	26	20	274	495	40.1	11.1
Axillary Lymph Node Dissection	6	4	17	332	546	47.9	11.4
Hormone Receptors (ER/PR)	9	5	15	290	482	46.6	11.6
Her2/neu	29	22	13	260	436	44.7	12
Oncotype	8	6	12	321	570	29.5	15.8
Breast Lymphedema	42	28	24	280	537	32.7	11.6
Mammogram	10	7	16	297	501	45.3	11.6
Breast MRI	52	41	21	276	471	49.1	9.7
Breast US	13	8	24	420	698	48.5	10.8
Autologous Breast Reconstruction	32	21	19	245	433	44.2	10.3
Tissue Expander Breast Reconstruction	56	31	23	312	566	39.6	11.1
Direct-to-Implant Breast Reconstruction	9	3	15	311	574	29.6	14.3
Oncoplastic Breast Surgery	40	21	12	275	520	23.6	15.7
Breast Cancer Genetic Testing	41	33	17	243	481	24.9	13.3
Median:	31	22	18	276	483	41.1	11.4
Min:	6	3	12	219	389	23.6	8.9
Max:	56	45	31	420	698	53.1	15.8

*FRES = Flesch Reading Ease Score; FKGL = Flesch Kincaid Grade Level

1207 - Implementation of a Digital Health Technology Platform to Improve Shared Decision-Making Following Breast Surgery Consultations: An IDEAL Stage 2A Study

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Background/Objective Patient retention of information after initial surgical consultations is often limited, especially during such emotionally charged situations as a new cancer diagnosis. Playback Health is a HIPAA-compliant digital health technology platform that allows clinical encounters to be video-recorded and shared with patients on their personal devices. According to the IDEAL (Idea, Development, Exploration, Assessment, Long-Term Study) framework for evaluating developing technologies and surgical innovations through research question and study-design heuristics, the use of Playback Health is best approximated at Stage 2A (Development). Previous literature is limited to small cohort studies primarily focused in the field of neurosurgery. This IDEAL Stage 2A study assesses the feasibility of using Playback Health during breast surgery consultations and its potential impact on patient recall following a new breast cancer diagnosis.

Methods: Patients over the age of 18 with newly diagnosed stage 0-III breast cancer undergoing surgery for curative intent were enrolled. The ability to use a mobile device was required for enrollment. Initial preoperative consultations were video recorded using a tablet or phone, then uploaded to the encrypted Playback Health platform. Patients were given instructions on accessing their videos and completed a follow-up survey 1–2 weeks later evaluating usability, access, and recall of information regarding their breast cancer diagnosis and treatment plan.

Results: Twenty-four patients were enrolled (median age 59, range 36–82). Twenty-one patients provided feedback and their answers were evaluated. Eleven patients identified as White (45.8%), eight as Black or African American (33.3%), four as Asian (16.7%), and one as Hispanic (0.7%). Sixteen patients (76.2%) viewed their personalized videos without issues; four patients (19.0%) did not view their videos and cited lack of interest, and one patient (1.8%) stated that her family member watched the video, but she did not. Among patients who accessed their video, eleven patients (68.8%) stated they watched the video 1-2 times. Five patients (31.3%) watched their video more than two times. Two patients (12.5%) specifically mentioned reviewing videos with family members. The average information recall was 90.74% (range 83.3%–100%).

Conclusion: Playback Health was feasible to implement and well-accepted by breast surgery patients, with no technical barriers reported and high engagement among users. Greater utilization was associated with patient comfort using mobile apps and the presence of a dedicated staff member for support and follow-up. As patients increasingly engage with digital health tools, it remains important to understand their real-world impact on patient's understanding of their diagnosis. This pilot study will inform further work in an IDEAL Stage 2B study with a larger cohort to assess whether broader implementation improves shared decision making among patients and providers.

1176 - Video Education to Prepare Patients for Breast Surgery

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Background/Objective: Background: Patient comprehension and participation in surgical decision-making are essential to high-quality care, though this may be hindered by language barriers. A novel digital video education platform was developed to address these disparities and enhance shared decision-making.

Methods: A prospective survey was conducted over a 20-month period (February 2024–October 2025) at a single institution. Participants viewed a customized preoperative educational video available in English or Spanish. A web-based tool, https://www.vidoceo.com/, was used to create and deliver video education tailored to the patient's surgical indication, procedures, and risks in their preferred language of English or Spanish. English- and Spanish-speaking breast surgery patients were compared across demographics, engagement, and perceived communication quality. Variables assessed included age, education level, family engagement, CollaboRATE score, preferred education format, and knowledge of surgical risks, benefits, and options. Statistical comparisons were performed using two-sample t-tests and chi-square analyses.

Results: Seventy-five patients completed the survey (37 English-speaking and 38 Spanish-speaking). English speakers had a mean total score of 25.3 with a 70% CollaboRATE Top Score rate, while Spanish-speaking patients had a mean total score of 24.1, with 78% achieving a CollaboRATE Top Score ($p > 0.05$). Educational attainment differed significantly between groups (46% of English speakers vs 21% of Spanish speakers held a college degree or higher; $p < 0.01$). All participants found the video easy to understand and helpful for surgical decision-making (92% English vs. 95% Spanish; $p > 0.05$). Overall, 92% of participants knew their management options and the benefits, while 84% understood their risks. Preferred future education formats were video (57%), both video and written (40%), and written only (3%). Family engagement was similar, with 57% of English-speaking participants and 42% of Spanish-speakers viewing videos with family ($p = 0.3$).

Conclusion: Video-based preoperative education is highly effective in promoting patient understanding and informed decision-making prior to breast surgery. The use of our novel digital video education platform produced consistently high satisfaction and comprehension scores across both language groups. Most patients preferred video education, or in combination with written materials. These findings support integrating multilingual, video-based consent tools as an effective strategy to promote understanding and shared decision-making in surgical patients. Future studies should evaluate video-based education in other surgical procedures and its impact on perioperative outcomes.

1135 - Integration of Body Composition Assessment in High-Risk Breast Clinics

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Background/Objective: Patients with elevated risk of breast cancer are referred to high risk clinics for monitoring and counseling. Patients who are at high risk of breast cancer often have a variety of risk factors that can range from genetic risks to co-morbidities to lifestyle risks. When being seen for breast cancer risk, there is an opportunity for intervention on lifestyle modifications. We sought to evaluate the use of body composition analysis to follow patients recommended for the lifestyle modifications of weight loss and resistance training to lose fat mass and improve muscle mass to reduce risk of breast cancer.

Methods: Patients meeting twenty percent lifetime risk criteria either based on personal, genetic or family history factors are referred to the High-Risk Breast Clinic. Patients are typically seen in a 60-minute new patient block with 6-month follow-up visits that incorporate breast specific health visits as well as discussions of nutrition and exercise interventions. Breast specific issues include genetic testing, interpretation of breast imaging, physical exam, and review of breast specific lifestyle risk factors. Patients are offered body composition analysis at each visit using BIS (SOZO, Impedimed) to track their muscle and fat mass.

Results: 121 patients elected to have body composition analysis during their visit to the high-risk clinic between 6/10/2024 and 10/28/2025. 39 patients have been analyzed 2 times or more. Of the 39 patients who have had analysis more than twice, 22 showed improvement in fat mass and muscle mass. 7 of those 39 patients with follow-up measurements showed worsening findings of fat mass and muscle mass. 8 patients showed stability of fat and muscle mass while 2 patients were not included as they are currently undergoing chemotherapy regimens.

Conclusion: High risk clinics can provide both cancer specific and wellness care that improves follow-up of high-risk patients. Assessing body composition analysis has allowed us to follow data points that are indicative of patients' adopting a healthier lifestyle to reduce their breast cancer risk with reduction in fat mass and improved muscle mass.

Table:

INTEGRATION OF BODY COMPOSITION ANALYSIS IN HIGH-RISKK BREAST CLINIC

CATEGORY	NUMBER OF PATIENTS ANALYZED (6/10/2024-10/28/2025)	PERCENT OF TOTAL PATIENTS ANALYZED	PERCENT OF THOSE ANALYZED > TWO TIMES
Total patients analyzed	121	100%	
Patients with > 2 analyses	39	32.2%	100%
Improved fat and muscle mass	22	18.2%	56.4%
Worsened fat and muscle mass	7	5.8%	17.9%
Stable fat and muscle mass	8	6.6%	20.5%
Excluded (under chemotherapy)	2	1.7%	5.1%

Phyllodes

1408 - Diagnostic Utility of Pre-Operative Features for Phyllodes Tumors

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Background/Objective: Phyllodes tumors (PTs) are a rare type of fibroepithelial lesion of the breast, representing 0.3 to 1% of all breast tumors. As of 2012, PTs are characterized as either benign, borderline, or malignant depending on various pathological factors. Malignant PTs are identified by stromal hypercellularity, marked atypia, present stromal overgrowth, infiltrative borders, and a mitotic rate of ≥ 10 mitoses per 10 high power fields (HPFs). However, pathological features and diagnoses are often inconsistent due to the unpredictable behavior of PTs. The objective of this retrospective study is to provide additional prognostic evidence to support existing research that will aid clinicians and pathologists in grading and characterizing PTs more accurately.

Methods: Patients treated at an Eastern Massachusetts Hospital between 1993 and 2019 who obtained a biopsy deemed either suspicious for, or diagnostic of, phyllodes tumor were included. Demographic and pathological characteristics, final lesion diagnosis, and treatment course and recurrence data were collected. The effect size of the relationship between prognostic factors and final tumor diagnosis was determined using Pearson's Chi-squared test for categorical or binary variables and a Kruskal-Wallis rank sum test for continuous variables. A Mann-Whitney U test or Bonferroni adjustment was performed to check pairwise significance in post-hoc analysis.

Results: 524 patients obtained a core biopsy suspicious for PT, of which 278 were not PT, with most being fibroadenomas (n=181). 246 patients ultimately were diagnosed with phyllodes on excision (median age of 40.3 years [range: 13.12-80.26], 242 female, 1 male, and 3 FTM transgender patients). 67.5% of patients were White (n=166), 10.2% were Asian (n=25), and 7.3% were Black or African American (n=18). 11.4% of patients identified as Hispanic or Latino (n=28). 70.0% of phyllodes cases were benign (n=171), 21.1% borderline (n=52), and 9.35% malignant (n=23). Mean age was higher in malignant cases (47, SD=13) compared to benign (39, SD=12), (p=0.004), but not among the other pair-wise comparisons. Mean tumor size for benign, borderline, and malignant lesions was 2.35cm (SD=2.46), 3.90cm (SD=3.05), and 7.01cm (SD=5.61), respectively (p<0.001). Mitotic rate, stromal overgrowth, and cytological atypia differed between final diagnoses (p<0.001). Mitotic rate of ≥ 10 mitoses per 10 HPF was identified for 80% of malignant cases compared to 0% and 16% of benign and borderline cases, respectively. Marked cytological atypia was found in 80% of malignant cases, and 0% and 3% of benign and borderline cases. Stromal overgrowth was found in 68% of malignant cases and 0.9% and 10% of benign and borderline cases. Surgically, more malignant cases were treated with mastectomy (47.8%) compared to borderline (7.7%) or benign (1.2%) cases, (p<0.001). Re-excision rates did not differ between phyllodes types (n=146), but residual phyllodes was found most often in borderline cases (17.1%) versus malignant (9.1%) and benign (2%), (p=0.005). Of the re-excisions, 8.9% were mastectomies (n=13, 46.2% benign, 38.5% malignant, and 5.7% borderline). Phyllodes recurrences (n=8) occurred at a rate of 13% in malignant tumors, 5.8% in borderline, and 1.2% in benign cases (p=0.005), with median recurrence times of 1.76, 1.98, and 3.12 years, respectively.

Conclusion: This study underscores the prognostic value of age, tumor size, mitotic rate, stromal overgrowth, and cytological atypia when determining the final diagnosis of a phyllodes tumor. Surgery types and treatment outcomes differed between types of phyllodes, suggesting that more accurate pre-operative diagnoses may help inform the surgical plan. This could reduce the occurrence of residual tumor at re-excision, particularly in the case of borderline phyllodes, where the tumors exhibit both benign and malignant characteristics. It also provides unique insights regarding the likelihood of a phyllodes tumor diagnosis when core biopsy is deemed suspicious for phyllodes.

Quality Measures

1422 - National Trends in Prophylactic Mastectomy: Patient Characteristics and Risk Profile

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Background/Objective: For patients with a higher-than-average risk of breast cancer, bilateral prophylactic mastectomy can reduce the risk of cancer development by up to 90%. In comparison, other risk reduction strategies, like chemoprevention and risk-reducing salpingoophorectomy, confer 40% and 55% reductions in cancer development, respectively. Surgery is therefore recommended as a preventative measure for high-risk patients. While breast surgery is low risk overall, risks associated with prophylactic breast surgery must be weighed against potential benefits and risk reduction. As the procedure is considered elective, a clear understanding of potential risks is vital to ensure appropriate counseling and patient selection. We aimed to clearly identify the risks of prophylactic mastectomy utilizing a large, nationwide database to assist clinicians in counseling high-risk patients. Additionally, we aimed to determine the frequency of these surgeries in the United States and identify existing disparities.

Methods: Women undergoing simple mastectomy (CPT 19303) were identified in the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database from 2013 to 2023. Prophylactic mastectomy patients were identified using ICD9/10 codes to select for those with a genetic mutation, undergoing prophylactic surgery, or family history conferring a risk of breast cancer. Baseline demographics, comorbidities, operative characteristics, and 30-day outcomes including readmissions and reoperations were extracted from the dataset.

Results: Between the years 2013 and 2023, 6,484 patients were identified as having undergone a prophylactic mastectomy. Patients undergoing prophylactic mastectomy had a mean age of 47, with the majority of patients falling between 38 and 56 years. Most individuals identified as White (77.5%) and non-Hispanic (81.0%), while a much smaller percentage identified as Black (4.8%), Asian (2.9%), or Hispanic (6.8%). Patients tended to be relatively healthy, with 76.8% falling into ASA classes I or II and nearly all (99.4%) were functionally independent. Common comorbidities included hypertension (19.3%) and diabetes (5.9%). The mean operative time was approximately 214 minutes, or 3.5 hours, and the average hospital stay was one day. Immediate reconstruction was observed in just over 60% of patients, the majority of which was implant-based reconstruction (57% implant-based vs 7.6% tissue-based reconstruction). The post-operative complication rates were low overall, with 5.6% of patients having any complication at 30 days. The vast majority of complications included surgical site infections (5%) which was also the leading cause of re-admission rates (<5%). Of those who required a re-operation, 41% underwent an incision and drainage and 25% returned for revision of their reconstruction. Major complications occurred in 0.23% of patients and there were no reported deaths within 30 days after a prophylactic mastectomy. The number of prophylactic mastectomies performed per year has increased from 2013 through 2023 with the most dramatic rise (32% increase) between 2013 and 2015 (472 patients vs 621 patients, respectively). In the years following 2015, the number of patients undergoing the risk reducing procedure has remained relatively stable.

Conclusion: Prophylactic mastectomy has increased in frequency over a 10-year period from 2013-2023; however, rates have remained relatively stable since 2015. Immediate reconstruction was observed in over 60% of patients, with implant-based reconstruction being the most common approach. The majority of women who undergo prophylactic mastectomy are non-Hispanic White women, despite there being a higher prevalence of genetic mutations in other racial groups. This may suggest an element of racial disparity in patients who undergo high risk evaluation and subsequent counseling on risk reducing options including prophylactic mastectomy. The overall safety of the procedure with relative low risk of 30-day post-operative complications, supports prophylactic mastectomy as a safe and effective option in this high-risk population.

1401 - Barriers and Facilitators to Resistance Training Adherence After Breast Surgery: A Systematic Review and Meta-Analysis

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Background/Objective: Resistance training (RT) is a critical component of cancer rehabilitation, shown to improve muscle strength, physical function, and quality of life among cancer survivors. RT has also been shown to counteract treatment-related sarcopenia, cancer-related fatigue, breast-cancer related lymphedema, and declines in functional independence, which are common sequelae of chemotherapy, endocrine therapy and surgical recovery. Despite compelling benefits and proven safety, participation in RT remains low among breast cancer survivors. National estimates indicate that only about 16.5% of survivors meet recommended guidelines for strength training. This gap between evidence and practice underscores the critical need to understand factors influencing RT adherence in breast cancer populations. Investigating adherence to resistance training and identifying its barriers and facilitators, particularly in post-surgical patients, are critical to maximize its implementation in breast cancer care.

Methods: Following PRISMA guidelines (PROSPERO Registration ID: CRD42024594082), we conducted a systematic review and meta-analysis using systematically searched PubMed, Embase, Cochrane, and Web of Science from database inception to 8/13/2024. We included clinical trials done both within and outside the United States of structured RT interventions conducted in patients with breast cancer that reported quantitative adherence measurements (attendance, compliance, or retention). Data extracted included study characteristics, participant demographics, surgical and treatment details, RT prescription (frequency, intensity, duration, supervision, setting), exercise modality [body weight, resistance bands, free weights, or machine-based training]), and inclusion of behavioral support. Adherence outcomes were pooled as proportions using a random-effects model. Subgroup analyses were conducted by program duration (2 vs. ≤2 sessions/week), marital status (married vs. single), type of surgery (mastectomy vs. breast-conserving), menopausal status (pre- vs. postmenopausal), race (Black vs. White), BMI category (6 weeks), concurrent treatment (no concurrent vs. adjuvant chemo vs. adjuvant radiation), and referral source (cancer center/oncologist vs. external/advertisement).

Results: A total of 4,577 studies were identified, of which 1,949 were screened resulting in 217 qualifying for full-text review. Of these, 63 studies met inclusion criteria as post-surgical resistance training interventions, comprising 3,309 participants. Pooled adherence to RT programs was 83.8% (95% CI: 80.5-86.8%), with high heterogeneity (I^2 = 76.9%). Subgroup analyses demonstrated significantly higher adherence in programs of 0.05) associations were observed between adherence and the following subgroups: BMI (6 weeks), supervision (supervised vs. unsupervised), behavioral support inclusion (yes vs. no), setting (home vs. clinic), training format (group vs. individualized), frequency (>2 vs. ≤2 sessions/week), concurrent treatment (no concurrent vs. adjuvant chemo vs. adjuvant radiation), or referral source (cancer center/oncologist vs. external/advertisement). Documentation of adverse events were reported in 75% of studies (n=47); 89% found no increase in lymphedema or wound

complications, one reported seroma formation in a single patient, and three studies reported lymphedema in fewer than two patients.

Conclusion: While demographic and clinical factors are often perceived as barriers to resistance training participation among breast cancer patients, our findings indicate that program design elements, particularly duration and exercise modality, play a greater role in influencing adherence. To our knowledge, this is the first systematic review and meta-analysis to quantitatively examine adherence patterns to structured resistance training interventions in breast cancer survivors. Tailoring resistance training programs to emphasize shorter duration and accessible, equipment-free modalities may enhance adherence and support broader implementation in survivorship care. Continued investigation into patient and provider preferences affecting resistance training following breast cancer surgery will be critical to strengthening future adherence interventions.

1390 - Concordance of Artificial Intelligence-Generated Breast Cancer Treatment Plans to Real-Life Physicians: Does AI Agree?

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Background/Objective: Artificial intelligence (AI) uses publicly available information to assist healthcare providers in clinical decision-making. While similar systems have been used by healthcare workers for years, such as electronic health record (EHR) alerts for abnormal lab values, the addition of AI broadens the processing power to allow for more personalized inputs, for example patient-specific imaging and pathology reports. We hypothesized that a prompt-trained AI chat bot, told to follow National Comprehensive Cancer Network (NCCN) guidelines, would recommend a similar proposed treatment plan to the patient's actual physician directed treatment plan when given de-identified radiology and pathology reports.

Methods: This was a pilot retrospective review using five patients with known breast cancer diagnoses. Each patient's de-identified breast imaging (mammogram, ultrasound, MRI) and core needle biopsy pathology reports were entered into a pre-prompted ChatGPT-4 model, which was asked to generate a proposed treatment plan including the chemotherapy, surgery, radiation therapy, and endocrine therapy recommendations per current NCCN guidelines. The primary outcome was concordance - defined as 1=yes, 0=no - comparing the AI-generated plan to the patient's real, clinician-generated plan across the four treatment modalities (chemotherapy, surgery, radiation, endocrine). Concordance rate was calculated using Excel.

Results: Our AI-generated treatment plans achieved an average 90% concordance rate as compared to the patient's real clinician-made treatment plans. Looking at each category: chemotherapy plans matched in 5/5 cases; surgery matched in 4/5 cases; radiation therapy matched in 4/5 cases; and endocrine therapy matched in 5/5 cases. In the one patient where disagreements occurred, the patient had a biopsy-proven lymph node positive for metastatic carcinoma. After neoadjuvant chemotherapy, AI deviated from the clinician's plan and recommended an axillary lymph node dissection with adjuvant

chest wall and axillary radiation. The patient's real clinician-decided plan was for mastectomy with radar-targeted axillary sentinel lymph node biopsy without adjuvant radiation.

Conclusion: Our study demonstrates that AI-CDSS can be trained to generate breast cancer treatment plans following national guidelines with high concordance compared to real-life clinician management. However, nuanced care from a multidisciplinary tumor board team may still differ from AI generated treatment plans. Particularly in cases where new data has not been adopted by national guidelines. While AI offers benefits in streamlining clinical decision-making and supporting adherence to national guidelines in breast cancer care, further validation in larger, prospective, multi-institutional cohorts is required.

Table 1. Concordance between AI-generated and clinician treatment plans with concordance defined as 1=yes, 0=no; DCIS = ductal carcinoma in situ, IDC = invasive ductal carcinoma, ER = estrogen receptor, PR = progesterone receptor, HER2 = Human Epidermal Growth Factor Receptor 2, (-) = negative, (+) = positive

Patient number	Patient Diagnosis	Chemotherapy	Surgery	Radiation	Endocrine	Concordance Rate
1	DCIS, ER(-), PR weak(+)	1	1	1	1	1
2	IDC, ER(+), PR(-), HER2 (-)	1	1	1	1	1
3	IDC, ER(+), PR(+), HER2(-)	1	1	1	1	1
4	IDC, ER weak(+), PR weak(+), HER2(-)	1	0	0	1	0.5
5	IDC, ER(+), PR(+), HER2(-)	1	1	1	1	1

1369 - Repeat Breast Cancer Surgeries After Segmental Mastectomy Meaningfully Increase Long-Term Healthcare Costs

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Background/Objective: Among early-stage breast cancer patients, breast conservation surgery (BCS) is the most performed surgery, utilized in approximately two-thirds of patients. While 5-year overall-

survival rates are excellent for these patients – typically above 90% – re-excision procedures can occur in up to 25% of index breast-conserving surgeries and some patients will require subsequent surgery for new breast cancer or recurrences. These extra procedures can negatively impact patients' survivorship journey, quality of life, and lead to excess healthcare costs. This study aimed to (1) characterize patients at higher risk for repeat breast cancer surgeries following BCS, and (2) quantify the long-term financial impact of additional surgeries using a real-world claims and clinical database.

Methods: A retrospective cohort study was conducted using data from the Optum Clinformatics Data Mart and Electronic Health Records. The study followed adult female breast cancer patients who received their index BCS between January 1, 2012, to March 31, 2023, and all healthcare encounters were tracked 1 year pre-operatively and up to 5-years post-operatively. Patient demographics, tumor characteristics, procedure details, and healthcare utilization were collected. Outcomes included incidence of repeat breast cancer surgeries (re-excision, repeat BCS, or subsequent mastectomy), perioperative complications, healthcare utilization, and standardized per-person-per-month (PPPM) costs.

Results: Of 285,108 identified patients, 87,190 met study inclusion criteria, with a mean follow-up of 3.7 years. Overall, 19.7% (n=17,212) of patients underwent reoperation within five years, with a re-excision/repeat BCS being the most common secondary operation. Repeat surgery rates decreased from 23.2% in 2012 to 18.0% in 2020. Patients requiring repeat surgeries were younger (Repeat: 38.5% 65 years +; no repeat: 45.2% 65 years +), had higher tumor grades (Repeat: 77.9% Grade 2 or 3; no repeat: 71.9% Grade 2 or 3) and larger tumor sizes (Repeat: 36% 5 cm; no repeat: 41% 5 cm), but fewer baseline comorbidities. Repeat surgery patients had lower per-patient per-month healthcare costs prior to index surgery (total mean costs: $3,682 vs. $4,047) but higher PPPM costs after index surgery (total mean costs: $5,110 vs. $4,145) compared to patients undergoing a single BCS. The elevated costs among re-operative patients were higher across ambulatory, inpatient, and pharmacy encounters, but no difference was detected for emergency room visits (Table 1).

Conclusion: Repeat breast cancer surgeries following BCS are common adverse outcomes and drive meaningfully higher long-term healthcare costs. The re-excision rate for positive margins following BCS has been well-reported, however this is one of the first studies to explore all additional cancer surgeries following BCS and the impact of these procedures. This study underscores the need for tailored strategies to reduce re-excision rates, optimize care pathways, and address factors to help decrease the related financial burden.

Table 1. Healthcare costs associated with Breast Cancer Surgeries

		Repeat cancer surgeries (N=17,212)	Single BCS procedure (N=69,978)	
		Mean (SD)	Mean (SD)	p-value
Healthcare Costs	**Baseline (PPPM)**			
	Total (medical + pharmacy) costs	$3,682 (5,519)	$4,047 (7,419)	<0.001
	Medical costs	$3,426 (5,218)	$3,762 (6,158)	<0.001
	Ambulatory	$2,310 (3,937)	$2,571 (4,878)	<0.001
	Office visits	$726 (2,347)	$831 (2,957)	<0.001
	Outpatient visits	$1,584 (3,061)	$1,741 (3,780)	<0.001
	Emergency room visits	$56 (322)	$57 (316)	0.867
	Inpatient stays	$238 (1,898)	$236 (1,978)	0.919
	Other medical costs	$822 (2,188)	$898 (2,420)	<0.001
	Pharmacy costs	$256 (1,457)	$285 (3,785)	0.113
	Follow-up (PPPM)			
	Total (medical + pharmacy) costs	$5,110 (5,636)	$4,145 (5,453)	<0.001
	Medical costs	$4,741 (5,171)	$3,815 (4,697)	<0.001
	Ambulatory	$2,844 (3,326)	$2,328 (3,048)	<0.001
	Office visits	$674 (1,503)	$629 (1,361)	<0.001
	Outpatient visits	$2,170 (2,866)	$1,699 (2,653)	<0.001
	Emergency room visits	$77 (234)	$73 (262)	0.066
	Inpatient stays	$639 (2,560)	$462 (2,277)	<0.001
	Other medical costs	$1,181 (2,232)	$952 (1,973)	<0.001
	Pharmacy costs	$369 (1,764)	$330 (2,423)	0.016

Legend: SD- standard deviation PPPM- per patient per month

1303 - Diagnostic Accuracy of Axillary Ultrasound in SOUND Trial-Eligible Cancer Patients: A Single-Center Study

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Background/Objective: Sentinel lymph node biopsy (SLNB) remains the cornerstone of axillary staging in early-stage breast cancer, yet it is not without potential for morbidity. The Sentinel Node vs Observation After Axillary Ultra-Sound (SOUND) trial demonstrated that SLNB can be safely omitted in women >50 years of age who have small tumors with favorable biology and who are clinically node-negative as defined by a negative axillary ultrasound (AUS) and normal physical examination who are undergoing breast-conserving therapy. Whether the SOUND criteria can be generalizable to all practices is highly dependent on the accuracy of AUS. The primary objective of this study was to determine the negative predictive value (NPV) of normal AUS in excluding axillary metastasis among patients who would have met eligibility criteria for the SOUND trial. We also sought to characterize those patients with false negative AUS results, identified as those who had positive pathologic lymph node staging on final pathology.

Methods: We conducted a retrospective, single-center cohort study of women with T1–T2 invasive breast cancer (<2 cm) undergoing breast-conserving therapy at a single academic institution between 2021 and 2023. Patients were excluded if they had T3-T4 tumors, an abnormal AUS, bilateral breast cancer, distant metastases, concurrent pregnancy, or were undergoing mastectomy. Demographic,

clinical, radiographic, and pathologic data were extracted from electronic medical records. NPV was calculated using final nodal pathology as the reference standard. Chi-square and Fisher exact tests were used for analysis of categorical variables.

Results: A total of 224 SOUND-eligible patients with normal AUS findings were included. The median age at diagnosis was 64 years, with a median body mass index of 29. The cohort was predominantly non-Hispanic White (85.7%). Among these patients, 210 underwent SLNB, while the procedure was omitted in 14 cases. Of those who underwent SLNB, 190 were node-negative and 20 were node-positive, resulting in a negative predictive value of 90.5%. Most node-positive cases represented low-volume disease, with 18 classified as pN1 and two as pN0(i+). All patients with pN1 or pN0(i+) had invasive ductal carcinoma on final pathology (p=0.026). There was no significant difference in hormone receptor status between those with negative nodes on final pathology and those who were node-positive. The metastatic deposits in positive nodes ranged from 1.9 to 16 mm, with a median size of 6 mm.

Conclusion: AUS exhibited a high NPV in clinically node-negative, early-stage breast cancer patients, reinforcing its utility as a noninvasive modality for guiding axillary management. These results support the practice of safely omitting SLNB in appropriately selected patients, reducing surgical morbidity without compromising oncologic outcomes. Future investigations will focus on the prognostic significance of specific sonographic features and the potential role of ultrasound-guided core needle biopsy to enhance patient selection and further refine axillary de-escalation strategies.

Table:

	Overall (N=224)
Age at diagnosis	
Median [Min, Max]	64.0 [24.0, 86.0]
Missing	10 (4.5%)
Race & ethnicity	
Asian	4 (1.8%)
Hispanic	1 (0.4%)
Non-Hispanic Black	26 (11.6%)
Non-Hispanic White	192 (85.7%)
Missing	1 (0.4%)
BMI	
Median [Min, Max]	29.0 [16.2, 55.7]
Missing	10 (4.5%)
Axillary surgery performed	
Omitted	22 (9.8%)
SLNB	202 (90.2%)
Final pT stage	
0	13 (5.8%)
1	194 (86.6%)
2	17 (7.6%)
Final pN stage	
0	182 (81.3%)
1	19 (8.5%)
0(i+)	1 (0.4%)
Omitted	22 (9.8%)
Pathology	
DCIS	14 (6.3%)
IDC	165 (73.7%)
ILC	26 (11.6%)
Other	18 (8.0%)
Missing	1 (0.4%)
Diagnostic Accuracy	
False negative	20 (8.9%)
True negative	182 (81.3%)
SLNB omitted	22 (9.8%)

1124 - Clinical Outcomes of Post-Mastectomy Imaging After Bilateral Mastectomy for Ductal Carcinoma In Situ

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Background/Objective: Bilateral mastectomy is a common surgical intervention for ductal carcinoma in situ (DCIS) despite lack of survival benefit. Meanwhile, post-mastectomy breast imaging surveillance recommendations are inconsistent among professional organizations, with American College of Radiology suggesting consideration of mammography after autologous reconstruction, American Society of Plastic Surgeons recommending non-contrast MRI or ultrasound for implant integrity surveillance, and a majority of oncologic societies recommending against breast imaging surveillance after bilateral mastectomy. Here we evaluate the frequency, indications and outcomes of post-mastectomy breast imaging in patients undergoing bilateral mastectomy for DCIS, hypothesizing that there would be an overuse of testing with minimal clinical benefit of breast imaging in this population.

Methods: We conducted a single-institution retrospective review of patients who underwent bilateral mastectomy for DCIS between 2017-2019. Patients with invasive breast cancer were excluded. Demographic, clinicopathologic and surgical data were collected, as well as details of post-mastectomy imaging (type, frequency, and indication) and subsequent interventions, including biopsy and pathology results. Wilcoxon rank sum test, Fischer's exact test, and Pearson's Chi-squared test were used to assess factors associated with imaging and recurrence.

Results: A total of 90 patients were included. Mean patient age was 52 years (33-73) and most patients (n=84, 93%) underwent reconstruction including 44 implant-based reconstructions and 40 autologous reconstructions. Out of 72 patients who underwent genetic testing, mutations in BRCA1 or BRCA2 were identified in 8 patients (11.1%). The mean DCIS size was 34.6 mm and 81% of cases (n=72) were hormone receptor positive. At a median follow-up of 64 months, 45 patients (50%) underwent 154 post-mastectomy breast imaging studies, including 49 screening studies in 18 patients and 105 diagnostic exams in 27 patients. Patient age, BMI, genetic testing result, and tumor characteristics were similar between those who did and did not undergo post-mastectomy imaging (Figure 1). Patients with longer median follow-up were more likely to receive imaging compared to those with shorter follow-up (81 mo vs 48 mo, $p<0.001$). Nine biopsies were performed, yielding four malignant recurrences for a local recurrence rate in the whole cohort of 4.4% (4/90). One recurrence was screen-detected and the remaining three were symptomatic. No patient or tumor characteristics were significantly associated with malignant biopsy findings. The patient with the screen-detected recurrence was a 54-year-old female BRCA2 carrier with autologous reconstruction after bilateral mastectomy for 11 mm of DCIS. She was found on post-mastectomy screening mammogram to have multifocal invasive ductal carcinoma and underwent a left partial mastectomy and sentinel lymph node biopsy, followed by radiation therapy.

