2023 ANNUAL MEETING

OFFICIAL PROCEEDINGS, Volume XXIV

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 Publications 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 Publications 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 ten poster category. The recipient of the award, selected by audience vote, is honored with a plaque.

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Contents

Scientific Oral Presentations I

Friday, April 28, 2023 1:15 pm–2:30 pm
Moderators: Sarah Blair, MD, FACS; Emilia Diego, FACS

1388031 - Intraoperative Pathology Assessment May Lead to Overtreatment of the Axilla in Clinically Node-negative Breast Cancer Patients Undergoing Upfront Mastectomy

Robert Pride[1], Charity Glass[2], Faina Nakhlis[3], Alison Laws[3], Anna Weiss[3], Jennifer Bellon[3], Elizabeth Mittendorf[3], Tari King[3], Olga Kantor[3]

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Background/Objective: Randomized trials have established the safety of observation or axillary radiation (AxRT) as an alternative to axillary lymph node dissection (ALND) among patients with limited nodal disease who undergo upfront surgery. While omission of ALND has been widely accepted for clinically node-negative patients found to have 1-2 positive sentinel lymph nodes (SLN) who undergo breast-conserving surgery, variability remains with regards to axillary management in similar patients undergoing mastectomy. Intraoperative pathology assessment can influence decision-making about ALND in the operating room and may lead to increased use of both ALND and AxRT in mastectomy patients otherwise eligible for axillary management with either approach per the AMAROS trial; this may be considered axillary overtreatment and translate to increased morbidity. Here we examine the impact of intraoperative pathology assessment in axillary management in a large cohort of AMAROS-eligible mastectomy patients reported to the National Cancer Database (NCDB).

Methods: The NCDB was used to identify AMAROS-eligible cT1-2N0 breast cancer patients from 2018-2019 undergoing upfront mastectomy and SLN biopsy (SLNB) found to have 1-2 positive SLN. We examined axillary management patterns by size of nodal metastases and use of intraoperative pathology. Intraoperative pathology assessment was defined as either “not done/not acted on” if ALND was either not performed or performed at a later date than SLNB, or “done/acted on” if SLNB and ALND were performed on the same day. AxRT was defined as postmastectomy radiation including radiation to the draining lymph nodes. Adjusted multivariable analysis was used to examine predictors of receiving both ALND+AxRT.

Results: Of 40,467 patients with cT1-2N0 disease who underwent upfront mastectomy that would be AMAROS-eligible, 8,216 (20.3%) had 1-2 positive SLN. Intraoperative pathology was not done/not acted on in 5,159 (62.8%) cases and done/acted on in 3,057 (37.2%). Overall axillary management was observation in 2,730 (33.2%), ALND in 2,184 (26.6%), AxRT in 1,820 (22.2%), and ALND+AxRT in 1,482 (18.0%). Patients with intraoperative pathology acted on were significantly more likely to have both ALND+AxRT than those without intraoperative pathology (17.2% vs 0.6% for micrometastases; 43.4% vs 7.3% for macrometastases, both $p< 0.001$). Axillary management by size of nodal metastasis and intraoperative pathology is shown in the Table. In those patients with intraoperative pathology not

done/not acted on, 609 (11.8%) returned to the operating room for ALND. On multivariate analysis adjusting for patient features and tumor characteristics, the strongest predictor of receiving both ALND+AxRT was use of intraoperative pathology (OR 8.53, 95% CI 7.32-9.95, p< 0.001). Additional predictors included macrometastases (OR 3.45) and increasing number of total positive nodes (OR 2.11 for 2, OR 3.84 for 3, OR 5.41 for >3).

Conclusions: In a large population of AMAROS-eligible cT1-2N0 patients undergoing upfront mastectomy with 1-2 positive SLN, acting on intraoperative pathology significantly increased the use of both ALND+AxRT. Omission or selective use of intraoperative pathologic assessment in this population would encourage consideration of AxRT as an alternative to ALND when appropriate to minimize axillary overtreatment and associated morbidity.

Table. Axillary management in cT1-2N0 patients undergoing mastectomy found to have 1-2 positive SLN

Axillary Management	Observation	ALND	AxRT	ALND+AxRT	P-value
Total (N=8216)	**N=2730 (33.2%)**	**N=2184 (26.6%)**	**N=1820 (22.2%)**	**N=1482 (18.0%)**	
By Size of nodal metastasis and intraoperative Pathology					
Micrometastases with intraoperative path not done or not acted on (n=1847)	1363 (73.8%)	72 (3.9%)	400 (21.7%)	12 (0.6%)	<0.001
Micrometastases with intraoperative path done and acted on (n=378)	0	313 (82.8%)	0	65 (17.2%)	
Macrometastases with intraoperative path not done or not acted on (n=3321)	1367 (41.3%)	284 (8.6%)	1420 (42.9%)	241 (7.3%)	<0.001
Macrometastases with intraoperative path done and acted on (n=2679)	0	1515 (56.6.0%)	0	1164 (43.4%)	

1387186 - A Randomized Control Pilot of Prehabilitation During Neoadjuvant Chemotherapy for Women with Breast Cancer: A Mixed Methods Study

Priya Brahmbhatt[1], Nicole Look Hong[2], Apishanthi Srikandarajah[2], Sharon Lemon-Wong[2], Nasrin Alavi[2], Leslie Gibson[2], David Berger-Richardson[2], Tracey Rapier[2], Joanna Mascarenhas[2], Elie Isenberg-Grzeda[2], Sarah Selvadurai[3], Daniel Santa Mina[1], Frances Wright[2]

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Background/Objective: Prehabilitation in other disease settings has demonstrated efficacy in improving peri-operative outcomes. Little is known about the feasibility of multimodal prehabilitation during neoadjuvant chemotherapy (NACT) in women with breast cancer, and whether it can attenuate treatment-related decrements. We hypothesized the prehabilitation during NACT would be feasible and that it would mitigate functional and psychosocial decline during and after NACT.

Methods: We conducted a multi-site randomized controlled trial of multimodal prehabilitation versus usual care during NACT women diagnosed with non-metastatic breast cancer in Toronto, CA (Sunnybrook Health Sciences Centre and University Health Network). Participants in the prehabilitation group received an individualized exercise program for the duration of NACT, dietetic support, and stress management counselling. Feasibility metrics included recruitment rates, attrition, and intervention-related adverse events. We also conducted an exploratory analyses of intervention efficacy on physical fitness (6-minute walk test, grip strength, anthropometrics) and psychosocial outcomes (participant-reported quality of life, fatigue, physical activity levels, upper quadrant function, and anxiety and depression) using linear mixed effects models. Data were collected before initiating NACT, following NACT completion, and 6 months after surgery. We also conducted semi-structured interviews in a subset of participants after study completion to understand their prehabilitation experiences more comprehensively. These data were analyzed using inductive thematic analysis.

Results: A total of 137 women were approached across the 2 study sites. Of these, 72 were randomized, resulting in a recruitment rate of 53%. There was an attrition rate of 13% over the study period. Mean participant age was 54.2 years (standard deviation [SD]: 11.48 years) and participants received an average of 8 NACT cycles (range: 4-12). There were no intervention-related adverse events reported. Participants in the prehabilitation group were meeting physical activity guidelines based on self-reported physical activity at both post-chemotherapy time-points, whereas control participants were not. Participants in the prehabilitation group had better functional walking capacity at the post-chemo time-point (between group difference of 49.43 m ± SD 23 m; 95% confidence interval [CI]: -118.07, 19.22) and at the post-surgery time-point (27.25 ± SD 23.9; 95% CI: -96.8, 42.18) compared to the control group. Intervention participants also reported better quality of life and less fatigue when compared with controls at both post-NACT timepoints (values represented clinically important differences). The qualitative data from the interviews (n=6) suggested that the intervention had a substantial positive impact on the treatment experience. Major themes that emerged from the interviews included: i) the diagnosis period as being extremely overwhelming; ii) prehabilitation as education; and iii) prehabilitation as respite. Other important themes included barriers and facilitators to prehabilitation participation and other unfulfilled needs from prehabilitation.

Conclusions: Prehabilitation during NACT in women with breast cancer is feasible and well received. Our pilot study suggests that multimodal prehabilitation may improve clinically relevant outcomes including physical fitness, quality of life, and fatigue. An adequately powered trial to determine efficacy is warranted.

Table. Mean estimates and between-group differences for quantitative measures at each study timepoint

Outcome	Time point	Group		Between-group contrasts (Control - Intervention)	
		Intervention (n=35)	Control (n=37)	Δ ± SE	(95% CI)
		Mean estimates ± SE	Mean estimates ± SE		
Objective Measures					
Six-Minute Walk Test	Baseline	507 ± 16	499 ± 16.3	-7.48 ± 22.8	(-73.91, 58.95)
(metres)	Pre-surgery	501 ± 16.7	452 ± 16.8	-49.43 ± 23.6	(-118.07, 19.22)
	6-months post-op	523 ± 16.7	495 ± 17.2	-27.25 ± 23.9	(-96.8, 42.18)
Grip strength	Baseline	48.4 ± 1.67	45.5 ± 1.68	-2.88 ± 2.37	(-9.78, 4.01)
(kg-force)	Pre-surgery	44.9 ± 1.73	44.4 ± 1.74	-0.54 ± 2.46	(-7.66, 6.59)
	6-months post-op	44.9 ± 1.73	40.7 ± 1.77	-4.21 ± 2.48	(-11.39, 2.97)
Body Mass Index (kg/m^2)	Baseline	27.4 ± 1.02	28.2 ± 1.05	0.83 ± 1.46	(-3.45, 5.10)
	Pre-surgery	27.3 ± 1.02	28.4 ± 1.05	1.09 ± 1.47	(-3.21, 5.38)
	6-months post-op	26.7 ± 1.02	27.7 ± 1.05	0.99 ± 1.47	(-3.31, 5.28)
Body Weight	Baseline	71.8 ± 3.01	73.4 ± 3.10	1.67 ± 4.32	(-10.99, 14.33)
(kg)	Pre-surgery	71.6 ± 3.02	74.2 ± 3.11	2.56 ± 4.33	(-10.14, 15.25)
	6-months post-op	70.1 ± 3.02	72.3 ± 3.11	2.25 ± 4.34	(-10.457, 14.97)
Waist circumference	Baseline	91.0 ± 2.27	92.6 ± 2.38	1.64 ± 3.29	(-7.95, 11.23)
(cm)	Pre-surgery	89.4 ± 2.34	92.7 ± 2.38	3.32 ± 3.34	(-6.41, 13.05)
	6-months post-op	87.8 ± 2.33	94.5 ± 2.43	6.70 ± 3.37	(-3.11, 16.50)
Participant Reported Outcomes					
GLTEQ	Baseline	12.6 ± 3.31	11.7 ± 3.36	-0.89 ± 4.72	(-14.51, 12.72)
	Pre-surgery	29.5 ± 3.44	18.7 ± 3.46	-10.81 ± 4.88	(-24.88, 3.27)
	6-months post-op	27.4 ± 3.44	19.6 ± 3.61	-7.76 ± 4.99	(-22.15, 6.63)
PROMIS	Baseline	34.1 ± 1.29	33.8 ± 1.32	-0.25 ± 1.84	(-5.60, 5.1)
	Pre-surgery	32.3 ± 1.33	28.2 ± 1.36	-4.07 ± 1.90	(-9.58, 1.44)
	6-months post-op	31.2 ± 1.32	28.7 ± 1.37	-2.47 ± 1.90	(-7.98, 3.04)
DASH	Baseline	7.71 ± 2.27	7.63 ± 2.31	-0.08 ± 3.24	(-9.41, 9.25)
	Pre-surgery	11.23 ± 2.37	18.46 ± 2.41	7.23 ± 3.38	(-2.52, 16.99)
	6-months post-op	18.89 ± 2.37	16.59 ± 2.49	-2.29 ± 3.44	(-12.21, 7.63)
FACT-An	Baseline	150 ± 4.35	146 ± 4.46	-4.048 ± 6.23	(-22.08, 13.98)
	Pre-surgery	141 ± 4.62	126 ± 4.77	-14.7 ± 6.64	(-33.86, 4.47)

1385363 - Timeliness of Breast Diagnostic Imaging and Biopsy in Practice—15 Years of Collecting, Comparing, and Defining Quality Breast Cancer Care

Cory Donovan[1], Cary Kaufman[2], Terry Sarantou[3], Margurite Thomas[4], Ayfer Polat[5], Bonnielyn Mack[6]

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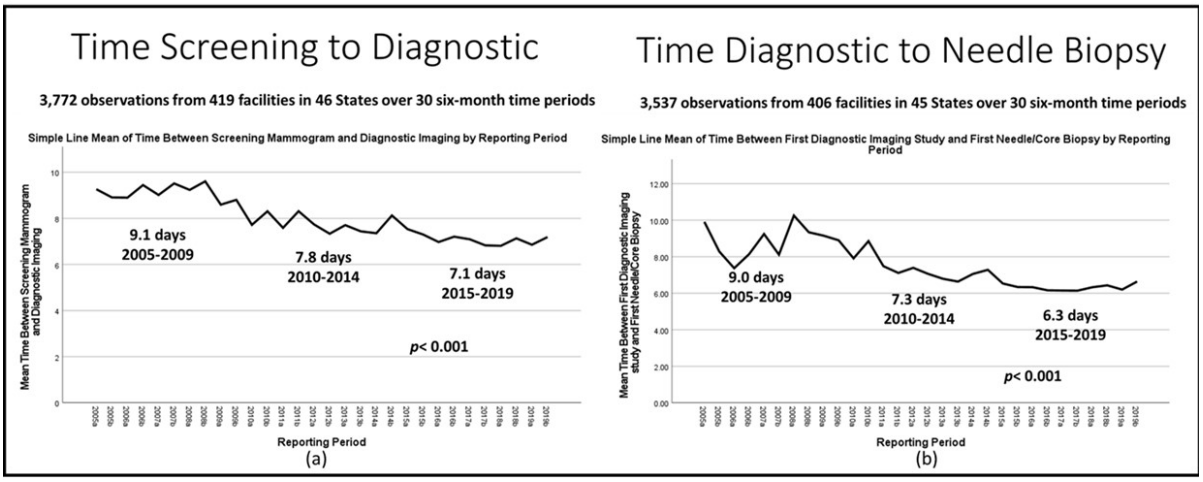
Background/Objective: The Institute of Medicine identified timeliness as a fundamental quality metric for cancer in 1999, yet the literature lacks well-established benchmarks for expected time between screening mammogram to diagnostic imaging and then to core-needle breast biopsy. Ensuring timely evaluation and diagnosis can optimize breast cancer outcomes and decrease patient anxiety.

Methods: The National Quality Measures for Breast Centers (NQMBC) is a voluntary, web-based tool providing 42 performance measures designed to evaluate quality breast care. Centers may utilize the NQMBC to instantly compare their performance with others. Two of the NQMBC measures evaluate (1) time in days from screening to diagnostic imaging and (2) time in days from diagnostic imaging to core-needle biopsy. Data on these measures were obtained from 2005-2019 every 6 months. We evaluated trends in timeliness and factors that influence timely breast diagnostic imaging and biopsy.

Results: From 2005-2019, 419 breast centers from 46 states submitted aggregate data representing 1,805,515 patients on the time from screening mammogram to diagnostic imaging. The overall average time to diagnostic imaging was 7 days with the 25th and 75th percentile values of 10 and 5 days, respectively. Ninety percent of centers performed within 13.5 days. Over the 15 years, the average days from screening to diagnostic imaging decreased from 9.1 days to 7.1 days ($p< 0.001$) (Figure 1a). The greatest gains were made in the poorest-performing groups. On multivariate analysis, screening centers performed better than diagnostic centers, and centers in the Midwest performed the better than centers in the South. Time to diagnostic imaging did not vary with screening or breast center volume. Time from diagnostic imaging to core-needle biopsy was submitted by 406 facilities from 45 states representing 386,077 patients. As in the first measure, the average time was 6 days, with the 25th and 75th percentiles being 9 and 4 days, respectively. Ninety percent of centers performed within 13.7 days. Over the study period, timeliness to core-needle biopsy improved from a mean of 9.0 days from 2005-2009, to 6.3 days from 2015-2019 ($p<.001$)(Figure 1b). This change was also the most noticeable for the lowest quartiles. On multivariate analysis, screening centers, centers in the Midwest, and in metropolitan areas had significantly shorter time to biopsy. Screening volume, diagnostic volume, and breast center volume were not associated with timeliness to biopsy.

Conclusions: In a robust dataset, the time from screening mammogram to diagnostic imaging and from diagnostic imaging to biopsy decreased 22% and 30% from 2005 to 2019. Improvements were the greatest for those organizations in the lowest-performing percentiles. In 2019, >90% of centers averaged less than 14 days from screening to diagnostic imaging and from diagnostic imaging to biopsy. On average, patients could expect to have diagnostic imaging and biopsies within 1 week of abnormal results. Monitoring and comparing performance with reported data may improve quality in breast care.

Figure. Timeliness in breast diagnostic imaging and breast biopsy 2005-2019



1385675 - The Benefits of a Clinically Based, Individualized Exercise Oncology Program on Quality of Life and Health Care Costs for Early-stage Breast Cancer Patients

Karen Wonders[1], Kathryn Schmitz[2], Jay Harness[3], E Ronald Hale[4], Arthur Lerner[5]

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Background/Objective: In 2018, 1.74 million individuals were diagnosed with cancer in the US. The direct and indirect cost of cancer care was $158 billion. Unplanned hospitalizations and emergency department (ED) visits account for a significant portion of overall cancer care costs. Physical and psychosocial interventions have proved efficacious for helping relieve patient burdens and reduce overall costs. The purpose of the present study was to prospectively establish the influence of quality of life on the health care utilization and costs following a 12-week individualized exercise intervention in patients with early-stage breast cancer.

Methods: For this open-label, randomized, prospective, comparative clinical trial, patients with early-stage breast cancer (Stage I to II) were randomly assigned into two groups: the control group (CG, n=120) and the exercise training group (EX, n=123). Patients in the exercise intervention group completed 12 weeks of prescribed, individualized exercise that aligned with the American College of Sports Medicine (ACSM) exercise guidelines for cancer survivors. The control group received the current standard of care, which includes a resource guide with various options available to cancer survivors. Both the EX and CG completed the Functional Assessment of Cancer Therapy-Breast (FACT-B), the Short Form-36 Health Survey (SF-36), and the Brief Fatigue Inventory (BFI) at baseline and following the 12-week exercise intervention.