Conclusion: In this cohort of 90 patients who underwent bilateral mastectomy for DCIS with over 5-year median follow-up, 50% of patients underwent post-mastectomy breast imaging yielding 4 breast cancer recurrences. Only one patient, a BRCA2-carrier with autologous reconstruction, had a screen-detected

recurrence, while most recurrences presented symptomatically. These findings suggest limited benefit of routine imaging in asymptomatic post-mastectomy patients with DCIS. Larger studies focusing on genetic risk and autologous reconstruction are needed to determine best practices of breast cancer surveillance after mastectomy.

Table 1. Patient & Tumor Factors by Post-Mastectomy Imaging

Characteristic	No imaging N = 45[1]	Imaging N = 45[1]	p-value[2]
Age (years)	52 ± 9	52 ± 9	0.9
BMI	26.3 ± 5.4	25.3 ± 4.5	0.3
Genetic mutation			0.6
Negative	21 (60%)	21 (57%)	
VUS	3 (8.6%)	7 (19%)	
BRCA1/2	4 (11%)	4 (11%)	
Other	7 (20%)	5 (14%)	
DCIS size on final path (mm)	30 ± 23	39 ± 30	0.3
Hormone receptor positive	34 (77%)	39 (91%)	0.088
Reconstruction			0.5
None	3 (6.7%)	3 (6.7%)	
Autologous	23 (51%)	17 (38%)	
Implant	19 (42%)	25 (56%)	
Follow-up (months)	48 ± 30	81 ± 20	<0.001

[1] Mean ± SD; n (%)

[2] Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-squared test

1107 - Multi-Agent Preemptive Analgesia Reduces Pain and Shortens Hospital Stay After Mastectomy with Reconstruction

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Background/Objective: Implementing enhanced recovery after surgery (ERAS) pathways has enabled safe same-day discharge for mastectomy patients. As outpatient mastectomy gains popularity, optimizing pain control is essential to improve recovery and facilitate comfortable same-day discharge. A cornerstone of ERAS pathways is preemptive analgesia-the administration of analgesic medications prior to incision to blunt central sensitization and postoperative pain. Agents such as acetaminophen, gabapentin, and celecoxib have demonstrated individual benefits, but their synergistic effects in perioperative mastectomy protocols remain incompletely characterized. At our institution, ERAS protocols enable high same-day discharge rates after mastectomy with immediate reconstruction. We

now evaluate the efficacy of different preoperative analgesia regimens for reducing patient-reported pain, opioid consumption, and postoperative length of stay (LOS).

Methods: We performed a retrospective review of consecutive women undergoing mastectomy with immediate implant/tissue-expander reconstruction from 1/2023 to 6/2024. Patient characteristics, comorbidities, preoperative analgesics given, use of paravertebral blocks, operative metrics, patient-reported postoperative pain scores, perioperative opioid consumption, and postoperative outcomes were collected. Opioid doses were converted to mg oral morphine equivalents (OME). The postoperative period was defined as the time from post-anesthesia care unit (PACU) admission to discharge. Postoperative pain was assessed using the 11-point Numeric Rating Scale (0–10), with higher scores indicating greater pain intensity. Preoperative analgesia medications were acetaminophen, gabapentin, and celecoxib. Regimens using acetaminophen only (A only); acetaminophen and gabapentin (A+G); acetaminophen, gabapentin, and celecoxib (A+G+C); or no analgesics (no meds) were administered at the discretion of the surgeon and anesthesiologist. Maximum postoperative pain scores, postoperative opioid consumption, and postoperative LOS were compared between groups using Kruskal-Wallis tests. Linear regression models isolated predictors of maximum patient-reported postoperative pain scores, postoperative opioid consumption, and postoperative LOS. Predictors with p-values < 0.2 on univariate analysis were included in the multivariable analysis. Statistical significance was defined as a p-value < 0.05. Most patients who received A+G+C had their surgery at a single ambulatory surgery center, so this center was included as a predictor in our model. All statistics were performed in R version 4.4.3.

Results: Among 537 mastectomy patients, median age was 48 years (range 25-78) and median BMI 25.5 kg/m2 (range 16.7-45.3). Indication for surgery was invasive cancer in 360 (67.0%), ductal carcinoma in situ in 118 (22.0%), and prophylaxis in 59 patients (11.0%). 95 patients (17.7%) had neoadjuvant chemotherapy. 362 (67%) had bilateral surgery and 175 (33%) unilateral. Direct-to-implant reconstruction was performed in 312 (58.1%) patients and tissue expander reconstruction in 225 (41.9%). 429 patients (79.9%) had sentinel node biopsy, 39 (7.3%) axillary dissection, and 69 (12.8%) no axillary surgery. 475 patients (88.5%) had same day discharge, with a median postoperative LOS of 3.9 hours (range 0.9-75.1).

533 patients (99.3%) received a preoperative paravertebral block. Distribution of preoperative oral regimens was: no meds, 70 (13.0%); A only, 298 (55.5%); A+G, 125 (23.3%); and Regimen A+G+C, 44 patients (8.2%). Of the 44 A+G+C patients, 33 (75.0%) had surgery at a single ambulatory surgery center. Median PACU opioid use was 7.5 mg for A+G+C, versus 22.5 mg for no meds and 15.0 mg for A only and A+G ($p<0.001$). Mean maximum pain score was lower with A+G+C (3.8±3.0) than with no meds (6.1±2.1), A only (5.8±2.4), or A+G (5.6±2.4) ($p<0.001$). A+G+C yielded a shorter median postoperative LOS (2.2 h) than no meds (3.9 h), A only (3.8 h), or A+G (4.6 h) ($p<0.001$).

On multivariable linear regression, A+C+G was associated with lower maximum pain scores compared with no meds ($\beta=-2.166$, $p<0.001$). A only and A+G demonstrated non-significant trends toward lower pain. Direct-to-implant reconstruction was associated with lower pain compared with tissue expander reconstruction ($\beta=-0.801$, $p<0.001$). The ambulatory surgery center was not an independent predictor of maximum postoperative pain after adjustment ($\beta = –0.0978$, $p = 0.867$).

Conclusion: Our findings demonstrate that comprehensive multi-agent preemptive analgesia with acetaminophen, gabapentin, and celecoxib reduces pain and LOS after mastectomy with reconstruction. These benefits persisted even after adjusting for care at the ambulatory surgery center, suggesting that

the observed effect reflects the preoperative analgesic regimen itself rather than site-specific practices. Even in our population where paravertebral blocks were routinely employed, the addition of this triple-agent regimen was significantly associated with reduced postoperative pain, opioid consumption, and LOS compared to single- or dual-agent regimens, underscoring its importance in this ERAS pathway. Clinically, these data support the routine integration of a standardized multi-agent oral analgesia regimen into care to minimize postoperative pain, especially for patients undergoing bilateral procedures or tissue expander reconstruction. Future studies should investigate other determinants of pain and LOS, optimize dosing and timing of preoperative analgesics, and identify strategies to enhance adherence to preoperative analgesia protocols.

Table 1: Linear Regression Identifying Predictors of Maximum Postoperative Pain (n=537)

	Univariate Analysis		Multivariable Analysis	
	β [95% CI]	p-value	β [95% CI]	p-value
Binary Variables				
Age < 55	**0.540 [0.091, 0.988]**	**0.019**	0.339 [-0.110, 0.789]	0.139
Body mass index > 30 kg/m2	-0.005 [-0.510, 0.501]	0.986		
Non-white race (ref: white)	0.308 [-0.290, 0.905]	0.312		
Neoadjuvant chemotherapy	-0.221 [-0.767, 0.325]	0.426		
Bilateral procedure (ref: unilateral)	**0.524 [0.078, 0.970]**	**0.021**	0.371 [-0.075, 0.817]	0.103
Axillary lymph node dissection	-0.054 [-0.876, 0.768]	0.898		
Implant (ref: tissue expander)	**-1.02 [-1.434, -0.604]**	**<0.001**	**-0.801 [-1.220, -0.382]**	**<0.001**
Sub-pectoral reconstruction (ref: pre-pectoral)	0.302 [-0.188, 0.792]	0.227		
Surgery at ambulatory surgery center* (n=42)	**-1.854 [-2.628, -1.079]**	**<0.001**	-0.0978 [-1.248, 1.052]	0.867
Preoperative pain medication regimen				
No preoperative medication (n=70)	ref	-		
Acetaminophen only (n= 298)	-0.273 [-0.898, 0.353]	0.392	-0.240 [-0.853, 0.373]	0.441
Acetaminophen + gabapentin (n= 125)	-0.460 [-1.164, 0.244]	0.200	-0.598 [-1.291, 0.095]	0.091
All 3 preoperative medications (n=44)	**-2.30 [-3.218, -1.382]**	**<0.001**	**-2.166 [-3.408, -0.924]**	**<0.001**
Continuous Variables				
Amount of intraoperative opioids	7.296e-4 [-7.942e-4, 0.002]	0.347		

*Single ambulatory surgery center where most patients received Regimen A+G+C

1100 - FISH or Cut Bait? Predicting HER2 Amplification in Equivocal Breast Cancer

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Background/Objective: Accurate determination of human epidermal growth factor receptor 2 (HER2) status is essential for guiding targeted therapy in breast cancer. Immunohistochemistry (IHC) is routinely used for initial screening. When results are equivocal (IHC 2+), reflex fluorescence in situ hybridization

(FISH) testing is done to confirm gene amplification. Although this process is standard, FISH testing is costly, time-consuming, and frequently negative. At our institution, most reflex FISH tests performed for HER2 IHC 2+ cases are negative, often delaying treatment by two weeks and costing $400 per test. This study therefore sought to identify histopathologic features that could predict HER2 FISH positivity and to develop a preliminary predictive nomogram to guide when reflex testing is truly warranted.

Methods: A single-institution retrospective review was conducted of breast cancer cases from 2018 to 2024 with HER2 IHC 2+ results and corresponding FISH testing. Cases were identified from the institutional pathology database. Demographic and pathologic variables collected included age, ethnicity, menopausal status, histologic type, tumor grade, mitotic index, Ki-67 proliferation index, estrogen and progesterone receptor (ER/PR) status, and final HER2 FISH result. Genomic assay data (Oncotype DX or MammaPrint) were included when available. Patients with incomplete pathology data were excluded. The primary endpoint was HER2 FISH positivity. Secondary endpoints included correlations between histopathologic features and HER2 status. Continuous variables were summarized as means ± standard deviation, and categorical variables as frequencies and percentages. Univariate and multivariate logistic regression analyses were used to identify predictors of HER2 amplification. The performance of individual predictors was assessed using receiver operating characteristic (ROC) curves and area under the curve (AUC) statistics. Optimal cutoffs for continuous variables were determined using sensitivity, specificity, and Youden Index calculations. Statistical significance was defined as $p < 0.05$.

Results: A total of 421 HER2 IHC 2+ breast cancer cases with reflex FISH results were analyzed. The median age was 64 years (range 24-99), and 98.6% were female. Most tumors were invasive ductal carcinoma (90.6%), followed by invasive lobular carcinoma (4.8%), and other subtypes (4.5%). Overall, only 16.6% of IHC 2+ cases were HER2 FISH positive, confirming that most reflex tests yielded negative results. Multivariate stepwise logistic regression identified Ki-67 proliferation index as the only significant independent predictor of HER2 FISH positivity ($p < 0.01$). Neither tumor grade, mitotic index, nor ER/PR status demonstrated independent associations after adjustment. ROC analysis for Ki-67 yielded an AUC of 0.73, indicating moderate discriminative power (Figure 1). Using a Ki-67 cutoff of 20%, the model achieved a sensitivity of 96% and a negative predictive value of 97%, corresponding to a false-negative rate of only 4%. Tumors with Ki-67 < 20% were almost uniformly FISH negative, while those with higher Ki-67 values demonstrated a progressively increased probability of HER2 amplification. The inclusion of additional histologic variables did not improve the model's predictive performance, confirming that proliferative activity remains the most informative histopathologic feature for predicting HER2 FISH positivity.

Conclusion: Ki-67 proliferation index appears to be the strongest histopathologic predictor of HER2 amplification among IHC 2+ breast cancers. A Ki-67 cutoff near 20% may serve as a practical threshold to guide when reflex FISH testing is warranted. Tumors with low Ki-67 were almost always FISH negative, supporting a selective testing strategy that prioritizes FISH for high-proliferation tumors. For low-proliferation, hormone receptor-positive cancers, genomic assays such as Oncotype DX or MammaPrint may provide comparable prognostic and therapeutic information without the added cost or delay of FISH testing. Future multi-institutional studies are needed to confirm these findings, refine Ki-67 cutoff values, and quantify the clinical and economic impact of a selective HER2 testing strategy.

Figure:

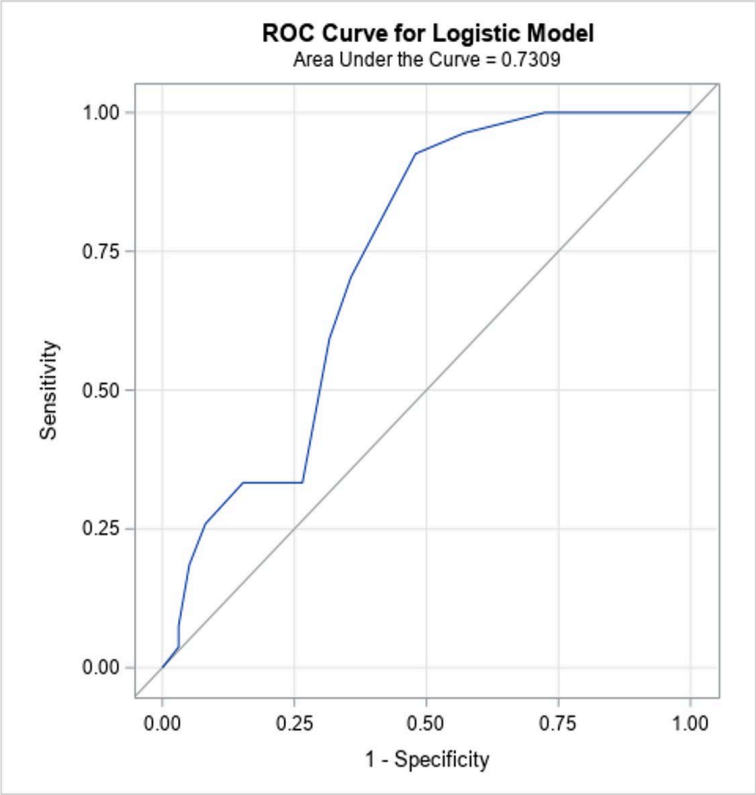

Figure 1. Receiver operating characteristic (ROC) curve for Ki-67 as a predictor of HER2 FISH positivity (AUC = 0.73).

1091 - Optimizing Exercise Prescription Duration: A Comparative Analysis of 4-Week, 4-Session, and 12-Week Exercise Interventions in Breast Cancer Patients

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Background/Objective: Exercise interventions are well-documented to improve physical function, reduce treatment-related side effects, and enhance quality of life in breast cancer patients. However, the optimal duration and structure of these programs remain uncertain. Current National Accreditation Program for Breast Centers (NAPBC) standards require exercise referrals for newly diagnosed patients, yet specific dosage recommendations vary widely. This study compared the effectiveness of three intervention models-4-week supervised programs, 4-session programs with mobile app integration, and 12-week supervised programs (virtual and in-person)-to identify optimal exercise prescription parameters.

Methods: Breast cancer patients (n=127) were assigned by program availability and preference into one of three groups: 4-week supervised exercise without app support (Alaska cohort, n=63), 4-session supervised exercise with mobile app integration (Marin cohort, n=27), or 12-week comprehensive programming (combined cohort, 27 virtual and 37 in-person participants). Standardized assessments included resting vitals, BMI, Timed Up and Go (TUG), sit-to-stand, arm curl, chair reach flexibility, and balance tests. Virtual participants completed 30-second assessments; in-person participants completed 60-second assessments with additional treadmill VO_2 testing. Pre- and post-intervention outcomes were compared using paired t-tests ($p<0.05$).

Results: Twelve-week programs demonstrated superior outcomes across nearly all measures. Virtual participants improved TUG by 25.4%, sit-to-stand by 30.9%, and arm curls by 24%. In-person participants showed VO_2 gains of 17.2%, TUG improvement of 14.9%, sit-to-stand gains of 28.1%, and arm curl improvements of 25%. Flexibility increases were most pronounced in 12-week programs, with virtual participants improving chair reach by 405–716% and in-person participants improving by 148–290%. Balance was best maintained in 12-week programs, with 96.3% of virtual and 83% of in-person participants maintaining or improving scores. The 4-week supervised cohort demonstrated meaningful but smaller improvements, including 13% faster TUG times and 22–38% gains in arm curls. The 4-session program with app support yielded attenuated outcomes, including 15% improvement in sit-to-stand and 5–6% gains in arm curls; however, 68% of these participants maintained perfect balance scores, suggesting potential benefit despite reduced dosage.

Conclusion: This comparative analysis highlights a clear dose-response effect in exercise oncology, with 12-week supervised programs producing the most comprehensive functional benefits across mobility, strength, cardiovascular capacity, flexibility, and balance. While 4-week programs provide clinically relevant improvements, they do not achieve the same breadth of benefit as longer interventions. The 4-session model with mobile app support demonstrated modest but encouraging outcomes, indicating that technology-enhanced approaches may partially compensate for reduced supervision and could provide a scalable option when longer programs are not feasible. These findings reinforce the value of extended programming for breast cancer patients while underscoring the emerging role of digital health tools in broadening access to care.

1076 - Implementing Synoptic Operative Reporting in Breast Surgery: Multi-Site Survey of Implementation Strategies and Perceived Impact

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Background/Objective: In 2020, the Commission on Cancer (CoC) mandated templated synoptic element documentation in operative reports (SORs) as an accreditation standard. In breast cancer operations, the aim was to standardize surgical technique and documentation of sentinel lymph node biopsy and axillary dissection (CoC accreditation standards 5.3-5.4). Prior to introduction of the SORs, the CoC did not provide explicit implementation strategies for new standards, introducing wide variations in integration of the standards. How different sites implemented the CoC SOR standard and the impact on clinical practice are unclear. In this study, we aimed to 1) identify strategies used to

implement breast SORs and the perceived effectiveness, feasibility, and appropriateness of those strategies, and 2) assess the perceptions of SOR uptake and the impact of SOR on the surgeon's operative techniques.

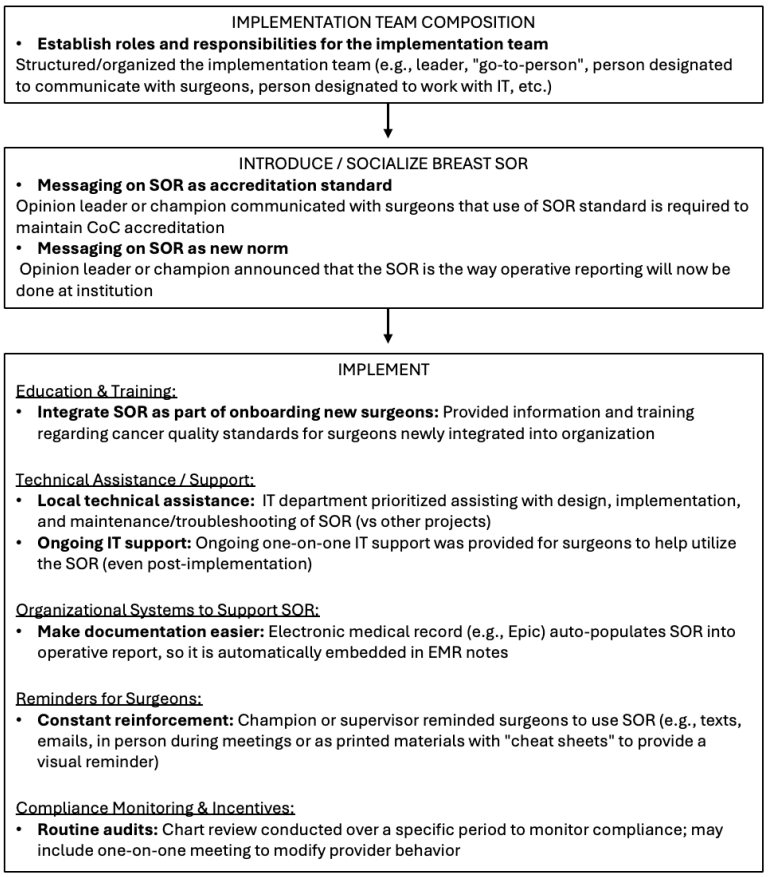
Methods: We conducted a cross-sectional survey of stakeholders at six CoC-accredited sites on breast surgery synoptic operative reporting (SOR) implementation strategies. The survey was distributed electronically from July-September 2025 to 50 individuals involved in implementing and/or using breast SOR at the six sites, including breast surgeons (end users), cancer liaison physicians, cancer program administrators, and information technology personnel (IT). We had previously interviewed these participants about barriers and facilitators to implementing SOR. Interview questions specifically pertaining to steps for implementing SOR were analyzed to identify implementation strategies that sites used or were planning to use. Strategies were organized by themes and reduced to 34 strategies to ensure relatively low burden to respondents. For each strategy, survey respondents were asked to indicate whether it was used at their site, and if so, to rate its perceived effectiveness (1=lowest, 5=highest). Respondents who rated a strategy's effectiveness as 3 or lower were also asked about its feasibility and appropriateness. Surgeons were additionally asked whether SOR changed their operative technique, and implementers were asked about internal and CoC audits. Analyses were performed at the site and participant level. Sites were categorized as early adopters of SOR if it was implemented prior to year 2022, versus late adopters if after 2022. Participants self-identified as surgeons (end users) or implementers (e.g., program leadership, administrators, IT) or both. We summarized the frequency of strategy use overall and by subgroup, and mean ratings for effectiveness and feasibility when appropriate. Fisher's exact tests were used to compare differences in the frequency of strategy use between early vs late adopter sites and surgeons vs implementers.

Results: Of 50 invitees, 19 (38%) responded from 5 of 6 sites; 10 from early adopter sites and 9 from late sites. Roles included 12 surgeons (end users), 6 implementers, and 1 surgeon-implementer. Across all responding sites, respondents reported that all or most surgeons were using SOR. Among the 4 sites with implementer responses, all reported conducting an internal audit on SOR use and 3 of those sites had a CoC accreditation site visit. Only 1 surgeon (8%) reported that SOR changed operative technique. Nine implementation strategies for SOR were reportedly used by all sites (Figure). The remaining 25 strategies had varying levels of uptake, with the least frequently used being negative consequences (used by 1 site) and engaging surgery schedulers and outside implementation advisors (used by 2 sites). Effectiveness ratings were generally high (means > 4.0, ranging from 3.8 to 4.8). For the 9 strategies used by all sites, the mean effectiveness was > 4.1 except routine audits (mean effectiveness 3.9). Feedback on the feasibility of routine audits was mixed, with 3 respondents rating feasibility unfavorably; mean feasibility was 2.3. Two other strategies also had effectiveness rated less than 4.0, these included distributing CoC education materials and collecting outside implementation resources. At the participant level, respondents from early adopter sites more frequently reported use of positive reinforcement (80% vs. 22%, p=0.02), phased implementation (90% vs. 33%, p=0.02), and peer surgeon communication about SOR (100% vs. 56%, p=0.03) than respondents from late adopter sites. Role-based differences were also observed: surgeons were more likely to report use of a mandatory internal policy (p=0.01), whereas implementers were more likely to report formal training for surgeons (p=0.03). Additionally, though not statistically significant, there was a trend for implementers to more often report the use of providing individual feedback and positive reinforcement.

Conclusion: SOR for breast surgery was widely adopted at the participating five sites, although with minimal perceived impact on operative technique. Use of implementation strategies varied by sites – nine were used universally but most were not, and early adopters of SOR reported greater use of

positive reinforcement, phased implementation and peer communication strategies than late adopters. Respondents that reported using a strategy generally rated that strategy's effectiveness highly, except for routine audits, which were reportedly used at all sites but rated less effective and feasible. Role-based perception gaps on implementation strategies suggest potential limited penetration of the strategies and need for additional shared planning. These findings can be informative for the programs and the CoC as CoC standards 5.3-5.4 adds annual SOR audits as an accreditation requirement.

Figure. Implementation strategies used by all 5 sites.



1065 - Preoperative Overestimation of Disease Extent and Discordance-Driven Mastectomy: A Retrospective Review of 245 Cases

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Background/Objective: Preoperative breast imaging plays a key role in surgical planning and patient counseling. However, imaging can both overestimate and underestimate the true extent of disease compared with final pathology, potentially influencing the decision toward mastectomy rather than breast-conserving surgery. Imaging–pathology discordance may therefore contribute to potentially avoidable mastectomies. This study aimed to (1) quantify the rate and directionality of imaging–

pathology discordance, (2) estimate the frequency of possible overtreatment defined as discordance-driven mastectomy (DDMR), and (3) identify clinicopathologic factors associated with DDMR using separation-robust modeling.

Methods: We retrospectively reviewed 245 consecutive mastectomy cases performed between 2018 and 2019, including total (TM), modified radical (MRM), nipple-sparing (NSM), and skin-sparing (SSM) mastectomies. Eligible patients were women undergoing surgery for invasive or in situ disease. Exclusion criteria included known high-risk predisposition (e.g., BRCA or other germline mutation carriers), inflammatory breast cancer, bilateral or recurrent disease, and male breast cancer. Preoperative imaging (mammography and/or MRI) was reviewed and categorized as "localized" or "extensive" disease. Extensive disease was defined as radiologic descriptions indicating extensive disease, extensive non-mass enhancement, multiple satellite lesions, or multifocal/multicentric disease. Postoperative pathology was reviewed to classify each case as (i) concordant–localized, (ii) overestimated by imaging (imaging extensive; pathology localized), (iii) concordant–extensive, or (iv) underestimated by imaging (imaging localized; pathology extensive). We recorded whether mastectomy was primarily due to patient preference or surgeon recommendation based on imaging interpretation and other clinical factors. The primary endpoint was the rate of DDMR, calculated overall and by mastectomy subtype, with binomial 95% confidence intervals (CIs). To address sparse cells and potential separation in logistic models, we applied Firth penalized logistic regression using a compact covariate set (imaging findings, tumor type, clinical T stage, age, laterality, neoadjuvant chemotherapy, and maximum preoperative tumor size). Imaging–pathology agreement was summarized using Cohen's κ.

Results: The overall rate of DDMR was 31.4% (77/245). Subtype-specific rates were 32.1% for TM, 31.6% for MRM, 36.4% for NSM, and 25.0% for SSM; overlapping 95% CIs indicated no statistically significant differences by subtype. Rates of discordance-driven mastectomy (DDMR) were also comparable between patients who did and did not receive neoadjuvant chemotherapy (NACT)-32.2% (28/87; 95% CI 22.8–43.2) vs 31.0% (49/158; 95% CI 24.0–38.9), respectively. The overlapping confidence intervals indicate no meaningful difference in DDMR frequency by NACT status, suggesting that preoperative systemic therapy was not associated with a higher or lower likelihood of discordance-driven surgical decision-making. Discordance directionality was consistent across imaging modalities. For MRI, 52.7% of cases were concordant–localized, 33.9% overestimated, 10.2% concordant–extensive, and 3.3% underestimated. For mammography, corresponding rates were 46.1%, 40.4%, 9.0%, and 4.5%. Among the 77 DDMR cases, the surgical decision was attributed to surgeon-only recommendation in 46.8% (36/77), patient request-only in 36.4% (28/77), both in 10.4% (8/77), and neither in 6.5% (5/77). In the "neither" group, chart review revealed no documented patient request or explicit surgeon recommendation, indicating that the mastectomy decision was based solely on imaging findings. Although surgeon-driven DDMR was numerically higher than patient-driven, the difference was not statistically significant (p=0.38). A small-sample robust logistic model (Firth method) was applied to the database, which produced stable odds ratios and supports the reliability of the associations with DDMR.

Conclusion: Approximately one in three mastectomies met predefined criteria for DDMR. This suggests that preoperative imaging overestimation may contribute to potentially avoidable non-conserving surgery. Both MRI and mammography tended to overestimate disease extent substantially more often than they underestimated it. This consistent directionality supports a plausible mechanism linking imaging–pathology discordance with surgical overtreatment. These findings highlight the importance of integrating imaging assessments into multidisciplinary discussions and, when imaging suggests extensive disease, corroborating findings with clinical, histologic, or targeted diagnostic information before

definitive surgical planning. Enhancing imaging interpretation and decision pathways may help reduce discordance-driven mastectomy and promote more individualized, evidence-based care.

1045 - Improvements Can Be Made in Surgical Waste and Unused Surgical Supplies in Breast Surgery Done at Ambulatory Surgical Centers and Hospitals

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Background/Objective: Healthcare is the second largest producer of waste worldwide. Further, it is well known that there is significant waste of valuable resources throughout the health care industry. Waste disposal accounts for up to 20% of hospitals annual environmental service budget. This study was performed to determine the amount of wasted materials in breast operations in the ambulatory surgery center setting compared to the hospital setting. In addition, this study also demonstrated the changes that can be readily implemented and result in improvement.

Methods: The study was performed at three hospitals and one ambulatory surgery center (ASC) from January 1, 2025 to September 30, 2025. A total of 200 operations were included in the study. 100 consecutive operations at the ASC and 100 operations were included in the hospitals. All breast-conserving operations (CPT 19301) were included. All cases were done by three fellowship trained breast surgical oncologists. All the disposable items and supplies that were opened and used were documented. All reusable surgical equipment and instruments were documented. At the conclusion of each case, the weight of the waste bags and laundry bags were recorded for each case.

Results: The study included 200 operations. In the initial 100 operations (60 at the ASC and 40 at two hospitals), the surgeons used 14/70 (20%), and 14/74 (19%) of the instruments at two of the hospitals and 14/50 (28%) of the instruments at ASC. There was no significant difference in the use of surgical instruments between surgeons (p NS). A significantly lower percentage of surgical equipment went unused at ASC vs hospitals ($p < 0.01$) The average weight of the waste produced from each site was 13.8 lbs and 14.0 lbs at the two hospitals, and ASC 7.97 lbs. The amount of waste produced at the two hospitals were not significantly different. At the ASC, however, the waste produced was significantly less ($p < 0.01$). The cost of the unused items per case at the two hospitals were $183.78 and $252.07. While the cost at the ASC was $52.35. Following the initial 100 operations, more specific trays were created at one of the hospitals and the ASC. The "mini plastics" tray at the hospital was a tray that had not been for over 5 years. The tray created at the ASC was new. Each tray included 18 instruments. The time required to reorganize the "mini plastics" tray was 3 weeks and to create the new tray at the ASC was 1 week. In the subsequent 100 operations, the surgeons still used 14/74 (19%) of the instruments at the hospital that did not modify trays and 10/63 (16%) at the third hospital. At the locations with the downsized trays, however, the surgeons used 14/18 (78%) and 14/18 (78%) of the instruments. The average weight of the waste produced from each site was 14.0 lbs, 14.2 lbs, and 15.7 lbs at the three hospitals and ASC 8.03 lbs. In addition, each hospital produced 6 lbs, 6.6 lbs, and 5.4 lbs of laundry. The bulk of which came

from mopping the floors after each case. The floors were not routinely mopped at the ASC and therefore no laundry was produced. The waste at the hospital where the downsized tray was implemented decreased from 14.0 lbs to 11.8 lbs.

Conclusion: Even in relatively small operations, such as breast conservation surgery, there is significant waste of valuable resources. Waste was significantly greater in hospitals vs the ASC setting. This may be another cost saving measure of the ambulatory surgery center compared to hospital-based surgery. Contrary to surgeon perception, more specific trays with fewer instruments can be created much faster than expected at both hospitals and ASC. Downsizing surgical instrumentation can lessen waste production, decrease use of resources, shorten turnover, and decrease operating room costs.

1041 - The Perceived Discrepancies in Margin Inking Status of Mastectomy Specimens

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Background/Objective: Accurate evaluation of mastectomy specimen margin status is crucial for effective management, particularly when a positive margin necessitates additional surgery. Current literature emphasizes improved margin accuracy when a surgeon performs intraoperative inking of a lumpectomy specimen, but there is a paucity of data evaluating the effectiveness of mastectomy margin inking. This study evaluated the current inking process of mastectomy specimens at a large academic medical center to identify potential discrepancies. The objective was to develop a quality improvement initiative for intraoperative mastectomy specimen inking to improve confidence in margin status.

Methods: A Redcap survey was created to evaluate the current mastectomy marking process utilized at our institution. It was sent by email to surgeons, pathologists, pathology assistants, and staff involved in inking mastectomy specimens. The survey was anonymous and contained 24 questions and evaluated who performed the specimen marking, how comfortable the surgeon and pathologist felt in defining the exact location of the positive margin, if the pathologist had ever been contacted by a surgeon regarding a margin discrepancy, and if there was a preference for surgeons inking their own specimens intraoperatively. After obtaining baseline data, education regarding a standardized mastectomy inking protocol was completed and implemented. Surgeons were allowed and encouraged to ink their own mastectomy specimen. This training included an instructional video sent via email to surgeons on intraoperative inking using six inking colors and fixation spray. This video highlighted separate colors for each quadrant and the nipple areolar complex. Six months after training and implementation, a follow-up survey was sent to participants to assess ongoing discrepancies. The post-education survey contained 24 questions and asked similar questions but also evaluated if intraoperative inking improved the pathologist's work and whether confidence in identifying a potential positive margin status improved. Descriptive statistics were used to analyze the responses from both surveys.