Results: In analysis of covariance models controlling for demographic factors and comorbidities, the breast cancer-specific quality of life improved significantly across categories of each health-related quality-of-life item in the EX-group compared to the CG ($p < 0.001$). In Cox regression models controlling for the same covariates, all of the health-related quality-of-life questions studied were significant predictors of ED visits, hospital outpatient visits, and private office-based visits. Specifically, ED visits decreased by 33.2%, hospital outpatient visits decreased by 21.5%, and private office-based visits decreased by 41.8%.

Conclusions: These results signify that all dimensions of health-related quality-of-life items studied were positively impacted by exercise and can be used as indicators to decrease health care costs among patients with early-stage breast cancer. As key providers of breast cancer care, breast surgeons can be important advocates for referring patients to supervised exercise oncology programs.

1385720 - A Randomized Double-blinded Study Comparing Timing of PEC Block for Post-operative Pain in Bilateral Mastectomy Patients

Kai Huang[1], Melinda Seering[2], Bhavana Yalamuru[3], Sarah Mott[4], Jerrod Keith[2], Sonia Sugg[2], Lillian Erdahl[2], Ronald Weigel[2], Ingrid Lizarraga[2]

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Background/Objective: Pectoral field blocks (PEC I/II) are commonly used for post-operative analgesia after mastectomy with immediate reconstruction. They are typically performed pre-operatively. Potential advantages of performing the block intra-operatively after the breast is removed include a more streamlined pre-operative process, increased technical ease of the procedure, and longer duration of post-operative pain control. However, this approach is poorly studied. We conducted a randomized double-blinded trial to evaluate the impact of timing of PEC I/II blocks on post-operative pain control for patients undergoing mastectomy and immediate reconstruction.

Methods: Patients with breast cancer undergoing bilateral mastectomy with immediate expander or implant reconstruction were randomized to receive either pre-operative PECS I/II by the anesthesia team after induction of anesthesia (n=17) or by the surgeon post-mastectomy and before reconstruction (n=17). Randomization was blinded to the patient and research coordinator. The primary outcome was the average pain score using the Numerical Rating Score (NRS) at rest during the previous 24 hours measured at post-operative day (POD) 2. The study was powered to detect to detect an effect size of 1 (difference in means in pain scores of 2, and a common standard deviation of 2) with 80% power for a two-independent samples t-test with a type I error rate of 0.05. The secondary outcomes were average pain scores at POD 3, 7, 14, post-operative narcotic requirements, PACU and inpatient length of stay, complications, and readmission rates. Pain was assessed using a validated pain scale recorded by nursing during inpatient stay and by the patient in a daily pain diary after discharge.

Results: Patient, tumor, and treatment characteristics were similar between the 2 groups. Between the pre-mastectomy (PreM) and post-mastectomy (PostM) groups, no significant differences were noted in average pain score during PACU (p=0.57) and inpatient stay (p=0.33), or in the 2 weeks after surgery at rest (p=0.90) or during movement (p=0.30). Median duration of block procedure (PReM:7 mins vs. PostM 6 mins) and intra-operative time (7 hours) did not differ between groups. Median PACU and inpatient length of stay were the same in each group (2 hours and 18 hours, respectively). Inpatient narcotic requirements were similar (PreM: 30 morphine milligram equivalents (MME) [range 0-75.8] vs. PostM: 25.5 MME [range 0-90], p=0.70). Need for additional pain prescriptions within 30 days (23.5% vs. 29.5%, p=1.00) were also similar. There were no significant differences between the PreM and PostM groups in 30-day outcomes including wound infection requiring operative intervention (17.6% vs. 11.8%, p=0.69), hematoma (0% vs. 5.9%, p=1.00), flap necrosis (11.8% vs.11.8%, p=1.00), and readmission rate (11.8% vs. 17.6%, p=1.00).

Conclusions: No significant difference in pain control or 30-day outcomes were identified in this randomized study examining timing of PEC block for mastectomy with immediate reconstruction. Intra-operative PEC I/II block administered by surgeons following mastectomy had similar outcomes as pre-operative blocks by anesthesiologists. These findings allow institutions to review the best workflow for offering these simple fascial blocks to patients undergoing mastectomies.

Table. Outcomes of pre-mastectomy and post-mastectomy PEC block

			Group		
Covariate	Statistics	Level	Pre-Mastectomy N=17	Post-Mastectomy N=17	P-value
Total amount of Lorazepam for muscle spasms on inpatient unit? (Duration:	N (Col %)	1 mg po	1 (5.9)	0 (0)	1.00
First 24 hours)	N (Col %)	None	16 (94.1)	16 (100)	
	N (Col %)	Missing	0	1	
30-Day Rate of Post-Operative Wound Infection or Cellulitis	N (Col %)	No	12 (70.6)	14 (82.4)	0.69
	N (Col %)	Yes	5 (29.4)	3 (17.6)	
30-Day Rate of Post-Operative Wound Infection or Cellulitis	N (Col %)	No	12 (70.6)	14 (82.4)	-
	N (Col %)	Yes, requires outpatient antibiotics	1 (5.9)	0 (0)	
	N (Col %)	Yes, requires inpatient antibiotics	1 (5.9)	1 (5.9)	
	N (Col %)	Yes, requires return to OR	3 (17.6)	2 (11.8)	
30-Day Rate of Post-Operative Hematoma	N (Col %)	No	17 (100)	16 (94.1)	1.00
	N (Col %)	Yes	0 (0)	1 (5.9)	
30-Day Rate of Post-Operative Flap Necrosis	N (Col %)	No	15 (88.2)	15 (88.2)	1.00
	N (Col %)	Yes	2 (11.8)	2 (11.8)	
30-Day Rate of Post-Operative Flap Necrosis	N (Col %)	No	15 (88.2)	15 (88.2)	-
	N (Col %)	Yes - requires surgical excision	1 (5.9)	2 (11.8)	
	N (Col %)	Yes-does not require surgical excision	1 (5.9)	0 (0)	
30-Day Readmission	N (Col %)	Yes	2 (11.8)	3 (17.6)	1.00
	N (Col %)	No	15 (88.2)	14 (82.4)	
Was patient given another 30 days pain prescription in the first 30 days?	N (Col %)	Yes	4 (23.5)	5 (29.4)	1.00
	N (Col %)	No	13 (76.5)	12 (70.6)	
Duration of Block Procedure (minutes)	N		17	17	0.21
	Median		7.0	6.0	
	Min		2.0	3.0	
	Max		15.0	19.0	
Intra-Operative Time (hours)	N		17	17	0.19
	Median		7.0	7.0	
	Min		6.0	5.0	
	Max		9.0	10.0	
Intra-Op Narcotic Use (MME)	N		17	17	0.99
	Median		42.0	42.4	
	Min		0.0	0.0	
	Max		254.0	108.0	
PACU Time (hours)	N		17	17	0.34
	Median		2.0	2.0	
	Min		1.0	1.0	
	Max		4.0	3.3	
PACU Narcotic Use (MME)	N		17	17	0.97
	Median		7.5	8.0	
	Min		0.0	0.0	
	Max		33.0	40.0	
Inpatient Time (hours)	N		17	16	0.62
	Median		18.0	18.0	
	Min		12.0	12.0	
	Max		24.0	43.0	
patient Narcotic Use (MME)	N		17	16	0.70
	Median		30.0	25.5	
	Min		0.0	0.0	
	Max		75.8	90.0	

1386205 - Impact of Post-operative Antibiotic Prophylaxis on Surgical Site Infection Rates After Mastectomy without Reconstruction: A Multicenter, Double-Blinded, Randomized Control Trial

Abida K. Sattar[1], Nida Zahid[1], Hania Shahzad[2], Taleaa Masroor[1], Russell Seth Martins[1], Rufina Soomro[3], Omema Saleem[4], Lubna Vohra[1], Sana Zeeshan[1], Muhammad Areeb Ashfaq[5], Irum Khan[1], Rida Nadeem[4], Nikhat Fatima[3], Ayisha Afzal Qureshi[1], Farin Amersi[6], Syed Faisal Mahmood[1]

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Background/Objective: Rates of surgical site infection after breast surgery range from 1-16%, and use of pre-operative antibiotic prophylaxis is well established. However, there is no consensus in the use of post-operative antibiotic prophylaxis (PAP) after mastectomy with or without immediate reconstruction. Thus, we assessed the surgical site infection (SSI) rates with or without continuation of post-,operative antibiotics (PAP) in women undergoing mastectomy without immediate reconstruction and with indwelling drains.

Methods: A 2-armed, randomized, double-blinded placebo-control clinical trial (RCT; registration number NCT04577846) was conducted across 3 large tertiary care centers in Pakistan (Sites A, B and C). We enrolled all consenting, consecutive patients (>18 years) undergoing mastectomy without immediate reconstruction. All patients received a single, pre-operative dose of cephalexin within 60 minutes of incision, and post-operatively were randomized to receive either continued PAP using cephalexin (intervention) or a placebo (control) for the duration of indwelling, closed-suction drains. The primary outcome measure was the development of SSI, which was evaluated at each clinic visit starting on post-operative day (POD) 5 (± 2) until drain removal, and subsequently by a phone call on PODs 30, 60, and 90. Secondary outcomes included treatment-associated adverse events. Intention-to-treat analysis was performed whereby associations between categorical variables were explored using Chi-square/Fischer's exact test, and differences between numeric variables were assessed using the independent sample t-test/Mann-Whitney U-test. A p-value <0.05 was considered significant.

Results: A total of 377 patients were enrolled in the study, of which 33 (8.75%) were lost to follow-up and excluded from the analysis. Of the 344 patients, 166 (48.3%) were randomized to the intervention (PAP) and 178 (51.7%) to the placebo (control) arm. The most common indication for mastectomy was breast cancer (PAP arm: 98.2%; placebo arm: 97.8%), with the remainder being phyllodes tumors. Over 70.5% patients in the PAP and 62.9% in the placebo arm were obese (BMI >25 kg/m2). More than half of the patients underwent a simple mastectomy with single drain placement (PAP: 51.2%; placebo: 52.8%), and the remainder had a modified radical mastectomy with 2 drains. Most patients underwent wound closure using staples. There were no statistically significant differences in baseline characteristics, comorbidities, operative or post-operative characteristics between the PAP and placebo arms (Table). The SSI rate was 1.8% in the PAP arm and 4.5% in the placebo arm (p=0.157). In a subgroup analyses of the study site, body mass index (BMI), history of smoking, hypertension or diabetes mellitus, type of procedure, or wound closure, there were no statistically significant differences observed. The most

common treatment-associated adverse effects were gastrointestinal symptoms (PAP arm: 6% vs. placebo arm: 4.5%; p=0.524).

Conclusions: This is the first RCT demonstrating low post-operative SSI rates in patients undergoing mastectomy without reconstruction despite presence of drains. Continuation of PAP did not offer additional benefit over placebo. Future studies should evaluate mastectomy with immediate reconstruction, and results of our study and future RCTs can help achieve uniformity in practice through revised consensus guidelines.

Table. Differences in baseline characteristics and outcomes between treatment arms

Variables	Treatment Arm		P-Value
	PAP (N=166) n (%); Mean ± SD	Placebo (N=178) n (%); Mean ± SD	
Age (years)	50.7 ± 11.7	50.8 ± 10.9	0.913
Site of Recruitment (number of patients)			0.947
Site A	47 (28.3)	53 (29.8)	
Site B	41 (24.7)	42 (23.6)	
Site C	78 (47.0)	83 (46.6)	
BMI			0.444
Underweight (< 18.5 kg/m^2)	6 (3.6)	6 (3.4)	
Normal (18.5-22.9 kg/m^2)	24 (14.5)	36 (20.2)	
Overweight (23-24.9 kg/m^2)	19 (11.4)	24 (13.5)	
Obese (> 25 kg/m^2)	117 (70.5)	112 (62.9)	
Risk Factors			
Hypertension	77 (46.4)	71 (39.9)	0.224
NIDDM	41 (24.7)	34 (19.1)	0.209
Smoking	8 (4.8)	6 (3.4)	0.497
Operation			0.766
Simple Mastectomy +/- SLNB	85 (51.2)	94 (52.8)	
Modified Radical Mastectomy +/- SLNB	81 (48.8)	84 (47.2)	
Operative Time (minutes)	155.16 ± 43.93	152.29 ± 41.18	0.531
Wound Closure			0.432
Staples	130 (78.3)	133 (74.7)	
Subcuticular	36 (21.7)	45 (25.3)	
Duration of Treatment/Indwelling Drains (days)	12.17 ± 4.12	11.78 ± 4.14	0.373
Neoadjuvant Treatment	93 (56.0)	93 (52.2)	0.482
Total SSIs at End of Study (i.e., 90 days)	3 (1.8)	8 (4.5)	0.157
Day SSI Developed			0.171
POD 0-30 (early SSI)	3 (1.8)	8 (4.5)	
POD 31-90 (late SSI)	0 (0)	0 (0)	
Timing of SSI *			> 0.999
While on Treatment (while drains in place)	2 (1.2)	4 (2.2)	
Post-Cessation of Treatment (after drains removed)	1 (0.6)	4 (2.2)	
GI Side Effects (N/V, constipation, diarrhea etc.)	10 (6.0)	8 (4.5)	0.524

GI: Gastrointestinal; *N/V*: Nausea or vomiting; *NIDDM*: non-insulin dependent diabetes mellitus; *PAP*: Postoperative antibiotic prophylaxis; *POD*: Postoperative day; *SLNB*: Sentinel lymph node biopsy

** Study drug regimens were discontinued at drain removal*

Scientific Oral Presentations II

Saturday, April 29, 2023, 1:45 pm – 3:00 pm
Moderators: Tina Hieken, MD, FACS; Mediget Teshome, MD, MPH, FACS

1382302 - De-implementation of Low-value Care in Women ≥70 Years with Low-risk Breast Cancer During the COVID-19 Pandemic

Ton Wang, Christina Weed, Joshua Tseng, Alice Chung, Marissa Boyle, Farin Amersi, Armando Giuliano
Cedars-Sinai Medical Center, Los Angeles, CA

Background/Objective: Women ≥70 years with Stage I estrogen receptor-positive (ER+) invasive breast cancer (IBC) have an excellent prognosis, but due to their age and co-morbidities are at high risk for treatment-related complications. Based on clinical trials demonstrating its safety, NCCN guidelines in 2004 proposed omitting radiotherapy after breast-conserving surgery (BCS) in women ≥70 years old with T1, clinically node-negative (cN0), ER+ IBC. Similarly, Choosing Wisely in 2016 recommended omitting sentinel lymph node biopsy (SLNB) in women ≥70 years with early-stage, ER+ IBC. Despite these long-standing guidelines, current national rates of post-BCS radiotherapy and SLNB in women eligible for omission of these therapies are greater than 65% and 80%, respectively. Resource-limited environments during the COVID-19 pandemic led to renewed interest in avoiding low-value care. The objective of our study was to determine whether there has been de-implementation of post-BCS radiotherapy and SLNB in women ≥70 years with low-risk breast cancer since 2020.

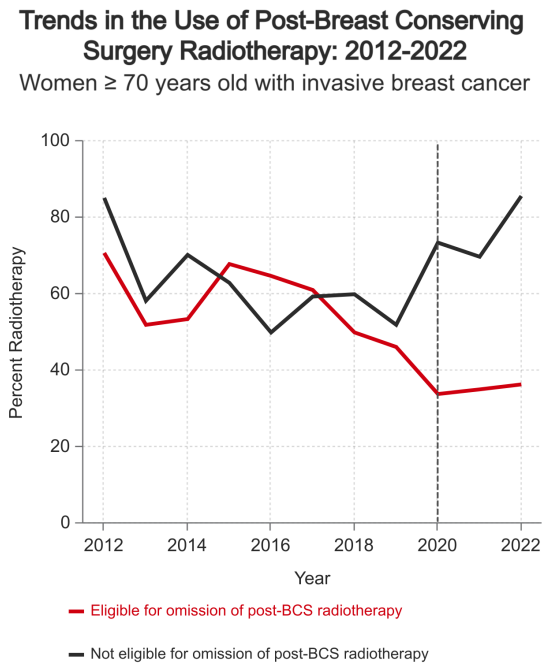
Methods: We analyzed a prospectively maintained database at a tertiary academic institution of women ≥70 years who received BCS for IBC from January 2012 to June 2022. Patients were divided into 2 cohorts: (1) patients with low-risk IBC (pT1, cN0, and ER+/HER2-) who were eligible for radiotherapy and SLNB omission and (2) patients with high-risk IBC (pT2-T4, cN+, ER-, or HER2+) who were ineligible for radiotherapy and SLNB omission. Patient clinicopathologic features and annual rates of radiotherapy and SLNB in both cohorts were analyzed.

Results: A total of 617 patients were included in the study, of which 364 (59%) had low-risk IBC and were eligible for radiotherapy and SLNB omission, and 253 (41%) had high-risk IBC and were ineligible for omission of these therapies. In patients with low-risk IBC, annual rates of radiotherapy were stable from 2012-2019, averaging 57% (range 46-71%). There was a significant decrease in radiotherapy rates in 2020, from 46% in 2019 to 34% in 2020 ($p< 0.01$), which was sustained through 2022 (36% in 2022). In contrast, radiotherapy usage in patients with high-risk IBC was stable during the study period, from 85% in 2012 to 86% in 2022 (range 50-86%) with no significant change in 2020 ($p=0.06$). In patients with low-risk IBC, SLNB rates gradually decreased from 88% in 2012 to 55% in 2022, but without significant change in 2020 ($p=0.13$). In patients with high-risk IBC, rates of SLNB were stable throughout the study period, from 93% in 2012 to 86% in 2022. Factors significantly associated with SLNB and radiotherapy receipt in patients with low-risk IBC were higher grade, pathological nodal status, and endocrine therapy receipt ($p< 0.01$).

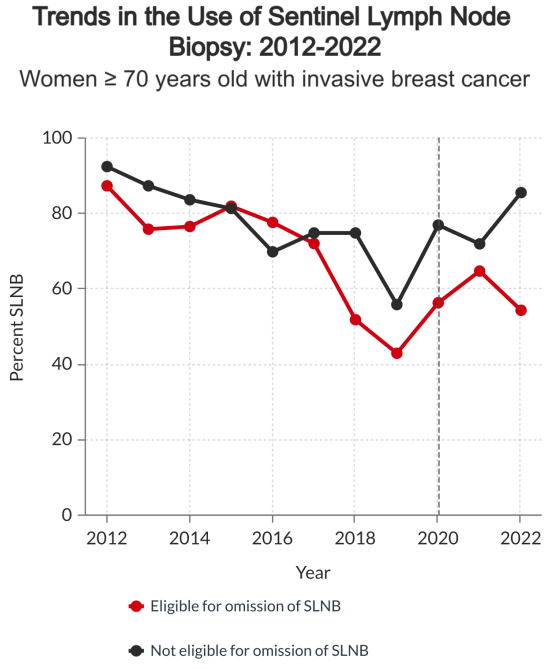
Conclusions: This study demonstrates appropriate de-escalation of post-BCS radiotherapy in women ≥70 years after the 2020 COVID-19 pandemic. Significant de-implementation of radiotherapy and SLNB was seen in patients with T1, cN0, ER+/HER2- breast cancer concurrent with persistently high rates of radiotherapy and SLNB in patients with higher-risk tumors. This trend continued for 2 years following the acute resource limitations associated with the pandemic, suggesting sustained changes in provider practice patterns.