Results: A total of 39 survey responses were collected during the initial survey phase, comprising 23% pathology assistants, 28% pathologists, and 49% surgeons. The study confirmed that a pathology assistant performed all of the mastectomy specimen inking in pathology. Initially, 61% of pathologists reported that they had been contacted by a surgeon in the past due to a discrepancy regarding a

positive margin. Surgeons reported that if their mastectomy report showed a positive margin, 53% of them experienced issues with identifying the margin's location when planning re-excision. Additionally, 58% of pathologists preferred that surgeons ink their own specimens. In the post-training survey, 30 responses were collected, comprising 33.3% pathology assistants, 33.3% pathologists, and 33.3% surgeons. In the 6 months following the training video, 70% of surgeons reported inking their own mastectomy specimens. Additionally, 65% of pathology assistants/pathologists reported that receiving an inked mastectomy specimen from the surgeon improved their work, and 80% of all respondents overall felt more confident with the margin status when receiving a specimen painted intraoperatively. Margin location was also improved with 47% of respondents reporting a decrease in discrepancy when surgeons marked their own specimens, with only 20% of pathologists reporting being contacted by a surgeon regarding a positive margin.

Conclusion: This study highlights that surgeons who perform standardized intraoperative specimen inking of mastectomy specimens results in improved confidence in identifying the location of a positive margin.

Radiation

1326 - Surgical Outcomes in Phase I Trial of Pre-Op Single Fraction Dose Escalation Ablative Stereotactic Partial Breast Irradiation (SPBI) Trial for Early-Stage Breast Cancer

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Background/Objective: A Phase 1 clinical trial was undertaken using a pre-op single fraction SPBI to assess impact of dose escalation on toxicity and tumor response in early-stage hormone receptor positive (HR+) breast cancer (Rahimi, et al NCT04040569). The primary objective was to escalate single fraction SPBI to an ablative dose without exceeding maximum tolerable dose (MTD). Secondary endpoints were pathologic complete response (pCR), near complete response (nCR), local control, toxicity, surgical morbidity, and cosmesis. In this trial, longer elapsed time from pre-op dose SPBI with hormonal therapy to surgery (>9 months), led to significantly higher pCR/nCR (92%). In this study, we report surgical outcomes.

Methods: Patients(pt) with <3 cm, HR+, Her2 negative, cN0 invasive breast cancer not requiring chemotherapy were treated on either MR LINAC, robotic radiosurgery, or cobalt stereotactic breast unit with 30, 34, or 38Gy. Post-SPBI, patients received endocrine therapy followed by standard of care surgery. Median time to Surgery (MTS) was recorded. Type of surgery, pathologic stage, margins, sentinel lymph node (SLN) biopsy outcomes, intraoperative tissue changes and surgical complications were assessed. Surgical complications were prospectively recorded and graded per NSQIP classification. Minor complications included seroma or hematoma in the breast undergoing needle aspiration and superficial infection requiring antibiotics. Major complications included return to OR, unanticipated

hospital admission, and wound dehiscence requiring prolonged wound care. Intraoperative tissue changes included significant tissue edema, vascularity, and extensive fibrosis.

Results: From 12/2019 to 5/2024, 14, 15 and 15patients received preop SPBI at doses 30, 34 and 38Gy with median follow-up 57, 45, and 25 months(m). Time to surgery ranged from 2.8 to 12.9m. For patients treated in the cohort 38Gy, MTS was the longest 11.4m(range 8.4–12.9), while MTS was shortest for patients treated in the 30Gy cohort (5.9m). All patients underwent breast-conserving surgery. All patients had negative tumor margins at index surgery. 50% of patients had pCR of primary tumor while those that had surgery >9 months had 72% pCR. 6patients underwent reconstruction with plastic surgery at index operation; 5 mastopexies and 1 implant exchange. 3/6 patients who underwent reconstruction had delayed wound healing that did not require surgery. 43/44 patients underwent SLN biopsy. SLN identification rate was 100%, with average of 3.5 SLN. The number of SLN retrieved was not associated with radiation dose or time to surgery($p>0.05$). 2patients in the 30Gy cohort had positive SLN, with pCR in the primary tumor. Time to surgery for cases of positive SLN were 9.6m and 11.5m. Of those with positive SLN, 1 patient underwent axillary lymph node dissection, while both patients received additional adjuvant radiation. Longer time to surgery was associated with increased postoperative complications (p0.05). Time from preop SPBI to surgery was the main predictor of pCR with longer time correlating to higher chance of pCR. Table 1.

Conclusion: Preoperative single-fraction SPBI with endocrine therapy yielded high pCR/nCR rates (92%) and favorable surgical outcomes with infrequent complications requiring unanticipated operative intervention. All patients underwent breast-conserving surgery, and final pathology showed 100% of cases had clear margins without need for re-excision. Sentinel node identification was not adversely affected by preoperative radiation; however, pCR of the primary lesion does not guarantee nodal pCR. Further studies are underway to define which patients may be eligible for omission of surgical intervention post SPBI.

Table:

	30Gy (N=14)	34 Gy (N=15)	38 Gy (N=15)	All Cohorts (N=44)
Median time to Surgery, month (range)	5.9 (2.8-11.7)	7.3 (5.3-12.0)	11.4 (8.4-12.0)	9.8 (2.8-12)
Path CR, n (%)	5 (35.7)	7 (46.7)	10 (66.7)	22 (50.0)
npCR+pCR, n(%)	9 (64.3)	14 (93.3)	14 (93.3)	37 (84.1)
pCR>9 months to surgery from XRT, n(%)	5/5 (100.0)	4/6 (66.7)	9/14 (64.3)	18/25 (72.0)
npCR+pCR >9 months to surgery from XRT, n(%)	5/5 (100.0)	5/6 (83.3)	13/14 (92.9)	23/25 (92.0)
Ki67<3% after Surgery, n(%)	9/9 (100.0)	7/8 (87.5)	4/4 (100.0)	20/21 (95.2)

1104 - Nodal Boost Irradiation in Patients with Locoregionally Advanced Breast Cancer and Residual Nodal Disease Following Neoadjuvant Chemotherapy

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Background/Objective: Patients with an elevated risk of residual microscopic disease in nodal basins may benefit from escalation of local therapy. We evaluated the safety and effectiveness of nodal boost (NB) irradiation in patients with locoregionally advanced breast cancer and residual nodal (ypN+) disease following neoadjuvant chemotherapy (nCHT).

Methods: We retrospectively identified patients treated at a single institution for non-metastatic, non-inflammatory breast cancer between January 2017 and December 2019 who received nCHT, definitive surgery showing ypN+ disease and radiation therapy. Wilcoxon rank sum, Fisher's exact, Welch's Two Sample t-test and Pearson's Chi-squared analyses were used for group comparisons. Survival analysis was performed using Kaplan-Meier statistics and log-rank tests were used to compare survival between groups. All statistics were performed using R version 4.2.2.

Results: We identified 64 patients who met inclusion criteria. Patients underwent either mastectomy (n=46) or lumpectomy (n=18) and either ALND (n=57) or SLN alone (n=7). All patients received conventionally fractionated whole breast/chest wall and regional nodal irradiation. Nineteen (30%) received ≥ 1 NB (16 axillary, 2 supraclavicular and 6 internal mammary) to a median cumulative dose of 66Gy; these patients were more likely to have clinical N2/3 disease (37% vs 8.9%, p0.5). Three patients who received axillary NB developed brachial plexopathy; however, two were attributed to recurrent axillary disease. Upper extremity lymphedema was numerically but not significantly higher in patients who received ALND vs SLN (16% vs 0%, p>0.05). LRRFS, DRFS, DFS and OS were not statistically different when comparing patients who received ALND vs SLN (p>0.05) and those with NB vs no NB (p>0.5) with 5-year estimates (95% CI) of 90.9% (83.6%-98.9%), 79.1% (69.2%-90.4%), 75.7% (65.3%-87.7%) and 88.4% (80.6%-96.9%) respectively for all patients.

Conclusion: Nodal boost appears to be well tolerated. Oncologic outcomes were not statistically different between patients who received NB versus those that did not, despite higher nodal disease burden in the NB cohort. Further study is needed to confirm if NB improves disease control and if NB may obviate the need for ALND in select patients with ypN+ disease.

1090 - Why Are So Many Women Over 70 with Stage 1, ER+/PR+/HER2– Breast Cancer Still Receiving Radiation After Lumpectomy?

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Background/Objective: Clinical trials support de-escalating therapy in patients ≥70 years old with Stage 1, ER-positive, PR-positive, HER2-negative breast cancer. Studies including CALGB 9343 and PRIME II demonstrate that, while adjuvant radiation reduces local recurrence, it does not improve overall survival in those receiving endocrine therapy. Choosing Wisely guidelines have endorsed selective omission of radiation for over 10 years. We hypothesize that, despite these recommendations, adjuvant radiation remains overutilized in this patient population. This study aims to evaluate current radiation use in community hospitals in a single health system, identify factors associated with use of radiation, and identify opportunities for safe, evidence-based de-escalation.

Methods: A retrospective cohort study was performed using the Tumor Registry Database between January 2023 and December 2024. Female patients aged ≥70 years with stage I, estrogen receptor (ER)-positive, progesterone receptor (PR)-positive, and HER2-negative breast cancer who underwent breast-conserving therapy (BCT) were included. Patients were analyzed based on receipt or omission of adjuvant radiation therapy (RT). Collected variables included age at diagnosis, histological grade, and receipt of sentinel lymph node biopsy, sentinel lymph node status, and receipt of endocrine therapy. Data distribution was assessed using the Shapiro–Wilk test, and non-parametric methods were applied. The Mann–Whitney U test compared age between groups, and multivariate analyses evaluated associations between RT status and clinical variables (pathological grade, histological grade, receipt of sentinel lymph node biopsy, and lymph node status). A two-tailed p-value <0.05 was considered statistically significant. Institutional review board approval was obtained.

Results: Among 113 patients identified, the mean age was 74.8 years (SD 4.36, range 70–86). In the study population, 80 patients (70.8%) received adjuvant radiation therapy (RT), while 33 patients (29.2%) did not (non-RT group). The majority of patients, 104 (97%), had low or intermediate grade tumors. Additionally, 80 patients (70.8%) received hormone therapy: 58 patients in the RT group (73%) and 22 patients in the non-RT group (67%, p=0.535). The mean age for the patients who did not receive adjuvant radiation therapy was 77.4 years old (SD=5.02, range 70–86), which was significantly greater than the mean age for the patients who received adjuvant radiation therapy (73.8 years old, SD=3.60, range 70–84) (mean difference 3.6 years; p=0.00016). Receipt of adjuvant radiation was significantly associated with undergoing sentinel lymph node biopsy (OR 4.24, 95% CI 1.26–14.32, p=0.014). Patients with ductal carcinoma were more likely to receive adjuvant radiation than those with lobular carcinoma, although this difference was not statistically significant (OR 1.40, 95% CI 0.47–4.15, p=0.55). Lastly, there was no difference in likelihood of patients receiving adjuvant radiation therapy or not (odds ratio = 0.982, 95% CI =0.44, 2.22; p=0.965) when comparing facilities with multidisciplinary clinics vs. non-multidisciplinary clinics.

Conclusion: In this retrospective review of women aged 70 and older with Stage 1 ER+, PR+, HER2/neu– breast cancer in a community health care system, we found that adjuvant radiation therapy after breast-conserving surgery is utilized in the majority of patients, despite evidence supporting its safe omission. Although Choosing Wisely was published over a decade ago, guideline-concordant omission of radiation

in this population has not been fully adopted. In this cohort, patients who did not receive adjuvant radiation were older and less likely to undergo sentinel lymph node biopsy, indicating a pattern of de-escalated management that could be extended to more patients aged ≥70 years. Radiation utilization was similar across facilities with multidisciplinary and non-multidisciplinary clinics, suggesting that overtreatment is not driven by facility type. These findings highlight the need for targeted education of breast care providers and patients to promote guideline-concordant, cost-effective care and facilitate the safe omission of radiation in this population.

Reconstruction

1146 - Locoregional Recurrence in Autologous vs. Implant-Based Breast Reconstruction: A Subgroup Meta-Analysis by Radiotherapy Timing

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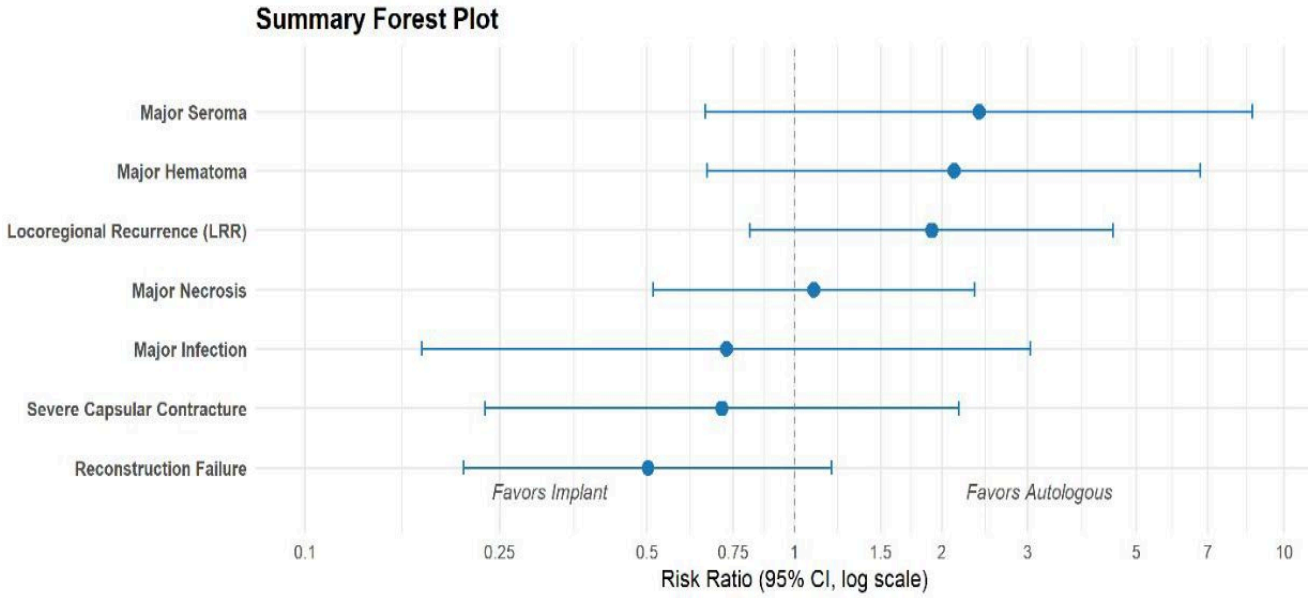
Background/Objective: Breast reconstruction after mastectomy poses unique challenges in the setting of radiotherapy (RT). The optimal RT timing and its interaction with reconstruction type remain uncertain. Conflicting evidence persists regarding whether autologous reconstruction (AR) or implant-based reconstruction (IBR) influences locoregional recurrence (LRR) or major complications when RT is delivered before or after mastectomy. To our knowledge, this is the first meta-analysis to comprehensively compare LRR and major complications between AR and IBR, stratified by RT timing.

Methods: This PROSPERO-registered meta-analysis followed PRISMA guidelines. PubMed, Medline, and PubMed Central were searched through October 2025. Of 3,293 records screened, 11 studies (n = 1,415; AR = 695; IBR = 720) met inclusion criteria. The primary outcome was LRR; secondary outcomes included major postoperative complications (failure, infection, hematoma, necrosis, seroma, and severe capsular contracture). Random-effects meta-analyses were conducted in R (v4.4) using the meta package with a restricted maximum likelihood (REML) estimator and Hartung–Knapp adjustment. Subgroup analyses were performed by RT timing (post-, pre-, or mixed).

Results: Overall, LRR rates did not differ significantly between AR and IBR (RR 1.90, 95% CI 0.81–4.48; k = 5; I^2 = 0.0%), consistent across RT-timing subgroups (p = 0.87). Similarly, there were no significant differences for reconstruction failure (RR 0.50, 95% CI 0.21–1.19; k = 9), infection (RR 0.73, 95% CI 0.17–3.03; k = 8), hematoma (RR 2.12, 95% CI 0.66–6.75; k = 8), necrosis (RR 1.10, 95% CI 0.51–2.33; k = 11), or severe capsular contracture (RR 0.71, 95% CI 0.23–2.17; k = 7). RT timing significantly modified the risk of major seroma (subgroup p = 0.0023). In the PMRT subgroup, AR showed a higher but nonsignificant risk (RR 1.70, 95% CI 0.72–3.99; I^2 = 0.0%), while in the mixed-RT subgroup, AR demonstrated a significantly higher risk (RR 6.03, 95% CI 1.75–20.76; I^2 = 63.2%). The heterogeneity observed for major necrosis (I^2 = 45.5%, p = 0.0496) reflected overall variability across studies rather than a subgroup-specific effect.

Conclusion: Autologous and implant-based reconstruction confer equivalent oncologic safety, as reflected by negligible heterogeneity ($I^2 = 0.0\%$) in LRR. However, complication profiles vary substantially, and RT timing significantly modifies seroma risk. Contrary to common assumptions, AR showed higher seroma rates in PMRT and mixed-RT settings. While oncologic outcomes should not determine reconstructive choice, these timing-dependent risks should guide individualized decision-making.

Figure:



SLN

1480 - Current Management Trends in Axillary Sampling for Early-Stage Breast Cancer: A National Analysis

Amber Sarvestani[1], Dakota King[1], Ananya Sharma[1], Anshal Vyas[1], Kelly Kapp[1]

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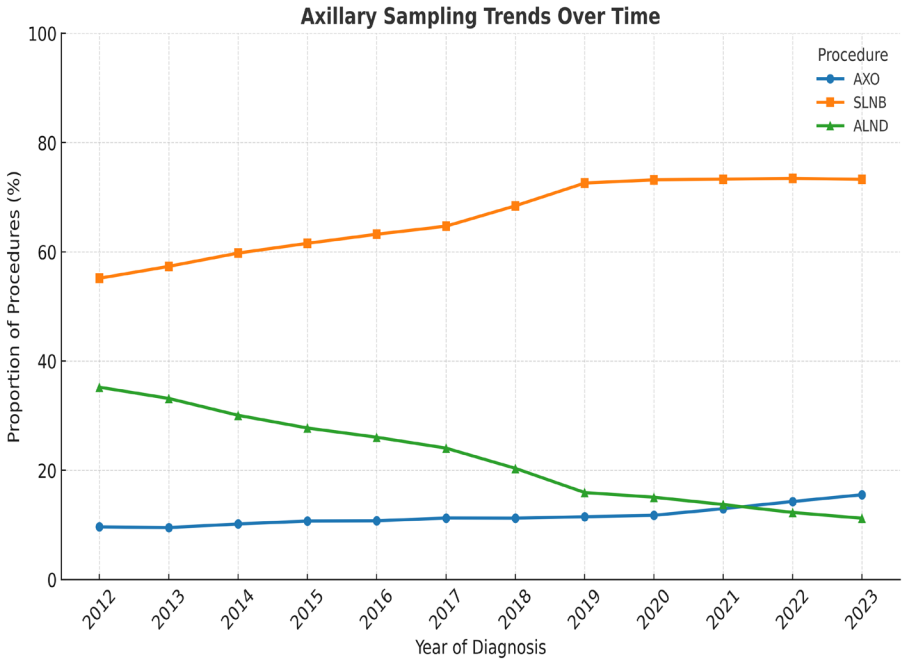
Background/Objective: Axillary lymph node staging has evolved significantly for patients with early-stage breast cancer over the past 15 years. In 2012, the National Comprehensive Cancer Network (NCCN) guidelines were updated following the practice-changing ACOSOG Z0011 trial, which demonstrated the safety and efficacy of sentinel lymph node biopsy (SLNB) over axillary lymph node dissection (ALND) in patients with early-stage disease. More recently, the INSEMA trial, amongst other publications, has suggested that omission of axillary sampling may also be safe in select patients. Our objective was to examine national trends in axillary management for early-stage breast cancer using data from the National Cancer Database (NCDB).

Methods: Using the 2023 NCDB Participant User File (PUF), we identified patients diagnosed between 2012 and 2023 with clinical T1–T2, N0, M0 invasive ductal or lobular carcinoma. The primary endpoint was the type of axillary surgery performed: axillary staging omission (AXO), SLNB, and ALND. Demographic, tumor, and treatment characteristics were analyzed. Descriptive statistics and Pearson's Chi-square (significance level $p < 0.05$) were used to assess for association with axillary sampling. Post-hoc z-tests with Bonferroni correction were also performed. A multivariable logistic regression model was performed to account for confounding factors.

Results: A total of 1,661,898 patients met inclusion criteria with majority of patients undergoing breast conservation therapy (70.9%). Among these, 11.8% underwent AXO, 67.1% underwent SLND, and 21.2% underwent ALND. Year of diagnosis was significantly associated with axillary staging procedure (p70 was associated with increased association with AXO in comparison to 70 (27.4% vs 21.3% vs 16.7%). White patients were least likely to undergo ALNB compared to Black, American Indian, Asian, Pacific Islander, and Hispanic patients (20.1% vs 25.4% vs 22.4% vs 20.7% vs 24.2% vs 25.1%, $p<0.05$).

Conclusion: This study characterizes national trends in axillary management for breast cancer, demonstrating a marked shift in 2017, following the publication of 10-year outcomes from the Z0011 trial. The rising rates of omission of axillary surgery reflect the integration of recent randomized trial data into clinical practice. Persistent disparities in axillary management by demographic and socioeconomic factors highlight the need for further research to elucidate underlying causes and to inform strategies to ensure equitable, evidence-based care for all breast cancer patients.

Figure:



1398 - Assessing Rates of SLNB Omission and Role of Axillary Surgical Staging in the Post-SOUND Era

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Background/Objective: Publications of the SOUND and INSEMA trials in 2023 and 2024 paved the way for the 2025 American Society of Clinical Oncology guideline update, which recommends against the routine performance of SLNB in patients > 50 years with cT1, hormone-receptor positive (HR+), HER2-neu negative (HER2-), grade 1 to 2 breast cancer undergoing breast-conserving therapy (BCT). This study evaluates the implementation of these studies by assessing rates of SLNB among women in this patient population before and after the publication of the SOUND trial and identifying factors that were associated with performance of SLNB.

Methods: Analysis of a prospectively maintained single-institution database was performed by identifying women > 50 years old with cT1-2, HR+HER2- breast cancer undergoing BCT from October 2022 to February 2025. Patients were excluded if they had undergone a mastectomy, had clinically involved lymph nodes or distant metastatic disease. Rates of SLNB were identified and compared between the pre-SOUND era, defined as October 2022 to October 2023, and the post-SOUND era, defined as January 2024 to February 2025. Demographics, tumor and treatment characteristics were compared between patients in pre- and post-SOUND eras, as well as between patients who underwent SLNB and those who did not. Multivariable analysis was performed to identify predictors of SLNB performance.

Results: Of 409 women identified from 10/2022 to 2/2025, 300 (73.4%) underwent SLNB while 109 (26.7%) did not. The rate of SLN involvement was 5.7%. Patients who underwent SLNB tended to be younger (66 vs 75 yrs, p=0.18), have private insurance (45.6 vs 14.7%, p<0.001) with less use of Medicare/Medicaid (54.0 vs 84.4%, p<0.001), be pre-/peri-menopausal (7.2 vs 0.9%, p=0.04), and have lower ASA scores (ASA 1 or 2: 76.8 vs 64.1%, p=0.04). Patients who underwent SLNB were more likely to have invasive lobular carcinoma (ILC, 14.0 vs 5.5%, p=0.004), multifocal/multicentric disease (3.0 vs 0.9%, p=0.23), lymphovascular invasion (LVI, 5.5 vs 1.9%, p=0.12), or an abnormal axillary ultrasound (8.4 vs 1.0%, p=0.01). Patients who underwent SLNB were more likely to receive adjuvant radiation (75.6 vs 44.4%, p<0.001) and chemotherapy (5.7 vs 0.9%, p=0.04). Among those who underwent SLNB, cited reasons included age, extent of disease, borderline node on imaging, and impact on adjuvant therapy decisions. Among those with SLNB omission, cited reasons included age, favorable tumor, comorbidities, and lack of impact on adjuvant therapy decisions. 226 patients were treated in the pre-SOUND era, and 183 were treated in the post-SOUND era with an increase in rate of SLNB from 64.9 to 83.6% (p<0.001). SLN involvement was higher in the post-SOUND era, although not statistically significant (7.2 vs 4.1%, p=0.25). More patients in the post-SOUND era had ILC (15.9 vs 8.0%, p=0.01), but cT, grade, LVI and focality did not differ between periods. In the post-SOUND era, more patients underwent APBI (22.5 vs 10.7%, p<0.001), while fewer underwent WBI (15.9 vs 30.2%, p<0.001) or received adjuvant chemotherapy (1.7 vs 6.2%, p=0.02). Age >70 was negatively associated with SLNB performance (p<0.001), as was having DCIS that upstaged to invasive disease at lumpectomy (p=0.005). Tumor multifocality/multicentricity (p=0.04) and being in the post-SOUND era (p<0.001) were associated with performance of SLNB.

Conclusion: Performance of SLNB in women > 50 years with cT1-2, HR+, HER2- breast cancer undergoing BCT did not decrease following the publication of the SOUND trial. Clinicians may have felt inclined to continue SLNB due to a perceived greater extent of disease in patients with ILC, LVI, or multifocal/multicentric disease. However, rates of nodal involvement among those who had SLNB remain very low. Broader adoption of SLNB omission in these patients is necessary as supported by recent randomized controlled trials.

Table: Multivariable logistic regression of risk of SLN involvement among women 50-70 years with invasive breast cancer

Risk Factor	Odds Ratio (OR)	Confidence Interval (CI)	p-value
Age	0.99	0.94-3.70	0.77
Race (ref: White)			
African American	1.02	0.30-3.45	0.98
Asian	0.76	0.20-2.92	0.69
Other	0.16	0.02-1.68	0.13
cT2 (ref: cT1)	2.15	1.07-4.30	0.03
Histology (ref: Invasive Ductal Carcinoma)			
Invasive Lobular Carcinoma	1.92	0.77-4.;75	0.16
Mixed Ductal/Lobular	4.04	0.29-56.85	0.30
Multifocal (ref: Unifocal)	2.45	1.21-4.93	0.01
Grade (ref: 1)			
2	1.59	0.66-3.83	0.30
3	0.68	0.20-2.33	0.54
Lymphovascular Invasion	8.43	3.60-19.73	<0.001
Genomic risk (ref: low)			
Intermediate	0.86	0.41-1.78	0.68
High	0.56	0.11-3.00	0.50
Receptor status (ref: HR+/HER2-)			
Her2+	0.28	0.05-1.57	0.15
Triple Negative	2.39	0.47-12.06	0.29

1332 - Outcomes Among T3 Breast Cancer Patients with 1-2 Sentinel Node Metastases Without Completion Axillary Lymph Node Dissection

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Background/Objective: Trials have established safety in the omission of completion axillary lymph node dissection (cALND) in patients with clinically node-negative (cN0) breast cancer with limited tumor burden on sentinel lymph node biopsy (SLNB). The SENOMAC trial sought out to validate these results in underrepresented subgroups, however, only 5.5% of patients included had T3 tumors who underwent SLNB without cALND; thus, safety in omission of cALND in cN0 breast cancers with large tumors measuring >50mm is not clear. This study aims to evaluate recurrence and survival outcomes in patients with T3 breast cancers who underwent upfront surgery with omission of axillary dissection.

Methods: Patient diagnosed with cN0 primary T3 breast cancers from 03/2015 to 12/2024 who underwent upfront surgery with 1 or 2 sentinel-node metastases were identified from our single-

institution tumor registry. Up to two macrometastatic sentinel lymph nodes with additional micrometastases and extracapsular extension were included. Clinicopathologic features, treatment variables, locoregional recurrence (LRR), and survival outcomes were compared between patients who underwent SLNB alone and SLNB + cALND. Statistical analysis was conducted using nonparametric t-tests and Fisher's exact tests with $p < 0.05$ considered statistically significant. Kaplan-Meier curves were constructed to estimate rates of overall survival (OS).

Results: Among 107 women, 60 (56.1%) underwent SLNB alone and 47 (43.9%) underwent SLNB + cALND. A total of 94 (87.9%) self-identified as White, 12 (11.2%) as Black, and 1 (0.9%) as multiracial/multicultural; 105 (98.1%) were not Hispanic and 2 (1.9%) were Hispanic. The median age at diagnosis was 62 years (interquartile range [IQR] 51.0-73.5). There were no differences in age at diagnosis, clinical T category, clinical stage, histologic type, grade, tumor subtype, focality, or presence of lymphovascular invasion (Table). The median pathologic tumor size was 62mm and was not significantly different between groups (p=0.868). Women who underwent SLNB alone were more likely to undergo a lumpectomy (16.7% vs. 2.1%; p=0.02) and have pathologic N1mi disease (26.7% vs. 4.3%; p=0.002) compared to those who underwent SLNB + cALND. Overall, 91 (85%) women received adjuvant radiotherapy, with no significant difference between groups (p=0.388). At a median follow-up time of 3.87 years (95% confidence interval [CI] 2.88-4.67 years), there were 4 LRR events; 2 of the 4 patients had regional recurrences. While all LRR events occurred in the SLNB alone group, there was no significant difference in crude-rates of LRR; 6.7% in SLNB versus 0% in SLNB + cALND group (p=0.129). The 5-year rate of OS was 83.3% (95% CI 70.0-99.1%) for SLNB alone compared to 78.3% (95% CI 64.9-94.4%) for the SLNB + cALND group (p=0.35).

Conclusion: We found that patients with clinically node-negative T3 tumors who underwent upfront surgery with SLNB alone had no statistical difference in locoregional recurrence or survival outcomes compared to those who underwent cALND. Further axillary surgery may not be indicated in select patients, such as those with low pathologic axillary tumor burden, although larger studies evaluating the safety in axillary dissection omission in higher risk patients with T3 tumors are needed.

Table: Clinicopathologic characteristics and recurrence outcomes among cN0 breast cancers measuring >50mm with 1 to 2 positive sentinel lymph nodes.