Figure.

1A



1B



1385180 - Intraoperative Radiation Therapy (IORT) with or without Whole-breast Treatment (WBRx)

Katherine Kramme[1], Emily Welker[2], Oana Andreea Raicu[2], Melvin Silverstein[3], Sadia Khan[3], Peter Chen[4], Kevin Lin[5], Brian Kim[4], Shane Lloyd[4]

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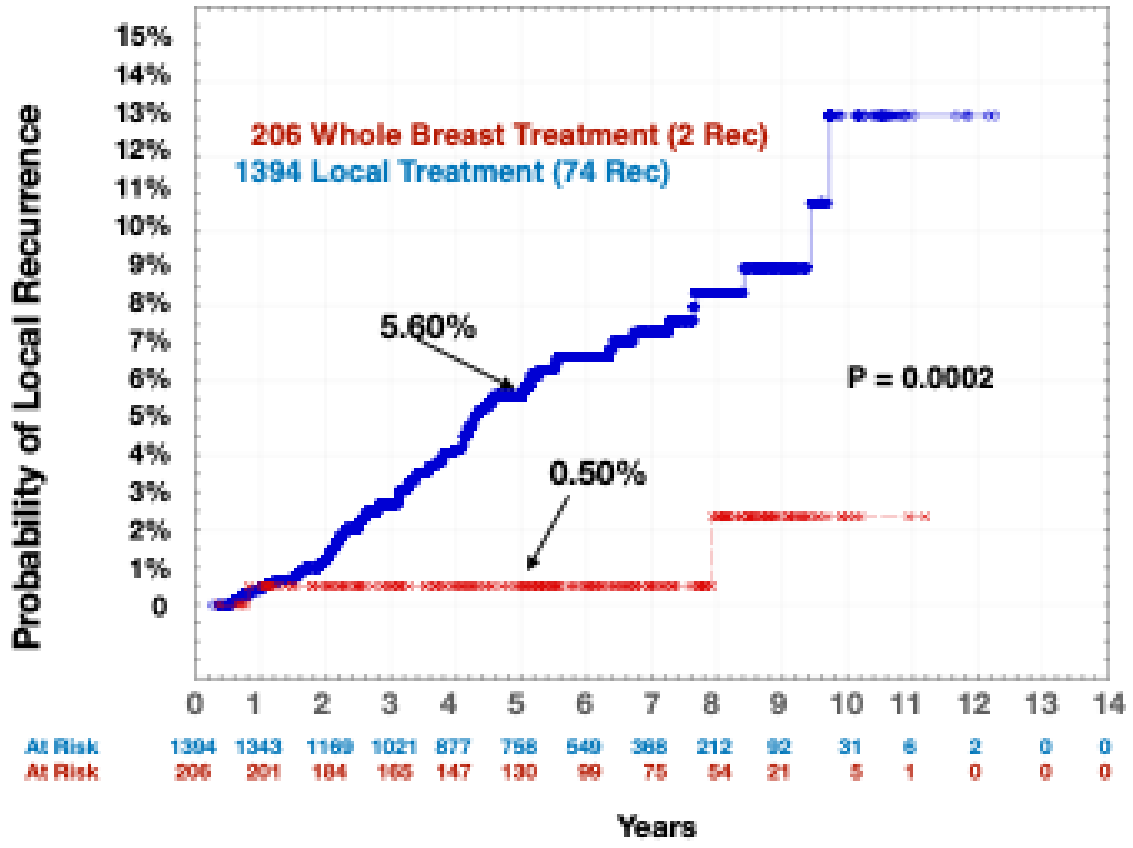
Background/Objective: Two prospective randomized trials have shown intraoperative radiation therapy (IORT) to be a safe alternative to whole-breast radiation therapy (WBRT) following breast-conserving surgery for selected low-risk patients. Both trials added additional whole-breast treatment (WBRx) including mastectomy or WBRT for predefined poor pathologic characteristics discovered on final histopathology. IORT patients who received additional WBRx were included in the final analysis of local breast recurrence (intention to treat method), artificially lowering the recurrence rate, making IORT appear better than it actually was.

Methods: In this study, 1600 patients were treated with IORT. Of these, 1350 patients underwent excision plus IORT only. Forty-four additional patients underwent re-excision, yielding a total of 1394 patients (87.1%) treated with local therapy alone. There were 170 patients who received additional WBRT, 16 patients received re-excision plus WBRT, and 20 patients underwent mastectomy, yielding a total of 206 patients (12.9%) treated with WBRx. Any ipsilateral breast tumor event was considered a local recurrence, regardless of location or type. Kaplan-Meier analysis was used to predict local recurrence probabilities. Curves were compared using the log rank test. Patients were analyzed all together as a single cohort of 1600 (intention to treat) and as 2 separate groups: local treatment (n=1394) vs WBRx (n=206).

Results: With a median follow-up of 64 months, there was a significant difference in local recurrence between patients who received local treatment versus patients who received WBRx. Among the 1394 patients who received local treatment only, there were 74 recurrences. Among the 206 patient who received WBRx, there were 2 recurrences. The predicted local recurrence rate at 5 years for the entire group of 1600 patients was 4.89%. The local recurrence rate at 5 years for the patients who underwent local treatment was 5.60% vs the patients who underwent WBRx was 0.50% respectively (p=0.0002).

Conclusions: The recurrence rate for local treatment alone was 10-fold higher than for those who received whole-breast treatment, despite the fact that those who received local treatment only had histopathologically more favorable tumors. The TARGIT A Trial had an extremely low rate of local recurrence, 2.23% at 5 years, but 30% of its IORT patients received WBRx. In this study, only 12.9% of patients received WBRx, explaining some of the difference in local recurrence probabilities. When reporting IORT results, those who receive local treatment alone should be analyzed and reported separately from those who receive IORT plus WBRx, as combining them artificially lowers the local recurrence rate.

Figure. Probability of local recurrence following local treatments vs whole-breast treatment



1388123 - To Dissect or Not to Dissect: Can We Predict the Presence of Four or More Axillary Lymph Node Metastases in Postmenopausal Women with cN0 Breast Cancer?

Clara Farley[1], Roland Bassett[2], Funda Meric-Bernstam2, Isabelle Bedrosian[2], Abigail Caudle[2], Sarah DeSnyder[2], Kelly K. Hunt[2], Henry Kuerer[2], Puneet Singh[2], Susie Sun[2], Nina Tamirisa[2], Mediget Teshome[2], Rosa Hwang[2]

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Background/Objective: Axillary lymph node (ALN) involvement is an important prognostic factor in breast cancer and essential in guiding multidisciplinary treatment. Recently, the RxPONDER trial demonstrated that postmenopausal women with hormone receptor (HR)-positive, HER2-negative breast cancer with 1-3 positive nodes identified at surgery and 21-gene recurrence score <25 did not benefit from adjuvant chemotherapy. To determine if these criteria are met in patients with suspected limited nodal involvement confirmed by sentinel lymph node biopsy (SLNB), the standard approach for complete axillary staging is axillary lymph node dissection (ALND), which is associated with significant morbidity. The objective of this study was to identify pre-operative clinicopathologic factors predictive

of ≥4 lymph node metastases (pN2/3 disease) in patients with cN0 breast cancer to inform systemic therapy recommendations.

Methods: Using a prospective database, we identified postmenopausal patients with clinical N0 invasive breast cancer who underwent SLNB +/- completion axillary lymph node dissection (cALND) between 1996 and 2007. Postmenopausal status was defined as age ≥50 years old. Clinicopathologic data including primary tumor size, presence of multifocal or multicentric disease, histology (ductal, lobular, mixed, or other), tumor grade (modified Black's nuclear grade), estrogen and progesterone receptor (ER and PR) and HER2/neu (HER2) status, presence of lymphovascular invasion (LVI), tumor location and tumor palpability were recorded. Univariate and multivariate logistic regression analyses identified factors predictive of ≥4 positive nodes in the overall cN0 patient population as well as those with either 1 or 2 positive SLNs.

Results: In total, 3571 patients were identified, with 2532 (71.9%) identified as post-menopausal and of these, 615 (24.3%) underwent cALND. On univariate analysis of the entire cohort (n=2532), the following factors were predictive of ≥4 positive LNs (n=65): tumor size ($p<0.0001$), LVI ($p<0.0001$), ER-positive status ($p=0.034$) and multifocality/multicentricity ($p<0.0001$). On multivariate analysis, all factors remained significant except ER status. Of the postmenopausal patients, 1263 (49.2%) had HR-positive, HER2-negative disease with 32 (2.5%) found to have ≥4 positive ALNs. Within this subset of patients, we then identified those who were found to have exactly 1 positive SLN and underwent subsequent cALND (n=130). Only 5.4% (7/130) of these patients were found to have a total of ≥4 positive ALNs following cALND, with high grade as the only factor predictive of extent of nodal disease ($p=0.013$). For patients with exactly 2 positive SLNs who underwent cALND (n=33), 27.3% (9/33) had a total of ≥4 positive ALNs following cALND, but there were no clinicopathologic factors predictive of having ≥4 positive lymph nodes within this subgroup.

Conclusions: Postmenopausal women with HR-positive, HER2-negative breast cancer with a single positive SLN had a very low risk (5%) of having ≥4 total positive ALNs on final pathology. With such a low risk of N2 disease, limited nodal staging with sentinel lymph node dissection may be sufficient to help guide adjuvant therapy decisions in this subset of patients.

1388238 - Patterns of Mammographic Surveillance in Women with Elderly Breast Cancer

Elizabeth Berger[1], Jessica Long[2], Meera Sheffrin[3], Ellie Proussaloglou[1], Rachel Greenup[1], Ilana Richman[1]

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Background/Objective: Controversy exists around appropriate mammographic surveillance among elderly women with a history of breast cancer who are at elevated risk of a second breast cancer diagnosis. Risks and benefits of surveillance may vary based on patient characteristics, and when weighing the value of identifying screen-detected cancers in women who may have shorter life

expectancy. We sought to characterize the use of surveillance mammography and risk of subsequent breast cancer in elderly women with breast cancer by life expectancy (LE).

Methods: We identified women aged 67 years or older who were diagnosed with a first, non-metastatic breast cancer from 2003-2007 using the SEER-Medicare registry data. We followed female beneficiaries from 1 year post-diagnosis until occurrence of a second primary breast cancer, death, or end of follow-up in 2017. LE estimates were established based on age, sex, and comorbidities. The primary outcomes were receipt of surveillance mammography over time and diagnosis of a second primary breast cancer.

Results: A total of 44,475 women comprised the study cohort; 30% of the cohort was over the age of 80 years old. Overwhelmingly, breast cancer diagnoses were early-stage and of favorable biology; Stage I or II breast cancers comprised 74% of the cohort, and 72% of women had a hormone receptor-positive breast cancer. A majority of women (55%) had at least 1 co-morbid condition, with 16% having 3 or more. Life expectancy estimates 1 year after diagnosis were as follows: 26% LE <5years, 36% LE 6-10 years, and 38% LE >10 years. The use of mammography was common among all LE groups. Notably, among women with <1 year life expectancy, 51% received at least 1 mammogram within 12 months of death. In women with 6-10 years of LE, 82% of women received at least 1 mammogram, and 62% of women received 5 mammograms. The cumulative incidence of developing a second primary breast cancer differed based on life expectancy and molecular tumor subtype; LE <5 years: 3.7% (95% CI 3.2-4.3); LE 6-10 years: 4.9% (95% CI 4.5-5.3); LE >10 years: 7.6% (7.2-7.9%). In women with LE<5 years and a triple-negative breast cancer, the cumulative incidence of a second primary was 4% compared to 3% in women with a hormone receptor-positive breast cancer. Women with a LE of >10 years and a triple-negative breast cancer had a cumulative incidence of 9.2% compared to 7% in women with a hormone receptor-positive breast cancer and LE of >10 years.

Conclusions: Utilization of surveillance mammography remains high among elderly women with a history of breast cancer, even in women having short life expectancies. Risk of developing a second primary breast cancer significantly differed based on estimated life expectancy and breast cancer subtype. Consideration of ongoing surveillance mammography among elderly women after breast cancer warrants valued-based and patient-centered stratification.

1462344 - Neoadjuvant Pembrolizumab + Chemotherapy vs Placebo + Chemotherapy Followed by Adjuvant Pembrolizumab vs Placebo for Early TNBC: Surgical Outcomes from the Phase 3 KEYNOTE-522 Study

Sherko Kümmel[1], Peter Schmid[2], Nadia Harbeck[3], Masato Takahashi[4], Michael Untch[5], Jean-Francois Boileau[6], Javier Cortes[7], Heather McArthur[8], Rebecca Dent[9], Joyce O'Shaughnessy[10], Lajos Pusztai[11], Theodoros Foukakis[12], Yeon Hee Park[13], Rina Hui[14], Fatima Cardoso[15], Carsten Denkert[16], Yalin Zhu[17], Wilbur Pan[17], Vassiliki Karantza[17], Peter A. Fasching[18]

[1]Breast Unit, Kliniken Essen-Mitte, Essen, Germany and Charité – Universitätsmedizin Berlin, Department of Gynecology with Breast Center, Berlin, Germany, [2]Barts Cancer Institute, Queen Mary University London, London, UK, [3]Breast Center, LMU University Hospital, Munich, Germany, [4]Hokkaido Cancer Center, Sapporo, Japan, [5]Breast Cancer Center, Helios Klinikum Berlin-Buch, Berlin, Germany, [6]McGill University, Jewish General Hospital Segal Cancer Centre, Montréal, Québec, Canada, [7]International Breast Cancer Center, Pangaea Oncology, Quiron Group, Barcelona, Spain and Universidad Europea de Madrid, Madrid, Spain, [8]University of Texas Southwestern Medical Center, Dallas, TX, [9]National Cancer Center Singapore, Duke – National University of Singapore Medical School, Singapore, [10]Baylor University Medical Center, Texas Oncology, US Oncology Network, Dallas, TX, [11]Yale School of Medicine, Yale Cancer Center, New Haven, CT, [12]Karolinska Institutet and Breast Cancer Centre, Karolinska University Hospital, Karolinska Comprehensive Cancer Center, Solna, Sweden, [13]Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea, [14]Westmead Breast Cancer Institute, Westmead Hospital and the University of Sydney, Sydney, NSW, Australia, [15]Breast Unit, Champalimaud Clinical Center/Champalimaud Foundation, Lisbon, Portugal, [16]Institute of Pathology, Philipps-University Marburg and University Hospital Marburg, Marburg, Germany, [17]Merck and Co., Inc., Rahway, NJ, [18]University Hospital Erlangen, Comprehensive Cancer Center Erlangen-EMN, Erlangen, Germany

Background/Objective: KEYNOTE-522 (NCT03036488) is a phase 3 study of neoadjuvant pembrolizumab+ chemotherapy vs placebo+ chemotherapy, followed by adjuvant pembrolizumab vs placebo, in patients with early triple-negative breast cancer (TNBC). Primary results showed statistically significant and clinically meaningful improvements in pathological complete response (pCR) and event-free survival (EFS) with pembrolizumab. Understanding whether neoadjuvant immunotherapy affects surgical outcomes can help guide treatment decisions for patients with early TNBC. In this exploratory analysis, we present surgical outcomes in patients treated with neoadjuvant immunotherapy in KEYNOTE-522.

Methods: Patients (≥18 years) with previously untreated, nonmetastatic, centrally confirmed TNBC (AJCC Stage T1c N1–2 or T2–4 N0–2) were enrolled from 21 countries. Patients with bilateral or multifocal primary tumors and inflammatory breast cancers were allowed. Those who received prior chemotherapy, targeted therapy, and radiation therapy within 12 months from the start of the study were excluded. Patients were randomized 2:1 (stratified by nodal status [positive vs negative], tumor

size [T1–T2 vs T3–T4], and carboplatin schedule [Q3W vs QW]) to receive neoadjuvant pembrolizumab (200 mg Q3W) or placebo (Q3W) + paclitaxel (80 mg/m2 QW) + carboplatin (AUC 5 Q3W or AUC 1.5 QW) for 4 cycles, then neoadjuvant pembrolizumab/placebo + (doxorubicin [60 mg/m2 Q3W] or epirubicin [90 mg/m2 Q3W]) + cyclophosphamide (600 mg/m2 Q3W) for 4 cycles. Surgery of the breast was at the discretion of the treating physician. Following definitive surgery, patients received adjuvant pembrolizumab or placeboQ3W for 9 cycles or until recurrence/unacceptable toxicity. Dual primary endpoints were pCR (ypT0/Tis ypN0) and EFS. Safety (evaluated per NCI CTCAE v4.0) was a secondary endpoint. In this analysis, AEs were assessed from day 0 (surgery day) to day 30 post-surgery before the first adjuvant treatment, including radiation therapy.

Results: A total of 1174 patients were randomized (pembrolizumab + chemotherapy, n=784; placebo + chemotherapy, n=390) between March 2017 and September 2018. The prospectively recorded type and timing of surgery and nodal status post-surgery are described in the Table. During post-surgery follow-up (days 0–30) and before starting adjuvant treatment, 35.8% of patients in the pembrolizumab group (n=768) and 40.4% in the placebo group (n=381) experienced ≥1 adverse event (AE). Grade ≥3 AEs occurred in 1.8% and 0.8% of patients in the pembrolizumab and placebo groups, respectively. There were no treatment-related fatal AEs in either group. The only AE occurring in ≥5% of patients in either group was procedural pain (7.0% vs 5.8%, respectively).

Conclusions: Data from KEYNOTE-522 show that addition of neoadjuvant pembrolizumab to chemotherapy had no adverse impact on surgical outcomes (including the type, timing, and safety of surgery) and further support the benefit of this treatment regimen for patients with early TNBC.

Table.