	Overall (n = 107)	SLNB (n = 60)	SLNB + cALND (n = 47)	p-value
Age at diagnosis, median (IQR)	62 (51.0-73.5)	63 (49.75-74.5)	60 (51.5-72)	0.79
cT category				0.483
cT1	20 (18.7%)	13 (21.7%)	7 (14.9%)	
cT2	39 (36.4%)	23 (38.3%)	16 (34.0%)	
cT3	47 (43.9%)	24 (40.0%)	23 (48.9%)	
cT4	1 (0.9%)	0 (0.0%)	1 (2.1%)	
Clinical Stage				
1	48 (44.9%)	30 (50.0%)	18 (38.3%)	0.357
2	51 (47.7%)	25 (41.7%)	26 (55.3%)	
3	8 (7.5%)	5 (8.3%)	3 (6.4%)	
Histologic Type				
IDC	34 (31.8%)	18 (30.0%)	16 (34.0%)	0.911
ILC	64 (59.8%)	37 (61.7%)	27 (57.4%)	
Mixed	9 (8.4%)	5 (8.3%)	4 (8.5%)	
Grade				0.185
1	22 (20.6%)	11 (18.3%)	11 (23.4%)	
2	71 (66.4%)	38 (63.3%)	33 (70.2%)	
3	14 (13.1%)	11 (18.3%)	3 (6.4%)	
Tumor Subtype				0.264
HR+/HER2-	101 (94.4%)	56 (93.3%)	45 (95.7%)	
HR+/HER2+	1 (0.9%)	0 (0.0%)	1 (2.1%)	
HR-/HER2+	0 (0%)	0 (0.0%)	0 (0%)	
HR-/HER2-	5 (4.7%)	4 (6.7%)	1 (2.1%)	
Median tumor size (mm) (IQR)	62.00 [55.0, 76.0]	62.00 [56.0, 75.25]	62.00 [55.0, 80.0]	0.868
Focality				0.912
Unifocal	63 (58.9%)	36 (60.0%)	27 (57.4%)	
Multifocal/Multicentric	43 (40.2%)	23 (38.3%)	20 (42.6%)	
Lymphovascular invasion				0.211
Yes	47 (43.9%)	24 (40.0%)	23 (48.9%)	
No	44 (41.1%)	29 (48.3%)	15 (31.9%)	
Final Breast Surgery				**0.02**
Lumpectomy	11 (10.3%)	10 (16.7%)	1 (2.1%)	
Mastectomy	96 (89.7%)	50 (83.3%)	46 (97.9%)	
Radiation				0.388
Yes	91 (85.0%)	49 (81.7%)	42 (89.4%)	
No	10 (9.3%)	6 (10.0%)	4 (8.5%)	
pN category				**0.002**
pN1mi	18 (16.8%)	16 (26.7%)	2 (4.3%)	
pN1A	89 (83.2%)	44 (73.3%)	45 (95.7%)	
Locoregional recurrence				0.129
Yes	4 (3.7%)	4 (6.7%)	0 (0.0%)	
No	103 (96.3%)	56 (93.3%)	47 (100.0%)	
Status				0.503
No evidence of disease	96 (89.7%)	56 (93.3%)	40 (85.1%)	
Alive with disease	2 91.9%)	1 (1.7%)	1 (2.1%)	
Dead of disease	5 (4.7%)	2 (3.3%)	3 (6.4%)	
Dead of other causes	4 (3.7%)	1 (1.7)	3 (6.4%)	

1319 - Implementation of Sentinel Lymph Node Biopsy Omission Among Canadian Oncology Providers – A National Survey Study

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Background/Objective: Recently, the Sentinel Node versus Observation after Axillary Ultrasound (SOUND) and Intergroup Sentinel Mamma (INSEMA) trials have demonstrated the safety of omitting sentinel lymph node biopsy (SLNB) in select patients with early-stage, low-risk node-negative breast cancer. These findings have expanded de-escalation allowing this patient population to avoid unnecessary axillary surgery and its associated morbidity. However, the omission of SLNB raises concerns regarding potential under-staging and rendering patients ineligible for appropriate adjuvant therapy. Understanding provider perspectives is therefore critical to guide evidence-based implementation of SLNB omission in clinical practice across Canada. This national survey aimed

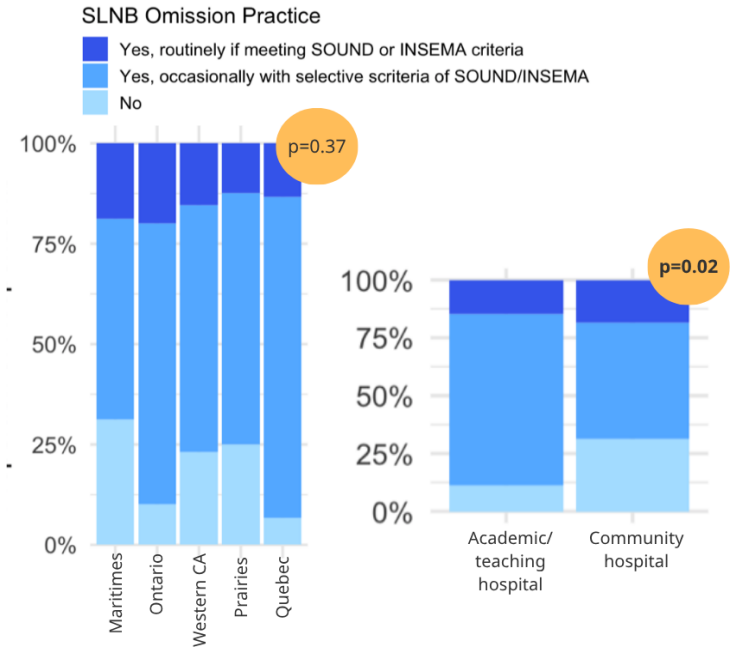
to evaluate current attitudes and practice patterns regarding SLNB omission in early-stage breast cancer among Canadian medical, surgical, and radiation oncologists.

Methods: Between May 15th and October 15th, 2025, an anonymous, 19-item online survey was distributed to medical, surgical, and radiation oncologists across Canada via individual provincial and national professional societies. The questionnaire collected information on participant demographics, perceived barriers to implementation, and attitudes and practice patterns related to SLNB omission via clinical scenarios. Respondents were categorized by region: Québec, Ontario, the Prairies, the Maritimes and British Columbia. Descriptive statistics were used to summarize responses, and Chi-squared and Fisher's exact tests were performed to assess associations between SLNB omission practices and physician specialty, years of experience, institutional setting, and geographic region.

Results: Of 113 Canadian physicians who completed the survey 49.6% were surgical oncologists (N=56), 43.7% were radiation oncologists (N=49), and 7.1% were medical oncologists (N=8). Most respondents (67.3 %) reported occasionally omitting SLNB as per SOUND or INSEMA criteria, whereas 15.9% routinely omitted SLNB when these criteria were met, and 16.8% reported never omitting SLNB. Specialists practicing in community hospitals or regional cancer centers were significantly more likely to never omit SLNB in their practice compared to those working in academic or teaching hospitals (31.2% vs. 11.1%; p = 0.02). There was no statistically significant difference in SLNB omission practices by region (p=0.37), by specialty (p=0.12), or by years of experience (p=0.56) in our cohort. When presented with the 2025 American Society of Clinical Oncology criteria for SLNB omission (age ≥ 50, cT1N0, HR+/HER2-, grade 1-2, negative axillary ultrasound), 51.3% of the participants felt comfortable (very comfortable = 11.5%, somewhat comfortable= 39.8%) with omitting SLNB in these patients, while the remaining respondents were either uncertain (22.1%) or uncomfortable with this approach (uncomfortable = 23.0%, very uncomfortable = 3.5%). Forty-two percent indicated that they would only omit SLNB in patients over the age of 70 years. The primary concern was lack of nodal information to guide systemic and radiation therapy. Most respondents (75.2%) expressed interest in the development of Canadian clinical guidelines for SLNB omission.

Conclusion: This survey demonstrates considerable heterogeneity in Canadian oncologists' attitudes toward SLNB omission despite recent level I evidence confirming the safety of this strategy. SLNB omission was significantly influenced by institutional setting, and there was a statistically non-significant trend towards greater adoption among more experienced physicians. Our findings highlight the need for country-specific consensus guidelines and knowledge translation initiatives to support axillary surgery de-escalation and to standardize the implementation of SLNB omission in Canada. Finally, real-world evaluation of the impact of SLNB omission on adjuvant radiation and systemic therapy decisions is also crucial.

Figure 1. Distribution of survey responses according to region & practice setting



1306 - Imaging-Occult Axillary Disease in a Mostly Black Population with Invasive Lobular Carcinoma of the Breast: Can We Trust Preoperative Imaging?

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Background/Objective: Sentinel lymph node biopsy (SLNB) has long been standard for axillary staging of breast cancer (BC) patients, offering lower, but not insignificant, morbidity than axillary lymph node dissection (ALND). As surgical management of BC continues to focus on de-escalation, the purpose of axillary node staging has come into question. A few trials, including the SOUND and INSEMA, studied the feasibility of omitting axillary staging in patients undergoing breast-conserving surgery, if they have negative axillary imaging preoperatively. While both trials established noninferiority for omitting SLNB, the portion of patients with ILC was limited to only 8-13%. Although ILC accounts for 10–15% of newly diagnosed BC cases, the data remains limited despite its diagnostic challenges and unique biology. Our study examines the success of preoperative imaging on a predominantly Black population with ILC, focusing on the rate of nodal metastatic burden in clinically node-negative (cN0) patients.

Methods: A single-institution, IRB-approved retrospective review was performed on 26 patients newly diagnosed stage I–II ILC from April 2020 to July 2025. Demographics, preoperative imaging, pathology results, axillary management, and adjuvant therapy were analyzed on patients who were cN0.

Results: 26 patients with ILC diagnosed on core needle biopsy had clinical tumor stage (cT)1-3 and were cN0 based on imaging and clinical assessment. These patients underwent primary surgery with an

average of 3.6 sentinel nodes removed. The mean age was 65.5 years, and 22 (84.6%) were Black, 2 (7.7%) Hispanic, 1 (3.8%) Asian and 1 (3.8%) Caucasian. All had mammography and ultrasound, and 13 (50%) had preoperative magnetic resonance imaging (MRI). SLNB identified 6 (23.1%) patients to have node-positive disease on final pathology. 3(60%) of the node-positive on pathology patients underwent ALND, with a mean of 13.3 lymph nodes removed-1 was completed intraoperatively due to a positive frozen section and 2 on reoperation-with 1 ALND showing additional nodal disease. All node-positive patients received adjuvant radiation; 3 (50%) were offered chemotherapy.

Conclusion: 23.1% of our patients had negative preoperative imaging (100% US, 50% MRI) but had pathologically positive axillary nodes. This rate of imaging-occult axillary disease in ILC suggests that alterations to standard axillary staging algorithms should be approached cautiously and always within a multidisciplinary context, given its potential impact on adjuvant systemic treatment recommendations.

Table:

Variable	Mean or Count (%)
Age, years (mean)	65.5
Race	
Black	22 (84.6%)
Caucasian	1 (3.8%)
Hispanic	2 (7.7%)
Asian	1 (3.8%)
Clinical Stage (n = 26)	
cT1N0	16 (61.5%)
cT2N0	8 (30.8%)
cT3N0	2 (7.69%)
Initial Treatment Modality	
Surgery as first treatment	26 (100.0%)
Neoadjuvant Chemotherapy	0
Imaging Modality	
Mammography	26 (100.0%)
Ultrasound	26 (100.0%)
MRI	13 (50.0%)
Patients undergoing SLNB	26 (100.0%)
Average number of SLNs removed in cN0	3.62
Positive node on pathology	6 (23.1%)
Average number of nodes dissected among positive node on pathology patients	13.3
Patients requiring axillary dissection	3 (50.0%)
• 1 intraoperative conversion (positive frozen section)	
• 2 returned for completion axillary dissection	
• 1 had positive node on completion dissection	
Adjuvant Therapy for positive node on pathology (n=6)	
Chemotherapy offered	3 (50.0%)
Radiation	6 (100.0%)

1292 - Adherence to the 2016 Choosing Wisely Guidelines on Sentinel Lymph Node Biopsy Omission in Early-Staged Breast Cancer Patients: Should We Be Choosing Even Wiser?

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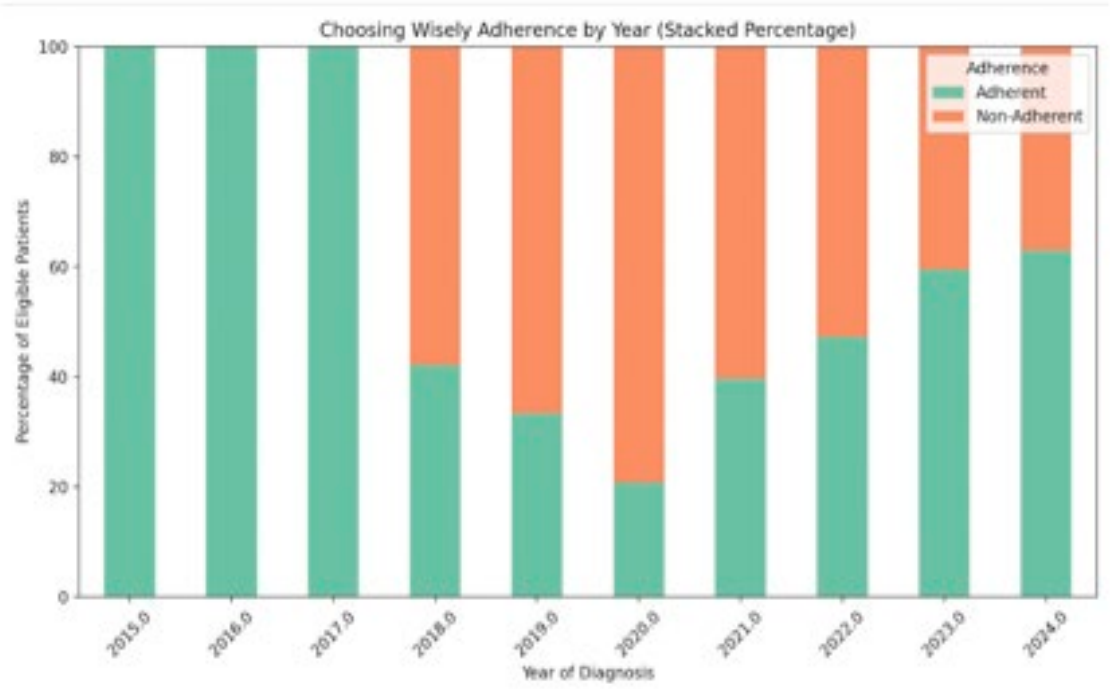
Background/Objective: Sentinel lymph node biopsy (SLNB) is standard for clinically node-negative, early-stage breast cancer. In 2016, the Choosing Wisely (CW) guidelines recommended omitting SLNB in low-risk patients ≥70 years, yet many still undergo the procedure. Factors influencing adherence, particularly in predominantly African American and Hispanic populations, remain unclear. More recently, in April 2025, ASCO released updated recommendations expanding SLNB omission to include younger, postmenopausal patients with early staged breast cancer. This study evaluated SLNB use and predictors of adherence after CW publication and assessed the proportion of patients who could forgo SLNB under the new ASCO criteria.

Methods: We reviewed patients ≥70 years with early-stage breast cancer (2016–2024) treated at a tertiary center. CW-eligible patients were defined as age ≥70, clinical T1–T2, node-negative, hormone receptor–positive, and HER2-negative disease. Adherence was defined as omission of SLNB. Multivariable logistic regression identified factors associated with adherence, while chi-square and Kaplan–Meier analyses evaluated recurrence and survival, respectively. Separately, we reviewed patients ≥50 years with early-stage breast cancer during the same period. ASCO eligibility included postmenopausal status, grade 1–2, hormone receptor–positive, HER2-negative, ≤2 cm tumors, negative axillary ultrasound, and planned breast-conserving therapy. The proportion of patients meeting ASCO omission criteria was calculated to estimate the potential impact of guideline expansion.

Results: Of the 978 patients in the cohort, 602 met CW criteria for SLNB omission. The cohort included 30.4% African Americans and 37.2% Hispanics. Among eligible patients, 255 (42.4%) omitted SLNB (adherent) while 347 (57.6%) underwent SLNB (non-adherent). Adherence was associated with older age (OR per year 1.15, 95% CI [1.10–1.19], p<0.001), later year of diagnosis (OR per year 1.17, 95% CI [1.08–1.27], p<0.001), smaller tumor size (OR per cm 0.96, 95% CI [0.94–0.98], p<0.001), and undergoing lumpectomy vs. mastectomy (OR 1.95, 95% CI [1.10–3.45], p=0.023). No significant associations were observed when stratifying by race, ethnicity, insurance type, BMI, prior breast cancer, progesterone receptor status, or smoking history. Of the 254 patients that SLNB was omitted, 98 (38.6%) received radiation therapy. Of the 344 patients that SLNB was performed, 216 (62.8%) received radiation therapy. The lymphedema rate in patients receiving SLNB was 5.2%. Recurrence rate in patients with omitted SLNB was 5.88% compared to 5.76% in patients who had SLNB performed (p = 0.57). Within two years of diagnosis, 11 of 255 patients without SLNB (4.3%) and 10 of 347 patients with SLNB (2.9%) had died. Kaplan-Meir analysis did show a statistical significance in overall survival for patients who received SLNB compared to those who did not (p = 0.006). However, on closer evaluation of mortality in our patient population, the leading causes of 2-year mortality were non-breast cancer related with the exception being one death (4.8%) due to metastatic breast cancer. We identified 828 patients who met the new ASCO guidelines. An additional 209 patients (25.3%) would have met criteria for SLNB omission with the updated ASCO criteria.

Conclusion: In our cohort, we noted an increased adherence with the guideline over time. Guideline adherence was associated with older age, smaller tumor size, and lumpectomy. We found no difference in recurrence rates highlighting the safety in de-escalation of axillary surgery. The difference in overall survival upon closer examination was mostly unrelated to the primary breast cancer. Omitted patients were high-risk surgical patients with additional comorbidities. Findings highlight opportunities to compare the CW criteria to the ASCO guidelines to assess the potential impact of this new criteria on de-escalation of axillary surgery.



1290 - Does Omission of Sentinel Lymph Node Biopsy in ER-Positive T1 Invasive Breast Cancer Potentially Lead to Undertreatment with CDK4/6 Inhibitors?

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Background/Objective: In April 2025, the American Society of Clinical Oncology (ASCO) issued guidelines recommending against routine sentinel lymph node biopsy (SLNB) in postmenopausal patients aged ≥ 50 with clinically node negative, grade 1-2, T1(<2cm) hormone receptor-positive, human epidermal growth factor receptor 2(HER2)-negative invasive breast cancer undergoing breast conserving therapy (BCT). Randomized trials have reported SLNB positivity rate of 14-15% in T1N0 disease. Because cyclin-dependent kinase 4/6 inhibitors (CDK4/6i) have demonstrated reduced systemic recurrence in node-positive, estrogen receptor (ER)-positive, HER2-negative breast cancer, omission of SLNB could prevent identification of patients eligible for these therapies. This study aimed to quantify the proportion of patients meeting ASCO criteria for SLNB omission who had positive sentinel lymph nodes (SLN) and would thus qualify for CDK4/6i therapy. A secondary aim was to identify clinical factors associated with SLN positivity.

Methods: A retrospective analysis was conducted using the National Cancer Database (NCDB) from 2018-2023. Inclusion criteria were female gender, age ≥ 50, grade 1-2, T1 (<2cm) ER-positive, HER2-negative invasive breast cancer treated with BCT and SLNB. The number of patients with at least one positive SLNB was determined. Univariate and multivariate logistic regression were performed to identify patient risk factors independently associated with positive SLNs.

Results: A total of 158,184 patients met inclusion criteria. Of these patients, 16,381 (10.4%) had at least one positive SLN. On multivariable analysis, compared with patients aged 50–59 years (reference), those aged 60–69 (OR 0.79, 95% CI 0.76–0.83), 70–79 (OR 0.70, 95% CI 0.67–0.73), and 80–89 (OR 0.76, 95% CI 0.70–0.82) had lower odds of SLN positivity. Larger tumor size (T1b; OR 1.77, 95% CI 1.63–1.91 and T1c; OR 3.81, 95% CI 3.52–4.11), higher grade (grade 2 vs 1; OR 1.30, 95% CI 1.26–1.35), Ki-67 ≥ 20% (OR 1.20, 95% CI 1.14–1.27), and Black (OR 1.21, 95% CI 1.14–1.28) or Hispanic (OR 1.21, 95% CI 1.13–1.30) race and ethnicity were independently associated with SLN positivity. Low PR expression (1-10%) was not associated with SLN positivity, while PR-negative status was independently associated with decreased SLN positivity (PR-negative vs. PR ≥11%; OR 0.844, 95% CI 0.79–0.90). Additionally, low ER expression (1-10%) was also independently associated with decreased SLN positivity (ER 1-10% vs. ER ≥11%; OR 0.676, 95% CI 0.517 – 0.883).

Conclusion: In this study, approximately 10% of patients who met clinical criteria for SLNB omission according to ASCO's 2025 guideline had positive sentinel nodes and were candidates for adjuvant CDK4/6i therapy, and the omission of SLNB in this group could potentially lead to undertreatment. Several high-risk clinical factors were independently associated with positive SLN suggesting that patients exhibiting these factors may need more individualized discussion about omission of SLNB. Further studies are warranted to evaluate the long-term clinical implications of SLNB omission in this subgroup of patients.

1283 - Defining Predictors of Nodal Involvement in Patients Undergoing Breast-Conserving Surgery and Consideration for Sentinel Node Biopsy Omission: Insights into the SOUND Era

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Background/Objective: Recent randomized trials have demonstrated the oncologic safety of omitting sentinel lymph node biopsy (SLNB) in clinically node-negative patients with T1 tumors and normal axillary ultrasounds. Updated guidelines based on these trials have recommended omission of SLNB in women >50 years with cT1N0, hormone receptor-positive (HR+), HER2 neu-negative (HER2-), grade 1 or 2 breast cancer undergoing breast-conserving therapy (BCT). While these recommendations were based on patients who were well represented in these trials, there is a growing inclination among surgeons to extrapolate this data to manage all patients with early-stage HR+ HER2- breast cancer. We identified clinicopathologic predictors of sentinel lymph node (SLN) involvement in these subsets of patients who did not meet criteria in these trials to refine patient selection for axillary surgery omission in early-stage HR+ HER2- patients.

Methods: Women 50-70 years old with cT1-2 cN0 invasive breast cancer who underwent BCT and SLNB were identified from a prospectively maintained single-institution database. Patients were excluded if they had undergone mastectomy, neoadjuvant chemotherapy, had palpable axillary lymph nodes or an abnormal axillary ultrasound. Demographics, tumor and treatment characteristics were compared between patients who had an involved SLN and those who did not. Rates of SLN involvement were evaluated among patient subgroups based on cT size, histology, grade, lymphovascular invasion (LVI), tumor focality, and receptor status. Kaplan Meier curves were used to evaluate recurrence-free (RFS)

and overall survival (OS) by SLN status, and multivariable regression analysis was used to identify predictors of SLN involvement.

Results: Out of 530 women who met inclusion criteria, 89 patients (17%) had SLN involvement. Patients with an involved SLN were more likely to have cT2 tumors (45.5% vs 22.9%, p<0.001), multifocal disease (43.1% vs 21.8%, p<0.001), and LVI (35.4% vs 8.7%, p<0.001). They were also more likely to undergo ALND (32.9% vs 16.1%, p<0.001) and receive adjuvant chemotherapy (48.3% vs 19.2%, p<0.001). Patients with cT2 tumors had a higher rate of SLN involvement than those with cT1 tumors (29.4% vs 12.9%, p<0.001). Rates of SLN involvement were also higher for patients with multifocal disease compared to unifocal (27.7% vs 12.4%, p<0.001) and patients with LVI (44.6% vs 12.4%, p<0.001). Patients with invasive lobular carcinoma tended towards a higher rate of SLN involvement compared to those with invasive ductal carcinoma (22.2% vs 16.4%, p=0.58), as did patients with grade 2 or 3 disease compared to grade 1 (21.3% vs 15.3%, p=0.07). There were no significant differences in SLN involvement by receptor status or genomic risk. Patients deemed low-risk with HR+, HER2-, grade 1 IDC without LVI had a rate of SLN involvement of 6.8% compared to 18.6% in the rest of the cohort. At a median follow-up of 92 months (range 1.7 to 168.7 months), there were no differences in locoregional or distant recurrences based on SLN involvement, as well as no significant difference in recurrence-free (RFS) (p=0.58) or overall survival (OS) (p=0.59). On multivariable analysis, cT2 size (OR 2.15, p=0.003), multifocality (OR 2.45, p=0.01), and LVI (OR 8.43, p<0.001) were significant predictors of a positive SLNB.

Conclusion: Patients 50 to 70 years old with low-risk invasive breast cancer may safely omit SLNB, however patients with multifocal disease, grade 2-3 disease, LVI or cT2 tumors are at higher risk of SLN involvement. Patients with these tumor characteristics should not undergo SLNB omission.

Table: Multivariable logistic regression of risk of SLN involvement among women 50-70 years with invasive breast cancer

Risk Factor	Odds Ratio (OR)	Confidence Interval (CI)	p-value
Age	0.99	0.94-3.70	0.77
Race (ref: White)			
African American	1.02	0.30-3.45	0.98
Asian	0.76	0.20-2.92	0.69
Other	0.16	0.02-1.68	0.13
cT2 (ref: cT1)	2.15	1.07-4.30	0.03
Histology (ref: Invasive Ductal Carcinoma)			
Invasive Lobular Carcinoma	1.92	0.77-4.;75	0.16
Mixed Ductal/Lobular	4.04	0.29-56.85	0.30
Multifocal (ref: Unifocal)	2.45	1.21-4.93	0.01
Grade (ref: 1)			
2	1.59	0.66-3.83	0.30
3	0.68	0.20-2.33	0.54
Lymphovascular Invasion	8.43	3.60-19.73	<0.001
Genomic risk (ref: low)			
Intermediate	0.86	0.41-1.78	0.68
High	0.56	0.11-3.00	0.50
Receptor status (ref: HR+/HER2-)			
Her2+	0.28	0.05-1.57	0.15
Triple Negative	2.39	0.47-12.06	0.29

1247 - Omission of Sentinel Lymph Node Biopsy in Patients with Low-Risk Breast Cancer Requires a Multi-Disciplinary Approach to Ensure Successful De-Escalation of Breast Cancer Treatment

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Background/Objective: Background: De-escalation of breast cancer treatment has become increasingly prominent over the last decade. Recent evidence from randomised controlled trials supports the omission of sentinel lymph node biopsy (SLNB) in women with low-risk breast cancer. However, the result of the SLNB may potentially influence appropriate de-escalation of adjuvant therapy in this low-risk group. Objectives: To investigate the rate of nodal involvement in patients with clinically node negative and biologically low risk breast cancer. To review the clinical factors that may be associated with pathological nodal status. To identify if the result of SLNB influences the adjuvant radiotherapy delivered and systemic treatment decisions in this population of low-risk breast cancer.

Methods: Data on all patients diagnosed with ER positive HER2 negative cT1N0 breast cancer ≥50 years treated at the three Glasgow breast cancer centres between 2022 and 2024. All patients underwent axillary ultrasound at diagnosis. All patients underwent primary breast-conserving surgery. Data was obtained from a prospective database of all breast cancer patients treated in the West of Scotland. Additional data on the type of adjuvant treatment was collected retrospectively. Statistical analysis was performed using SPSS v.29.02.0. Chi squared test was performed to compare categorical variables.

Results: Data on 775 patients were available. 469/775 (60.5%) were detected through the National Breast Screening Programme. 604/775 (77.9%) were diagnosed as Non-Special type (NST) breast cancer. 755/775 (97.4%) patients underwent axillary surgery. Of the patients undergoing SLNB 14/755 (1.8%) required axillary node sampling because of failed mapping. 82/755 (10.9%) were node positive with only 2/755 (0.26%) having >3 nodes involved. Age was not significantly associated with nodal involvement (P = 0.631). Symptomatic presentation was significantly associated with nodal involvement (Symptomatic 47/291 (16.2%) vs Screen detected 35/464 (7.5%) P< 0.001). Use of adjuvant chemotherapy was significantly associated with nodal involvement (Node negative 17/673 (2.5%) vs node positive 20/82 (24.4%). However, in this cohort (n=775) only 4.8% (n=37) received adjuvant chemotherapy.

Conclusion: The overall rate of nodal involvement in this population is low and similar to the accepted false negative rate of SLNB. This data supports the omission of SLNB in this population. Tumour size remains an important factor in predicting a positive SLNB. Age and lobular subtype did not influence nodal status. In this contemporary cohort the result of the SLNB influences the type of adjuvant radiotherapy and endocrine therapy. It is therefore crucial in our attempt to de-escalate axillary surgery by omitting SLNB that this does not negatively impact on the potential for de-escalation of adjuvant treatment. Going forwards omission of SLNB requires a multi-disciplinary team approach to ensure appropriate de-escalation of adjuvant treatment.

1220 - Perioperative Injection of Tc-99 Sulfur Colloid for Sentinel Lymph Node Mapping Can Achieve Cost Savings Without Compromising Accuracy

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Background/Objective: Process optimization offers an opportunity to improve value by reducing expenses, while maintaining safe and high-quality patient care. Blue dyes and radioactive tracers are used as single agents or in combination to identify axillary sentinel lymph nodes intraoperatively during breast cancer surgery. The two forms of radiotracers commonly available include Technetium Tc99 Sulfur Colloid (Tc99 SC) and Technetium Tc99 Tilmanocept 'Lymphoseek' (Tc99 TL). Prior studies have demonstrated that both tracers have reliable mapping and similar rates of sentinel node identification, with Tc99 TL having faster injection site clearance, but a higher cost. Our institution recently standardized to the use of a single radiotracer, Tc99 SC, injected perioperatively by the surgeon in an effort to reduce procedural cost. The objective of this study was to evaluate whether transitioning from Tc99 TL to Tc99 SC would result in equivalent diagnostic accuracy with reduced cost.

Methods: A retrospective chart review of a single institutional hospital enterprise was performed to identify patients undergoing axillary sentinel lymph node mapping. Pre- and post-institutional standardization of single-agent, Tc99 SC, use across all hospital sites occurred on June 1, 2025. The study collected data on two groups: 50 patients who received Tc99 TL prior to process change and 50 patients who received Tc99 SC after the process change. Patients were included if there was a diagnosis of primary invasive breast cancer undergoing surgical intervention with lumpectomy or mastectomy and sentinel lymph node surgery. Data collected included clinicopathologic features, time and location of radiotracer injection (pre-operatively or intra-operatively), number of sentinel lymph nodes identified, and number of positive nodes removed. The cost of each radiotracer was provided by our Institution's Nuclear Medicine Department. The primary endpoint was to determine if there was similar diagnostic accuracy for sentinel lymph node identification between the two groups with perioperative injection. The secondary endpoint was to evaluate cost savings. Patients were analyzed according to the use of Tc99 SC or Tc99 TL. Fischer's exact test was used with chi-squared tests applied for larger sample sizes, and T-test was employed for comparative means.

Results: One hundred patients were included in this study: 50 in the Tc99 SC group and 50 in the Tc99 TL group. Baseline patient characteristics were similar between the groups (Table 1). Dual tracer mapping with blue dye was utilized in 78% (n=39) of the Tc99 SC and 72% (n=36) of the Tc99 TL group. Intraoperative injection was performed in 42 patients (84%) in the Tc99 SC group and 37 patients (74%) in the Tc99 TL group (p=0.326). For the patients not injected intraoperatively with the radiotracer, the injection was performed preoperatively by the surgeon, ranging from 12 to 87 minutes prior to surgical incision. No adverse reactions to injection were reported in both groups. There was 100% sentinel lymph node identification in both groups. The average number of sentinel lymph nodes identified in the Tc99 SC group was 2.42 compared to 2.35 in the Tc99 TL group (p=0.284). There were 19 (38%) node-positive patients in the Tc99 SC group and 13 (26%) in the Tc99 TL group. The average number of positive nodes in the Tc99 SC group was 0.62 compared to 0.42 in the Tc99 TL group (p=0.284), with the

majority having one positive sentinel node (24% Tc-99 SC vs. 20% Tc-99 LS, p=0.446). The cost of a single injection (450 microcuries) of Tc99 TL is $595 compared to $104 for Tc99 SC. For 50 patients in each group, this equates to $29,750 total cost for Tc99 TL use compared to a total cost of $5,200 for Tc99 SC, with a total cost reduction of $491 per injection or $24,550 for the 50 patients after transitioning to Tc99 SC.

Conclusion: Peri-operative surgeon-injected Tc99 SC results in significant cost savings without compromising sentinel node detection rates, accuracy, or patient safety. Continuous evaluation of workflow and operational changes is key to ensuring alignment with quality, efficiency, and patient-centered outcomes.

TABLE 1: Patient demographics and clinicopathologic factors

Clinicopathological factors	Tc Sulfur Colloid (N=50)	Tc Tilmanocept (N=50)	p-value
Age	Mean 62.52	Mean 59.86	0.251
Tumor Histology			0.623
Invasive Ductal	37 (74%)	34 (68%)	
Invasive Lobular	9 (18%)	9 (18%)	
Mixed/Other	4 (8%)	7 (14%)	
Receptor Status			0.723
HR+/HER2-	43 (86%)	43 (84%)	
HR+/HER2+	3(6%)	2 (4%)	
HR-/HER2+	0 (0%)	1 (2%)	
HR-/HER2-	4 (8%)	5 (10%)	
Tumor Size			0.356
T1	27 (54%)	34 (68%)	
T2	20 (40%)	14 (28%)	
T3	3 (6%)	2 (4%)	
Tumor grade			0.231
Grade 1	8 (16%)	10 (20%)	
Grade 2	34 (68%)	26 (52%)	
Grade 3	8 (16%)	14 (28%)	
Surgery			>0.99
Lumpectomy	26 (52%)	26 (52%)	
Mastectomy	24 (48%)	24 (48%)	
Number of nodes positive			0.446
0 nodes positive	31 (62%)	37 (74%)	
1 node positive	12 (24%)	10 (20%)	
2 nodes positive	3 (6%)	1 (2%)	
3 nodes positive	2 (4%)	0 (0%)	
>/=4 nodes positive	2 (4%)	2 (4%)	

1140 - De-escalation of the Axilla in Hormone Receptor-Positive HER2-Negative Multiple Ipsilateral Breast Cancer: Is It Safe?

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Background/Objective: Patients with multiple ipsilateral breast cancer (MIBC) are typically excluded from current trends towards omission of axillary sampling in hormone receptor-positive (HR+)/HER2-negative (low) breast cancer, despite evidence supporting the oncologic safety of surgical de-escalation in this population. The aim of this study was to characterize demographic and pathologic features of HR+/HER2-negative (HER2-) MIBC to determine if these patients might be candidates for explicit omission of axillary sampling.

Methods: Retrospective analysis of a prospective breast cancer database at a large tertiary academic institution was performed to identify patients (n = 356) diagnosed with unifocal or multiple ipsilateral early-stage HR+/HER2- breast cancers between 2018-2022. Demographics were analyzed including age at diagnosis, ethnicity/race, and smoking status. We assessed prognostic features including final pathologic tumor size and nodal stage, axillary lymph node status/burden and oncotype recurrence score. Receipt of adjuvant therapy was also reviewed. Patients with synchronous bilateral breast cancer were excluded. This study was reviewed and is IRB exempt.

Results: Among patients with early-stage HR+/HER2- breast cancer, those with MIBC were younger (59.5 vs 64.2 years old, p = 0.003) and had more axillary disease burden when compared to their unifocal cohorts (positive axillary nodes in 33.9% vs 17.4%, p = 0.007). Subgroup analysis of elderly patients (≥ 70 years old) revealed those with multiple foci had higher rates of axillary lymph node removal (66.7% vs. 32.6%, p = 0.065) without significant difference in nodal positivity when compared to their matched unifocal cohort (11.1% vs. 10.8%, p = 1.00). Patients of all ages with MIBC were more likely to undergo neoadjuvant chemotherapy (10.5% vs 3.4%, p < 0.05) and receive nodal radiation (25% vs. 11.3%, p < 0.05).