	Pembrolizumab + Chemotherapy	Placebo + Chemotherapy
Type of breast surgery, n (%)	**N = 784**	**N = 390**
Breast-conserving surgery	354 (45.2)	178 (45.6)
Mastectomy	345 (44.0)	166 (42.6)
Other procedures	69 (8.8)	37 (9.5)
No surgery	16 (2.0)	9 (2.3)
Timing of surgery, median (range), mo		
	N=763	**N=381**
From end of neoadjuvant treatment to surgery	1.2 (0.4–6.7)	1.2 (0.5–9.3)
	N=558	**N=320**
From surgery to adjuvant treatment	2.6 (0.4–7.6)	2.7 (0.8–7.1)
Nodal status, n (%)		
	N = 408[a]	**N = 196**[a]
Complete nodal response (cN1/2/3 to ypN0)	313 (76.7)	137 (69.9)
	N = 376	**N = 194**
No nodal spread (cN0 to ypN0)	355 (94.4)	183 (94.3)

[a]Includes patients with positive nodal status (cN1 and cN2, and cN3) at baseline. Per protocol, patients with N3 disease were not eligible for the study, but 2 patients (one in each group with N3) at baseline were enrolled.

1397080 - Intraoperative Pegulicianine Fluorescence Guidance for Tumor Detection During Lumpectomy Surgery for Stage 0-III Breast Cancer

Barbara L. Smith[1], Kelly K. Hunt[2], David Carr[3], Peter Blumencranz[4], E. Shelley Hwang[5], Michele A. Gadd[1], Kimberly Stone[6], Donna L. Dyess[7], Daleela Dodge[8], Stephanie Valente[9], Nayana Dekhne[10], Patricia Clark[11], M. Catherine Lee[12], Laila Samiian[13], Beth-Anne Lesnikoski[13], Lynne Clark[14], Kate Porta Smith[15], Manna Chang[15], Brian Schlossberg[16], Jorge Ferrer[15], Irene Wapnir[17]

[1]Massachusetts General Hospital, Boston, MA, [2]UT MD Anderson Cancer Center, Houston, TX, [3]Novant Health, Winston-Salem, NC, [4]Baycare Medical Group, Clearwater, FL, [5]Duke University, Durham, NC, [6]Stanford University, San Jose, CA, [7]Mitchell Cancer Institute, Mobile, AL, [8]Penn State Milton S. Hershey Medical Center, Hershey, PA, [9]Cleveland Clinic, Cleveland, OH, [10]Beaumont Health, Royal Oak MI, Oakland University William Beaumont School of Medicine, Royal Oak, MI, [11]Honor Health, Scottsdale, AZ, [12]Moffitt Cancer Center, Tampa, FL, [13]Baptist MD Anderson, Jacksonville, FL, [14]CHI Franciscan, Tacoma, WA, [15]Lumicell, Inc., Boston, MA, [16]Lumicell, Inc., Newton, MA, [17]Stanford University, Stanford, California, CA

Background/Objective: Although survival after lumpectomy and mastectomy are equivalent, local recurrence after lumpectomy increases breast cancer mortality. Positive lumpectomy margins, which imply incomplete tumor removal, are the strongest predictor of local recurrence. Currently, positive margins are identified days after surgery and necessitate a second operative procedure. Better tools are needed for real-time, accurate intraoperative assessment of residual cancer in breast-conserving surgery (BCS).

Methods: We conducted a prospective, randomized trial of pegulicianine fluorescence-guided lumpectomy surgery (pFGS) vs. standard lumpectomy surgery for Stage 0-III breast cancers at 14 US sites (NCT03686215). After standard lumpectomy specimen excision, additional pFGS-guided cavity margins were excised at sites of high pegulicianine fluorescence signal in lumpectomy cavity walls using a hand-held imaging device and a patient-calibrated cancer detection software. Safety and 3 co-primary endpoints, rate of residual cancer removal, sensitivity, and specificity, were evaluated.

Results: A total of 406 patients, median age 64 (range 36-83) years, received 1.0 mg/kg intravenous pegulicianine followed by lumpectomy. There were 328 patients (81%) who had invasive cancers +/- ductal carcinoma in situ (DCIS), and 78 (19%) had DCIS alone. In 27 of 357 pFGS patients (7.6%; 95% CI [5.0%, 10.8%]), pFGS-guided margins removed tumor left behind by standard lumpectomy, 22 from cavity orientations read as negative on standard margin evaluation. Among those with positive margins following standard lumpectomy specimen excision, second surgeries were avoided by pFGS in 9 of 62 (15%) patients. Overall, pFGS removed residual tumor and/or avoided second surgeries in 10% of study patients (35 of 357). The use of pFGS resulted in a mean of 1 additional pFGS-guided cavity margin per patient, adding 10 cm3 (10%) to the total tissue volume removed. On per-margin analysis, pFGS specificity was 85.2% (95% CI [83.7%, 86.6%]) and sensitivity 49.3% (95% CI [37.0%, 61.6%]). The margin-level negative predictive value was 98% across all margins (95% CI [97.7%, 98.8%]). The complication rate of pFGS was low, with a 1.2% rate of hypersensitivity, allergic reactions, or anaphylactic reactions

related to pegulicianine (n=5), 2 of which (0.5%) were serious adverse events. All events resolved without sequelae.

Conclusions: The results of this prospective, randomized trial show that pFGS is a safe, promising adjunct to the standard of care for guiding breast cancer lumpectomy surgery. The use of pFGS allowed intraoperative examination of the entire lumpectomy cavity in real time to identify and remove residual cancer left behind after standard lumpectomy surgery. pFGS identified and removed tumor left behind after standard lumpectomy and reduced the need for second procedures for positive margins.

Quickshot Presentations

Friday, April 28, 2023, 5:30 pm–6:15 pm
Moderators: Lauren Postlewait, MD, FACS; Miraj Shah-Khan, MD, FACS

1380029 - Does Pre-operative MRI Reduce Positive Margins After Breast-conserving Surgery?

Ashley Cairns[1], Marissa Howard-McNatt[1], Jukes Namm[2], Sharon Lum[2], Elizabeth Dupont[3], Kristalyn Gallagher[4], David Ollila[4], Edward Levine[1], Akiko Chiba[5], Michelle Hong[2], Naveenraj Solomon[2], Jennifer Gass[6], Melissa Lazar[7], Laura Walters[8], Andrew Fenton[9], Anees Chagpar[10]

[1]Wake Forest University, Winston-Salem, NC, [2]Loma Linda University, Loma Linda, CA, [3]Watson Clinic, Lakeland, FL, [4]University of North Carolina-Chapel Hill, Chapel Hill, NC, [5]Duke University, Durham, NC, [6]Women and Infants Hospital of Rhode Island, Brown University, Providence, RI, [7]Thomas Jefferson University, Philadelphia, PA, [8]Beaumont Hospital, Troy, MI, [9]Cleveland Clinic Akron, Akron, OH, [10]Yale University School of Medicine, New Haven, CT

Background/Objective: Breast-conserving surgery (BCS) is important in the management of breast cancer. Obtaining negative margins is critical. Some clinicians utilize MRI to reduce positive margins and evaluate extent of disease. We sought to determine whether patients who had an MRI were less likely to have positive margins than those who did not.

Methods: Data from 2 randomized controlled trials from 10 centers evaluating cavity-shaved margins were combined. We evaluated whether a pre-operative MRI was associated with a reduced rate of positive margins at the time of surgery before the randomization for cavity shave margins.

Results: A total of 631 patients participated in the trials. Median age was 64, with a median tumor size of 1.3 cm. There were 165 patients who had palpable tumors, 7% had invasive lobular histology, 32.8% had an extensive intraductal component (EIC), and 6.5% had neoadjuvant chemotherapy. An MRI was performed in 193. Those who had an MRI were less likely to have a positive margin (31.1% vs. 38.8%), although this did not reach statistical significance (p=0.073). On multivariate analysis, controlling for patient age, race, neoadjuvant chemotherapy, EIC, histologic subtype, and tumor size, MRI was not associated with a higher rate of negative margins (p=0.110). Rather, patient age (p=0.032) and tumor size (p=0.040) were predictive of margin status. MRI use was associated with younger patients (median 63 vs. 66 years) and smaller tumors (median 2.0 vs. 2.1 cm).

Conclusions: Pre-operative use of MRI does not affect margin status; rather, patient age and tumor size are key in predicting margin status.

1386799 - Predictors of Early Versus Late Recurrence in Invasive Lobular Carcinoma of the Breast: Impact of Local and Systemic Therapy

Firdows Mujir, Rita Mukhtar, Cheryl Ewing, Helena Record, Elle Clleland, Harriet Rothschild, Michael Alvarado, Jasmine Wong, Laura Esserman
University of California, San Francisco, San Francisco, CA

Background/Objective: Invasive lobular carcinoma (ILC) is known for high cumulative risk of late recurrence. There are limited data on factors associated with early versus late recurrence specifically in ILC. Determining risk of early/late recurrence could help tailor surveillance strategies.

Methods: We analyzed an institutional ILC database. Early recurrences were defined as local or distant recurrence occurring within 5 years of diagnosis; late recurrences were defined as occurring more than 5 years after diagnosis. We evaluated standard clinicopathologic features as well as body mass index (BMI), highest Ki67, and 21-gene Recurrence Score (RS) when available. We used t-tests, chi-squared tests, and logistic regression models in Stata 17.0.

Results: We identified 822 cases of Stage I-III ILC in whom there were 129 recurrence events at median follow-up time of 6.3 years. There were 75 early recurrences, 54 late recurrences, and 384 cases with no recurrence and at least 5 years of follow-up. Those with early recurrence had significantly larger tumors compared to those without recurrence (mean 4.2 cm versus 2.9 cm, p=0.0005), and were more likely to have >3 positive nodes (32.4% versus 7.7%, p>0.001). Tumors in those with early recurrence with significantly more likely to be progesterone receptor (PR)-negative, higher grade, and have higher Ki67. Treatment type was associated with early recurrence, including absence of adjuvant endocrine therapy (40% versus 18.9%, p< 0.001), and undergoing lumpectomy without radiation. In a multivariate model, early recurrence was associated with larger tumors, more positive nodes, PR negativity, grade 3 disease, and undergoing lumpectomy alone (odds ratio 4.5, 95% confidence interval [CI] 1.4-13.7, p=0.009). Age at diagnosis, BMI, and 21-gene RS were not associated with early recurrence. Those with late recurrence were also significantly more likely to have >3 positive nodes (19.2% vs 7.7%, p=0.007). However, tumor size, receptor size, tumor grade, surgical therapy, and endocrine therapy were not associated with late recurrence on univariate analyses. Late recurrence was significantly associated with BMI >25 kg/m2 (61.0% versus 43.3%, p=0.012). RS was <25 in 50% of those with late recurrence, and in 88% of those without (p=0.002). Additionally, those with late recurrence were younger (mean age 55.6 years versus 59.2, p=0.03), and tumors had higher Ki67 (19.8 vs 12.4, p=0.0478). In a multivariate model, positive nodes were significantly associated with late recurrence (OR 1.2, 85% CI 1.03-1.3, p=0.011) while adjuvant endocrine therapy use was associated with decreased odds (OR 0.31, 95% CI 0.1-0.9, p=0.029).

Conclusions: Local therapy appeared to be associated with early recurrence specifically, with lumpectomy alone having significantly elevated risk of early recurrence but not late recurrence in univariate and multivariate models. Interestingly, while tumor features such as grade and receptor subtype were associated with early recurrence but not late, other features like 21-gene RS appeared to predict late but not early recurrence on univariate analyses. Increasing number of positive nodes and lack of adjuvant endocrine therapy were associated with increased risk of both early and late recurrence. These data may help guide treatment selection and monitoring for patients with ILC.

1387282 - The POWER-PAK Score Characterizes Tumor Response to Three Months of Pre-operative Endocrine Therapy

Max Meneveau, Michael Crawford, Lena Turkheimer, Trish Millard, Kristen Atkins, Shayna Showalter
University of Virginia, Charlottesville, VA

Background/Objective: The Pre-Operative Window of Endocrine Therapy to Inform Radiation Therapy Decisions (POWER, NCT04272801) aims to determine whether 3 months of pre-operative endocrine therapy (pre-ET) will inform adjuvant radiation therapy (RT) decisions among older women with early-stage, estrogen receptor (ER)-positive breast cancer. We have proposed the POWER Trial Pathologic Assessment and Ki67 (POWER-PAK) scoring system to categorize the observed histologic effects of pre-ET. The purpose of this analysis was to characterize the range of POWER-PAK scores observed after 3 months of pre-ET. We hypothesized that tumors from POWER Trial participants would have a heterogenous response to pre-ET.

Methods: Histologic and immunohistochemical evaluation was performed on core biopsy (before pre-ET) and lumpectomy specimens (after pre-ET) from POWER trial participants. Tumor characteristics and patient demographics were collected. The POWER-PAK score consists of tumor regression (% change in tumor burden), % change in Ki67 expression, and ER expression. Scores were assigned based on existing evidence as follows for each component: 0 for tumor regression <10%, 1 for 10% to <25%, and 2 for ≥25%. For Ki67: 0 for percent change of <10%, 1 for 10% to ≤20%, and 2 for >20%. ER expression was scored as 0 for <10% staining, 1 for 10% to ≤50%, and 2 for >50%. Individual indices were totaled to create the POWER-PAK score with a range from 0 to 6. Participants with a pathologic complete response (pCR) were maximally responsive to pre-ET and therefore unevaluable for Ki67 and ER. These specimens were assigned a POWER-PAK score of 6-CR for “complete response.” Participants were then dichotomized into “PAK-low” (score ≤4) and “PAK-high” (score ≥5). These groups were then compared for differences in clinical and pathologic factors using R.

Results: Data from the first 31 consecutive participants on the POWER Trial who had completed pre-ET and surgery were analyzed. Overall, Ki67 decreased from 15% (95%CI 10% - 21%) in biopsy specimens to 3% (95%CI 1%-8%) in the lumpectomy specimens (p<0.001). Tumor cellularity similarly decreased from 40% (95%CI 32%-50%) to 23% (95%CI 10%-38%) (p<0.001). ER% did not significantly change between biopsy and lumpectomy specimens. We observed significant heterogeneity of POWER-PAK scores ranging from 2 to 6-CR. Scores were as follows: 2, n=1 (3%); 4, n=7 (23%); 5, n=4 (13%); 6, n=13 (42%), 6-CR, n=6 (19%) (Table). Participants with a high PAK score (≥5) were more likely to have ductal tumors (91%, n=21) compared to those with low (≤4) scores (62%, n=5); p = 0.04 (Table). Additionally, BMI was significantly higher among those with a low PAK score (37.4 vs 28.8, p=0.02).

Conclusions: The initial analysis of the histologic effects of pre-ET shows significant heterogeneity in treatment response and demonstrates pCR in a significant proportion of patients. High POWER-PAK score is associated with ductal tumors and patients with lower BMI. We propose the POWER-PAK scoring system to quantify response to pre-ET. Future studies will explore the use of POWER-PAK scores to support informed decision-making among adjuvant therapy options for older women with early-stage breast cancer.

Table. Comparison of participants with high vs low POWER-PAK scores

Variable	PAK-low (≤4), n = 8[1]	PAK-high (≥ 5), n = 23[1]	p-value[2]
POWER PAK Score[3]			
2	1 (12%)	0 (0%)	
4	7 (88%)	0 (0%)	
5	0 (0%)	4 (17%)	
6	0 (0%)	13 (57%)	
6CR	0 (0%)	6 (26%)	
Histologic subtype			**0.04**
Ductal	5 (62%)	21 (91%)	
Lobular	3 (38%)	1 (4.3%)	
Tubular	0 (0%)	1 (4.3%)	
Tumor grade			0.4
1	2 (29%)	12 (52%)	
2	5 (71%)	11 (48%)	
Age at diagnosis (years)	73 (72, 74)	77 (70, 79)	0.5
BMI	37.4 (32.4, 39.7)	28.8 (24.4, 31.5)	**0.02**
Imaging tumor size (mm)	9.0 (7.5, 11.5)	8.0 (5.8, 9.2)	0.2
Pathologic tumor size (mm)	12.0 (9.0, 12.0)	8.0 (5.0, 12.5)	0.5

[1]n (%); Median (IQR)

[2]Fisher's exact test; Wilcoxon rank sum test

[*3]Row demonstrates the distribution of PAK scores so no statistical comparison was made.

1387325 - Lymph Node Positivity of Axillary Reverse Mapping Lymph Nodes Following Axillary Lymph Node Dissection, Two-site Prospective Study

Molly Benolken[1], Sarah McLaughlin[1], Mary Mrdutt[2], Mara Piltin[2], Zhuo Li[1], James Jakub[1]

[1]Mayo Clinic Florida, Jacksonville, FL, [2]Mayo Clinic, Rochester, MN

Background/Objective: Axillary reverse mapping (ARM) was introduced in 2007 to identify and selectively preserve upper extremity lymphatics during an axillary lymph node dissection (ALND), and thus decrease the risk of lymphedema. Low rates of metastatic involvement of ARM LNs have been reported; however, this is primarily in patients undergoing ALND for a positive SLN and does not represent the current patient population for which ALND is now performed. Our study aimed to determine the frequency of metastatic involvement of an ARM LN in a contemporary cohort of patients undergoing ALND for breast cancer.

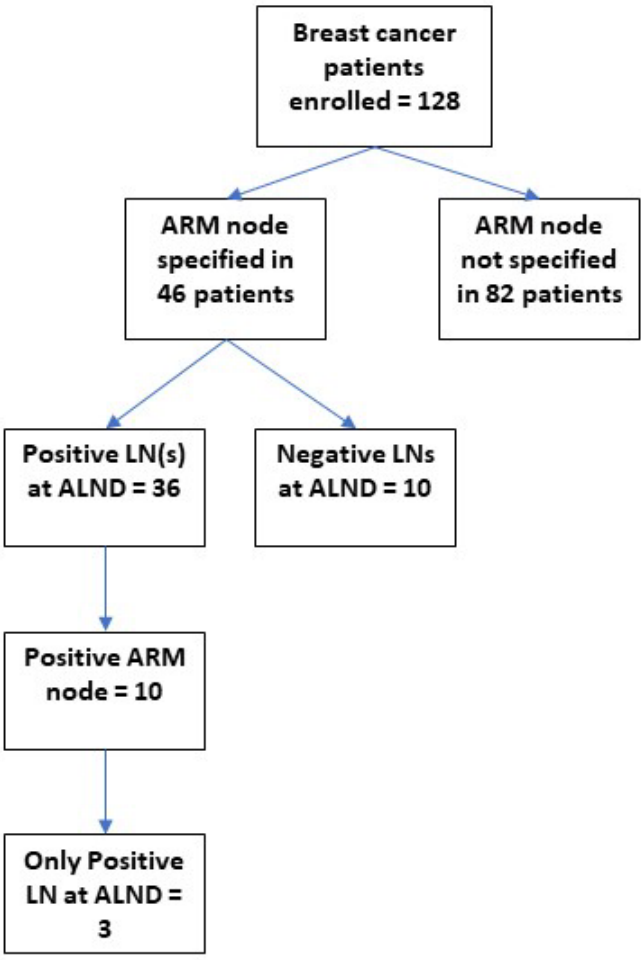
Methods: As part of a prospective trial patients underwent ALND with or without immediate lymphatic reconstruction via lymphovenous bypass. Patients were enrolled between 2018-2022. In this analysis, we report on the cohort of patients with breast cancer enrolled in the intervention arm (immediate lymphatic reconstruction). Herein, we report the ARM node positivity and total LN positivity rates during ALND.