Conclusion: These findings demonstrate that appropriately selected patients with MIBC may be candidates for omission of axillary staging. This study supports further expanding the widely accepted Choosing Wisely Guidelines to elderly patients (≥ 70 years old) with early-stage HR+/HER2- MIBC, a population that is not traditionally considered for sentinel lymph node omission. Notably, as new standards of care push towards omission of sentinel lymph node biopsy in younger populations with favorable pathology, our findings support the current practice of axillary sampling in patients < 70 years old with multiple ipsilateral breast cancer due to higher rates of axillary disease.

1092 - The Impact of the SOUND Trial on Practice Utilization: A Retrospective Single-Center Cohort Analysis

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Background/Objective: The SOUND randomized clinical trial is a landmark study published in 2023 that established the omission of axillary surgery was noninferior to sentinel lymph node biopsy (SLNB) in patients with small, node-negative, hormone receptors-positive breast cancers. Since then, the INSEMA trial and subsequent update to ASCO guidelines for SLNB has reinforced the relevance of the study

findings to clinical practice. In December 2023, our institution's breast cancer multidisciplinary team adopted an institutional protocol for incorporating SOUND findings into clinical practice, very similar to the guidelines subsequently published by ASCO. This study investigates the financial and logistical impact that the omission of axillary surgery on breast surgery practice since the publication of the SOUND trial. The study objective was to assess the percentage of partial mastectomies for breast cancer done with SLNB before vs. after SOUND implementation at our institution.

Methods: This is a retrospective study of female patients with breast cancer who underwent partial mastectomy surgery for cancer (invasive or DCIS) at our institution. Cases were divided into cohorts based on surgery date: before the SOUND trial was published (Pre-SOUND; 1/1/2020-8/31/2023) and after our institutional protocol for incorporating SOUND findings was established (Post-SOUND, 1/1/2024-present). Within this overall group, we calculated rate of SLNB. A subgroup of patients (the most recent patients chronologically, from each cohort) was identified for chart review. On this subgroup, we collected information on patient, tumor, and surgery characteristics. Patients aged ≥ 50 years; with invasive breast cancer; negative preoperative axillary ultrasound; and tumors that were grade 1-2, ≤ 2 cm, HR positive, and HER-2 negative were defined as meeting ASCO criteria to consider SLNB omission; all others were defined as not meeting ASCO criteria. For the subgroup that underwent chart review, we assessed the proportion who underwent SLNB, and the proportion in whom ASCO guidelines suggest considering SLNB omission. Because our institution has considered SLNB omission for patients > 70 years old prior to SOUND publication, we also separately analyzed these outcomes in patients aged 50-70. The percentage of patients who needed sentinel node reoperation after omission was also recorded. Chi-square tests were used to compare the rate of SLNB pre- vs. post-SOUND; Fisher's exact test was used when the assumption of chi-square was not met.

Results: In the overall group, rate of SLNB decreased from 66.9% pre-SOUND (823/1230) to 47.7% post-SOUND (295/619; p<0.001). The reduction in SLNB was similar in the subgroup that underwent chart review (pre-SOUND 80.0%. vs. post-SOUND 56.3%, p<0.001; Table 1). The most significant difference in this subgroup was amongst the population in which SLNB was able to be omitted per ASCO guidelines and was not performed (pre-SOUND 15.0% vs. post-SOUND 35.7%, p=0.001). In both time cohorts, very few patients had SLNB omitted but did not meet ASCO criteria for omission (5.0% pre-SOUND vs. 8.0% post-SOUND; p=0.41). In both time cohorts, the rate of re-operation for SLNB was very low (0% pre-SOUND vs. 3.6% post-SOUND, p=0.14). Finally, when analyzing only the patients who met the ASCO SLNB omission criteria, there was a decrease in SLNB by 33.7% (pre-SOUND 27/39 [69.2%] vs. post-SOUND 22/62 [35.5%], p<0.001). For patients aged 50-70, the overall SLNB rate decreased by 25% pre-SOUND vs. post-SOUND (40/51 [78.4%] vs. 31/58 [53.4%] p<0.006). Among patients aged 50-70 only, results by category were generally consistent with those shown in Table 1.

Conclusion: Based on these findings, it is apparent that the de-escalation of axillary surgery requires breast surgery practices to adjust accordingly. In our practice, standard posting time for partial mastectomy alone is 45 minutes, whereas posting time for partial mastectomy plus SLNB is 90 minutes. When accounting for a standard 45 minute-turnover time, a single surgeon can perform 4 partial mastectomies with SLNB or 6 partial mastectomies alone within the same block time. This reduction in axillary surgery can expedite scheduling, and for large multi-surgeon groups, could even impact the number of surgeons needed for a fixed patient population. The CPT codes 38525, 38792, and 38900 that are charged for the injection, mapping, and excision of sentinel lymph nodes account for a total of 9.58 wRVUs and have a total professional charge of $1200. For a breast surgeon performing 100 partial mastectomies annually, assuming a 19.2% reduction in SLNB, this would translate into a loss of 184 wRVU and $23,040 in revenue. It is important that breast surgeons acquire and maintain non-surgical,

office-based skills to compensate for the loss of surgical revenue. The rate of omitting SLNB when SLNB was indicated per ASCO guidelines was low and similar pre- and post-SOUND. These omissions likely reflect extenuating circumstances such as patient comorbidities or refusal. Overall, the SOUND trial has benefited patients by de-escalation of surgery, which in turn has had an impact on breast surgery practices. This effect is likely to become more pronounced over time as oncology teams become more comfortable omitting SLNB.

Table 1.

Measure	Pre-SOUND	Post-SOUND	P-Value
Overall SLNB Rate	64/80 (80.0%)	63/112 (56.3%)	**<0.001**
SLNB Performed, and SLNB was ASCO* Necessary	37/80 (46.3%)	41/112 (36.6%)	0.180
SLNB Performed, and SLNB could have been omitted per ASCO	27/80 (33.8%)	22/112 (19.6%)	**0.027**
SLNB Not Performed, and SLNB was ASCO Necessary	4/80 (5.0%)	9/112 (8.0%)	0.409
SLNB Not Performed, and SLNB could have been omitted per ASCO	12/80 (15.0%)	40/112 (35.7%)	**0.001**
Sentinel Node Reoperation Rate	0/80 (0.0%)	4/112 (3.6%)	0.142

*ASCO guidelines indicate a SLNB could be omitted for patients aged ≥ 50 years, with invasive breast cancer, negative preoperative axillary ultrasound, and tumors that were grade 1-2, ≤ 2 cm, HR positive, and HER-2 negative.

1080 - Is Omission of Axillary Surgery Safe in Patients with Invasive Lobular Carcinoma?

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Background/Objective: Recent randomized trials such as SOUND and INSEMA have identified breast cancer patients for whom axillary surgery omission appears to have no detrimental impact on recurrence. However, some have questioned the safety of omitting axillary surgery in patients with invasive lobular carcinoma (ILC), the second most common type of breast cancer. ILC has a diffuse growth pattern that is difficult to detect clinically, leading to higher rates of nodal involvement and upstaging. Given the paucity of data in patients with ILC, we analyzed an institutional database to determine factors associated with axillary surgery omission, the proportion of patients who might be candidates for omission, and the association between axillary surgery omission and local recurrence free survival.

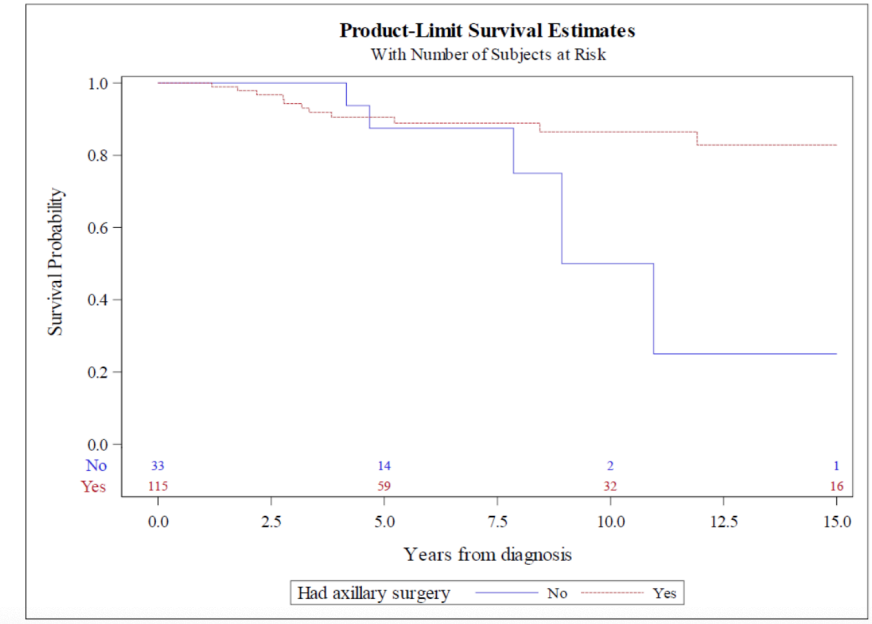
Methods: We analyzed a prospectively maintained institutional database of ILC patients containing 1029 tumor records from 1001 patients (28 patients had bilateral disease). All tumor records were analyzed as independent observations. Chart review was performed to identify the cohort of patients who had omission of axillary surgery (OAS) and determine clinical nodal status and pre-operative axillary imaging modality and results. For patients who underwent axillary surgery, clinical tumor size and nodal

status were not available, so modified criteria were developed based on pathologic features at surgery (tumor size < 5 cm, node negative status, undergoing upfront breast-conserving surgery (BCS) followed by radiotherapy) to identify a cohort that would have met INSEMA trial criteria. We compared clinicopathologic and treatment characteristics between patient cohorts using chi-square tests for categorical variables and Kruskal-Wallis tests for continuous variables. A multivariable Cox proportional hazards model was used to evaluate the association between axillary surgery and local recurrence free survival when controlled for covariates age, grade, receptor subtype, and pathologic tumor size. Results are reported as hazard ratios (HR) with 95% confidence intervals (CI). Local recurrence free survival rates were reported using the Kaplan-Meier method. All survival analysis were right censored at 15 years from the diagnosis date. Statistical analysis was performed using SAS version 9.4.

Results: Out of 1029 ILC cases, median age was 58 years (range 21-97), median pathologic tumor size was 2.2 cm, receptor subtype was HR+HER2- in 869 (91.2%), most had grade 1-2 tumors (n=938, 94.5%), and 513 (51.0%) had BCS, of whom 148 had lumpectomy without radiation (RT). Of 1029 cases, 208 (20.2%) had axillary surgery yet met modified criteria for OAS based on INSEMA. Conversely, 65 of 1029 patients (6.3%) had OAS. Comparing the 208 patients who met modified INSEMA criteria to the 65 patients who had OAS, we found significant differences in clinicopathologic features. Patients in the OAS cohort were older (median age 73 vs 61 years, p<0.001), differed in pT category (p<0.001, e.g. 73.0% pT1 vs 65.2%), and differed in tumor receptor subtype (p=0.04, e.g. 73.0% ER+PR+Her2- vs 81.3%) compared to those meeting modified INSEMA criteria. Of 65 patients in the OAS cohort, 95.4% were clinically node negative. Preoperative axillary imaging was obtained in 41 (63.1%), and utilized breast MRI (65.0%), ultrasound (47.5%), and PET/CT (25.0%), with multiple imaging tests in 49.0%. In this cohort, most patients (n=48, 73.8%) had BCS, but only 13 (27.1%) had adjuvant RT. Of the 17 OAS cases undergoing mastectomy (26.2%), 6 (35.3%) had adjuvant RT. In the overall study cohort of 1029 cases, those who had axillary surgery had significantly improved local recurrence free survival compared to those with OAS (HR 0.42, 95% CI 0.19-0.97, p=0.04) in a model adjusting for age, grade, receptor subtype, and tumor size. However, when evaluating only the 148 cases that underwent lumpectomy without RT (n=33 without axillary surgery and n=115 with axillary surgery), axillary surgery remained associated with lower hazard rate for local recurrence (HR 0.47), but was no longer significant (95% CI 0.16-1.39, p=0.17). At 10 years, estimated cumulative local recurrence free survival was 50% (95% CI 6.3-93.8) in the OAS group, and 86.5% (95% CI 78.3-94.7) in the axillary surgery group.

Conclusion: In this population of over 1000 patients with ILC of the breast, omission of axillary surgery was rare, but more common in older patients with smaller tumors. Despite this, we identified an unexpectedly high rate of local recurrence among patients who had omission of axillary surgery. Interestingly, many patients who omitted axillary surgery also omitted radiotherapy after breast conservation, which likely contributed to the higher rates of local recurrence. To account for this, we analyzed the subset of patients who had breast conservation alone and found that the increased risk of local recurrence in the axillary surgery omission cohort was no longer statistically significant, although with a smaller subgroup sample size. These findings illustrate the need for longer follow up and further analysis of axillary surgery omission in patients with ILC before applying trial results to this patient population. As we continue to de-escalate aspects of locoregional therapy, deciding which component of therapy to omit and identifying appropriate patients for omission is critical.

Figure 1:
Kaplan-Meier estimates for local recurrence free survival by axillary surgery among 148 patients who had lumpectomy alone



1063 - Evaluating the Relevance of the SOUND Trial in Early-Stage Hormone Receptor–Positive, HER2-Negative Invasive Lobular Carcinoma

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Background/Objective: Sentinel lymph node biopsy (SLNB) remains the gold standard for axillary staging in patients with breast cancer; however, the procedure carries the risk of lymphedema, paresthesia, and issues related to range of motion The Sentinel Node vs. Observation After Axillary Ultrasound (SOUND) trial advances the concept of axillary de-escalation by evaluating the oncologic safety of omitting axillary surgery in patients with early-stage breast cancer. Notably, only a small proportion of patients enrolled in the SOUND trial had invasive lobular carcinoma (ILC). This study aims to compare 5-year overall survival (OS) and recurrence-both locoregional and metastatic-in patients with ILC who underwent axillary staging (AS) versus those managed with axillary omission (AO).

Methods: An institutional database was reviewed retrospectively. Patient demographics, tumor characteristics, adjuvant treatment, recurrence, and OS were evaluated for women aged ≥ 18 with hormone receptor (HR) positive, HER2 negative, cT1-T2N0 ILC from 2016-2024. Patients meeting SOUND eligibility were identified based on preoperative ultrasound. Differences between AS and AO were compared using chi-squared tests. Kaplan-Meier analysis was used to estimate 5-year OS. The significance level was set at 0.05.

Results: Of the 316 women in the study, ages 33-94 (mean 64), 283 underwent AS and 33 had AO. No differences were found in menopausal status, grade, Ki-67, receipt of adjuvant radiation, and CDK 4/6 inhibitor between cohorts. Compared to AO patients, AS patients were younger (62 vs. 77, $p < 0.001$), more likely to undergo mastectomy (36.7% vs. 9.1%, $p < 0.001$), receive adjuvant endocrine therapy (84.8% vs. 54.5%, $p < 0.001$), and receive adjuvant chemotherapy (13.4% vs. 0%, $p = 0.03$). There was no difference found in recurrence, including locoregional and metastatic disease (0% vs. 2.1%, $p = 0.40$). (Table 1). 165 patients met SOUND trial eligibility criteria; of this subset, 146 underwent AS and 19 had AO. Similar trends are shown with no differences found in recurrence (0% vs. 2.1%, $p = 0.54$). (Table 1). Average follow up in the study was 53.5 months. Kaplan-Meier analysis estimated the rate of 5-year survival to be 87.9% (95% CI: 70.9%- 95.3%) for patients with AO, and 96.8% (93.9%- 98.3%) for patients who underwent AS ($p = 0.34$). Finally, pathological tumor and nodal upstaging were evaluated. For cT1 patients who had AS, 14% were upgraded to pT2. cT1 patients with AO, 29% were upgraded to pT2. Amongst cN0 patients who had AS, 3.8% had pNmicro disease, 8.9% were upgraded to pN1 and 1.3% were upgraded to pN2-3.

Conclusion: HR positive, HER2 negative ILC patients with AO did not have higher incidence of recurrence or worse 5-year OS compared to those who underwent AS. Although there are limitations with sample size, our single institution study corroborates the conclusions of the SOUND trial in an ILC focused cohort. Nodal staging could have an impact on adjuvant treatment recommendations. Multiple factors including patient co-morbidities, oncotype score, and willingness to undergo treatment may impact overall recommendations. Although there was no difference in the receipt of CDK 4/6 inhibitors, overall use was low in our population; notably, these therapies were not approved for early staged breast cancer until recently. Our findings emphasize the importance of multidisciplinary decision making in counseling patients and treatment decisions regarding the role for axillary staging in each specific patient.

Table 1: Patients demographics and tumor characteristics by axillary surgery type

	All Patients (N = 316)		p-value	Sound Eligible Patients (N=165)		p-value
	Axillary Omission (N=33)	Axillary Surgery (N=283)		Axillary Omission (N=19)	Axillary Surgery (N=146)	
Age (mean)	77	62	**<0.001**	79	62	**<0.001**
Menopausal	32 (97.0%)	243 (85.9%)	0.10	18 (94.7%)	126 (87.5%)	0.36
Type of Breast Surgery						
Lumpectomy	30 (90.9%)	179 (63.3%)	**0.001**	16 (84.2%)	84 (57.5%)	**0.025**
Mastectomy	3 (9.1%)	104 (36.7%)		3 (15.8%)	62 (42.5%)	
Ki-67						
< 20%	29 (87.9%)	241 (85.2%)	0.49	17 (89.5%)	122 (83.6%)	0.73
≥ 20%	4 (12.1%)	42 (14.8%)		2 (10.5%)	24 (16.4%)	
Grade						
1	10 (33.3%)	84 (31.5%)	.65	5 (29.4%)	45 (31.7%)	.39
2	17 (56.7%)	167 (62.5%)		9 (52.9%)	86 (60.6%)	
3	3 (10.0%)	16 (6.0%)		3 (17.6%)	11 (7.7%)	
Adjuvant Therapies						
CDK 4/6 inhibitor	0 (0.0%)	5 (1.8%)	0.44	0 (0.0%)	3 (2.1%)	0.53
Radiation	6 (18.2%)	61 (21.6%)	0.65	2 (10.5%)	31 (21.2%)	0.27
Endocrine	18 (54.5%)	240 (84.8%)	**<0.001**	11 (57.9%)	128 (87.7%)	**<0.001**
Chemotherapy	0 (0.0%)	38 (13.4%)	**0.025**	0 (0.0%)	29 (19.9%)	**0.032**
Recurrence	0 (0.0%)	6 (2.1%)	0.40	0 (0.0%)	3 (2.1%)	0.54

1056 - Osteopathic Manipulative Medicine Enhances Tracer Uptake and Sentinel Node Mapping During Breast-Conserving Surgery: A Randomized Controlled Trial

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Background/Objective: Accurate sentinel lymph node (SLN) mapping is essential for successful breast cancer staging and treatment planning, yet variable tracer uptake persists despite advances in dual-tracer protocols. Osteopathic Manipulative Medicine (OMM) is a form of neuromusculoskeletal treatment that helps to restore the body's functional state and optimize fascial movement and lymphatic flow. Our study hypothesized that targeted OMM performed prior to breast-conserving surgery (BCS) and sentinel lymph node biopsy (SLNB) would increase radiotracer and blue dye uptake and ultimately optimize SLN identification.

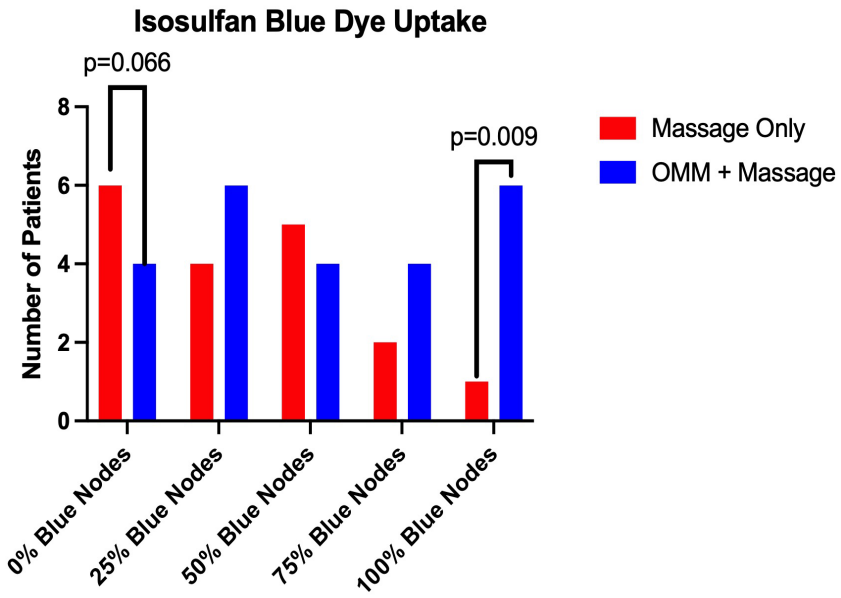
Methods: Following IRB approval, this ongoing single-institution feasibility randomized controlled trial (target n = 30) was conducted accruing women undergoing BCS with SLNB with no prior breast or

axillary surgery. Patients were randomized to either a control or intervention group with 3 breast surgeons blinded to group allocation. Following intraoperative injection of both 3cc of isosulfan blue and 0.9–1.1 mCi of Tc-99m sulfur colloid into the breast, the control group received nine minutes of standard breast massage (SBM), while the intervention group received five minutes of SBM followed by four minutes of OMM performed by the first author. These OMM techniques included opening the thoracic inlet, pectoral traction, and thoracic and axillary lymphatic pumps. Primary endpoints included time to first SLN retrieval, percentage of blue dye uptake, and average SLN radiotracer counts. The percentage of blue dye uptake was determined visually by the operating surgeon. A node was labeled as 25% blue if it had a blue channel and/or minimal blue coloration of the node, 50% blue if it was a moderately/partially blue node, 75% blue if it was a mostly blue node, and 100% blue if it was a completely blue node. Multivariable logistic and multinomial regression models were used to assess group differences, controlling for age, race, body mass index, and tumor subtype. This report summarizes the interim analysis of 25 completed cases.

Results: A total of 25 patients were enrolled, with 12 in the control group (SBM) and 13 in the intervention group (OMM+SBM). Baseline characteristics including BMI (28.4 vs 30.8, p=0.5) and tumor size (1.25±0.71 cm vs 1.55±0.72 cm, p=0.3) were similar between the OMM+SBM and SBM groups, respectively. Patients receiving OMM+SBM had a higher statistically significant rate of 100% blue dye uptake in SLNs compared to those receiving SBM (46% [n=6] vs. 8.3% [n=1], p=0.009) (Fig.1). OMM+SBM yielded a higher total number of blue-identified SLNs compared to SBM (22 vs 14 total). Mean SLN radiotracer counts were higher in the OMM+SBM group compared to the SBM group (9,408 ± 13,948 counts/10sec vs. 6,566 ± 6,489 counts/10sec, p=0.054). Non-blue SLNs were less frequently removed in OMM+SBM patients compared to SBM patients (31% [n=4] vs 50% [n=6], p=0.066) (Fig.1). Additionally, one patient failed to map both tracers, and this occurred in the SBM only group. Time to first SLN retrieval was shorter in the group receiving OMM+SBM compared to SBM (73 ± 19 min vs 84 ± 25 min, p=0.8).

Conclusion: Our study shows that the addition of osteopathic manipulation prior to sentinel lymph node biopsy in breast-conserving surgery was associated with significantly increased rates of complete (100%) blue dye uptake, decreased number of patients with non-blue nodes removed, and a trend approaching significance towards higher radiotracer uptake per node. We postulate that these effects may result from OMM decreasing fascial restrictive barriers of the chest wall and axilla and improving forward flow of lymph fluid. Our initial results suggest that these manipulation techniques may lead to enhanced lymphatic flow and tracer migration, particularly for isosulfan blue dye, and in doing so, result in improved accuracy and ease of axillary SLN identification. The sample size is small for this interim analysis, and validation in larger cohorts is needed to confirm reproducibility; however, this technique holds promise for providing an inexpensive and effective way to improve SLN mapping in breast cancer patients.

Figure:



1022 - Choosing Wisely in Rural America: Compliance with Recommendations on Surgical Management of the Axilla in Elderly Patients Over Time Across the Rural-Urban Continuum

Kristina Fraser[1], Jared Reyes[1], Patty Tenofsky[1], Stephen Helmer[1], Ashley Wilbers[2]

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Background/Objective: In 2016, the Choosing Wisely campaign published recommendations for patients 70+ years old with cT1-2N0 HR+/HER2- breast cancer, which stated that surgeons should avoid routine sentinel lymph node biopsy (SLNB) in this patient population, as it did not result in improved survival. The goal of this study was to determine if rurality of the patient and treating facility type influenced the decision to adhere to or stray from following this recommendation, and if compliance changed over time.

Methods: The National Cancer Database Participant User Data File (PUF) was used to collect information from 2018-2022 on women 70+ years of age with cT1-2N0, HR+/HER2- invasive breast cancer and compare demographic characteristics, tumor biology, and treatment (breast and axillary surgical management, radiotherapy (RT), and systemic therapy) of these women. The NCDB is a joint project of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. Specifically, we looked into the rates of SLNB across the rural-urban continuum over time after the release of the Choosing Wisely recommendations. The American College of Surgeons and the Commission on Cancer have not verified and are not responsible for the analytic or statistical methodology employed, or the conclusions drawn from these data by the investigators.

Results: A total of 186,175 women were included in the study. Rural patients were more likely to undergo SLNB ($p < 0.001$) and more likely to undergo both simple and modified radical mastectomy ($p < 0.001$) than metropolitan counterparts. On logistic regression, patients from rural or urban areas, < 80 years of age, Hispanic heritage, treated at an academic hospital, living in higher income areas, and T2 tumors were more likely to receive SLNB. Over time patients undergoing SLNB decreased from 79.3% in 2018 to 66.3% in 2022. Although rural areas saw a similar trend in the decrease of the rate of SLNB over time, overall rates of SLNB remained higher than metropolitan or urban areas ($p < 0.001$).

Conclusion: Our paper demonstrates that rurality impacts the compliance with recommendations. A 2022 study of only 195 patients demonstrated increasing compliance with the Choosing Wisely recommendations over time at a single institution safety-net hospital. Our review of our larger cohort of women confirms this trend with some variance in the rates of compliance across categories of rurality. Based on these findings we recommend continuing to find ways to improve dissemination of information to more rural areas to increase rates of compliance with recommendations, especially as new potential practice-changing studies such as the SOUND trial are released.

Figure:

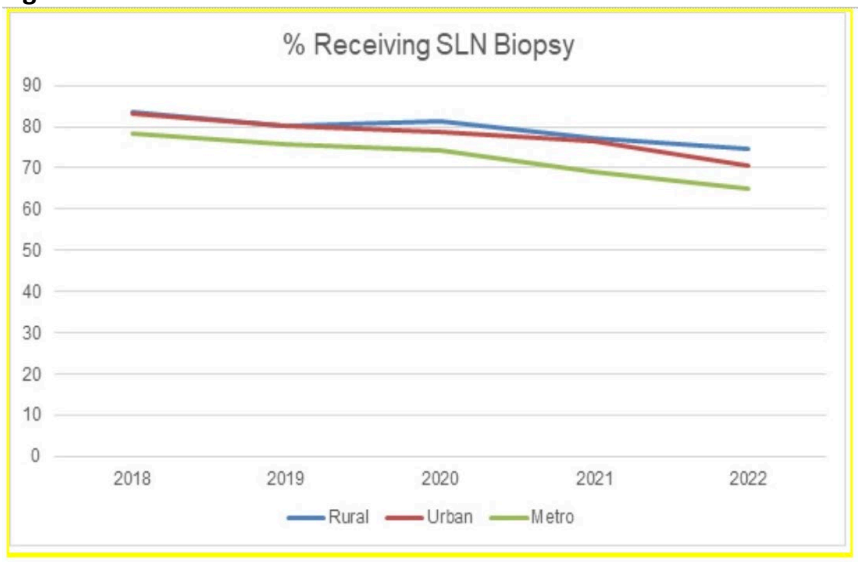

Figure 1. The % of cases receiving a sentinel lymph node biopsy (SLN) by rurality from 2018 to 2022

1009 - Axillary Dissection with Increasing Nodal Burden: Is It Necessary?

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Background/Objective: Driven by data from the ACOSOG Z0011 study, national guidelines suggest that patients with >2 positive sentinel lymph nodes at the time of up-front breast cancer surgery undergo a completion axillary lymph node dissection (ALND). This procedure is associated with significant functional impairment and potential long-term adverse outcomes. Avoiding axillary dissection may improve outcomes for breast cancer survivors. This study compares locoregional and systemic recurrence of patients with ≥3 positive sentinel lymph nodes in whom ALND was omitted to outcomes of similar patients who did undergo ALND as well as patients with fewer positive sentinel nodes who were not treated with ALND.

Methods: This retrospective cohort study was conducted in a single NCI designated academic medical center. Chart review was performed on patients with invasive breast cancer treated between 4/1/2011 and 3/31/2016. Eligible patients ≥18 years who underwent sentinel lymph node biopsy (SLNB) at the time of up-front breast cancer surgery. Patients were excluded if they were lost to follow-up after surgery or had treatment for another malignancy within one year of diagnosis. Data extracted included receptor status, number of positive nodes, ALND status, adjuvant treatment received, and locoregional and systemic recurrences. Locoregional recurrences were defined as both breast and axillary recurrences. Incidence rates were reported as events per 1000 patients/year (IR). Treatment effects were estimated using hazard ratios (HR) with 95% confidence intervals (CI), and statistical significance was assessed using the log-rank test ($p<0.05$).

Results: In the study period, 270 patients with invasive breast cancer underwent SLNB and met inclusion criteria for analysis. Regarding locoregional recurrences, patients with ≥1 positive sentinel lymph nodes demonstrated a higher, though not statistically significant, incidence rate (11.9%) compared to those with no nodal status (7.6%; HR 1.43, 95% CI, 0.64-3.2; p=0.3767). Among the 25 patients who were found to have ≥3 positive sentinel nodes, those who underwent ALND had a 6.5% locoregional recurrence rate, while those without ALND had no recurrences (p=0.3980). Locoregional recurrence rates were similarly statistically comparable between patients with ≥3 positive sentinel nodes without ALND (0%) and those with ≤2 positive sentinel nodes who also did not receive ALND (9.36%; p=0.3373). For distant recurrences, patients ≥1 positive sentinel lymph nodes showed a significantly higher rate (9.6%) compared to those with 0 positive sentinel nodes (3.4%; HR 2.94, 95% CI, 1.09-7.91; p=0.0329). However, distant recurrence rates were statistically comparable between patients with ≥3 positive sentinel lymph nodes (7.95%) and those with ≤2 (4.99%), regardless of ALND status (HR 1.65, 95% CI 0.37–7.33, p = 0.5077).

Conclusion: Despite small numbers, these data indicate that omission of ALND in patients with 3 or more positive sentinel nodes does not result in increased rates of locoregional recurrence when compared to patients with ≥3 sentinel nodes who receive ALND or those with ≤2 positive nodes who do not receive ALND. These results are consistent with data from the AMAROS trial, which included small numbers of patients with ≥3 sentinel nodes who safely avoided ALND. With great advances in both systemic therapy and radiation delivery, axillary dissection in patients with a clinical negative axilla or

those who have limited disease burden on pre-operative evaluation may increase long term risk to limb without decreasing threat to life. Surgeons should thoughtfully consider risk versus benefit when considering ALND in patients with 3 or more positive sentinel nodes.

Table:

	N	IR	HR (95%CI)	p-Value
Locoregional Recurrence				
Total Population (N=270)				
0 positive SLN	183	7.6	1 [Ref]	
≥1 positive SLN	87	11.9	1.43 (0.64 to 3.2)	0.3767
≥3 positive SLN (N=25)				
ALND = No	10	0		
ALND = Yes	14	6.5		0.3980
ALND = No (N=233)				
≥3 positive SLN	10	0		
≤2 positive SLN	224	9.36		0.3373
Distant Recurrence				
Total Population (N=270)				
0 positive SLN	183	3.4	1 [Ref]	
≥1 positive SLN	87	9.6	2.94 (1.09 to 7.91)	0.0329
Total Population (N=270)				
≤2 positive SLN	246	4.99		
≥3 positive SLN	24	7.95	1.65 (0.37 to 7.33)	0.5077

Abbreviations: SLN = sentinel lymph node; ALND = axillary lymph node dissection; IR = incidence rate (%); HR = hazard ratio; CI = confidence interval.

SLN/NAC

1462 - The Evolving Landscape of Axillary Lymph Node Dissection in Breast Cancer: A Population-Based Study

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Background/Objective: Indications for axillary lymph node dissection (ALND) have been decreasing in the management of breast cancer (BC) over the past 20 years, and this procedure is now largely performed in the most complex cases. The aim of this study was to examine trends in ALND over time and describe individual surgeon volume for this procedure.