Results: A total of 128 patients met the inclusion and exclusion criteria and make up the study population. Of these, 99.2% were female, 43.6% (56/128) were cT3 or greater, and 69.5% (89/128) had at least cN1 disease. Seventy-eight (60.9%) patients underwent neoadjuvant chemotherapy. A median number of 22.0 (0.0, 63.0) LNs were identified at ALND. There were 104 out of 128 (81.2%) who had

positive nodes at ALND. ARM nodes were marked and specified in the pathology report in 46 out of 128 patients (35.9%). Six of 46 patients had more than 1 ARM LN identified. Of the 46 patients with identified ARM nodes, 36 (78.2%) had a positive LN at ALND, with a median number of positive LNs of 1.0 (0.0,1.0). Of the 36 patients with a positive LN at ALND, 27.8% (10/36) had positive ARM nodes. The ARM LN was the only positive node in 3 out of 10 cases.

Conclusions: In our contemporary patient population undergoing ALND, the positivity rate of the ARM lymph node was relatively high (22%), and for patients with any positive LNs at ALND the ARM was positive in 28%. This suggests leaving ARM lymph nodes in patients undergoing ALND may not be oncologically safe.

FIGURE. ARM LN positivity in breast cancer patients who underwent ALND with immediate lymphatic reconstruction



1387359 - Is Choosing Wisely Wise for Lobular Carcinoma in Patients Over 70? A National Cancer Database (NCDB) Analysis of Sentinel Node Practice Patterns

Nicole Goldhaber[1], Thomas O'Keefe[1], Sasha Douglas[1], Sarah Blair[2]

[1]University of California, San Diego Health, San Diego, CA, [2]University of California San Diego, La Jolla, CA

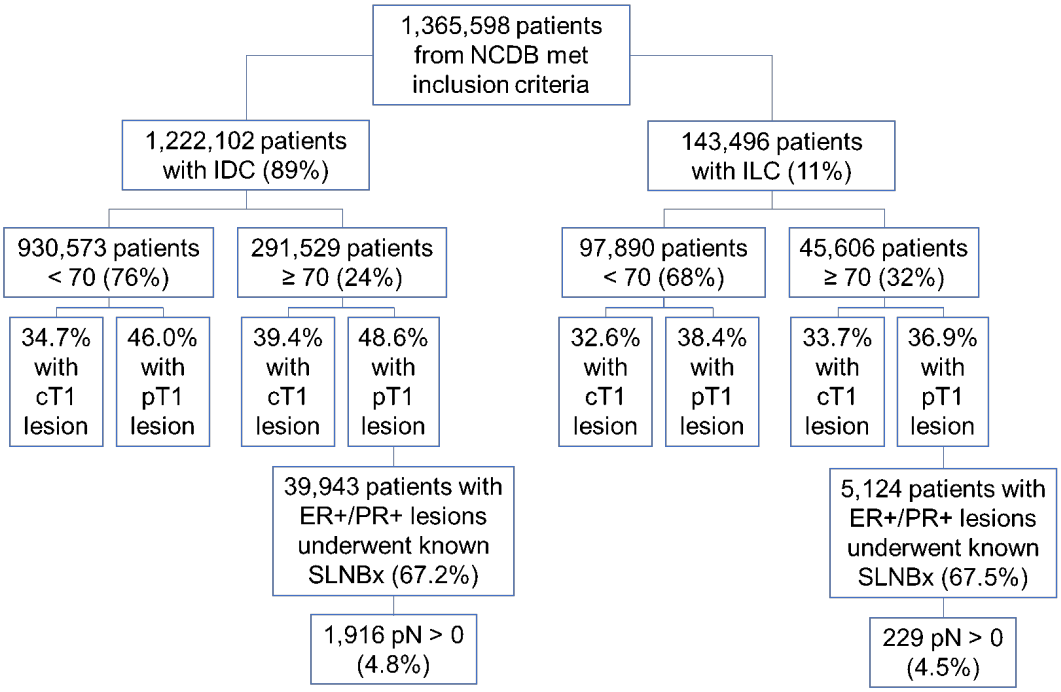
Background/Objective: Controversy continues in the treatment of breast cancer in women over 70. Additionally, there remains a paucity of literature informing the treatment of invasive lobular cancer (ILC) in this select group. In 2016, the Society of Surgical Oncology recommended against routine use of sentinel lymph node biopsy (SLNBx) as a part of the "Choosing Wisely Campaign." Previous literature reports ILC is more likely to present with extensive disease that is underappreciated on pre-operative imaging. This calls into question whether avoidance of routine SLNBx in patients with ILC over 70 is oncologically safe. In this study, we investigate the extent of disease in ILC in women over 70, as well as whether there are differences in positivity rate of SLNBx in ductal versus lobular carcinomas in this age group.

Methods: The National Cancer Database (NCDB) was used to identify women with infiltrating ductal carcinoma (IDC) and ILC. Those with in situ behavior designation were excluded, as were those with incomplete staging data. Comparisons were made using Pearson's Chi-squared tests. RStudio version 4.0.3 was utilized for all statistical analyses.

Results: A total of 1,365,598 patients diagnosed with IDC (n=1222102; 89%) or ILC (n=143496; 11%) met inclusion criteria for this analysis. Of these, 32% (n=45,606) of patients with ILC were over the age of 70 years. Of patients with ILC, those over 70 were more likely to have clinical Stage T1 lesions clinically (cT1) compared to those under 70 ($p<0.01$); however, the same group was found to be less likely to have Stage T1 lesions pathologically (pT1) ($p<0.01$). In comparison, patients with IDC over 70 were more likely to have clinical ($p<0.01$) and pathologic ($p<0.01$) Stage T1 lesions compared to those under 70. It is important to note that percentage differences are quite small, and likely are not clinically significant (Figure). In women over 70 with ER+/PR+ pT1 tumors (n=88,696), 89.4% of patients with IDC and 89.8% of patients with ILC received some type of lymph node surgery ($p=0.31$). After 2012, when SLNBx was specifically reported in NCDB, 39,943 (67.2%) of patients with IDC and 5,124 (67.5%) of patients with ILC underwent sentinel lymph node biopsy ($p=0.62$). Of patients who underwent SLNBx (n=45,913), there is no significant difference ($p=0.32$) in positive pathological node status between patients with IDC (n=1916; 4.8%) and patients with ILC (n=229; 4.5%) (Figure).

Conclusions: While ILC tends to present more diffusely than IDC and is often understaged on pre-operative imaging leading to higher rates of upstaging on pathology, this has not been extensively studied for women over 70. In this study, we demonstrate that in women over 70 with early-stage ILC, there was no clinically significant difference in surgical/pathological staging. Together with the lack of significant difference found in pathologic nodal positivity between ILC and IDC in this group, we should be reassured that surgeons can continue to choose wisely and limit the use of SLNBx in women over 70 with ILC T1 tumors. These results can help guide management of ILC in women over age 70.

Figure.



1387724 - Does Non-classical Lobular Carcinoma In Situ at the Lumpectomy Margin Increase Local Recurrence?

Anna Beck[1], George Plitas[1], M. Gabriela Kuba[1], Solange Bayard[2], Paula Garcia[1], Monica Morrow[1], Audree Tadros[1]

[1]Memorial Sloan Kettering Cancer Center, New York, NY, [2]Weill Cornell Medicine, New York, NY

Background/Objective: Non-classic lobular carcinoma in situ (NC-LCIS) identified in a breast biopsy has a higher upgrade rate to invasive carcinoma upon excision than classic LCIS. The clinical significance of NC-LCIS at the surgical margin of excisions for invasive cancer is unknown. We sought to determine if NC-LCIS at or near the margin in the setting of a concurrent invasive carcinoma is associated with risk of ipsilateral breast tumor recurrence (IBTR) and locoregional recurrence (LRR).

Methods: Patients treated between 1/2010-1/2022 at a single institution were retrospectively identified using a pathology database. Patients were included if they underwent lumpectomy for Stage I-III invasive cancer and had NC-LCIS, described as pleomorphic, florid, with acinar expansion, or central necrosis. Patients with prior ipsilateral breast cancer or margins positive for invasive carcinoma were excluded. Margins were stratified as NC-LCIS positive or <1mm, 1-5mm, and >5mm. Rates of IBTR and LRR, defined as IBTR with or without nodal recurrence or nodal recurrence alone, were examined for association with NC-LCIS margin status.

Results: Two hundred female patients (median age 61 years [IQR 52-69]) with NC-LCIS and an associated ipsilateral breast cancer with a median follow-up of 4.8 years [IQR 2.5-8.6] were identified. The clinical characteristics of the patients are outlined in the Table. The majority of patients had invasive lobular carcinoma (n=134, 67%). Re-excision after initial lumpectomy was performed for 56 (28%) patients and was specifically for NC-LCIS alone in 4 cases (2%). Final margins for NC-LCIS were >5mm in 117 patients (58%), 1-5mm in 68 (34%), and <1mm or positive in 15 (8%). Incidence of IBTR was 3.5% (n=7), and LRR was 7.0% (n=14). There was no difference in the crude rate of IBTR by NC-LCIS margin status (IBTR rate: 4.3% >5mm, 2.9% 1-5mm, 0% <1mm, p=0.827) nor in LRR (LRR rate: 7.0% >5mm, 6.8% 1-5mm, 6.7% <1mm, p=0.982); however, radiation therapy was given more often to those with closer (≤5mm) NC-LCIS margins (62% >5mm, 85% 1-5mm 80% <1mm, p=0.006) as was endocrine therapy (55% versus 82% versus 67%, p=0.001). Those who had an IBTR were less likely to receive radiation therapy (3/7 [43%] versus 73% of all patients with no IBTR, p=0.084), although this did not reach statistical significance. There were no differences in overall survival between groups.

Conclusions: For completely excised invasive breast cancers associated with NC-LCIS, extent of margin width for NC-LCIS was not associated with a difference in IBTR or LRR. These data suggest that the decision to perform re-excision of margin after lumpectomy should be driven by the invasive cancer, rather than the NC-LCIS margin.

Table. Clinical characteristics in overall cohort and stratified by NC-LCIS margin status

	All Patients (n=200)	>5mm NC-LCIS margin (n=117)	1-5mm NC-LCIS margin (n=68)	<1mm or positive NC-LCIS margin (n=15)	p-value
Age at diagnosis, years [IQR]	61 [52-69]	63 [53-69]	60 [51-70]	65 [55-69]	0.665
Axillary procedure					0.040
ALND	28 (14.0%)	15 (12.8%)	12 (17.6%)	1 (6.7%)	
SLNB	140 (70.0%)	82 (70.1%)	48 (70.6%)	10 (66.7%)	
None	32 (16.0%)	20 (17.1%)	8 (11.8%)	4 (26.7%)	
Invasive histology					0.246
Ductal	29 (14.5%)	17 (14.5%)	9 (13.2%)	3 (20%)	
Lobular	134 (67.0%)	76 (65.0%)	46 (67.6%)	12 (80%)	
Mixed lobular/ductal	37 (18.5%)	24 (20.5%)	13 (19.1%)	0 (0%)	
Type of NC-LCIS					0.522
Pleomorphic	111 (55.5%)	64 (54.7%)	37 (54.4%)	10 (66.7%)	
Pleomorphic plus Other types	37 (18.5%)	22 (18.8%)	11 (16.2%)	4 (26.7%)	
Other type only	52 (26.0%)	31 (26.5%)	20 (29.4%)	1 (6.7%)	
Tumor stage					0.003
TIS	19 (9.5%)	12 (10.3%)	5 (7.4%)	2 (13.3%)	
T1	122 (61.0%)	72 (61.5%)	40 (58.8%)	10 (66.7%)	
T2	47 (23.5%)	23 (19.7%)	22 (32.4%)	2 (13.3%)	
T3	1 (0.5%)	0 (0%)	1 (1.5%)	0 (0%)	
T4	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Unknown	11 (5.5%)	10 (8.5%)	0 (0%)	1 (6.7%)	
Nodal stage					0.069
N0	118 (59.0%)	69 (59.0%)	38 (55.9%)	11 (73.3%)	
N1	37 (18.5%)	21 (17.9%)	16 (23.5%)	0 (0%)	
N2-3	21 (10.5%)	9 (7.7%)	11 (16.2%)	1 (6.7%)	
Unknown	24 (12.0%)	18 (15.4%)	3 (4.4%)	3 (20%)	
Invasive tumor grade					0.001
Low	5 (2.5%)	2 (1.7%)	2 (2.9%)	1 (6.7%)	
Intermediate	26 (13.0%)	15 (12.8%)	8 (11.8%)	3 (20.0%)	
High	143 (71.5%)	90 (76.9%)	47 (69.1%)	6 (40%)	
Unknown	26 (13.0%)	10 (8.5%)	11 (16.2%)	5 (33.3%)	
ER positive	186 (93.0%)	109 (93.2%)	65 (95.6%)	11 (73.3%)	0.004
PR positive	154 (77.0%)	90 (76.9%)	53 (77.9%)	10 (66.7%)	0.250
HER2 positive	25 (12.5%)	13 (11.1%)	8 (11.8%)	4 (26.7%)	0.048

Abbreviations: NC-LCIS, non-classic lobular carcinoma in situ; IQR, interquartile range; ALND, axillary lymph node dissection; SLNB, sentinel lymph node biopsy; ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2

1391991 - Local Steroid Injection in Severe Idiopathic Granulomatous Mastitis as a New First-line Treatment Modality with Promising Therapeutic Efficacy

Neslihan Cabioglu[1], Cihan Uras[2], Selman Emiroglu[1], Derya Subasi Sezgin[2], Halime Mutlu[1], Mustafa Tukenmez[1], Halil Kara[2], Enes Arikan[2], Onur Dulgeroglu[2], Mahmut Muslumanoglu[1]

[1]Istanbul University, Istanbul, Turkey, [2]Acıbadem University, School of Medicine, Istanbul, Turkey,

Background/Objective: Autoimmunity may play a major role in the pathogenesis of idiopathic granulomatous mastitis (IGM). Most common therapeutic approaches are systemic and/or topical corticosteroid administration. Local steroid injection modality has appeared as a novel modality in recent years. We aimed to explore the therapeutic efficacy of local steroid injection in patients with severe IGM.

Methods: Between June 2019 and June 2022, 38 patients who were treated with either local steroid injection (LSI)-alone (n=13, 34%) or combined LSI with systemic oral steroid treatment (OST) (n=25, 66%) with a diagnosis of IGM were analyzed in terms of therapy response and side effects. The local steroid injection protocol included an intralesional triamcinolone acetonide injection into palpable granulomas every 4 weeks, and topical administration of steroid-containing pomades including mostly triamcinolone acetonide 0.1% pomade on the affected surface of the breast. Patients with OST received oral methyl prednisolone on different doses per day. Response of therapy was determined by physical exam and radiological findings.

Results: Median age was 33 (range, 24-52). Patients in this cohort had severe symptoms of IGM such as mass (100%), redness (92.1%), painful granulomas (97.4%), fistula formation (42.1%), and multifocal/multicentric granulomas (47.4%) as shown in the Table. The majority of patients (89.3%) with a previous use of oral steroids (n=28) due to the IGM were treated with combined LSI with OST, whereas only 10 patients in the LSI-group (77%) received LSI as the sole first-line therapy. Patients in the combined LSI/OST-group used oral steroids at a median dose of 8 mg (range, 416 mg) for a median of 7 months (range, 1-12) following LSIs. The median number of LSI applications was 4 (range, 1-11), whereas patients with LSI-alone had more LSI applications than those with combined treatment (LSI: 6, range, 1-10; vs LSI/OST: 3 range, 1-11; p=0.005) to obtain an effective therapeutic response. At a median of 11 months (range, 4-42), 45% of patients have shown a complete clinical response with disappearance of granulomas and clinical signs associated with IGM, whereas the remaining had partial response (55%). Of 10 patients with first-line treatment, 6 were found to have a complete response (60%). Patients with LSI-group were more likely to have a complete response than patients with LSI/OST-group that did not reach a statistical difference (61.5% vs 36%, p=0.124) that might be due to the increased use of LSI. Further, steroid-related systemic side effects were found to be lower in the LSI-alone group ($p<0.05$).

Conclusions: Local steroid injection could be considered in patients with severe IGM as the first-line treatment until a therapeutic response have been obtained either as the sole treatment modality or combined with oral steroids. Compared to systemic oral steroid therapy, local steroid administration can be considered as a new treatment modality with fewer side effects.

Table. Clinical and treatment characteristics of patients with idiopathic granulomatous mastitis treated with local steroid injections with/without oral steroids

Patient Characteristics	TOTAL (N=38)	Local Steroid Injection only (n=13)	Local Steroid Injection with Oral Steroid Treatment (n=25)	*p-value*
Median age (range, min-max)	33 (24-52)	31 (24-44)	37 (25-52)	0.450*
Mass	97.4% (37/38)	100% (13/13)	96% (24/25)	0.999
Erythema	92.1% (35/38)	100% (13/13)	88% (22/25)	0.538
Pain	100% (47/47)	100% (23/23)	100% (24/24)	0.999
Erythema nodosum	10.5% (4/38)	0% (0/13)	16% (4/25)	0.278
Multifocality/ Multicentricity	47.4% (18/38)	38.5% (5/13)	52 % (13/25)	0.506
Abscess&Cutaneous fistula formation	42.1% (16/38)	53.8% (7/13)	36% (9/25)	0.323
The median size of the granuloma	40 mm (range, 12-80 mm).	50 mm (range, 20-80 mm).	32 mm (range, 12-80 mm).	0.194*
Median follow-up time (months)	11 (range, 4-42)	12 (range, 4-41)	11 (range, 4-42)	0.293*
Number of LSI applications	4 (range, 1-11)	6 (range, 11-10)	3 (range, 1-11)	0.005*
Median week of steroid use	26 (range, 4-44)	N.A.	26 (range, 4-44)	N.A.
Median maximum methyl prednisolone dose per day	8 mg (range, 4-16)	NA	8 mg (range, 4-16 mg)	N.A.
Response to four-month therapy after diagnosis:				0.178
Partial response (>50% disappearance of lesions)	55.3% (21/38)	38.5 % (5/13)	64 %(16/25)	
Complete response rate	44.7% (17/38)	61.5% (8/13)	36% (9/25)	

*Mann-Whitney U-test was used. N.A.= not applicable

1460952 - A Randomized Trial Comparing the Effectiveness of Pre-test Genetic Counseling Using an Artificial Intelligence Automated Program Chatbot and Traditional In-person Genetic Counseling in Women Newly Diagnosed with Breast Cancer

Zahraa Al-Hilli[1], Ryan Noss[1], Jennifer Dickard[1], Wei Wei[1], Anna Chichura[2], Vincent Wu[1], Holly Pederson[1], Charis Eng[1]

[1]Cleveland Clinic, Cleveland, OH, [2]Cleveland Clinic Foundation, Cleveland, OH

Background/Objective: Alternative service delivery models are critically needed to address the increasing demand for genetics services and limited supply of genetics counselors and medical geneticists. This study proposes the utilization of an artificial intelligence automated technology, Chatbot, to improve access to genetic pre-test counseling for women with breast cancer who do not meet NCCN guidelines. A randomized trial comparing Chatbot to traditional genetic counseling was conducted. The primary aims of the study were to assess overall patient satisfaction and comprehension in the study groups. Secondary aims were to determine uptake of testing for those who do not meet NCCN guidelines, and to assess gene mutation rate in the overall cohort.