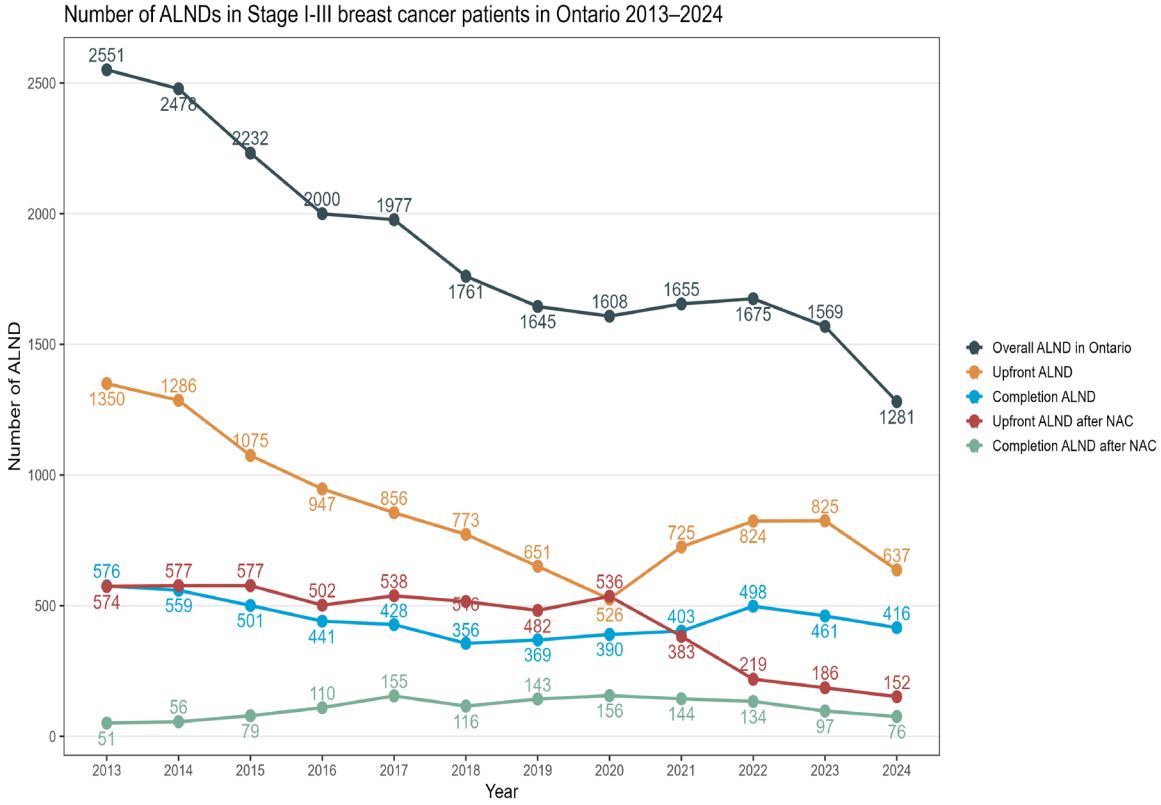
Methods: We performed a population-based cohort study using linked health administrative data in Ontario, Canada. Data were obtained from ICES (formerly known as the Institute for Clinical Evaluative Sciences), an independent, non-profit research institute that maintains health administrative data for more than 14 million Ontarians. Using the Ontario Cancer Registry (OCR), we identified Ontario residents aged 18 years and older with valid Ontario Health Insurance Plan (OHIP) numbers who were diagnosed with non-metastatic breast cancer between April 1, 2012 and December 31, 2024. Exclusion criteria included a) invalid birth/death date or missing sex data, b) in situ breast carcinoma (e.g. DCIS) or metastatic disease, and c) patients with no recorded breast surgery within one year of breast cancer diagnosis. Patient characteristics were determined from the Registered Persons Database and disease/tumor characteristics were taken from the OCR. Covariates included age at diagnosis, year of diagnosis, overall stage, clinical tumour stage, clinical nodal stage, surgery type, hormone receptor status and HER-2 status, and socioeconomic status/rurality. The 8th edition of the American Joint Committee on Cancer (AJCC) guidelines was used for breast cancer stage. Using comprehensive OHIP billing codes, we identified all ALNDs in this cohort. Patient and surgeon characteristics were described. Differences between groups were assessed using Mann-Whitney U tests for continuous variables and Chi-squared tests for categorical variables. Missing data were managed using pairwise deletion. The data analysis for this paper was generated using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). All statistical tests were two-sided, and a p-value of ≤ 0.05 was considered statistically significant.

Results: After exclusions, 126,343 women had surgery for Stage I-III BC between 2013 and 2024 in Ontario, among whom 22,432 ALNDs were performed. The proportion of patients who underwent ALND decreased from 29% in 2013 to 12% in 2024. There was a post-pandemic increase in ALNDs performed in patients having upfront surgery, while dissections after neoadjuvant chemotherapy dropped sharply (Figure 1). Of 4,525 dissections performed from 2022 to 2024, 2,286 (50%) were performed in patients who had surgery as first treatment. Further, only 37% of patients in this time period had a SLNB prior to ALND. The cohort was divided into three time periods and patient characteristics compared. Patients who underwent ALND from 2019-2024 were more likely to have early-stage disease (35% Stage I vs 14% Stage I in the earliest time period; $p < 0.001$). This appeared to be driven by an increase in patients with N1 disease (62% N1 latest time period vs 48% N1 earliest time period; $p < 0.001$). 578 General Surgeons were identified who performed at least one breast procedure over the study period, of whom 93 (16%) did not perform an ALND. The majority (88%) of these 93 surgeons were non-breast surgeons (< 0.001) and had more years since graduation from medical school (median 30 vs 19; $p < 0.001$). Among surgeons who performed at least one axillary dissection, the median number of procedures performed per year decreased from 4 in 2013 to 2 in 2024. When restricted to surgeons entering practice during the study period, the median number of ALNDs performed in the first 2 years of practice decreased from 2.5 in 2013-2014 to 1 in 2019-2020.

Conclusion: In this province wide study, ALNDs were performed in fewer breast cancer patients overall from 2013 to 2024. However, we observed increases in ALND among upfront surgery patients in the immediate post-pandemic period, which has persisted until 2024. ALNDs after neoadjuvant chemotherapy have been decreasing rapidly since 2020, likely reflecting greater uptake of SLNB after neoadjuvant chemotherapy and increasing rates of complete axillary pathologic response. Our results show that most surgeons performing ALNDs are low volume, which has important implications for familiarity with the procedure for new surgeons and residents. The exposure to ALND in the first two years of practice among surgeons who performed breast surgeries has more than halved over our study period. Surgeons who are higher volume are significantly older, and it may be difficult to replicate their exposure to axillary dissections without a high-volume breast practice in a center than manages complex

cases. Further research is needed to determine if there is a volume-outcome relationship in these increasingly complex BC patients.

Figure:



1354 - Patterns in Axillary Node Yield by Treatment Sequence and Nodal Burden

Jennifer Hale[1], Demond Handley[1], Yesung Kweon[1], Mohamed Elsaid[1], Samilia Obeng-Gyasi[1]

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Background/Objective: Pathological evaluation of axillary lymph nodes is a critical component of breast cancer staging, prognosis, and adjuvant therapy planning. Contemporary practice standards and guidelines consider axillary lymph node dissection (ALND) adequate when at least 10 level I to II nodes are examined for axillary staging. However, emerging data suggest that the total lymph node yield may differ when dissection follows neoadjuvant chemotherapy (NAC) compared to when it follows upfront surgery. This study aimed to examine the differences in axillary lymph node yield between patients who received NAC and those who underwent upfront ALND.

Methods: Women aged ≥ 18 years with stage I–III breast cancer who underwent sentinel lymph node biopsy (SLNB) and ALND were identified from the National Cancer Database (NCDB). Patients were categorized according to the treatment sequence: upfront surgery versus receipt of NAC. Crude and weighted general estimating equations with log link functions and Poisson distributions for the outcome

were fitted to examine the association between treatment group and total lymph node yield. In the weighted analysis, covariates were balanced using overlap weighting for age, race, ethnicity, year of diagnosis, facility type, clinical AJCC stage group, clinical N-stage, tumor grade, tumor size, histology, and molecular subtype.

Results: Of the 160,276 patients who met the inclusion criteria, 79.1% (126,796) underwent upfront surgery and 20.9% (33,480) received NAC. Overall, patients treated with NAC had a 9% lower expected lymph node yield than those who underwent upfront surgery (RR: 0.91, 95% CI: 0.90 to 0.92). Among cN0 patients, the median number of lymph nodes removed was similar between groups (NAC median [IQR]: 6 [4 to 11] vs. upfront surgery median [IQR]: 6 [3 to 12]). Weighted analysis showed that cN0 patients who received NAC had a slightly higher expected lymph node yield (RR: 1.06, 95% CI: 1.03 to 1.10). As the clinical nodal burden increased, patients treated with NAC had progressively lower lymph node yields than those who underwent upfront surgery (cN1 median [IQR]: 11 [7 to 16] vs. 12 [7 to 17]; cN2 median [IQR]: 12 [7 to 17] vs. 13 [9 to 18]; cN3 median [IQR]: 11 [6 to 17] vs. 18 [13 to 23]). Weighted analyses confirmed this pattern, with a decreasing expected lymph node yield among NAC recipients as the nodal stage increased (cN1 RR: 0.94, 95% CI: 0.92 to 0.96; cN2 RR: 0.90, 95% CI: 0.86 to 0.95; cN3 RR: 0.70, 95% CI: 0.65 to 0.76). Moreover, when stratified by AJCC stage, NAC was associated with higher lymph node yield in Stage I (RR: 1.17, 95% CI: 1.12 to 1.22), but lower yield in Stages II (RR: 0.90, 95% CI: 0.88 to 0.92) and III (RR: 0.85, 95% CI: 0.82 to 0.88).

Conclusion: Neoadjuvant chemotherapy was associated with a lower overall axillary lymph node yield, with the largest reductions at a higher clinical nodal burden, while yields were similar or slightly higher in cN0 and Stage I. Future guidelines may consider incorporating treatment sequence and pretreatment nodal stage when defining axillary lymph node adequacy thresholds, recognizing that node counts following neoadjuvant chemotherapy may reflect therapeutic response rather than procedural inadequacy.

1342 – Triple-Negative Breast Cancer: Sentinel Lymph Node Biopsy Alone Following Neoadjuvant Chemotherapy

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Background/Objective: Information from sentinel lymph node biopsy (SLNB) has traditionally been used to guide treatment recommendations and determine the need for further axillary intervention in breast cancer patients. Recent evidence has questioned its role in early-stage hormone receptor (HR) positive disease. However, its implications are lacking in triple-negative breast cancer (TNBC) and those undergoing neoadjuvant chemotherapy (NAC).

Methods: A retrospective single institution chart review was performed among all patients with TNBC treated from 2018-2023. Patients who presented with recurrence or distant metastasis at the time of diagnosis were excluded.

Results: A total of 212 patients were identified with a median age at diagnosis of 57 years (range: 48-67), mean tumor size was 2.5 cm (range: 0.1-11). One hundred and fifty-one (71.2%) patients were

clinically node negative (cN0), 50 (23.6%) were cN1, and 11(5.2%) were cN2/3. One hundred and forty-one (66.5%) patients received NAC, of whom 71 (50.4%) underwent subsequent mastectomy and 70 (49.6%) had lumpectomy. In the NAC cohort, SLNB alone was performed in 108 (76.6%) patients with 19 (13.5%) patients having combined SLNB/axillary lymph node dissection (ALND), 13 (9.2%) patients having ALND alone, and one patient had no axillary surgery. Patients who were cN0 were more likely to undergo SLNB alone compared to those who were cN1 or cN2/3 [75 (88.2%) vs 29 (61.7%) vs 4 (44.4%)], (P=0.001). Following surgery, among patients who underwent NAC, 111 (78.7%) were pN0. Seventy-four (87.1%) cN0 patients were also pN0 after NAC, while 30 (63.8%) cN1 patients converted to pN0. The median follow-up time for NAC patients was 37 months. There were 2 (1.4%) axillary recurrences, and both occurred in patients who were cN0, which was not statistically significant when compared to patients in the cN1 or cN2/3 groups (P=0.365).

Conclusion: Among TNBC patients with cN0 following NAC, the majority showed no disease in the SLN at time of surgery. Nearly two-thirds of patients with cN1 disease converted to pN0 after NAC. The overall rate of axillary recurrence was extremely low despite undergoing SLNB alone. These findings suggest that in cN0 and cN1 TNBC patients undergoing NAC, SLNB alone without the need for intra-operative frozen section or additional axillary surgery may be sufficient, thus reducing healthcare costs and additional patient morbidity.

1153 - Surgical De-escalation Trends in Young Women with Breast Cancer

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Background/Objective: The ACOSOG Z1071 trial demonstrated that targeted axillary dissection (TAD) can be safely utilized in patients with node-positive breast cancer who are clinically node-negative following neoadjuvant chemotherapy (NAC). Completion axillary lymph node dissection (ALND) is still considered the standard approach for women who have residual nodal disease on final pathology. Although the results of the Alliance A011202 trial are pending, surgical de-escalation continues, with selected patients undergoing TAD followed by adjuvant radiation to address residual axillary disease. Given that younger women (≤45 years) often present with biologically aggressive disease requiring NAC, our study aimed to compare disease characteristics, recurrence patterns, and survival outcomes among women undergoing modified radical mastectomy (MRM) versus simple mastectomy with TAD.

Methods: We performed a retrospective chart review of a prospectively maintained institutional database of 732 patients who were diagnosed with breast cancer at age ≤ 45 from 2010-2023. Women with clinical T1-T3, N1-3, M0 disease who received neoadjuvant chemotherapy and mastectomy were included. Exclusion criteria included women who presented with bilateral disease, underwent partial mastectomy, and/or received axillary surgery prior to neoadjuvant chemotherapy. Ultimately, 202 women were identified. Demographic details (age, race, ethnicity), tumor characteristics (clinical T and N stage, receptor status), treatment variables (receipt of neoadjuvant chemotherapy, adjuvant chemotherapy, endocrine therapy, radiation therapy), surgical management (type of breast surgery, axillary surgery, contralateral prophylactic mastectomy), pathologic response (ypT and ypN stage), and follow-up data (recurrence, type and date of recurrence, survival status, date of death, and duration of

follow up) were extracted from electronic medical records. Time-to-event outcomes, such as time to recurrence and time to death, were calculated in months from the date of diagnosis. Continuous variables were compared between groups using the Mann-Whitney U test. Categorical variables were compared between groups using chi-square or Fisher's exact test when expected cell counts were <0.05.

Results: Of the 202 women identified, 95 (47.0%) underwent MRM and 107 (53.0%) underwent simple mastectomy with TAD. Demographics and receptor status were not significantly different between groups, with a similar proportion of patients having either triple-negative or HER2+ disease (53.7% MRM vs. 54.2% TAD). The majority of patients who underwent MRM presented with clinical T3 disease (50 patients, 52.6%), while the majority of patients who underwent simple mastectomy with TAD presented with clinical T2 disease (65 patients, 60.7%) (p = 0.003). Similarly, a greater proportion of patients who underwent MRM presented with clinical N2-N3 disease (26 patients, 27.3%) compared to those who underwent simple mastectomy with TAD (12 patients, 11.2%) (p = 0.01). Post-operatively, patients who underwent MRM had greater residual disease burden, with 35 patients (36.9%) having ypT2-ypT4 disease as compared to 21 patients (19.6%) who underwent simple mastectomy with TAD (p = 0.001). MRM patients also had more pathologic disease burden in the axilla, with a greater proportion having ypN2 or ypN3 disease (26.3% MRM vs. 4.67% TAD) (p = 0.0002). Adjuvantly, there were no significant differences in receipt of endocrine therapy (p = 0.70), chemotherapy/immunotherapy (p = 0.58), or radiation therapy (87.4% MRM vs. 85% TAD, p = 0.63). There were no significant differences in median follow-up time (p = 0.93), recurrence (p = 0.19), median time to recurrence (p = 0.24), or type of recurrence (p = 0.69) based on surgical management. While median time to death was similar between groups (39 months MRM vs. 41 months TAD, p = 0.63), there was a greater proportion of deaths in the modified radical mastectomy group, specifically 30 deaths (31.6%) as compared to 18 deaths (16.8%) in the simple mastectomy with TAD group (p = 0.01).

Conclusion: In young women diagnosed with clinically node-positive breast cancer at age ≤ 45 receiving neoadjuvant chemotherapy, TAD was not inferior to ALND with respect to recurrence and survival. While patients who underwent MRM experienced a higher proportion of deaths, the overall likelihood of recurrence, type of recurrence, time to recurrence, and time to death among those experiencing events were similar to patients who underwent simple mastectomy with TAD. Demographics, tumor biology, adjuvant therapies, and follow-up time were comparable between groups. These findings suggest that differences in oncologic outcomes are largely driven by the higher clinical stage and residual disease burden seen in MRM patients, rather than the choice of axillary surgical management itself. Overall, these findings suggest that simple mastectomy with TAD may offer comparable oncologic outcomes to MRM in appropriately selected patients, aligning with emerging evidence supporting surgical de-escalation and the growing role of adjuvant radiation. Prospective studies, such as Alliance A011202, are critical to confirm whether axillary radiation can safely replace ALND for residual lymph node disease following NAC.

Table:

Patient Characteristics	MRM (%)	Simple Mastectomy w/ TAD (%)	Overall (%)	p value
N	95 (47.0)	107 (53.0)	202 (100)	
Median age (years)	37	37	37	0.36
Age group				0.77
≤35	38 (40.0)	45 (42.1)	83 (41.1)	
36-45	57 (60.0)	62 (57.9)	119 (58.9)	
Race				0.09
Asian	2 (2.11)	1 (0.93)	3 (1.49)	
Black	23 (24.2)	15 (14.0)	38 (18.8)	
White	70 (73.7)	89 (83.2)	159 (78.7)	
Other/Declined	0 (0.00)	2 (1.87)	2 (0.99)	
Ethnicity				**0.04**
Hispanic	2 (2.11)	3 (2.80)	5 (2.48)	
Non-Hispanic	82 (86.3)	101 (94.4)	183 (90.6)	
Not specified	11 (11.6)	3 (2.80)	14 (6.93)	
Receptor status				0.2
Triple-negative	22 (23.2)	35 (32.7)	57 (28.2)	
HER2+	29 (30.5)	23 (21.5)	52 (25.7)	
HR+/HER2-	44 (46.3)	49 (45.8)	93 (46.0)	
cT stage				**0.003**
T1	5 (5.26)	11 (10.3)	16 (7.92)	
T2	40 (42.1)	65 (60.7)	105 (52.0)	
T3	50 (52.6)	31 (29.0)	81 (40.1)	
cN stage				**0.01**
N1	69 (72.6)	95 (88.8)	164 (81.2)	
N2	8 (8.42)	4 (3.74)	12 (5.94)	
N3	18 (18.9)	8 (7.48)	26 (12.9)	
ypT stage				**0.001**
ypT0	21 (22.1)	40 (37.4)	61 (30.2)	
ypTis	4 (4.21)	6 (5.61)	10 (4.95)	
ypT1	35 (36.8)	40 (37.4)	75 (37.1)	
ypT2	20 (21.1)	18 (16.8)	38 (18.8)	
ypT3	14 (14.7)	1 (0.93)	15 (7.43)	
ypT4	1 (1.05)	2 (1.87)	3 (1.49)	
ypN stage				**0.0002**
ypN0	40 (42.1)	61 (57.0)	101 (50.0)	
ypN1	30 (31.6)	41 (38.3)	71 (35.1)	
ypN2	18 (18.9)	4 (3.74)	22 (10.9)	
ypN3	7 (7.37)	1 (0.93)	8 (3.96)	
Adjuvant radiation therapy				0.63
Yes	83 (87.4)	91 (85.0)	174 (86.1)	
No	12 (12.6)	16 (15.0)	28 (13.9)	
Adjuvant endocrine therapy				0.7
Yes	57 (60.0)	62 (57.9)	119 (58.9)	
No	37 (38.9)	45 (42.1)	82 (40.6)	
No data	1 (1.05)	0 (0.00)	1 (0.50)	
Adjuvant chemotherapy/immunotherapy				0.58
Yes	49 (51.6)	51 (47.7)	100 (49.5)	
No	46 (48.4)	56 (52.3)	102 (50.5)	
Median follow-up (months)	62	60	60	0.93
Recurrence				0.19
Yes	32 (33.7)	27 (25.2)	59 (29.2)	0.69
Locoregional recurrence	3 (9.38)	4 (14.8)	7 (11.9)	
Distant recurrence	29 (90.6)	23 (85.2)	52 (88.1)	
No	63 (66.3)	80 (74.8)	143 (70.8)	
Median time to recurrence (months) (range)	17 (7-124)	24 (8-75)	19 (7-124)	0.24
Death				**0.01**
Yes	30 (31.6)	18 (16.8)	48 (23.8)	
No	65 (68.4)	89 (83.2)	154 (76.2)	
Median time to death (months) (range)	39 (10-129)	41 (10-128)	39.5 (10-129)	0.63

Table 1. Patient demographics, tumor characteristics, pathologic results, and effects of treatment variables on recurrence and survival outcomes after neoadjuvant chemotherapy. Statistical analyses were performed using the chi-square (categorical variables) or Mann-Whitney U tests (continuous variables), or Fisher's exact test if counts were ≤ 5.

1122 - Impact of Total and Positive Lymph Node Count on Recurrence in Young Women Undergoing Neoadjuvant Chemotherapy

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Background/Objective: Axillary management after neoadjuvant chemotherapy (NAC) remains controversial. Lymph node ratio (LNR), the proportion of pathologically positive lymph nodes to total lymph nodes retrieved, has been evaluated in many oncologic contexts, including colorectal, lung, pancreas, and breast. Additionally, young patients often present with breast cancers, such as triple-negative or HER2+ subtypes, that are sensitive to NAC. We sought to examine the association between total lymph node count, in the context of metastatic lymph node count and lymph node ratio, and recurrence and survival outcomes in a cohort of young women treated at our institution.

Methods: This was a retrospective study of a prospectively maintained database of women age 45 or younger with clinical T1-3, N1-3, M0, unilateral, invasive breast cancer, who received systemic targeted or chemotherapy before undergoing surgery between January 2010 and December 2023. Patient demographics, tumor characteristics, histopathologic findings including total and positive lymph node count, and adjuvant therapies were recorded. Recurrence, whether locoregional, contralateral, or distant, as well as overall survival outcomes were analyzed. Furthermore, among women with at least 3 retrieved sentinel nodes who were found to have at least 1 metastatic node, total examined lymph node counts across 3 LNR tiers were compared between those who did and did not develop recurrence. Statistical analysis was performed using Mann-Whitney U, exact Wilcoxon-Mann-Whitney, Chi-squared, Fisher's exact, and Student's t-tests.

Results: 274 women met inclusion criteria. Of these, 78 patients (29%) recurred within an overall median follow-up time of 60 months. The median age was 37; the majority of women were non-Hispanic (91%) and White (73%). Most women who recurred had triple-negative (35%, n=27) or HR+/HER2- (46%, n=36) cancers, with clinical T2 (35%) or T3 (59%) and N1 (71%) disease. After neoadjuvant chemotherapy, a greater proportion of ypT2-3 (38%, versus 17%) and ypN1-3 (74%, versus 36%) disease was seen in the recurrence versus no recurrence group. There was no significant difference in the type of axillary surgical treatment received by those who recurred and those who did not (p=0.07). On average, 7.9 lymph nodes were removed during surgery. A median of 2 metastatic nodes (interquartile range [IQR], 1-4) was excised from those who eventually developed a recurrence versus 0 from those who did not (IQR, 0-1) ($p<0.001$). The mean LNR was 0.49 in the recurrence group, 0.37 in the no recurrence group (p=0.01), and 0.39 overall. The use of adjuvant endocrine therapy did reach significance between those who did and did not develop a recurrence (p=0.04); there were otherwise no differences in adjuvant therapies. Median time to recurrence was 21 months, and median time to death was 40 months.

Recurrences among women with at least 3 nodes removed were additionally compared between LNR tiers of 0.01 to 0.34, 0.35 to 0.67, and 0.68 to 1, and then sorted according to total lymph node counts, as shown in Table 1. Though the proportion of patients with recurrences increased with higher LNR (respectively 34%, 48%, and 74%), the number of lymph nodes excised within any given LNR tier did not prove to have statistical significance.

Conclusion: Patients who ultimately developed a recurrence presented with more advanced disease, were found to have greater residual burden of disease both in the breast and the lymph nodes, and underwent similar adjuvant radiation, targeted, and chemotherapies as those who did not recur. When there was a minimum of 1 involved lymph node out of a minimum of 3 retrieved lymph nodes, the total number excised did not correlate significantly with recurrence, even despite increasing proportions of metastatic nodes. Oncologic outcomes may be more reflective of tumor biology, chemoresistance, and residual tumor burden after neoadjuvant chemotherapy, rather than the number of nodes removed or the extent of nodal surgery. Prospective, large-scale, long-term studies are needed to better elucidate this question, especially in the young, high-risk population.

Table:

	Overall (%)	Recurrence (%)	No recurrence (%)	p value
N	274	78 (28.5)	196 (71.5)	
Median age (IQR)	37 (33,41)	37 (31,40)	38 (34,41)	0.11
Age group				0.67
≤35	107 (39.1)	32 (41.0)	75 (38.3)	
36-45	167 (60.9)	46 (59.0)	121 (61.7)	
Race				0.53
Asian	4 (1.5)	1 (1.3)	3 (1.5)	
Black	67 (24.5)	23 (29.5)	44 (22.4)	
White	201 (73.4)	54 (69.2)	147 (75.0)	
Declined/Other	2 (0.7)	0 (0.0)	2 (1.0)	
Ethnicity				0.88
Hispanic	8 (2.9)	2 (2.6)	6 (3.1)	
Non-Hispanic	248 (90.5)	70 (89.7)	178 (90.8)	
Not specified	18 (6.6)	6 (7.7)	12 (6.1)	
Receptor status				0.16
TNBC	86 (31.4)	27 (34.6)	59 (30.1)	
HER2+	75 (27.4)	15 (19.2)	60 (30.6)	
HR+/HER2-	113 (41.2)	36 (46.2)	77 (39.3)	
cT stage				**<0.001**
T1	23 (8.4)	5 (6.4)	18 (9.2)	
T2	148 (54.0)	27 (34.6)	121 (61.7)	
T3	103 (37.6)	46 (59.0)	57 (29.1)	
cN stage				**0.01**
N1	221 (80.7)	55 (70.5)	166 (84.7)	
N2	18 (6.6)	6 (7.7)	12 (6.1)	
N3	35 (12.8)	17 (21.8)	18 (9.2)	
ypT stage				**<0.001**
ypT0	89 (32.5)	10 (12.8)	79 (40.3)	
ypTis	13 (4.7)	4 (5.1)	9 (4.6)	
ypT1	105 (38.3)	31 (39.7)	74 (37.8)	
ypT2	47 (17.2)	20 (25.6)	27 (13.8)	
ypT3	17 (6.2)	10 (12.8)	7 (3.6)	
ypT4	3 (1.1)	3 (3.8)	0 (0.0)	
ypN stage				**<0.001**
ypN0	140 (51.1)	19 (24.4)	121 (61.7)	
ypN0(i+)	5 (1.8)	1 (1.3)	4 (2.0)	
ypN1	92 (33.6)	36 (46.2)	56 (28.6)	
ypN2	28 (10.2)	14 (17.9)	14 (7.1)	
ypN3	9 (3.3)	8 (10.3)	1 (0.5)	
Breast surgery				0.67
Lumpectomy	68 (24.8)	18 (23.1)	50 (25.5)	
Mastectomy	206 (75.2)	60 (76.9)	146 (74.5)	
Axillary surgery				0.07
SLNB	154 (56.2)	37 (47.4)	117 (59.7)	
ALND	120 (43.8)	41 (52.6)	79 (40.3)	
Examined lymph node count				
Mean ± SD	7.9±6.2	8.8±6.7	7.6±5.9	0.14
Median (IQR)	6 (3,12)	7 (4,13)	5 (3,11)	0.15
1	14 (5.1)	3 (3.8)	11 (5.6)	
2	29 (10.6)	7 (9.0)	22 (11.2)	
3	42 (15.3)	9 (11.5)	33 (16.8)	
4	27 (9.9)	10 (12.8)	17 (8.7)	
5 to 9	70 (25.5)	18 (23.1)	52 (26.5)	
10 to 15	58 (21.2)	21 (26.9)	37 (18.9)	
16+	34 (12.4)	10 (12.8)	24 (12.2)	
Median positive lymph nodes (IQR)	0 (0,2)	2 (1,4)	0 (0,1)	**<0.001**
Lymph node ratio (LNR)				
Mean LNR ± SD	0.39±0.27	0.49±0.32	0.37±0.24	**0.01**
Median LNR (IQR)	0.33 (0.20,0.53)	0.43 (0.23,0.76)	0.33 (0.21,0.50)	0.05
LNR 0.01-0.34				
3 lymph nodes examined	14	2 (14.3)	12 (85.7)	
4	6	3 (50.0)	3 (50.0)	
5 to 9	20	6 (30.0)	14 (70.0)	
10 to 15	22	9 (40.9)	13 (59.1)	
16+	12	5 (41.7)	7 (58.3)	
Total	74	25 (33.8)	49 (66.2)	
LNR 0.35-0.67				0.47
3 lymph nodes examined	3	0 (0.0)	3 (100.0)	
4	3	1 (33.3)	2 (66.7)	
5 to 9	7	4 (57.1)	3 (42.9)	
10 to 15	11	7 (63.6)	4 (36.4)	
16+	3	1 (33.3)	2 (66.7)	
Total	27	13 (48.1)	14 (51.9)	
0.68-1.0				0.67
3 lymph nodes examined	3	2 (66.7)	1 (33.3)	
4	4	2 (50.0)	2 (50.0)	
5 to 9	5	4 (80.0)	1 (20.0)	
10 to 15	3	2 (66.7)	1 (33.3)	
16+	4	4 (100.0)	0 (0.0)	
Total	19	14 (73.7)	5 (26.3)	
^Adjuvant chemo/immunotherapy				0.57
Yes	136 (49.6)	41 (52.6)	95 (48.5)	
No	137 (50.0)	37 (47.4)	100 (51.0)	
Adjuvant radiation therapy				0.18
Yes	240 (87.6)	65 (83.3)	175 (89.3)	
No	34 (12.4)	13 (16.7)	21 (10.7)	
§Adjuvant endocrine therapy				**0.04**
Yes	149 (54.4)	35 (44.9)	114 (58.2)	
No	123 (44.9)	43 (55.1)	80 (40.8)	
Median follow-up (months) (IQR)	60 (31,99)	43 (25.25,82.75)	62.5 (35,103)	**0.01**
Median time to recurrence (months) (IQR)	n/a	21 (14.25,42.75)		
Type of recurrence				
Locoregional recurrence	n/a	18	n/a	
Contralateral breast	n/a	0	n/a	
Distant metastasis	n/a	60	n/a	
Death				**<0.001**
Yes	57 (20.8)	53 (67.9)	4 (2.0)	
No	217 (79.2)	25 (32.1)	192 (98.0)	
¶Median time to death (months) (IQR)	40 (21.75,62.75)	40 (21,64.25)	35.5 (24.75,50.25)	0.92

Table 1. Patient demographics, tumor characteristics, histopathologic findings including total and positive lymph node count and lymph node ratio, surgical and adjuvant treatments, and recurrence and survival outcomes. No data available for ^1, §2, or ¶3 patients.

Time to Treatment

1411 - Recent National Trends in Time to Surgery for Breast Cancer and Predictors of Delay in Meeting the 60-Day Benchmark

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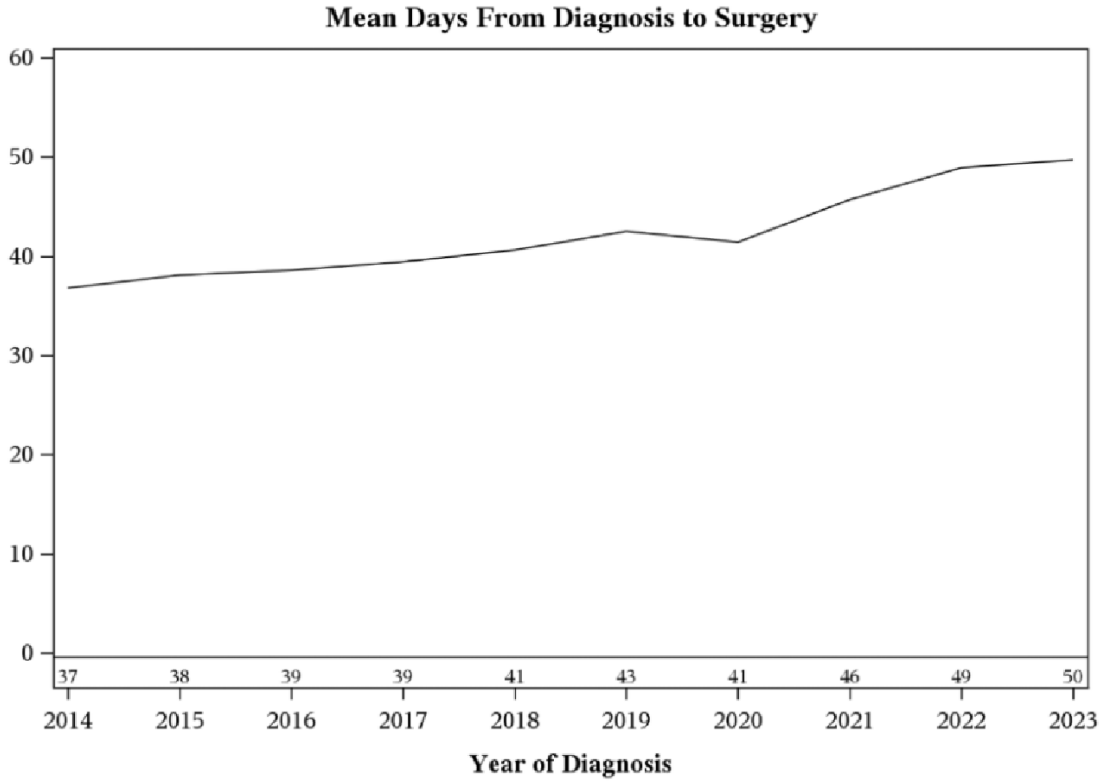
Background/Objective: Definitive upfront surgery within 60 days of diagnosis for clinical stage I-III breast cancer is an established evidence-based quality metric. Recent data suggests that time to surgery is increasing, potentially exacerbated by the COVID-19 pandemic. This study evaluates 10-year trends in time to surgery in the National Cancer Database (NCDB) and identifies populations at risk for delay to surgery and noncompliance with the 60-day quality metric.

Methods: Data from 520,967 adult women diagnosed between 2014 and 2023 with AJCC 8th edition clinical stage I-III invasive breast cancer were analyzed using the NCDB. Patients receiving neoadjuvant therapy and surgery beyond 180 days after diagnosis were excluded. Multivariable linear and logistic regression were used to estimate the effect of patient and disease characteristics on days from diagnosis to surgery (DDS) and the odds of not receiving surgery within 60 days.

Results: There was an increase in DDS over the study period with a mean of 37 and 50 days in 2014 and 2023, respectively. Relative to 2014-2019, the COVID pandemic resulted in 2.09 days (95% CI 1.86-2.32) increase in time to surgery, on average. DDS further increased by 7.51 days (95% CI 7.35-7.69) on average, in 2021-2023. The longest time to surgery was associated with uninsured status (+7.99 days, 95% CI 7.33-8.65), diagnosis at another facility (+6.55 days, 95% CI 6.40-6.69), and immediate reconstruction (+8.27 days, 95% CI 7.99-8.55). While most patients were still able to undergo surgery within the 60-day period, there was a decline evidenced over time consistent with the increase in DDS. In 2014, 88% of patients underwent surgery within 60 days whereas only 74% did by 2023. The odds of not having surgery within 60 days increased by 17% in 2020 (OR 1.17, 95% CI 1.13-1.20) and almost two-fold between 2021-2023 (OR 1.90, 95% CI 1.87-1.94) relative to before the pandemic. Other factors associated with the greatest odds of not having surgery within 60 days included uninsured status (OR 2.10, 95% CI 1.96-2.25), diagnosis at another facility (OR 1.81, 95% CI 1.78-1.84), undergoing immediate reconstruction (OR 1.81, 95% CI 1.76-1.87), and Black (OR 1.72, 95% CI 1.67-1.77) and Hispanic (OR 1.70, 95% CI 1.65-1.75) patients. In 2023, only 58% of uninsured patients and 59% of patients undergoing immediate reconstruction had surgery within 60 days.

Conclusion: Time from diagnosis to upfront surgery in clinical stage I-III invasive breast cancer is rising, with greater increases seen after the onset of the COVID-19 pandemic. Although most patients still meet the 60-day benchmark, there are subgroups of patients at greater risk of delay to surgery based on social determinants of health and need for more complex surgery. Strategies to address barriers to care including efficient patient navigation and care coordination are needed to mitigate these trends.

Figure 1: Average Days from Diagnosis to Definitive Surgery from 2014-2023



1402 - Improvements in On-Time Breast Cancer Surgery Following Medicaid Expansion

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Background/Objective: Timely surgical treatment is a nationally endorsed quality benchmark in breast cancer care with the Commission on Cancer (CoC) recommending definitive surgery within 60 days of diagnosis. Delays beyond this threshold are associated with worse survival and disproportionately affect patients who face racial and socioeconomic inequities compounded by system level barriers such as insurance coverage. The 2014 Affordable Care Act Medicaid expansion was designed to address these barriers. States that adopted expansion saw reductions in uninsured rates and later stage presentations, yet its effect on achieving guideline concordant surgery remains unclear. As ongoing debates threaten the stability of Medicaid coverage, understanding whether expansion improved on-time surgery among newly insured patients, or whether benefits reflected broader gains that persisted even after accounting for insurance type, is essential to guide future policy decisions.

Methods: Using the National Cancer Database (2011–2018), we identified women aged ≥40 years with stage I–III breast cancer who underwent definitive surgery without neoadjuvant chemotherapy. The primary outcome was on-time surgery, defined as ≤60 days from diagnosis per CoC standards. The exposure was state Medicaid expansion status. Difference-in-Differences estimation was applied to compare changes of on-time surgery (measured by percentage points [pp]) between expansion and non-expansion states before and after January 1, 2014, adjusting for age, race, ethnicity, insurance, comorbidity, urban/rural residence, facility type, and zip-code level socioeconomic indicators: education (quartiles based on the percentage of adults without a high school degree) and household income (quartiles of median income), with region and year fixed effects. Triple difference estimation (Difference-in-Differences-in-Differences) were applied to subgroups of age (<45 years vs. ≥65 years), race (White vs. Black vs Asian), ethnicity (Hispanic vs. Non-Hispanic), insurance type (Medicaid vs Medicare vs. uninsured vs. privately insured), facility type (academic/research program vs. comprehensive community cancer program vs. integrated network cancer program), and rural/urban classification (rural vs. urban vs. metro).

Results: Among 708,612 patients, 45.5% resided in Medicaid expansion states and 54.5% in non-expansion states. Medicaid expansion was associated with an improvement in on-time surgery in expansion states compared with non-expansion states (adjusted DiD = +1.9 percentage points [95% CI, 1.5–2.2]; p<0.001), after adjustment for patient demographics, insurance type, comorbidity, facility, and zip-code level socioeconomic variables (Table 1).

In triple-difference analyses, adjusted for the same covariates as above, the benefits of expansion remained most pronounced among patients aged <45 years compared with those ≥65 years (+1.9 pp [95% CI, 0.0–3.7]; p=0.044), Black patients compared with White patients (+1.4 pp [95% CI, 0.0–2.8]; p=0.030), and Hispanic patients compared with non-Hispanic patients (+3.8 pp [95% CI, 1.9–5.7]; p< 0.001). Medicaid beneficiaries experienced a greater improvement in timely surgery compared with privately insured patients (+2.5 pp [95% CI, 0.5–4.4]; p=0.016). Differences for uninsured and Medicare patients were not statistically significant compared with privately insured patients. Conversely, patients treated in urban (–2.2 pp [95% CI, –3.2 to –1.2]; p<0.001) and rural (–3.4 pp [95% CI, –5.9 to –0.9]; p=0.007) settings experienced relative declines compared with metropolitan areas. Academic research programs showed greater improvements compared with integrated network cancer programs (+1.8 pp [95% CI, 0.7–2.8]; p<0.001). Expansion effects were also larger among patients residing in zip codes with lower educational attainment (Q1, highest proportion without a high school degree) compared with higher-education zip codes (Q4; +1.6 pp [95% CI, 0.4–2.8]; p=0.011) (Table 1).

Event-study analyses demonstrated parallel pre-expansion trends and divergence beginning in 2014, consistent with a causal policy effect of Medicaid expansion on improved surgical timeliness.

Conclusion: States that expanded Medicaid experienced significant improvements in on-time breast cancer surgery, representing measurable progress toward meeting national quality benchmarks. Medicaid insured patients showed significant improvements in surgical timeliness; however, even after adjusting for insurance type, and therefore accounting for increased Medicaid enrollment, expansion benefits remained more pronounced among younger, Black, Hispanic, and lower education zip codes, groups historically facing barriers to timely surgical care. To our knowledge, this is the first study to specifically examine the impact of Medicaid expansion on guideline-concordant breast cancer surgery. Previous studies have primarily evaluated time to any treatment (surgery, chemotherapy, or radiation), whereas this analysis isolates surgical timeliness, which is a distinct and clinically meaningful quality metric. Our results align with prior literature demonstrating improvements in time to treatment

following expansion but extend these findings by revealing persistent subgroup differences in race, ethnicity, education and age. This persistence suggests that Medicaid expansion may have influenced factors beyond coverage alone, potentially reflecting broader system-level improvements that occurred secondary to the policy change, particularly within hospitals serving vulnerable populations. Further research is warranted to identify the specific mechanisms underlying these gains. Together, these findings underscore that policy level insurance reform can advance equity and guideline-concordant breast cancer surgical care.

Table:

	Expansion State			Non-expansion State			Adjusted DiD or DDD (pp, 95% CI)	p-value
	Pre (%)	Post (%)	Abs. Δ (pp)	Pre (%)	Post (%)	Abs. Δ (pp)		
Overall	83.6	81	-2.6	86.1	81.7	-4.4	**1.9 (1.5, 2.2)**	**<0.001**
Age								
65+ (Reference)	85.8	83.7	-2	88.2	84.6	-3.7	-	-
<45	78.4	73.3	-5.1	81.4	73.1	-8.2	**1.9 (0.0, 3.7)**	**0.045**
45-54	80.4	76.5	-3.9	83	77.5	-5.5	0.3 (-0.7, 1.2)	0.607
55-64	83.7	80.5	-3.2	85.6	80.7	-4.9	0.4 (-0.5, 1.2)	0.370
Race								
White (Reference)	85.1	82.5	-2.6	87.4	83.2	-4.1	-	-
Black	70.7	68.3	-2.5	78.4	73.2	-5.3	**1.4 (0.0, 2.8)**	**0.050**
Asian	82.7	79.1	-3.7	81.1	77.9	-3.1	-1.7 (-4.2, 0.8)	0.190
Pacific Islander	78.4	75.5	-2.9	85.3	70.7	-14.5	7.6 (-6.8, 21.9)	0.302
Other	80.3	73.6	-6.8	81.6	75.6	-6	-1.8 (-5.5, 1.9)	0.346
Unknown	78.8	79.9	1.1	83.8	80.8	-3	2.9 (-1.4, 7.2)	0.191
Ethnicitiy								
Non-Hispanic (Reference)	83.8	81.3	-2.5	86.4	82.4	-4	-	-
Hispanic	76.4	72.9	-3.5	79	70	-9	**3.8 (1.9, 5.7)**	**<0.001**
Unknown	86.4	82.9	-3.4	88.9	81.8	-7.1	1.7 (-0.4, 3.9)	0.117
Insurance								
Private Insurance / Managed Care (Reference)	83.7	80.2	-3.5	86.2	80.8	-5.4	-	-
Not Insured	75.2	72.4	-2.8	73.4	66.5	-6.9	2.5 (-1.2, 6.3)	0.183
Medicaid	73	70.5	-2.6	77.6	70.5	-7.1	**2.4 (0.5, 4.4)**	**0.015**
Medicare	85.4	83.5	-1.9	88.1	84.2	-3.9	0.2 (-0.5, 1.0)	0.514
Other Government/Unknown	80.4	78.6	-1.8	79.4	78.1	-1.3	-1.8 (-4.3, 0.7)	0.164
Urban/Rural area								
Metro (Reference)	83.1	80.7	-2.4	85.6	81.2	-4.4	-	-
Urban	86.9	83	-4	88.6	84.8	-3.8	**-2.2 (-3.2, -1.2)**	**<0.001**
Rural	89.7	84.1	-5.6	87.4	83.7	-3.7	**-3.4 (-5.9, -0.9)**	**0.007**
Facility Type								
Integrated Network Cancer Program (Reference)	84	80.6	-3.3	84.9	80.1	-4.8	-	-
Community Cancer Program	87.2	85.1	-2.1	89	85.2	-3.8	0.4 (-1.0, 1.9)	0.541
Comprehensive Community Cancer Program	86	83.3	-2.8	89	85.1	-3.8	-0.2 (-1.1, 0.8)	0.714
Academic/Research Program	80.2	78.2	-2	80.5	75.7	-4.8	**1.8 (0.7, 2.8)**	**0.001**
Comorbidity Score								
0 (reference)	83.9	81.2	-2.7	86.3	81.8	-4.5	-	-
1	82.5	80.6	-1.9	85.6	81.8	-3.8	0.1 (-0.9, 1.1)	0.845
2+	81.6	78.9	-2.7	83.5	79.7	-3.8	-0.6 (-2.5, 1.3)	0.545
% No High School Degree (Zipcode)								
Q4 (Reference)	85.4	83.3	-2.1	87.4	84.1	-3.3	-	-
Q1 (highest % without HS degree)	77.9	75.5	-2.4	84.7	79.4	-5.3	**1.6 (0.4, 2.8)**	**0.011**
Q2	82.8	80.1	-2.7	85.9	81.2	-4.7	0.7 (-0.3, 1.8)	0.170
Q3	84.6	81.7	-3	86.8	82.7	-4.1	-0.3 (-1.3, 0.6)	0.508
Median Household Income (Zipcode)								
Q4 (Reference)	84.2	82.1	-2	86.2	82.8	-3.3	-	-
Q1 (poorest)	80.1	76.5	-3.6	85.4	80.3	-5.1	0.1 (-1.1, 1.3)	0.866
Q2	84.3	80.7	-3.5	86.8	82	-4.8	-0.6 (-1.6, 0.5)	0.278
Q3	83.6	80.6	-3	86.6	82.2	-4.5	0.0 (-0.9, 1.0)	0.924

Pre = before Medicaid expansion policy on Jan 1, 2014; Post = after expansion policy. Percentages are unadjusted; absolute changes are percentage points (pp). Adjusted DiD shown for Overall; adjusted DDD shows level-vs-reference contrasts within each subgroup.

Table 1: Changes in On-time Breast Cancer Surgery Before and After Medicaid Expansion in Expansion vs Non-Expansion States. Pre- and post-expansion percentages of patients undergoing on-time surgery (≤60 days from diagnosis) across expansion and non-expansion states are shown. Absolute changes represent unadjusted within-group differences in percentage points (pp). Adjusted difference-in-differences (DiD) and difference-in-difference-in-differences (DDD) estimates represent the adjusted policy effect comparing expansion with non-expansion states, and level-vs-reference contrasts within each subgroup, respectively. Bolded coefficients indicate statistical significance ($p<0.05$).

1301 - Determinants of Extreme Delays in Breast Cancer Treatment: A Multi-Institutional Analysis of Patient and System Factors

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Background/Objective: A variety of reasons can lead to patients presenting with neglected breast cancer, including pursuit of alternative treatment strategies, denial, and social and economic determinants. Previously, this population has been relatively understudied. The aim of the present study was to identify patients with extreme delays from diagnosis to treatment of greater than 6 months as a proxy for neglected breast cancer in order to identify primary reasons for delay.

Methods: A retrospective cohort study was performed at two institutions – one safety net hospital and one quaternary care center – of all patients greater than or equal to 18 years(yr) diagnosed with breast cancer from 2015 to 2025 with treatment delays >180 days(d). Delay to care was defined as time from biopsy proven diagnosis to initiation of chemotherapy, endocrine therapy, surgery, or radiation. Medical charts were extensively reviewed to identify documented reasons for delay, categorized as financial/insurance, social, medical comorbidities, systems/scheduling, alternative treatments, denial/fear, and undefined. Categories were not mutually exclusive. The category financial/insurance included delays related to insurance coverage, lack of insurance, and personal financial difficulties. Social delays included lack of family or social support and interference with other responsibilities such as work or school. Systems/scheduling delays were defined as those caused by transfer of care between hospital systems or providers within the same system and difficulty scheduling follow-up. Alternative treatments that led to delay of care included pursuit of holistic diet for cancer management, treatment exclusively through non-medical wellness centers, ivermectin paste, coffee enemas, clay masks, and healing creams. Fisher's exact test and Wilcoxin rank sum tests were used.

Results: 97 patients (mean 60yr, range 24-82yr) were identified who had delays to treatment beyond 180d, of which 46 presented to the safety net hospital and 51 presented to the quaternary care center. There was a significantly larger percentage of Hispanic patients treated at the safety net hospital(56.5%) compared to the quaternary care center(18.6%). Among all patients, the most common documented reasons were systems/scheduling(30%), followed by 23% for financial/insurance, 22% for denial/fear, 21% for social, 18% for medical comorbidities, and 6.2% for alternative treatments. 15% of patient delays were undefined. Of those who encountered systems/scheduling delays, 69% were initially evaluated at the quaternary care center. Documented increased rates of systems/scheduling delays were associated with Non-Hispanic ethnicity(39% vs 17% Hispanic patients; p=0.034), primary insurance (60% Medicaid, 43% private insurance, 27% Medicare, 67% other government insurance, 17% Uninsured, p=0.029), and metastatic disease at presentation(80% of patients presenting with metastatic disease, p=0.044). Patients who reported financial delays were disproportionately younger in age at diagnosis(median 48yr vs 61yr, p<0.001) compared to those without financial delays. In contrast, patients who reported delays secondary to denial and fear were older in age(median 62yr vs 54yr, p=0.042). Those experiencing delays due to medical comorbidities were more frequent in older, Medicare-insured patients(p=0.002 and p=0.013, respectively). Social delays were associated with higher nodal stage at diagnosis (p=0.037), with cN2-3 disease comprising 15% of socially delayed patients compared to 1% of those without social delay. A clinical stage of T2-3 on diagnosis was more common among patients with delays caused by pursuit of alternative treatment compared with those with other delays (66% vs 19%, p=0.033). Alternative treatment was associated with longer time from diagnosis to treatment(p=0.027). Table1.

Conclusion: Breast cancer treatment delays have been proven to contribute to worse outcomes. Understanding the reasons behind these extreme delays is crucial for implementing change to improve patient care. Our findings suggest a multifactorial cause of extreme treatment delay and highlight the need for complex coordination of multidisciplinary care. Care must be taken to address potential for delay both on an individual patient level as well as at an institutional level in order to optimize timeliness of cancer care.

Table 1. Significant Associations between Patient/Tumor Characteristics and Reasons for Treatment Delay

Delay Category	%	Key Demographic Correlate	Key Clinical Correlate	$p < 0.05$ Findings	Interpretation
Systems/Scheduling	30%	Non-Hispanic, Insurance type	Higher cM at diagnosis, Higher cM at treatment	p=0.034, p=0.029, p=0.044, p=0.005	Patients facing scheduling delays more often had private and government coverage, while lack of insurance did not correlate with schedule delay. Scheduling problems disproportionately affect patients with metastatic disease who may require more complex multidisciplinary coordination
Financial/Insurance	23%	Younger age		p<0.001	Younger patients are more likely to have documented delays in care due to financial or insurance reasons.
Denial/Fear	22%	Older age		p=0.042	Older patients are more likely to have delays related to documented denial of cancer or fears related to their cancer
Social	21%		Higher cN at diagnosis	p=0.037	Patients reporting social causes of delay (transportation, support system, family barriers) present with more advanced nodal disease.
Medical Comorbidities	18%	Older, Medicare		p=0.002, p=0.013	Older patients are more likely to have comorbid conditions contributing to extended delays in care
Not-defined	15%	Hispanic/Spanish origin		p<0.05	
Alternative Treatment	6%		Longer delay interval, Higher cT at diagnosis	p=0.027, p=0.033	Patients who pursue alternative treatment experience significantly longer delays and present with larger tumors compared to patients facing delays for other reasons.

1284 - Cardiac Toxicity and Adrenal Insufficiency from Neoadjuvant Pembrolizumab Are Associated with a Surgical Delay in Triple-Negative Breast Cancer

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Background/Objective: The integration of pembrolizumab into neoadjuvant chemotherapy regimens for triple-negative breast cancer (TNBC) has significantly improved pathologic complete response rates and disease-free survival, as demonstrated in the KEYNOTE-522 trial. Despite these therapeutic gains, immune-related adverse events (irAEs) have the potential to impact surgical timing. The objective of this study was to characterize the frequency of irAEs and evaluate their association with time to surgery.

Methods: Patients with TNBC who received neoadjuvant Pembrolizumab as a part of the KEYNOTE-522 regimen from 2021 to 2024 were retrospectively identified from our institution's Cancer Registry. Documented irAEs included: hypothyroidism, cardiac toxicity (including myocarditis, cardiac symptoms, and atrial thrombus), nephritis, deep vein thrombosis (DVT), hepatitis, dermatitis, pneumonitis, sinusitis, pancreatitis induced diabetes mellitus, and arthropathy. For each patient, time to surgery was calculated from the initiation of neoadjuvant Pembrolizumab to the date of surgery. Student's t-test and Welch's t-test, depending on variance homogeneity, were utilized to evaluate the association of irAEs with time to surgery with significance set at $p<0.05$.

Results: A total of 126 patients received neoadjuvant Pembrolizumab as a part of the KEYNOTE-522 regimen for TNBC. Of these patients, 42 patients (33.3%) developed at least one irAE. The most common irAEs were hypothyroidism (15 patients, 35.7%), cardiac toxicity (8 patients, 19%), hepatitis (6 patients, 14.3%), and dermatitis and adrenal insufficiency each affecting 5 patients (11.9%) (Table 1). 7 patients (16.7%) experienced two or more irAEs. The mean time to surgery was 178.7 days among patients with irAES and 162.6 days for those without, representing an average delay of 16.1 days ($p=0.07$). Cardiac toxicity led to the most significant delay from initiation of immunotherapy to time to surgery with a mean of 208.9 days, $p=0.029$, corresponding to an average 46.3-day delay. Adrenal insufficiency was also associated with a significant delay to surgery with an average 34.8-day delay compared to those without irAEs (197.4 vs 162.6, $p=0.018$). DVTs were associated with an average 70.4-day delay, however, this was not statistically significant given the small sample. While hypothyroidism was the most common adverse event, this did not lead to a significant delay in surgery with an average increase of only 7.3 days.

Conclusion: One-third of patients undergoing neoadjuvant pembrolizumab treatment for TNBC experienced irAEs. Overall, patients with irAEs experienced a modest 16.1-day delay. Cardiac toxicity and adrenal insufficiency, in particular, resulted in statistically significant surgical delays, while other adverse events such as DVT or experiencing more than two irAEs demonstrated clinically meaningful but non-significant trends towards delay. These findings differ from prior studies that observed no clinically meaningful trends towards surgical delay and highlight the importance of early recognition and multi-disciplinary management of irAEs. Identifying which toxicities are most likely to prolong the treatment to surgery time interval can aid surgeons in optimizing preoperative planning, minimizing disruptions to oncologic timelines, and ensuring patients receive timely surgery.

Table 1. Type and frequency of immune-related adverse events (irAEs)

	N	%	Mean time to surgery (days)	SD	p value	Mean time delayed (days)
No irAE	84		162.6	48.9		
All irAEs	42		178.7	45.7	0.078	16.1
Hypothyroidism	15	35.7	169.9	44.7	0.568	7.3
Cardiac toxicity	8	19.0	208.9	52.9	0.029*	46.3
Hepatitis	6	14.3	163.8	27.5	0.692	1.3
Adrenal insufficiency	5	11.9	197.4	22.1	0.018*	34.8
Dermatitis	5	11.9	161.2	55.8	0.960	-1.4
Arthropathy	2	4.8	129.0	66.5	0.512	-33.6
DVT	2	4.8	233.0	79.2	0.470	70.4
Nephritis	2	4.8	182.5	33.2	0.570	19.9
Pneumonitis	2	4.8	165.0	21.2	0.910	2.4
Pancreatitis induced DM	1	2.4	207.0	NA	NA	44.4
Sinusitis	1	2.4	158.0	NA	NA	-4.6
≥ 2 irAEs	7	16.7	182.3	54.3	0.390	19.7

*7 patients with hypothyroidism had additional irAEs. *p value is statistically significant.*

1221 - Does Being Foreign-Born Delay Time to Breast Cancer Treatment: A Retrospective Review of Newly Diagnosed Breast Cancer Patients at an Urban, Ethnically Diverse Hospital

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Background/Objective: Timely initiation of breast cancer treatment is associated with improved survival, while delays exceeding 60–90 days are linked to tumor upstaging and increased mortality. The American College of Surgeons Commission on Cancer (CoC) quality measure recommends that definitive surgery in a non-neoadjuvant setting be performed within 60 days of breast cancer diagnosis. Large, population-based studies have noted racial/ethnic and socioeconomic disparities in time to treatment (TTT); however, few studies explore the impact of being foreign-born as a risk factor for delay in TTT. As foreign-born populations in the United States have markedly increased, country of birth may be an important factor to assess disparities in cancer treatment and outcomes. We evaluated the association of patients who are foreign-born with TTT in a predominantly foreign-born community in Queens, NY.

Methods: A retrospective review was conducted of patients with newly diagnosed ductal carcinoma in situ (DCIS) or invasive breast cancer, diagnosed and treated between January 2021-June 2025 at an urban, ethnically diverse hospital in New York City. TTT measures, demographic, and oncologic data were collected for all patients, and treatment delay was defined as the time from tissue diagnosis to surgery greater than 60 days, based on recent CoC quality measures, as well as time from any tissue diagnosis to any treatment (neoadjuvant or surgery) greater than 90 days. A Wilcoxon rank-sum test was performed to compare differences in time to treatment across foreign-born patients, race, ethnicity, insurance status, and language preference. Chi-square test or Fisher's exact test was performed, as appropriate, to compare the proportional differences in treatment delay between foreign-born and native-born patients.

Results: A total of 209 women with stage 0-3 breast cancer met inclusion criteria. 77.5% of patients were foreign-born, while 15.7% were born in the United States and 6.7% were unknown. 58.2% were Asian, 14.6% were Hispanic, 10.1% were Black, and 12.5% were White. 66.4% were Medicaid/Medicare-insured, and 43.5% were non-English speaking. The median TTT was 47 days (IQR 35-68 days). 67.6% of patients received surgery within 60 days, while 86.0% of patients initiated treatment (surgery or neoadjuvant therapy) within 90 days. Overall, TTT did not vary based on being foreign-born (Median (IQR), 47 (35-63) vs. 54 ((30, 80) days, p=0.691). TTT also did not differ by race, age, insurance status, language, or pathologic stage. Non-Hispanic, native patients had a higher percentage of delay to treatment (25.0%) compared to foreign-born patients (10.2%), p=0.033. Furthermore, no difference in TTT was observed when patients were disaggregated by foreign-born country.

Conclusion: The majority of patients in this study received timely breast cancer treatment within national quality benchmarks. Foreign-born status, along with other social determinants of health, was not associated with treatment delay, suggesting that culturally and linguistically concordant care in this community may help increase awareness of breast cancer and mitigate barriers to treatment. Further investigation is needed to determine the impact of other factors, such as age at immigration and time in the U.S., on quality measures among foreign-born patients. Additional research is also needed to determine how to mitigate healthcare barriers and delays to treatment in immigrant communities.

Table 1: Summary of Patient Characteristics and Time to Treatment Measures

	Foreign-born (n=162)	Native (n=33)	P value	Unknown (n=14)	Total (n=209)
Age, Mean (SD)	60.3 (12.4)	63.2 (12.0)	0.215	63.3 (10.9)	61.0 (12.3)
Race, N (%)			<0.001		
Asian	116 (72.1)	1 (3.03)		4 (28.6)	121 (58.2)
Black	9 (5.59)	9 (27.3)		3 (21.4)	21 (10.1)
White	8 (4.97)	17 (51.2)		1 (7.14)	26 (12.5)
Other/Other Combinations	28 (17.4)	6 (18.2)		6 (42.9)	40 (19.2)
Ethnicity, N (%)			1.000		
Hispanic	22 (13.8)	4 (12.1)		4 (30.8)	30 (14.6)
Non-Hispanic	138 (86.3)	29 (87.9)		9 (69.2)	176 (85.4)
Insurance, N (%)			0.002		
Medicare/Medicaid	108 (67.1)	22 (66.7)		8 (57.1)	138 (66.4)
Low-income	29 (18.0)	0 (0.00)		0 (0.00)	29 (13.9)
Private	24 (14.9)	11 (33.3)		6 (42.9)	41 (19.7)
Primary Language, N (%)			<0.001		
English	76 (46.9)	32 (96.9)		10 (71.4)	118 (56.5)
Other	86 (53.1)	1 (3.03)		4 (28.6)	91 (43.5)
Stage, N (%)			0.471		
0	49 (31.8)	7 (21.9)		1 (7.69)	57 (28.6)
1	91 (59.1)	21 (65.6)		12 (92.3)	124 (62.3)
2	11 (7.14)	4 (12.5)		0 (0.00)	15 (7.54)
3	3 (1.95)	0 (0.00)		0 (0.00)	3 (1.51)
Outcomes					
Days from biopsy to surgery or neoadjuvant treatment, Median (IQR)	47 (35, 63)	54 (30, 80)	0.691	52 (42, 95)	47 (35, 68)
Delay to treatment (>90 days), N (%)	18 (11.2)	7 (21.9)	0.100	4 (28.6)	29 (14.0)
Delay to treatment (>60 days), N (%)	59 (36.7)	13 (40.6)	0.671	6 (42.9)	67 (32.4)

1179 - Timely Surgery in ER+ HER2- Breast Cancer: The Impact of Race, Clinical Factors, and Social Determinants of Health

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Background/Objective: Delays in surgery after breast cancer diagnosis are associated with increased mortality. The Commission on Cancer recommends surgery within 60 days, and recent data show that time to surgery (TTS) over 42 days significantly increases breast cancer–specific mortality in hormone receptor–positive, HER2-negative patients. Surgical delay has been linked to younger age, Medicaid insurance, and preoperative MRI. Studies on race have shown mixed results, with some reporting longer TTS for Black and Hispanic patients and others finding no significant disparities. Further, it has been shown that patients with social determinants of health (SDoH) barriers are at higher risk of treatment delay. This study aims to identify surgical delay risk factors in a single academic institution in the Bronx, NY, which treats a diverse population in a large urban setting.

Methods: A single-institution retrospective review was conducted for ER+/HER2- breast cancer patients diagnosed from January 2023 to December 2024. Eligible participants were women ≥18 years undergoing upfront surgery. Exclusions included males, in situ disease (DCIS, LCIS), neoadjuvant therapy, and TTS >120 days. TTS was defined as days from diagnostic biopsy to index surgery. Demographic, clinical, and treatment factors including need for additional imaging, reconstruction, intraoperative radiation therapy (IORT), and medical clearance were collected. A secondary analysis included patients who completed a social determinants of health (SDoH) survey within one year of diagnosis. The 10-item survey assessed barriers such as housing, food security, utilities, transportation, healthcare cost, and social safety. TTS was compared between patients with and without SDoH deficiencies. Univariate and multivariate linear regression identified risk factors for surgical delay. U-Mann Whitney tests were also utilized to compare TTS means among stratified groups.

Results: Among 227 ER+/HER2- breast cancer cases, the mean time to surgery (TTS) was 55.0±21.0 days; 65% underwent surgery within 60 days and 30% within 42 days. Mean time from biopsy to first clinic visit was 16.7±9.6 days, and from clinic visit to surgery 38.3±20.0 days, with a strong correlation between the latter and total TTS ($\rho = 0.863$, $p < 0.001$). Median age was 65 years (IQR 57–73); younger patients (≤65) had longer TTS than older (>65) (57 vs 48 days, $p = 0.0037$). On univariate analysis, Black race, Medicaid insurance, and mastectomy were associated with longer TTS.

Multivariate analysis identified Black race, invasive lobular carcinoma, intraoperative radiation therapy (IORT), reconstruction, medical clearance, preoperative MRI, and surgery cancellation/rescheduling as independent predictors of delay (all $p<0.05$). Reconstruction had the largest effect (+17.2 days), followed by canceled surgery (+13.7 days) and Black race (+10.1 days).

Of 177 patients with SDoH data, 51(28.8%) reported ≥1 barrier. Patients with ≥1 SDOH barrier had a longer mean TTS compared to those without (59.2 vs. 53.7 days), though the difference did not reach statistical significance ($p=0.093$). Linear regression indicated each additional SDOH factor was associated with a 2.35-day increase in TTS, although these results were not statistically significant($p=0.074$).

Conclusion: This single-institution study found that both clinical and logistical factors contributed to surgical delays in ER+/HER2- breast cancer. Black race, ILC pathology, and coordination needs such as plastic surgery, IORT, and medical clearance were key predictors. The largest contributors to delay-plastic surgery involvement and canceled/rescheduled surgeries- highlight actionable targets for quality improvement. While SDoH factors trended toward longer TTS, they were not statistically significant. These findings underscore the need for institution-specific strategies to streamline surgical workflows and address disparities, particularly as delays beyond 42 days may adversely affect survival in this patient population.