Methods: A prospective randomized controlled trial of women with Stage 0-III breast cancer who do not meet NCCN criteria for genetic testing. Patients were identified and consented after their visit with a breast surgeon and were randomized to 1 of 2 groups using an automated program to complete pre-test counseling with a Chatbot or with an in-person genetics counselor. Patients in both groups completed a survey assessing satisfaction with their decision regarding genetic testing and a questionnaire assessing their knowledge of breast cancer genetics. Data collected include patient demographics, cancer diagnosis details, family history, decision to proceed with genetic testing, result of genetic testing, time from diagnosis to surgery, surgery type, and if surgery type was impacted by decision to obtain testing. Patient characteristics were summarized using frequencies and percentages by arm and compared using Fisher's exact test. Knowledge and satisfaction scores were summarized in median and range by arm and compared using Wilcoxon rank sum test.

Results: Thirty-six patients were enrolled in the study, and of these, 2 patients withdrew prior to genetic counseling. Seventeen were randomized to Chatbot and 17 to traditional genetic counseling. Thirteen (38.2%) patients had a family member with breast cancer but did not meet NCCN criteria. Fourteen (41%) patients had Stage I breast cancer, 6 (17.6%) had DCIS, 31 (91%) had hormone receptor-positive breast cancer, and 2 (5.9%) had HER2-positive disease. Nine (26.5%) were treated with neoadjuvant chemotherapy and 2 (6%) with neoadjuvant endocrine therapy. All patients opted to undergo genetic testing. Genetic testing revealed a total of 5 mutations in 4 patients (12.5%), including CHEK2 (n=2), MSH3 (n=1), and BRCA1 and HOXB13 (n=1). No patients had a delay in time to breast cancer treatment due to waiting for genetic testing results, and no patients underwent further surgery after testing was resulted. Median (range) of the knowledge score of the Chatbot arm was 11 (9-13), whereas the in-person arm was 12 (8-14) (p=0.20). Median (range) of satisfaction score of the Chatbot and in-person arm was 30 (6-30) and 30 (24-30), respectively (p=0.31).

Conclusions: Satisfaction and comprehension in breast cancer patients undergoing pre-test genetic counseling using an automated Chatbot is not inferior to in-person genetic testing. Utilization of this technology can offer improved access to care and a broader option for genetic pre-test counseling.

Poster Session and Reception

Friday, April 28, 2023, 6:15 pm–7:30 pm

Top 10

1383182 - Initial Experience Using Superparamagnetic Iron Oxide (SPIO) for Delayed Sentinel Lymph Node Biopsy in DCIS

Odette Solis[1], Hayne Noh[2], Helene Sterbling[1], Arkadii SIpok[1], Shawna Willey[1]

[1]Inova Health System, Falls Church, VA, [2]University of Virginia School of Medicine, Herndon, VA

Background/Objective: Superparamagnetic Iron Oxide (SPIO; Magtrace) has recently been introduced as a magnetic lymphatic tracer with the unique benefit of retention in the lymph node for up to 30 days following injection, allowing for the possibility of delayed sentinel lymph node biopsy if final pathology demonstrates an upstage to invasive cancer. The purpose of this study was to perform an observational analysis of patients with DCIS who underwent SPIO injection to determine the number of patients spared from unnecessary sentinel lymph node biopsy, and to determine the success of delayed mapping in those found to have invasive cancer.

Methods: This was a single-institution, retrospective analysis of 114 patients with biopsy-proven ductal carcinoma in situ (DCIS) who underwent SPIO injection for delayed sentinel lymph node biopsy in patient's undergoing mastectomy or oncoplastic surgery from 2020-2022. After IRB approval, all DCIS patients who received SPIO were captured from our institution's electronic medical record, and all data entry and statistical analyses were performed using RedCap data software. The primary outcome was number of patients with invasive carcinoma on final pathology who required return to the operating room for delayed sentinel lymph node biopsy. Secondary outcomes were success in lymph node mapping and any adverse effects of SPIO.

Results: Of 114 patients (117 breasts), 13 patients (14 breasts) returned to the operating room for delayed sentinel lymph node biopsy for invasive cancer. One patient had bilateral upstage to invasive disease, and delayed sentinel biopsy with SPIO was unsuccessful on either side and required traditional technetium injection at the time of second operation, which was successful. The only adverse event noted from SPIO was brown skin discoloration noted in 1 patient. The longest return to operating room time was 28 days, and the median number of lymph nodes removed was 2.

Conclusions: This study demonstrates the effectiveness and safety of SPIO for delayed sentinel lymph node mapping in patients with DCIS and contributes to the small but growing literature supporting the use of SPIO in this patient population. SPIO is an effective tool to spare the majority of our patients with DCIS from the unnecessary cost and morbidity of a sentinel lymph node biopsy.

Table. Return to operating room for sentinel lymph node biopsy

Number of patients with occult malignancy with return to OR for SLNBx	13 (11.4)
Successful Mapping with SPIO (breasts)	12 (92.3)
Final pathology of SLNBx	
DCIS	0 (0)
Invasive ductal ca	1 (0.9)
Invasive lobular ca	0 (0)
Benign	12 (10.5)
Median number of lymph nodes removed, (IQR)	2 (range: 1-4)
Average number of lymph nodes removed	2
Complications or adverse events associated with SPIO injection	1 (7.6)
Skin staining	1 (7.6)
Allergic reaction	0 (0)
Other	0 (0)

1386923 - Association of Stromal Tumor Infiltrating Lymphocytes and Clinical Outcomes in Patients with TNBC Who Omitted Systemic Therapy

Julia Tchou[1], Diego Gonzalves[2], Anupma Nayak[2], Steven Woodward[2], Macy Goldbach[2], Oluwadamilola Fayanju[2], Jennifer Zhang[2], Leisha Elmore[2], He Xu[2]

[1]University of Pennsylvania, Wayne, PA, [2]University of Pennsylvania, Philadelphia, PA

Background/Objective: Stromal tumor-infiltrating lymphocytes (TILs) ≥60% in triple-negative breast cancer (TNBC) is associated with higher complete pathologic response rate and better overall survival after neoadjuvant chemotherapy. Treatment outcomes in patients with high TILs who omit systemic therapy is unclear. In a retrospective cohort of TNBC patients who received upfront surgery, we sought to compare clinical outcomes between patients who did and did not receive adjuvant systemic therapy. The association of stromal TILs and outcomes in those who omitted systemic therapy was further assessed.

Methods: After approval by our institutional review board, we identified all patients with non-metastatic TNBC treated by upfront surgery stratifying by receipt of adjuvant chemotherapy (AC) at our institution between 2009-2017 (n=940). Multivariate logistic regression models were performed to identify clinical factors associated with outcomes. Stromal TILs were estimated in the no AC group in whom archival formalin-fixed paraffin-embedded tumor sections were available for central review (n=53). Clinical data, histologic variables, and outcomes were compared between patients with low (<60%) and high TILs (≥60%) using the Fisher-Freeman-Halton Test due to low event rates.

Results: Of the 940 patients with TNBC in this study who underwent upfront surgery, 734 (78%) received AC, and 206 (22%) received no AC. Clinical characteristics stratified by AC vs no AC are summarized in the Table. Patients in the no AC group tended to be older, more likely to have smaller, lower-grade tumors, more likely to have breast-conserving surgery, less likely to receive adjuvant radiation, higher rate of recurrence, and a higher crude death rate. Multivariate logistic regression analyses demonstrated that increased risk of distant recurrence was associated with no AC (OR 1.80, 95% CI 1.0-3.2, p=0.05), pathologic Stage II (OR 3.09, 95% CI 1.2-7.8, p=0.02) and pathologic Stage III (OR 9.45, 95% CI 1.3 – 7.2, p=0.03). Of the 206 patients in the no AC group, 170 (82.5%) remained disease-free at a median follow-up of 3.2 years. A subset analyses of 53 archival hematoxylin and eosin-stained tumor sections from the no AC group demonstrated that 37 (70%) had low TILs, and 16 (30%) had high TILs. Clinical and histologic characteristics were similar between these 2 TILs groups. Of note, all recurrences (n=4) were in the low TILs group but differences were not statistically significant (Table).

Conclusions: Our preliminary results suggested that TNBC with high stromal TILs (≥60%) may have improved outcomes. Whether high stromal TILs may be utilized as a biomarker in future TNBC treatment de-escalation studies remains an active area of investigation at our institution and elsewhere.

Table. Clinical characteristics of patients with TNBC undergoing upfront surgery stratified by adjuvant chemotherapy (AC) vs. no adjuvant chemotherapy (no AC) and subset analyses of no AC group stratified by low and high TILs

Table 1- Demographic and Breast Cancer Characteristics of TNBC patients who underwent upfront surgery and stratified by those who received adjuvant vs. no adjuvant chemotherapy						Subset analyses of 53 archival tumor samples from the no AC group stratified by low TILs (<60%) vs. high TILs (≥60%)				
	AC		no AC		p-value	TILs <60%		TILs ≥ 60%		P-value
	n	%	n	%		n	%	n	%	
Total n=940	734		206			37	70.0%	16	30.0%	
Age, mean ± SD	54.5 (12.1)		67.9(13.3)		<0.001	70.5		70		
Race										
White	512	69.8%	142	68.9%		20	54.1%	9	56.3%	
Black	184	25.1%	59	28.6%	0.32	17	45.9%	6	37.5%	0.32100
Asian/Pacific Islander	25	3.4%	3	1.5%		0	0.0%	1	6.3%	
Other/NA	13	1.8%	2	1.0%		0	0.0%	0	0.0%	
	734		206							
Year Diagnosed, median (IQR)	2014 (4)		2013 (4)		0.06					
Tumor size (cm)										
<=2 cm	295	40.2%	94	45.6%		21	56.8%	8	50.0%	
2.1-5 cm	244	33.2%	40	19.4%	<0.001	6	16.2%	7	43.8%	0.06300
>5 cm	17	2.3%	7	3.4%		10	27.0%	1	6.3%	
Missing	178	24.3%	65	31.6%						
No. of involved nodes		0.0%								
0	534	72.8%	169	82.0%		33	89.2%	11	68.8%	
1-3	150	20.4%	24	11.7%	0.20	3	8.1%	5	31.3%	0.08800
>3	47	6.4%	8	3.9%		1	2.7%	0	0.0%	
Missing	3	0.4%	5	2.4%						
Tumor Grade										
1	8	1.1%	10	4.9%		1	2.7%	0	0.0%	
2	108	14.7%	60	29.1%	<0.001	5	13.5%	1	6.3%	0.75800
3	593	80.8%	114	55.3%		31	83.8%	15	93.8%	
Missing	25	3.4%	22	10.7%						
Definitive Surgery										
Lumpectomy	430	58.6%	122	59.2%		33	89.2%	15	93.8%	(1-sided, 0.52
Mastectomy	304	41.4%	82	39.8%	0.03	4	10.8%	1	6.3%	
Missing	0	0.0%	2	1.0%						
Adjuvant Radiation										
Yes	468	63.8%	99	48.1%		24	64.9%	10	62.5%	1-sided, 0.55
No	260	35.4%	107	51.9%	<0.001	13	35.1%	6	37.5%	
Missing	6	0.8%	0	0.0%						
Follow up†(days),median (IQR)	1498.5 (1452)		1176.5(1466.5)		<0.001	1288.5		1485		
Recurrence						4	10.8%	0	0.0%	
Local/Regional	30	4.1%	18	8.7%		3	8.1%	0	0.0%	0.17600
Distant Metastasis	68	9.3%	18	8.7%	0.03	1	2.7%	0	0.0%	
No recurrence	636	86.6%	170	82.5%						
Total Deceased	98	13.4%	45	21.8%	<0.001	8	21.6%	2	12.5%	0.44120

1387179 - What Proportion of Patients with cT1-2N1 Breast Cancer Could Potentially Be Spared Axillary Lymph Node Dissection: An Analysis of the National Cancer Database

Austin Williams[1], Lucy De La Cruz[2]

[1]Fox Chase Cancer Center, Philadelphia, PA, [2]MedStar Washington Hospital Center, Washington, DC

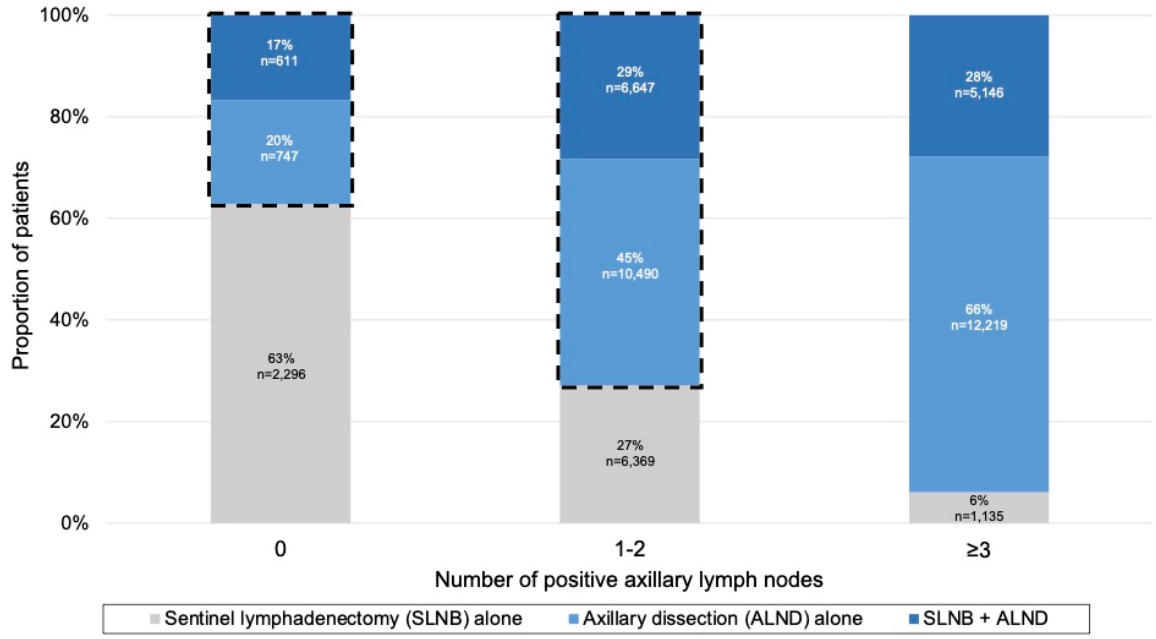
Background/Objective: Given its morbidity, axillary lymph node dissection (ALND) in clinically node-negative breast cancer with 1-2 positive sentinel lymph nodes (+SLNs) has largely been replaced by observation or radiation with acceptable oncologic control. Axillary imaging, however, has increased the pre-operative detection of nodal disease. We sought to investigate the proportion of cN1 patients undergoing upfront surgery who have a low nodal disease burden and could potentially avoid ALND.

Methods: From the National Cancer Database (2012-2019), we identified females with cT1-2N1 breast cancer undergoing upfront surgery. We stratified by the number of +LNs (0; 1-2; ≥3) and performed comparisons between the groups to identify factors associated with lower nodal burden and the correlation between +SLNs and additional +LNs. We then assessed the proportion of patients who underwent sentinel lymphadenectomy (SLNB) alone and those who underwent ALND. Given that patients with hormone receptor-positive (HR+) HER2-negative (HER2-) breast cancer more frequently undergo upfront surgery due to inferior response rates to neoadjuvant therapy, we performed subset analyses based on receptor subtype.

Results: A total of 45,660 patients with cT1-2N1 breast cancer were identified, 44% of whom underwent breast conservation. Considering total LNs, evaluation 8% had 0 +LNs, 51% 1-2 +LNs, and 41% ≥3 +LNs on pathologic analysis. Larger tumors, high tumor grade, and lymphovascular invasion were the factors most strongly associated with having ≥3+LNs on multivariable analysis (all $p<0.05$). Overall, the rate of ALND was 79%, with 37% of those who ultimately had no +LNs and 74% of those with 1-2 +LNs undergoing ALND. If ALND were omitted for <3 +LNs, 41% of the cohort would have been spared ALND (boxes). In patients for whom the number of +SLNs was known (n=2,521), SLNB correctly identified 71% of patients with < 3+SLNs as having <3 total +LNs. Among the 33,966 patients with HR+HER2- disease, 78% underwent ALND, with 35% of those who ultimately had no +LNs and 72% of those with 1-2 +LNs undergoing ALND. In this subgroup, SLNB correctly identified 84% of patients <3+SLNs as having <3 total +LNs.

Conclusions: In the upfront surgery setting for cN1 disease, SLNB correctly identifies the majority of patients who have <3 +LNs and could potentially avoid ALND, regardless of tumor subtype. While we do not know the definition of clinically node-positive in these cases (biopsy-proven vs. palpable vs. radiographically suspicious), refinement of guidelines for pre-operative axillary imaging in patients without palpable axillary lymph nodes may help to decrease the proportion of patients with early-stage disease who are labeled cN1, thereby sparing these patients the morbidity of ALND.

Figure. Axillary surgical approach among clinically node-positive patients stratified by total number of positive axillary lymph nodes



1387856 - Neoadjuvant and Adjuvant Chemotherapy Treatment Patterns Among Older Triple-negative and HER2-positive Breast Cancer Patients with Comorbidities

Nina Tamirisa, Wenli Dong, Yu Shen, Simona Shaitelman, Gildy Babiera, Isabelle Bedrosian
MD Anderson Cancer Center, Houston, TX

Background/Objective: Several studies have demonstrated age-related disparities in older patients with breast cancer, resulting in undertreatment. Older patients with co-morbidities can pose a challenge for cancer care providers who must balance competing risk of death due to toxicity from standard multimodality treatment recommendations. We sought to determine whether the sequencing of chemotherapy and surgery impacted the ability to deliver both modalities of cancer care.

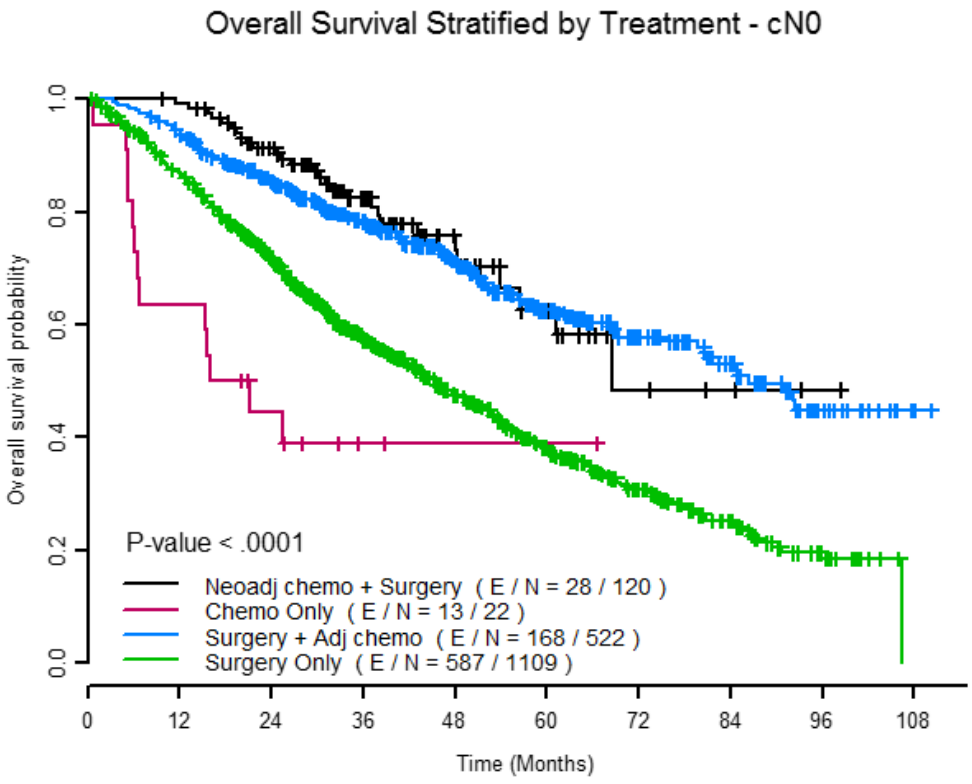
Methods: Using the National Cancer Database (2010-2017), we identified patients >70 with a Charleson Deyo Comorbidity (CCDM) score of 2 or 3 and clinical Stage T1c-3 and N0-3, HER2-positive or triple-negative invasive breast cancer treated with chemotherapy alone, surgery alone, or both surgery and chemotherapy. Patients treated with chemotherapy and surgery were further divided into 2 groups: neoadjuvant vs adjuvant chemotherapy. Chi-square or Wilcoxon rank sum test was used to evaluate differences between patient groups. Kaplan-Meier curves were produced by prognostic factors of interest. The Log-rank test was used to test the difference in survival distributions among the subgroups.

Results: A total of 2,911 patients met the selection criteria, of whom 87.4% (n=2,544) underwent surgery as the first step in treatment. Compared to women treated with chemotherapy first, women

treated with surgery first were older (78.9 vs 75.9 yo, p<0.01) with earlier stage of disease (cT1c: 39.5% vs 16.4% and cN0: 79.5% vs 53.4%, p<0.01). Among patients who received chemotherapy first (n=367), 77.9% were able to complete subsequent surgery. Factors associated with completion of treatment with surgery after chemotherapy were younger age (75.4 vs 77.8 yo, p<0.01) and clinically negative lymph nodes (cN0: 58.0% vs 37.0%, p<0.01). Among patients treated with surgery first, only 36.0% (n=917) received adjuvant chemotherapy. Patients more likely to complete adjuvant chemotherapy after surgery were younger (75.9 vs 80.6 yo), with clinically node-positive disease (cN1-cN3: 27.0% vs 16.8%, p<0.01) and moderate comorbidity (CCDM 2: 69.9% vs 64.7%, p<0.01). Among patients who received both modalities of treatment (n=1,203), women with more advanced stage tumors and those diagnosed in more recent years were more likely to receive neoadjuvant chemotherapy. With a median follow-up of 49.3 months (95% CI = 47.1 -50.7), cN0 patients who received treatment with both surgery and chemotherapy had significantly better survival compared to patients who received single treatment (Log-rank test p-value <0.001, Figure).

Conclusions: In older, triple-negative or HER2-positive breast cancer patients with comorbidities, receipt of chemotherapy and surgery was associated with improved survival, and neoadjuvant chemotherapy patients were almost twice as likely to receive both modalities than patients who underwent surgery first. A multidisciplinary approach to care with geriatric assessments may support patients through chemotherapy to deliver guideline concordant cancer care and improve outcomes in this vulnerable population.

Figure. Overall survival stratified by treatment in older patients with comorbidities and HER2-positive/triple-negative breast cancer



1387926 - Tyrer-Cuzick Lifetime Risk Is Not Associated with Non-BRCA1/2 Pathogenic Variants for Breast Carcinoma

Divya Rao[1], Chloe Wernecke[2], Lisa Baron[3], Steven Cai[3], Peter Beitsch[4], Rakesh Patel[5], Pat Whitworth[6], Barry Rosen[7], Nhan Tran[3], Kevin Hughes[8], Paul Baron[3]

[1]Lenox Hill Hospital/Northwell Health, Dix Hills, NY, [2]Targeted Medical Education, Moffett Field, CA, [3]Lenox Hill Hospital/Northwell Health, New York, NY, [4]Dallas Surgical Group, Dallas, TX, [5]Good Samaritan Hospital, Los Gatos, CA, [6]Nashville Breast Center, Nashville, TN, [7]Advocate Aurora Healthcare, Chicago, IL, [8]Medical University of South Carolina, Charleston, SC

Background/Objective: The Tyrer-Cuzick (TC) or IBIS risk calculator is used to estimate the probability of an unaffected female patient developing breast cancer within 10 years, and over their lifetime, and can calculate their likelihood of carrying a BRCA1/BRCA2 pathogenic variant. Version 8 of this tool considers family history, personal history, breast density, and past medical history to assess the risk of breast cancer. A TC lifetime risk (LR) of <15% is average risk, 15-19% is intermediate risk, and greater than 20% is high risk. Historically, TC LR has been used to guide patients towards further diagnostic imaging, genetic testing, chemoprevention or risk-reducing surgery. The purpose of this study is to determine if TC LR is associated with non-BRCA1/2 pathogenic variants (PVs).

Methods: Using the Informed Genetics Annotated Patient Registry (iGAP), a population of 964 patients with TC LR Version 8 scores were evaluated for 12 PVs that are associated with breast cancer susceptibility (ATM, BARD1, BRCA1, BRCA2, BRIP1, CDH1, CHEK2, NBN, PALB2, PTEN, STK11, TP53), as well as variants of unknown significance (VUS) using lab agnostic genetic testing. Patients were enrolled from 2019-2022, and historical TC scores in patients who eventually developed breast cancer were included. Chi square was used to test for significance.

Results: The average TC LR for the 964 patients was 7.71%. A family history of cancer was noted in 78.30%, and a personal history of cancer other than breast occurred in 20.74%. Including historical TC LR scores, 13.80% of the population (133 patients) developed breast cancer. There were 116 patients (12.03%) who were found to have a PV (7 ATM, 4 BARD1, 26 BRCA1, 30 BRCA2, 6 BRIP1, 29 CHEK2, 9 NBN, 2 PALB2, 1 PTEN, 2 TP53), with an average TC LR of 8.98%. A total of 102 patients had a VUS (10.58%), with an average TC LR of 8.29%, while 746 patients were negative for PV/VUS with an average TC LR of 7.43%. The average TC LR was 13.76% for BRCA1 mutations and 11.85% for BRCA2. There were 60 patients (52% of those with PVs) with non-BRCA1/2 PVs, with an average TC LR of 5.47%. The majority of BRCA1 (22 out of 26) and BRCA2 (20 out of 30) were found to be average risk patients, with a TC LR 15% or below. A greater TC LR was associated with finding BRCA1 PV's when compared to non-BRCA1/2 PVs (p=0.015) or no PVs/VUS (p=0.020). We also noted a higher TC LR was significantly associated with BRCA1/BRCA2 variants, as compared to non-BRCA1/2 PVs (p=0.038).

Conclusions: We found that TC LR scores were low in patients with non-BRCA1/2 PVs. The decision for genetic testing should not be influenced by TC lifetime risk score but should be based on individual patient's family history, NCCN guidelines, or the TC genetic risk score.

Table. Demographics and breast density of TC LR patient population

	BRCA	Non-BRCA PVs	Neg	Cohort
Demographics				
Age (years)	48.48 ± 15.82	53.80 ± 14.40	51.00 ± 13.94	51.02 ± 14.10
BMI (kg/m2)	27.07 ± 6.248	26.62 ± 6.532	27.96 ± 6.895	27.54 ± 7.343
TC LR	12.74% ± 0.113	5.47% ± 0.066	7.43% ± 0.103	7.70% ± 0.102
Breast Density				
A #(%)	3 (5.36%)	0 (0.00%)	11 (1.30%)	14 (1.45%)
B #(%)	16 (28.57%)	8 (13.33%)	119 (14.03%)	143 (14.83%)
C #(%)	12 (21.43%)	17 (28.33%)	185 (21.82%)	214 (22.20%)
D #(%)	3 (5.36%)	4 (6.67%)	43 (5.07%)	50 (5.19%)
Unknown #(%)	22 (39.29%)	31 (51.67%)	490 (57.78%)	543 (56.33%)
Breast Density: A = Fatty, B = Scattered, C = Heterogeneous, D = Extremely Dense				

1387932 - Survival After Contralateral Secondary Breast Cancer by Age Group in California

Lauren Perry[1], Theresa Keegan[2], Qian Li[1], Frances Maguire[2], Candice Sauder[1]

[1]University of California Davis School of Medicine, Sacramento, CA, [2]University of California Davis Comprehensive Cancer Center, Sacramento, CA

Background/Objective: Secondary cancers account for 16% of all new cancer diagnoses, with breast cancer (BC) the most common secondary cancer and having poorer survival than primary BC (pBC). Breast cancer survivors who develop a contralateral secondary BC (CsBC) currently receive similar treatments to pBC given our present knowledge. Identification of survival differences between pBC and CsBC could influence future counseling and treatments for patients at risk for CsBC. Therefore, we utilized a large population-based dataset to compare BC-specific survival (BCSS) between pBC and CsBC.

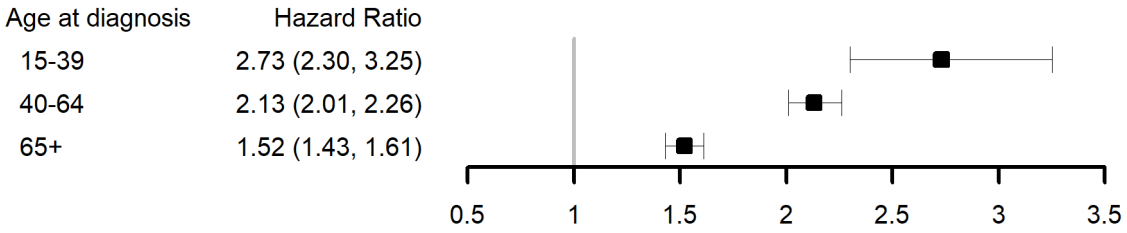
Methods: Women (>15 years) diagnosed with pBC from 1991-2015 in the California Cancer Registry (n=377,176) were compared to those with CsBC (n=15,586) by age group (15-39, n=406; 40-64, n=6,814; >65, n=8,366). Multivariable logistic regression models assessed demographic and clinical characteristics associated with CsBC compared to pBC by age group. Multivariable Cox proportional hazards regression models assessed BCSS of CsBC compared to pBC by age group, while accounting for the competing risk of death.

Results: On univariate analysis, younger patients with CsBC more commonly underwent mastectomy (61%) and chemotherapy (54%) than middle-age (56%, 42%) and older women (46%, 16%). On multivariate analysis, CsBC patients across all ages were more likely to have ER/PR-negative (15-39: odds ratio (OR) 1.81, confidence interval (CI) 1.42-2.31; 40-64: OR 1.56, CI 1.46-1.67; >65: OR 1.26, CI 1.17-1.35), and HER2-negative tumors (15-39: OR 1.39, CI 1.17-1.67; 40-64: OR 1.26, CI 1.21-1.32; >65: OR 1.11, CI 1.06-1.17) compared to pBC. CsBC patients were also observed across all ages as less likely to

have larger tumors (15-39: OR 0.25, CI 0.16-0.38; 40-64: OR 0.41, CI 0.37-0.45; >65: OR 0.46, CI 0.42-0.51) and lymph node-positive disease (15-39: OR: 0.86, CI 0.69-1.08; 40-64: OR 0.88, CI 0.83-0.93; >65: OR 0.89, CI 0.84-0.94). CsBC was associated with worse survival compared to pBC across all ages (15-39: hazard ratio (HR) 2.73, CI 2.30-3.25; 40-64: HR 2.13, CI 2.01-2.26; >65: HR 1.52, CI 1.43-1.61). Younger patients with CsBC had the poorest BCSS, with nearly 3 times the risk of death (OR 2.73; 2.30-3.25) compared to pBC (Figure).

Conclusions: BCSS is significantly decreased among all women diagnosed with CsBC compared to pBC, with the strongest impact on survival seen in younger women. Worse survival after CsBC despite associations with smaller tumors and lymph node negativity suggests that CsBC may be biologically distinct and need treatment reconsideration.

Figure. Contralateral secondary breast cancer-specific survival across age groups



1387985 - Low Rates of Local-regional Recurrence in Inflammatory Breast Cancer Patients After Contemporary Trimodality Therapy

Taiwo Adesoye[1], Shlermine Everidge[1], Jennifer Chen[2], Susie Sun[1], Mediget Teshome[1], Vincente Valero[1], Wendy Woodward[1], Anthony Lucci[1]

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Background/Objective: Inflammatory breast cancer (IBC) represents an aggressive but rare subset (2-3%) of breast cancer with worse prognosis when compared to non-IBC. Historically, overall survival rates of 50% and local-regional recurrence (LRR) rates of 20% have been reported. The aim of this study was to evaluate LRR in a contemporary cohort of non-metastatic IBC patients undergoing trimodality therapy at a single institution, and to identify factors associated with local failure.

Methods: Patients with non-metastatic IBC who received trimodality therapy (neoadjuvant chemotherapy, modified radical mastectomy, and adjuvant radiation) and had surgical resection performed at our institution were identified from an institutional prospective database (2007-2019). Clinicopathologic factors were obtained, and local-regional and distant recurrence outcomes were reported. Survival outcomes were analyzed using Cox proportional hazards regression model.

Results: A total of 262 patients were treated over the study period. Median age at diagnosis was 52 years, and median follow-up was 5.1 years. A total of 124 (47%) patients were diagnosed with Stage IIIC

disease. Surgical margins were negative in 261 (99%) patients, and 81 (30.9%) patients achieved pCR (breast and axilla). Local-regional recurrence was observed in 17 (6.4%) patients; this was isolated to the chest wall in 11 (64.7%) patients, and isolated to regional nodes in 4 (23.5%) patients. Distant recurrence was observed in 92 (35.1%) patients. There were 90 (34.4%) deaths during follow-up. The 5-year probability of LRR was 6.5% (95%CI 3.6-10.7%), and the 5-year overall survival was 69.9%. In multivariate analysis, pathologic complete response was associated with improved disease-free survival.

Conclusions: In Stage III IBC patients treated with contemporary trimodality therapy, the 5-year probability of local-regional recurrence was 6.5%, similar to non-IBC patients. Following chemotherapy, surgical resection with modified radical mastectomy to negative margins, followed by postmastectomy radiation therapy resulted in excellent long-term local-regional control.

Table. Clinicopathologic characteristics of patients with inflammatory breast cancer

Characteristic	Total N = 262
Age (years)	
≤40	51 (19.5%)
41-50	71 (27.1)
51-60	82 (31.3)
61-70	47 (17.9)
>70	11 (4.2)
Race/Ethnicity	
White, non-Hispanic	212 (80.9%)
Hispanic	22 (8.4%)
Black	19 (7.3%)
Native American	2 (0.8%)
Other	7 (2.7%)
BMI (kg/m^2)	
< 18.5	2 (0.8%)
18.5-24.9	47 (17.9%)
25-29.9	74 (28.2%)
>30	138 (52.7%)
Unknown	1 (0.4%)
Menopause status	
Pre-menopause	100 (38.2%)
Peri-menopause	26 (9.9%)
Post-menopause	136 (51.9%)
Clinical N Stage	
0	9 (3.4%)
1	112 (42.7%)
2	17 (6.5%)
3	124 (47.3%)
Tumor Subtype	
HR+ HER2-	105 (40.1%)
HR- HER2+	44 (16.8%)
HR+ HER2+	51 (19.5%)
HR- HER2-	62 (23.7%)
Pathologic complete response (pCR, breast and axilla)	
No	181 (69.1%)
Yes	81 (30.9%)
Lymphovascular Invasion	
No	124 (50.4%)
Yes	122 (49.6%)
Surgical Margins	
Negative	261 (99.6%)
Positive	1 (0.4%)

1387998 - Digistain: A Novel, Rapid, and Cost-effective Prognostic Marker for Guiding Adjuvant Therapy in ER+, HER2- Breast Cancer

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Background/Objective: Gene assays offer useful support in guiding adjuvant therapy decisions in hormone-positive breast cancer, but their cost renders them inaccessible to the majority of breast cancer patients. Furthermore, they require special tissue handling protocols, including the transportation of tissue to laboratories. Here we report on a rapid and economical prognostic tool to help guide therapy decisions for under-supported patients.

Methods: A previously established mid-IR imaging technique (Digistain) was used to produce a prognostic score. We risk-classified 801 patients from a well-characterized series using the DI prognostic score to test if it would correlate with the likelihood of distant recurrence in hormone-positive, HER2- primary breast cancer. The median patient follow-up period was 152 months.