Table 1: Selected Demographic, clinical, treatment factors and effects on time to surgery (TTS)

	Median TTS	IQR	Mean TTS	Std Dev	Univariate p-value	Multivariate p-value
Race					0.0432	0.004
White	49	36.0-62.8	51.61	19.68		
Black	58	42.0-75.2	59.63	22.12		
Asian	43	30.0-54.0	48.89	23.17		
Other/Unknown	60	47.2-66.8	58.69	20.15		
Ethnicity					0.5964	0.4468
Hispanic	49	38.8-65.0	54.1	19.8		
Non-Hispanic	55	40.5-69.0	55.71	22.09		
Insurance					0.005	0.0557
Private	52	38.0-70.0	55.57	23.05		
Medicaid	59	49.0-83.0	62.82	22.16		
Medicare	48.5	36.0-63.0	50.94	18.21		
Unknown	65	65.0	65	0		
Smoking					0.93	
Current	49	42.0-65.0	58.12	23.52		
Former	50	38.5-63.5	54.32	21.10		
Never	51	39.0-68.0	54.45	20.31		
Unknown	86.5	70.8-102.2	86.50	44.55		
	Median TTS	IQR	Mean TTS	Std Dev	Unadjusted p-value	Adjusted p-value
Pathology					0.2108	0.0404
IDC	50	38.0-64.0	53.85	20.71		
ILC	64	49.8-75.0	63.93	22.69		
IMC	47	45.0-49.0	49.40	9.21		
Other	54.5	51.2-57.8	54.50	9.19		
Mixed	49	32.0-75.0	52.86	26.26		
Surgery					0.0044	0.4909
Lumpectomy	49	37.0-64.0	53.11	20.34		
Mastectomy	62	52.8-80.2	66.37	22.21		
Axillary Surgery					0.0823	0.5989
SLNB	53.5	41.0-69.0	56.02	21.70		
ALND	65	52.8-78.0	67.90	20.50		
None	47	35.0-61.0	48.73	17.01		
IORT					0.1522	0.0039
Yes	57	43.0-69.5	58.10	21.11		
No	50	37.0-65.0	54.08	21.00		
Plastic Surgery					<0.001	0.0013
Yes	66	57.0-83.0	70.07	21.72		
No	49	37.0-64.0	52.67	20.01		
Clearance					0.0271	0.0026
Yes	58	42.0-69.8	60.11	22.68		
No	49	37.0-64.0	52.68	19.92		
Breast MRI					0.0017	0.0186
Yes	57.5	43.0-72.8	59.70	22.21		
No	48	37.0-62.0	51.11	19.28		
Staging Scans					0.0079	0.0566
Yes	69	57.5-93.5	74.55	25.12		
No	50	38.0-65.0	53.97	20.38		
2nd Look Imaging					0.0093	0.5716
Yes	68	58.0-81.0	72.33	20.44		
No	50	38.0-65.0	54.25	20.80		
Additional Biopsy					<0.001	0.3664
Yes	70	64.0-84.0	75.35	16.81		
No	49.5	37.2-64.0	53.32	20.51		
Outside Review					0.042	0.2257
Yes	60	49.2-71.2	64.44	22.13		
No	50	38.0-65.0	54.15	20.80		
Canceled/Reschedule Sx					0.006	0.0195
Yes	58	57.0-85.0	71.45	18.60		
No	50	38.0-65.0	54.13	20.85		

1088 - Pretreatment MRI is Associated with Delay to Surgery in New Breast Cancer Patients

Meghan Maceyko[1], Rosemary Kaufman[1], Kelsey Van Housen[1], Mariah Bloomfield[1], Scott Koeneman[1], Allison Doermann[1], Melissa Lazar[1]

[1]*Thomas Jefferson University Hospital, Philadelphia, PA*

Background/Objective: Due to its high sensitivity, MRI is considered a state-of-the-art imaging modality for the detection of breast cancer. However, its low specificity raises controversy over its global benefit (1). Current American Society of Breast Surgeons guidelines recommend screening or diagnostic MRIs for newly diagnosed cancer in high-risk patients (2), however several studies suggest no significant benefit of pretreatment MRI (pMRI) on surgical management and overall survival (3-7). One study reports significant variation in prescription rates of pMRIs ranging from 10-72% (8). In another study, significant treatment delays were reported due to pMRI, though MRI was only conducted on 2% of newly diagnosed patients (9). As pMRIs are being ordered more frequently at our institution, we aimed to explore the impact of pMRIs on time to surgery in all new breast cancer patients. We hypothesize that compared to standard methods, pMRI delays time to treatment in newly diagnosed patients.

Methods: A single institution, retrospective review of 409 selected patients with newly diagnosed breast cancer from 2020-2025 was performed. Pretreatment MRI was defined by MRI performed prior to first therapy (surgery, neoadjuvant chemotherapy, etc.). T-tests were used to compare differences in mean time between various events between pMRI and no pMRI groups, with a Holm-Bonferroni adjustment used to account for multiplicity. Secondary analysis was performed by calculating odds ratios with confidence intervals to explore differences in race and surgery type between the pMRI and no pMRI groups.

Results: Among 409 new breast cancer patients identified, 330 (80.7%) underwent upfront surgery and 72 (17.6%) underwent chemotherapy first. In the surgery first group, 108 (32.7%) patients underwent pMRI. Those who underwent pMRI were more likely to be white (OR 1.81; 95% CI 1.106 – 2.974) and were more likely to undergo mastectomy (OR 2.39; 95% CI 1.425 – 4.108) compared to the no pMRI group. 53 (16.2%) patients underwent additional biopsy with 19 (35.8%) of those resulting in malignant pathology. There was a statistically significant difference in length of time from diagnosis to surgery in patients who received pMRI versus those who did not (63.6 vs. 53.6 days; 95% CI 2.685 – 17.268; adjusted p = 0.03). There was no significant difference in time from diagnosis to first surgeon encounter (14.2 vs. 18.3 days; 95% CI -8.795 – 0.623; adjusted p = 0.266) or time from first surgeon encounter to surgery (63.5 vs. 51.2 days; 95% CI -10.558 – 31.173; adjusted p = 0.663). In patients who underwent upfront chemotherapy there was no significant difference in time from diagnosis to initiation of chemotherapy between those who underwent pMRI versus those who did not (40.7 vs. 39.7 days; 95% CI -10.46 – 12.574; adjusted p = 1.00).

Conclusion: Pretreatment MRI was associated with a delay in time to surgery in patients undergoing upfront surgery. This delay to treatment was not present in those receiving chemotherapy as initial treatment and may reflect systems constraints in operating room scheduling. Patients who received pMRI were more likely to undergo mastectomy compared to those who did not. This may be because over one-third of patients who underwent additional biopsy because of their pretreatment MRI were found to have further foci of invasive cancer on pathology. This study emphasizes the importance of

weighing the risks and benefits of delaying surgery for MRI with the potential identification of additional disease requiring intervention and potentially more invasive surgical treatment.

Tumor Genetics

1228 - Evaluating Circulating Tumor DNA and MRI for Predicting Pathologic Complete Response Following Neoadjuvant Chemotherapy in Chinese American Breast Cancer Patients

Kavita Jain[1], Diana Kantarovich[1], Ivy Lin[1], Samantha Smith[1], Lisa Baron[1], Paul Baron[1], Songchuan Guo[1], Steven Cai[1]

[1]Northwell Lenox Hill Hospital, New York, NY

Background/Objective: Patients who achieve a pathologic complete response (pCR) following neoadjuvant chemotherapy (NAC) have significantly improved prognoses. However, reliable preoperative studies and tests that predict pCR are lacking. Circulating tumor DNA (ctDNA) and magnetic resonance imaging (MRI) have emerged as promising tools for evaluating treatment response. This pilot study investigates the potential role of ctDNA and MRI in predicting pCR among Chinese American breast cancer patients undergoing NAC.

Methods: We conducted a retrospective chart review of Chinese American female patients with breast cancer who received NAC at our institution. Clinical, radiologic, and molecular data were collected, including pre-NAC and post-NAC ctDNA levels, and post-NAC MRI findings. Pathologic response was determined from surgical specimens. Associations between ctDNA clearance, radiologic complete response (rCR), and pCR were evaluated using contingency analysis with calculations of positive predictive value (PPV), negative predictive value (NPV), and area under the curve (AUC).

Results: Of 29 identified patients, 3 patients lacked complete ctDNA data, 9 had undetectable preNAC ctDNA – thus 17 patients were included for analyses involving ctDNA; MRI and pathology were available for all patients. 72% of patients (21/29) achieved pCR. CtDNA clearance status accurately predicted pCR status in 12/17 cases (70.6%), while 5/17 patients cleared their ctDNA but did not achieve pCR, one of whom had positive nodal disease but breast pCR. PPV for ctDNA clearance was 69%, NPV 100% with an odds ratio of 4.40 and AUC 0.58. While ctDNA clearance status predicted pCR status in 70.6% of cases, lack of clearance shows to be a good marker of residual disease. Post-NAC MRI predicted pCR status accurately in 65.5% of cases (19/29, similar to literature), with PPV of 79%, NPV of 40%, odds ratio of 2.5, and AUC of 0.61. When assessing both ctDNA clearance status or post-NAC MRI disease status together, they correctly predicted pCR status in 14/17 patients (82.35%), with PPV 78.6%, NPV 100%, odds ratio of 22.0 with a p-value of 0.029 and an AUC of 0.75. Only 3 patients (18%) had discordant results where both ctDNA clearance status and post-NAC MRI findings differed from pCR status.

Conclusion: In this pilot study of Chinese American breast cancer patients, data suggests that ctDNA may be a useful biomarker in predicting treatment response. Although MRI provides valuable noninvasive assessment, its findings did not consistently correlate with surgical pathology. However, ctDNA clearance with post-NAC MRI results may better predict pCR status, and when used in

combination have a higher positive predictive value than either test alone. As the sensitivity of ctDNA detection test increases, our positive predictive value should increase accordingly. Larger studies with more diverse populations are warranted to validate these preliminary observations to explore integration of ctDNA and MRI as combined predictors of pCR and to ultimately guide personalized surgical and therapeutic decision making.

Table/Figure:

ctDNA Clearance → pCR

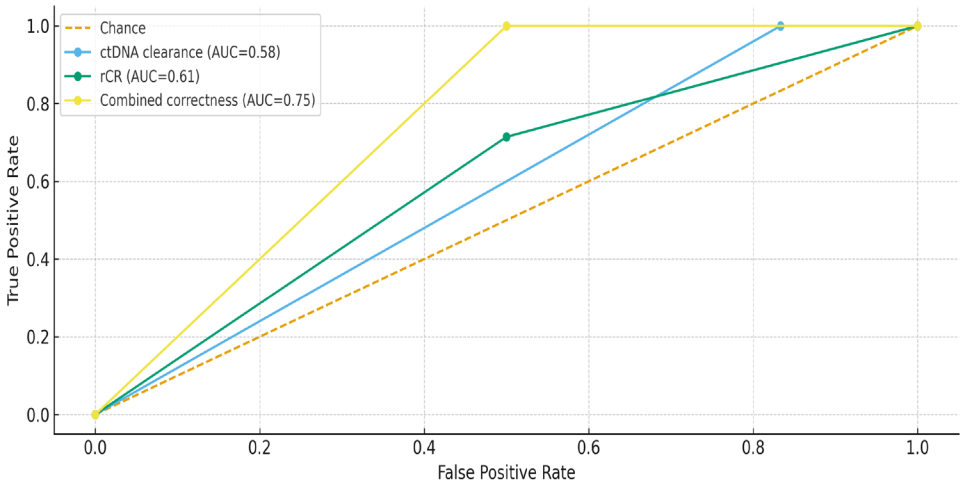
	pCR	No pCR
Test Positive	11	5
Test Negative	0	1

rCR → pCR

	pCR	No pCR
Test Positive	15	4
Test Negative	6	4

Combined Correctness → pCR

	pCR	No pCR
Test Positive	11	3
Test Negative	0	3



1196 - Impact of BRCA Mutation Status on Pathologic Response in Triple-Negative Breast Cancer Post-Neoadjuvant Chemotherapy with Immune checkpoint Inhibitors: Signal or Redundancy?

Nishitha Prashanth[1]

[1]*Aster International Institute of Oncology, Bangalore, India*

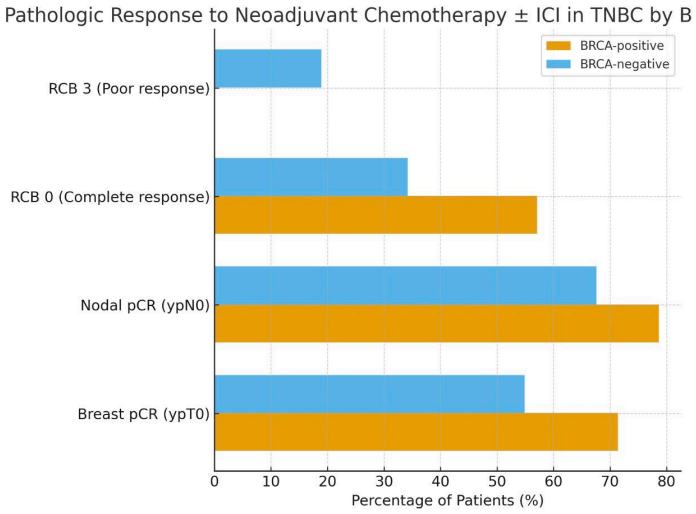
Background/Objective: Triple-negative breast cancer (TNBC) accounts for 15-20% of all breast cancers and is characterized by aggressive behaviour and lack of targeted therapy options. BRCA1/2 mutations, found in approximately 20-30% of TNBC cases, confer homologous recombination deficiency (HRD), leading to high genomic instability and chemosensitivity. Immune checkpoint inhibitors have improved outcomes in TNBC, yet the benefit in BRCA-mutated TNBC remains unclear. This study evaluates the benefit of ICIs in BRCA-mutated TNBC, given their inherently high pathologic complete response (pCR).

Methods: We prospectively analyzed 153 patients with TNBC who received platinum-based neoadjuvant anthracycline and taxane-based chemotherapy with ICI (Pembrolizumab). Patients were stratified by BRCA mutation status: BRCA-negative (n=111) vs BRCA-positive (BRCA1 and/or BRCA2, n=42). Clinicopathologic features, surgical outcomes, and pathologic responses (ypT0, ypN0, RCB 0) were compared. Logistic regression evaluated BRCA status as an independent predictor of response.

Results: Among 153 TNBC patients, Rates of breast pathological complete response (ypT0) were significantly higher in the BRCA+ group (71.4% vs 54.9%, p=0.0008), as were nodal pCR rates (ypN0: 78.6% vs 67.6%, p=0.0243). RCB 0 was achieved in 57.1% of BRCA+ patients versus 34.2% in BRCA– patients (p=0.013), and no BRCA+ patient had RCB 3 (vs 18.9% in BRCA–, p<0.0001). On multivariate logistic regression, BRCA positivity remained an independent predictor for both ypT0 (OR = 3.08; 95% CI: 1.34–7.07; p=0.0078) and ypN0 (OR = 5.69; 95% CI: 1.83–17.7; p=0.0025). These findings highlight the robust chemosensitivity of BRCA-mutated TNBC in the absence of immunotherapy.

Conclusion: Our findings suggest that BRCA1-mutated TNBC achieves exceptionally high pathologic responses with chemotherapy, potentially limiting the added benefit of ICIs. In contrast, BRCA– patients-who demonstrate lower chemosensitivity-may derive the greatest incremental benefit from immunotherapy. BRCA2-mutated tumors appear biologically distinct, with heterogeneous responses warranting further biomarker-driven stratification. These results highlight the need for genetic stratification in future TNBC immunotherapy trials.

Figure:



1190 - Impact of BRCA Mutation Status on Pathologic Response in Triple-Negative Breast Cancer Post-Neoadjuvant Chemotherapy with Immune checkpoint Inhibitors: Signal or Redundancy?

Nishitha Prashanth[1], Somashekhar S P[1]

[1]*Aster International Institute of Oncology, Bangalore, India*

Background/Objective: Triple-negative breast cancer (TNBC) accounts for 15-20% of all breast cancers and is characterized by aggressive behaviour and lack of targeted therapy options. BRCA1/2 mutations, found in approximately 20-30% of TNBC cases, confer homologous recombination deficiency (HRD), leading to high genomic instability and chemosensitivity. Immune checkpoint inhibitors have improved outcomes in TNBC, yet the benefit in BRCA-mutated TNBC remains unclear. This study evaluates the benefit of ICIs in BRCA-mutated TNBC, given their inherently high pathologic complete response (pCR).

Methods: We prospectively analyzed 153 patients with TNBC who received platinum-based neoadjuvant anthracycline and taxane-based chemotherapy with ICI (Pembrolizumab). Patients were stratified by BRCA mutation status: BRCA-negative (n=111) vs BRCA-positive (BRCA1 and/or BRCA2, n=42). Clinicopathologic features, surgical outcomes, and pathologic responses (ypT0, ypN0, RCB 0) were compared. Logistic regression evaluated BRCA status as an independent predictor of response.

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Conclusion: Our findings suggest that BRCA1-mutated TNBC achieves exceptionally high pathologic responses with chemotherapy, potentially limiting the added benefit of ICIs. In contrast, BRCA– patients-who demonstrate lower chemosensitivity-may derive the greatest incremental benefit from immunotherapy. BRCA2-mutated tumors appear biologically distinct, with heterogeneous responses

warranting further biomarker-driven stratification. These results highlight the need for genetic stratification in future TNBC immunotherapy trials.

1114 - Evaluating the Necessity of Sentinel Lymph Node Biopsy in Mammaprint Ultralow and Low-Risk Breast Cancer

Nicole Taylor[1], York Chew[1], Laura Godkin[1], Maham Mundh[2], Esther Munezero[3], Nicole Sookhan[1], Beth Sieling[1]

[1]St. Mary's Hospital, Waterbury, CT, [2]Saba University, Devens, MA, [3]University of Medicine and Health Sciences, Basseterre

Background/Objective: The utility of axillary lymph node staging has been debated throughout the past years. As a society we have progressed from axillary lymph node dissections to sentinel node biopsy (SLNB) and have even begun to omit axillary staging, such as in the elderly population due to de-escalation of therapy. Tumor genomics offer in-depth knowledge of tumor subtype predicting effectiveness of chemotherapy, as well as prognostic information providing information on risk of relapse. Mammaprint is a 70-gene genomic test that classifies a patient's risk for recurrence into Low/High, now recently expanded to Ultralow/Low/High risk 1/High risk 2. We hypothesized that patients with an Ultralow or Low Risk Mammaprint may not benefit from sentinel lymph node biopsy.

Methods: We performed a single-institution retrospective chart review of 829 Stage I-III female breast cancer patients who had undergone surgical treatment from January 2018 - July 2025. Patients in whom sentinel lymph node biopsy was deferred or those without Mammaprint/Blueprint testing were excluded. Patient characteristics such as age, operation received (lumpectomy vs. mastectomy), and cancer pathology (ductal vs. lobular) were recorded. Patients were separated by Mammaprint risk status: Ultralow risk (ULR), Low risk (LR), High risk (HR), High risk1 (HR1) and High risk2 (HR2) although many patients had undergone Mammaprint testing prior to creation of ULR, HR1, H2 categories. As patients with a Mammaprint of HR and above are recommended to undergo adjuvant chemotherapy, we assessed the rate of positive SLNB as well as the number of positive SLN in patients with ULR and LR. We then assessed the rate of change in post-operative management in ULR and LR patients with the SLNB information including need for adjuvant post-mastectomy radiation or chemotherapy that would have otherwise not been recommended for another reason (such as HER2+ disease). Results were analyzed using standard statistical techniques.

Results: There were 428 patients who had undergone surgery for Stage I-III breast cancer with SLNB and Mammaprint data. There were 21 ULR patients, 213 LR patients, 179 HR patients, 11 HR1 patients and four HR2 patients. Patients with an increase in risk status were noted to be significantly younger (Table 1). There were no patients in the ULR group with a positive SLNB. No patients with an ULR required adjuvant chemotherapy or post-mastectomy radiation. There were 39/213 (18.31%) LR patients with positive SLNB, 10 of the 39 patients had >2 lymph nodes with metastatic disease. Additionally, 11/213 (5.16%) of LR patients were recommended to undergo adjuvant chemotherapy due to sentinel lymph node information who would have otherwise not received it. Out of the 39 LR patients with positive SLNB, 15 had undergone mastectomy and 13 required post-mastectomy radiation based on the AMAROS trial.

Conclusion: The rate of lymph node metastasis may remain significant in Low risk Mammaprint disease. In this patient sample, 5.16% of patients required additional chemotherapy based on sentinel lymph node information affecting systemic decision making. There were no patients in the Ultralow risk group that had positive lymph nodes or required additional chemoradiation suggesting that this group may not benefit from SLNB however this conclusion is limited due to the small number of patients in this group. We hope to gather more data regarding UL and LR patients in the future to have a better understanding of the role of axillary staging in the future.

Table:

Mammaprint	Ultralow Risk	Low Risk	High Risk	High Risk 1	High Risk 2	Significance
	n = 21	n = 213	n = 179	n = 11	n = 4	
Population Characteristics						
Average age (years)	61.57	62.73	61.56	58.09	55.5	p = 0.002
# Invasive Ductal Carcinoma	15 (71.43%)	170 (79.81%)	161 (89.94%)	9 (81.82%)	4 (100%)	
# Invasive Lobular Carcinoma	6 (28.57%)	43 (20.19%)	15 (8.38%)	2 (18.18%)	0	
Lymph Node Staging						
# Patients with Positive SLNB	0	39 (18.31%)	39 (21.79%)	2 (18.18%)	1 (25%)	p = 0.844
Patients with **>2** Positive Lymph Nodes	N/A	10/39 (25.64%)	4/39 (10.26%)	1/2 (50%)	0	
Post-operative Management						
Adjuvant Chemotherapy Recommended due to SLNB	0	11	N/A	N/A	N/A	
Post-Mastectomy Radiation Recommended due to SLNB	0	13				
Long Term Monitoring						
# Patients with Disease Recurrence	1*	1**	11	1	0	

*Had positive margins on index operation not re-excised at outside facility

**Patient with +SLNB not given adjuvant chemotherapy after index operation due to Mammaprint

1109 - Patterns of Oncotype Use and Adjuvant Systemic Therapy in Premenopausal Women with Positive Nodes

Leslie Kim[1], Carolyn Vanek[1], Raffaella Symmans[1], Tara Balija[1], Tianxiang Sheng[1], Elisa Port[1], Stephanie Bernik[1]

[1]*Mount Sinai, New York, NY*

Background/Objective: RxPONDER demonstrated that all premenopausal, node-positive (N+) patients derived benefit from adjuvant chemotherapy, regardless of OncotypeDX score. Nevertheless, OncotypeDX is used selectively in this patient population. Our goal was to evaluate patterns of OncotypeDX use in these patients and whether this influenced subsequent systemic treatment.

Methods: We performed an IRB-approved retrospective review of a prospectively maintained institutional database of breast cancer patients from 2022-2023 to identify premenopausal patients with unilateral, hormone-receptor positive, Her2 negative cancers and ≥1 N+ on final pathology. Variables of interest included number of N+, whether OncotypeDX was offered, OncotypeDX score, and type of systemic adjuvant treatment received (chemotherapy vs endocrine therapy alone). Wherever possible, we attempted to ascertain why patients received an OncotypeDX score. OncotypeDX scores were stratified by low (0-10), intermediate (11-25), or high risk (>26). Patients who declined recommended treatments were excluded.

Results: We identified 50 patients who were premenopausal with N+ disease (Table 1). Most patients had just 1 N+. OncotypeDX testing was offered to or discussed with 36/50 patients (72%) and performed in 33/50 patients (66%). All OncotypeDX scores were performed after surgery, and scores ranged from 1-43. Per chart review of medical oncology discussions, 24/33 (73%) patients who received an OncotypeDX score wished to avoid chemotherapy. Of 11/33 (33.3%) patients with oncotype who did not

receive adjuvant chemotherapy, none had a high-risk score, with 2/11 (18%) having low-risk scores, and 9/11 (82%) having intermediate-risk scores. The most common endocrine therapy administered was ovarian suppression+ aromatase inhibitor (OS+AI; n=9/11, 82%). Of 22/33 (66.7%) patients with oncotype who did receive chemotherapy, scores ranged from 6-43. Among them, 2/22 (9%) had low-risk scores, 15/22 (68%) had intermediate-risk scores, and 5/22 (23%) had high-risk scores.

Conclusion: Although OncotypeDX is not specifically recommended for determining chemotherapy benefit in premenopausal women with N+, most of this population at our institution did receive one, and a subset did not have chemotherapy based on results. All non-chemotherapy patients had low-intermediate scores. Among those who received chemotherapy, only 2 had low scores. Utilization of OncotypeDX to influence adjuvant treatment for premenopausal N+ women is gaining traction, generally rendering them postmenopausal with OS+AI, instead of systemic treatment. Clinical trial data will definitively determine whether OS+AI without chemotherapy in this group is adequate to prevent recurrence and if OncotypeDX can aid in that decision making.

Table 1: OncotypeDX Score Distribution in Premenopausal Patients with Node Positive Disease

N=50	1 node (n=27)	2 nodes (n=11)	3 nodes (n=7)	>3 nodes (n=5)
RS offered/ discussed (n=36)	22 (82%)	8 (73%)	3 (43%)	3 (60%)
RS sent (n=33)	20 (74%)	8 (73%)	3 (43%)	2 (40%)
- Low (0-10)	- 2 (10%)	- 1 (12%)	- 1 (33%)	- 0 (0%)
- Int (11-25)	- 15 (75%)	- 6 (75%)	- 1 (33%)	- 2 (100%)
- High (≥26)	- 3 (15%)	- 1 (12%)	- 1 (33%)	- 0 (0%)
Chemotherapy given	19 (70%)	9 (82%)	6 (86%)	5 (100%)
- Low RS	- 1 (5%)	- 1 (11%)	- 0 (0%)	- 0 (0%)
- Int RS	- 8 (42%)	- 4 (44%)	- 1 (17%)	- 2 (40%)
- High RS	- 3 (15%)	- 1 (11%)	- 1 (17%)	- 0 (0%)
No chemotherapy	8 (23%)	2 (18%)	1 (14%)	0 (0%)
- Low RS	- 1 (12%)	- 0 (0%)	- 1 (100%)	- 0 (0%)
- Int RS	- 7 (88%)	- 2 (100%)	- 0 (0%)	- 0 (0%)
- High RS	- 0 (0%)	- 0 (0%)	- 0 (0%)	- 0 (0%)

Clinical Studies

1321 - A Clinical Study of a Prototype DAA/TAA Vaccine Targeting MUC1 for Immune Interception and Prevention in Ductal Carcinoma In Situ

Emilia Diego[1], Julia Foldi[1], Olivera Finn[2], Leisha Emens[3]

[1]University of Pittsburgh Medical Center, Pittsburgh, PA, [2]University of Pittsburgh, Pittsburgh, PA, [3]Calico Lifesciences, South San Francisco, CA

Background:
Hypoglycosylated tumor MUC1, a transmembrane glycoprotein, is recognized by human T-cells and antibodies as a tumor-associated antigen. It is overexpressed in premalignant precursor lesions, including ductal carcinoma in situ (DCIS), thereby serving as a potential potent DCIS rejection target. Vaccine-induced immune response to MUC1 may halt DCIS recurrence or progression to invasive disease and may offer a future strategy for primary disease prevention in high-risk individuals.

We hypothesize that our MUC1 peptide vaccine will be both safe and immunogenic in patients with DCIS and that the elicited systemic immune response will affect changes in the microenvironment of the DCIS from pro- to anti-tumor.

Eligibility Criteria:
1. Female, 18 years or older
2. Biopsy proven ER+ DCIS
3. Candidate for tamoxifen of AI
4. Surgery planned as part of definitive local therapy

Prospective Clinical Trial Design:
This single institution (University of Pittsburgh), open label, randomized phase I clinical trial (NCT06218303) is designed for 50 women with previously untreated estrogen-receptor positive (ER+) DCIS histologically confirmed on core needle biopsy (CNB). Patients with autoimmune diseases are excluded. Patients are randomized 2:1 to the vaccine group. The vaccine is composed of a 100aa long MUC1 peptide corresponding to 5 tandem repeats of 20 amino acids from the MUC1 variable number of tandem repeats region (VNTR), admixed with the poly-ICLC adjuvant Hiltonol. The vaccine is administered intramuscularly. The vaccine group receives the MUC1 peptide vaccine series pre-operatively (at 0, 2, and 10 weeks) with optional tamoxifen or an aromatase inhibitor (AI). The control group receives only optional tamoxifen or AI. All undergo surgery at 12 weeks. Research blood is drawn in the vaccine group at baseline and 2 weeks after each vaccine, and in the control group at baseline and at week 12. Tissue from the pre-treatment CNB and the post-treatment operation are also collected. An optional booster is available to vaccine responders 6 months post-surgery.

Specific Aims:
The primary objective is to assess the immunogenicity of the MUC1 vaccine in ER+ DCIS patients prior to surgery.

The secondary objective is to assess the safety and feasibility of the MUC1 vaccine in ER+ DCIS patients prior to surgery.

The exploratory objective is to characterize peripheral MUC1-specific effector T-cells, regulatory T-cells and myeloid-derived suppressor cells (MDSC) at baseline and after vaccination. Changes in features of the tumor microenvironment and peripheral immunity at baseline and after vaccination may also be explored.

Statistical Methods:
Sample size/power: Assuming a one-sided type I error $\alpha \leq 0.05$ and that the rate of patients having a $\geq$ 2× change in anti-MUC1 IgG 1 is 35% in the vaccine arm and 2% in the control arm (to account for random response), a sample sizes of n=32 and 18 respectively in each arm will yield 88% power. With a dropout of up to 3 patients in each arm, the remaining sample size will still yield power of 82%.

Statistical analysis:
Fisher's exact test will be performed at the one-sided α=0.05 for the primary immunogenicity endpoint for comparing the experimental arm to the control arm.

Present and Planned Accrual:
Planned accrual of 50 patients. There are 20 patients on study to date.

Contact information for clinicians and patients with an interest in the clinical trial.
Principal Investigator:
Emilia J. Diego, MD
diegoe@upmc.edu

1053 - Non-Invasive Vagus Nerve Stimulation Combined with Acupressure Point Stimulation for Psychoemotional Symptom Relief After Breast Cancer Surgery: A Pilot Study of mindvybe™ with Biomarker Validation

Stacy Krisher[1], Anna Mazor[1], Yakov Katsnelson[2], Ashley Trymbiski[3]

[1]Redeemer Health, Meadowbrook, PA, [2]Innerstill Device Design Manufacturer, Sudbury, MA, [3]Independent Contractor, Meadowbrook, PA

Background:
Women recovering from Breast Cancer Surgery often experience persistent psychoemotional symptoms-distress, fatigue, sleep disorders, and disturbances of well-being-that impair quality of life and hinder recovery. Non-invasive vagus nerve stimulation combined with Acupressure Point Stimulation (nVNS/APS) is a promising non-pharmacological method of neuromodulation that reduces the severity of these symptoms by activating the parasympathetic nervous system. This pilot study evaluated the clinical effects of mindvybe™, a patented multi-channel device for nVNS/APS, on the severity of these symptoms as reported by patients and physiological biomarkers.

Eligibility Criteria:
Inclusion criteria:
• Individuals between the ages of 18 to 75

• Breast cancer diagnoses and treatment within the last five years, where all chemotherapy and/or radiotherapy has been completed, with the exception of individuals who are receiving chronic treatment for stage IV disease.

Prospective Clinical Trial Design:
This study is an open label study of tVNS/APS using the consumer wellness product mindvybe™ in adults eighteen years to seventy-five years of age who have well-being disturbances due to a cancer diagnosis and treatment.

Specific Aims:
• The percentage of improvement as measured by the Psychological General Well-Being Schedule (PGWB-S) from before the first session in comparison to the fifth session, and at 2, 4, 8 and 12 weeks of follow-up percentage of improvement as measured by the below assessments from before the first session in comparison to the fifth session, and at 2, 4, 8 and 12 weeks of follow-up.

• NCCN Distress Thermometer
• WHO 5
• NeuralChek HRV (will only be assessed from before the first session in comparison to the fifth)
• The PROMIS Fatigue – Short Form
• The Morin Insomnia Severity Index

Statistical Methods:
The null hypothesis is:
• The percent improvement in The Psychological General Well-Being Schedule (PGWB-S) score is equal in treated subjects before the first session, after the fifth session, and at 2,4,8, and 12 weeks of follow up.

The alternative hypothesis is:

• The percent improvement in The Psychological General Well-Being Schedule (PGWB-S) score in treated subjects before the first session, after the fifth session and at 2,4,8,and 12 weeks of follow-up are not equal.

For statistical hypothesis testing, the type I error will be set to 0.05 and the type II error set to 0.80.
This hypothesis will be tested using a statistical t-test on the primary endpoint to see if we can reject the null hypothesis.
A cumulative distribution analysis using the Kolmogorov-Smirnoff statistic will also be conducted on the primary endpoint.
Descriptive statistics will be used to describe demographics.

Covariate analysis on the data will be performed (possible covariates are age, sex, length of arthritis, unilateral vs bilateral, arthritis type, education, concomitant medication, concomitant diseases)

Present and Planned Accrual:
Reporting on the initial 23 subjects; planned accrual of 60 subjects total.

Contact information for clinicians and patients with an interest in the clinical trial.

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