Results: The Digistain-based prognostic accuracy and negative predictive values (0.98 for low-risk classification) were consistently high (for all clinical outcomes examined). Overall, the DI-based stratification into low- and high-risk showed statistical significance for all clinical outcomes such as survival ($p< 0.001$) and primary recurrence ($p< 0.001$) examined in the main group, as well as in the lymph node-positive and post-menopausal subgroups.

Conclusions: The technology we studied classified patients as low or high risk with clear and wide confidence intervals and with similar predictive performance as reported for other risk stratification tools. It is validated as being able to quantify the likelihood of distant recurrence in patients with early-stage hormone receptor-positive, HER2- breast cancer. The low cost and ability to provide almost immediate prognostic information afford Digistain the potential to offer clinical utility to patients who would be otherwise inaccessible.

1388092 - Contrast-enhanced Digital Mammography in the Evaluation of Breast Cancer

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Background/Objective: Contrast-enhanced digital mammography (CEDM) is an imaging modality that has shown good promise relative to ultrasound (US), standard digital mammography (MG), and magnetic resonance imaging (MRI) in the diagnosis of breast cancer. The primary aim of this study was to compare the accuracy of CEDM relative to US, MG, and MRI in the prediction of pathologic tumor size. The secondary aim was to determine if CEDM retains accuracy in women with dense breasts or prior breast treatment.

Methods: We performed a retrospective cohort study evaluating 102 women with invasive or in situ breast cancer who underwent CEDM and US, MG, and/or MRI prior to surgery between 2011 and 2021. Medical records were reviewed for demographic, clinical, imaging, and pathology variables. Intraclass correlations (ICCs) between imaging and pathologic tumor size were determined. ICC values of <0.5, 0.5 – < 0.75, 0.75 – <0.9, and 0.9 – 1 were indicative of poor, moderate, good, and excellent reliability, respectively. The ICCs of the different imaging modalities were then compared using Steiger's Z test. The Mann-Whitney U test was used to determine if there was a significant difference in the accuracy of CEDM between women with dense versus non-dense breasts and between women with prior breast surgery or radiation versus no such history.

Results: The ICCs between CEDM, US, MG, and MRI and pathologic tumor size were statistically significant ratings of good reliability, poor reliability, moderate reliability, and good reliability, respectively. While there was no significant difference between the ICCs of CEDM and MRI, a significant difference was observed between the ICCs of CEDM and US as well as CEDM and MG. There was no significant difference in CEDM's prediction of pathologic tumor size between women with dense versus non-dense breasts nor between women with prior breast treatment versus no prior breast treatment.

Conclusions: Our study demonstrates that CEDM has good reliability in the prediction of pathologic tumor size. It is more accurate than US and MG and comparable to MRI. Furthermore, it retains accuracy among women with dense breasts and those with prior treatment. CEDM is a valuable tool in the evaluation of breast cancer.

Table. Intraclass correlations between imaging modalities and pathologic tumor size

Imaging Modality	ICC Between Imaging and Pathologic Tumor Size [ICC (p-value)]	ICC Rating	Comparison of CEDM ICC vs Other Imaging Modalities (p-value)
CEDM	0.806 (p<0.001)	Good	n/a
Ultrasound	0.453 (p=0.004)	Poor	<0.001
Mammogram	0.608 (p=0.008)	Moderate	<0.001
MRI	0.830 (p<0.001)	Good	0.414

ICC = intraclass correlation

1388247 - Assessing Mode of Recurrence in Breast Cancer to Identify an Optimised Follow-up Pathway – A 10-year Review

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Background/Objective: Surveillance programmes for breast cancer patients differ significantly in different regions. The primary goal of surveillance after completion of breast cancer treatment is to identify recurrence and/or new breast primary early thereby maximising overall survival through timely intervention. Surveillance programmes often include annual clinical examination in combination with

radiological assessment, usually mammography+/- magnetic resonance imaging (MRI). There remains significant debate around the value of annual clinical review for patients with a history of breast cancer. The aim of this study was to assess how local recurrent disease and/or new breast primaries were diagnosed in patients with a personal history of breast malignancy with a focus on evaluating the role of annual clinical examination.

Methods: A retrospective cohort study was performed utilising a prospectively maintained database in an academic tertiary referral symptomatic breast cancer centre. All patients between the years 2010 – 2020 who were diagnosed with a biopsy-proven breast cancer recurrence and/or new breast primary were included regardless of what treatment they subsequently received. Patients were excluded where data were incomplete or where they had evidence of distant metastatic disease. The primary outcome was the diagnostic modality in which the recurrence or secondary breast cancer was observed. Diagnostic modalities included (i) self-detection by the patient, (ii) clinical examination by a breast surgeon or (iii) radiological assessment (mammography, ultrasound, computed tomography (CT) and/or MRI).

Results: A total of 233 patients were identified with a breast cancer recurrence or new breast primary from 2010-2020. Following application of exclusion criteria, 140 patients were included. Of these, 75 (54%) were diagnosed radiologically; mammography (50/75; 67%), US (4/75; 5%), MRI (2/75; 3%) and CT (19/75; 25%) while 65 (46%) patients presented with clinical findings. In 63/65 (97%) of these, the patient noted a breast abnormality outside of their annual scheduled breast clinic appointment either by themselves (59 patients) or by a carer (4 patients). In only 2/65 (3%) patients, the abnormality was diagnosed by a breast surgeon at clinical examination. The most common clinical presentation was breast lump (28%), axillary lump (20%), or wound/scar abnormality (11%). Sixteen percent of recurrences/new primaries developed within 2 years post original diagnosis and 42% occurring within 5 years. The median time to recurrence in all patients was 48 months (range 2-263 months). Median overall recurrent tumour size (invasive and in-situ) and invasive tumour size were 35mm (range: 2-110mm) and 23mm (range: 2-110mm) respectively in the radiological group compared to 42mm (range: 8-250mm) and 26mm (range: 2-170mm) in the clinical group.

Conclusions: Less than 5% of patients with breast cancer recurrence/new breast primaries are diagnosed at routine clinical examination performed as part of a breast cancer surveillance programme. It is likely that breast cancer surveillance programmes may benefit from reduced focus on use of annual clinical examination. Greater focus should be placed on ensuring patients have timely access to a breast surgical clinic if they develop new symptoms/signs.

Currently Accruing Clinical Trials

1385526 - Breast Cancer-related Lymphedema - An Epidemic That Needs Assessment of Patient-related Outcomes for Risk Assessment, Prevention, and Early Detection

Anshumi Desai[1], Orli Friedman-Eldar[1], Gili Halfteck[2], Dido Franceschi[1], Susan Kesmodel[3], Mecker Moller[1], Neha Goel[1], Kristin Rojas[3], Jessica Crystal[1], Laura Huang[1], Diana Molinares[1], Jennifer Hu[1], Koru Tulay[1], Wei Zhao[1], Alexis Narvaez-Rojas[1], Eli Avisar[1]

[1]University of Miami, Miami, FL, [2]University of Texas Medical Branch, Galveston, TX, [3]University of Miami Miller School of Medicine, Miami, FL

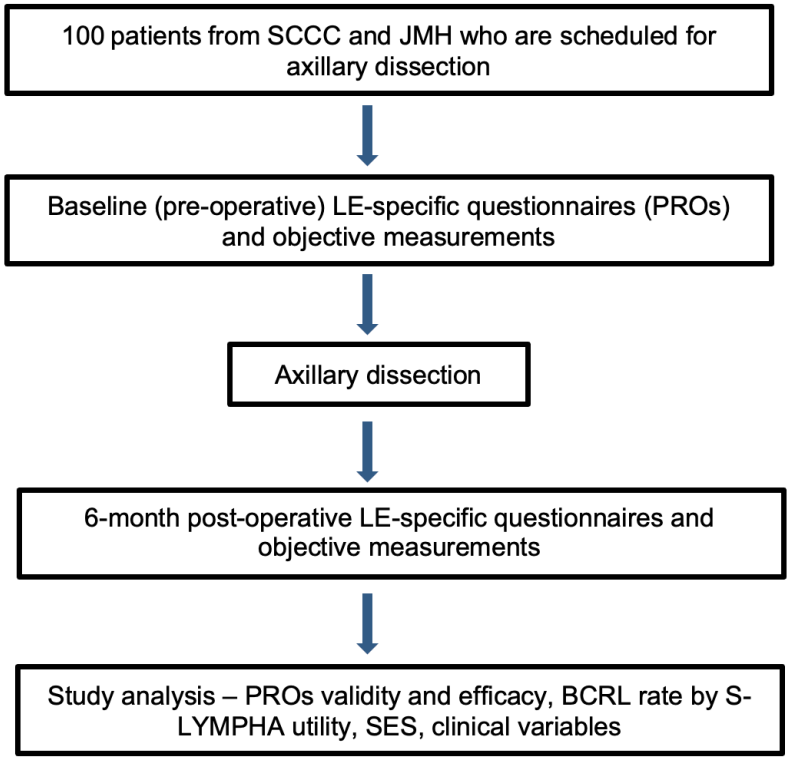
Background/Objective: Breast cancer-related lymphedema (BCRL) is a problem for patients, negatively impacting quality of life. There is no consensus regarding the detection method or standardization regarding the monitoring. Patient-reported outcomes (PROs) have been recognized as a key element in assessing cancer survivor outcomes. Different LE-specific quality of life (QoL) questionnaires have been developed but specific tools might be more appropriate for evaluation of specific outcomes. Simplified Lymphatic Microsurgical Preventative Healing Approach (S-LYMPHA), a unique preventive surgical approach has been developed on our campus. Patients have been treated with excellent results and the procedure is being taught worldwide. This study will evaluate the validity and reliability of QoL and LE-specific PROs among our population of Sylvester Comprehensive Cancer Center (SCCC) and Jackson Memorial Hospital (JMH) patients and assess their importance in LE assessment.

Methods: In the first phase, we implement 3 validated questionnaires, the Lymphedema Functioning, Disability and Health Questionnaire (Lymph-ICF), quality of life measure for limb lymphoedema (LYMQOL) and FACT B+4, in patients scheduled for axillary dissection. These are obtained pre-operatively and 6 months post-operatively. We assess the validity and reliability in comparison to objective measurements (arm circumference and L-Dex). In the second phase, we compare PROs to clinical LE diagnosis. We track presurgical baseline objective measurements, education rates, preventive procedures, post-surgical monitoring, and rates of S-LYMPHA intervention. Study results will be adjusted for other patient demographics, lifestyle factors, tumor characteristics, and treatments. The trial began 01/28/2021 , and the anticipated study length is 30 months.

Results: • Patients 18 years and older • Scheduled for axillary dissection • Patients who had 9 or more lymph nodes removed or received axillary radiation •. Willing and able to fill questionnaires at baseline and at 6 months from surgery with clinical follow-up • Able to give informed consent

Conclusions: -To assess the validity and efficacy of incorporating PROs with LE objective measurements undergoing axillary dissection - To detect BCRL early and improve assessment of S-LYMPHA efficacy -To investigate socioeconomic and clinical risk factors associated with BCRL disparities

Figure. Schema for the trial



1388204 - A Pivotal Phase III Randomized Clinical Trial to Evaluate the Safety and Efficacy of the Fluorescent Imaging Agent PD G 506 A for the Real-time Visualization of Cancer During Standard-of-Care Breast-conserving Surgery

Kathryn Ottolino-Perry[1], Eleftherios Mamounas[2], Sheldon Feldman[3], Nicole Zaremba[4], Rachel Eisenberg[2], Sonali Lanjewar[3], Franklin Zeuhl[4], Danielle Henry[2], Maureen McEvoy[3], Jessica Pastoriza[3], Areej Shihabi[3], Meredith Witten[4], Julie Kepple[4], Jennifer Durand[2], Michael T. Roberts[2], Amy Nester[2], Melissa Suarez[3], Linda Castellanos[3], April Fu[3], Christian Donahoe[4], Maeve Richmond[1], Jagapreetha Visweswaran[1], Nayana Thalanki[1], Ralph DaCosta[1], Kelly Johnson[3], Anjuli Gupta[3], Marisa Cooke[2], Michael Kahky[2]

[1]SBI ALApharma Canada Inc., Toronto, ON, Canada, [2]Orlando Health, Orlando, FL, [3]Montefiore Medical Center, Bronx, NY, [4]Aurora St. Luke's Medical Center, Milwaukee, WI

Background/Objective: The goal of breast-conserving surgery (BCS) is to adequately resect the primary breast tumor while conserving as much healthy tissue as possible. Despite best efforts to assess the completeness of surgical resection intraoperatively, positive margins remain frequent after BCS. This often results in the need for repeat surgical procedures to obtain free margins. Potentiated by a recent Phase II study, this ongoing Phase III randomized clinical trial (ClinicalTrials.gov Identifier: NCT04815083) evaluates the safety and efficacy of the imaging agent PD G 506 A for real-time intraoperative fluorescent visualization of cancer during BCS. PD G 506 A, also known as aminolevulinic acid hydrochloride (ALA HCl), is an investigational drug that is converted in the body into the fluorescent molecule protoporphyrin IX (PpIX) that accumulates in cancer cells.

Methods: Three hours prior to anesthesia, patients will receive orally either placebo or PD G 506 A solution, which selectively accumulates in tumor tissues to produce PpIX fluorescence in vivo. The Eagle V1.2 Imaging System will then be used to identify areas of fluorescence in the resected BCS specimen or the lumpectomy cavity in patients who are randomized to receive PD G 506 A solution (group allocation is unblinded following completion of standard of care (SoC) BCS). Additional tissue from the surgical cavity will be removed based on the presence of fluorescence in the excised specimen and/or in the lumpectomy cavity. Data collected includes patient demographics, tumor characteristics, adverse events, presence of fluorescence in the cavity and/or resected specimen, histopathologic assessment of resected tissues, patient-reported cosmetic outcome, and re-excision rates.

Results: Eligible patients must be female, ≥18 years of age, with histologically confirmed invasive and/or DCIS primary breast cancer on core biopsy. Patients must have normal organ and bone marrow function and agree to undergo BCS for their primary breast cancer.

Conclusions: The primary endpoints are (1) the percentage of patients with positive margins following SoC BCS that are converted to negative margins following fluorescence-guided resection (FGR), (2) specificity to identify residual carcinoma at the end of SoC and (3) sensitivity to identify residual carcinoma at the end of SoC.

Figure. PpIX fluorescence in sectioned lumpectomy specimen

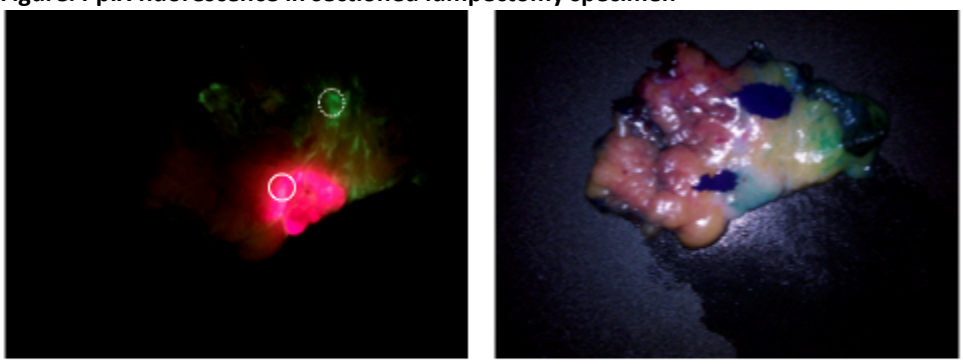


Figure 1. Fluorescence (left) and white light (right) images of a serial slice of a lumpectomy specimen from a patient administered PD G 506 A (20 mg/kg b.w.) ~3 hours prior to surgery. The area of PpIX red fluorescence was histologically–confirmed invasive ductal carcinoma (white circle) while histologically-normal breast tissue (dotted circle) was negative for PpIX red fluorescence.

1460974 - The VIVID Study: Volumetric Lumpectomy Specimen Image Visualization for Intraoperatively Directing Cavity Shaves: An Ongoing Phase II Study

Swati Kulkarni[1], Denise Scholtens[1], David Schacht[1], Jorge Novo[1], Wendy Swetzig Dhiman[1], Kevin Bethke[1], Nora Hansen[1], Seema Khan[1], Sonya Bhole[1], My Vu[2], Stephanie Valente[3], Xiaoqin Jennifer Wang[4], Rebecca Aft[5], Adrienne Chen[6], Michelle Guo[6], Raquel Carrera[1], Padraig Carolan[1], Michelle Hasse[7], Christian Wietholt[7], Xiao Han[7]

[1]Northwestern University, Chicago, IL, [2]Children's Hospital Los Angeles, Chicago, IL, [3]Cleveland Clinic, Cleveland, OH, [4]University of Kentucky, Lexington, KY, [5]Washington University, St. Louis, MO, [6]Northwestern University Feinberg School of Medicine, Chicago, IL, [7]Clarix Imaging Corp., Chicago, IL

Background/Objective: Specimen radiography is an important tool used by surgeons to assess margin status after lumpectomy for breast cancer. 2D and digital tomosynthesis (DBT) imaging modalities lack depth resolution, which results in positive pathologic margins and the need for re-excision lumpectomy. In our retrospective study, volumetric specimen imaging (VSI) showed superior sensitivity and specificity over 2D radiography and DBT. Based on these results, we are undertaking a prospective study evaluating the potential of VSI in reducing the positive margin rate to less than 10%.

Methods: This is a multicenter, prospective single-arm study with historical control for patients undergoing lumpectomy surgery for invasive breast cancer (IBC) or DCIS. After imaging the lumpectomy specimen using the VSI device, the 3D VSI image is interpreted by both the surgeon and the radiologist to identify close or positive margins. The surgeon uses that information to excise "VSI-directed shaves" and then completes the surgery according to their standard practice. Post-operatively, the surgeon completes a survey stating if a re-operation would have been required if only the VSI-directed shaves

were taken. These data will be compared with matched historical controls using multiple regression to power a follow-on randomized controlled trial.

Results: The study includes patients over 18 who are planning to undergo lumpectomy with planned localization for the management of IBC or DCIS. The lesion must have been visualized on mammography/digital breast tomosynthesis, ultrasound, or magnetic resonance imaging. Patients undergoing re-excision or who are expected to have an excised specimen larger than 9x9x7 cm are not eligible.

Conclusions: The primary objective is to determine if intraoperative use of the VSI device allows surgeons to accurately identify margin status, such that ≤10% of patients have positive margins on final surgical pathology. Additional objectives include sensitivity and specificity of VSI-directed shaves, time spent acquiring VSI images, volume of tissue excised in the main lumpectomy specimen and VSI-directed shaves, comparison of the estimated final positive margin rate for lumpectomy with VSI-directed shaving alone to the historical final positive margin rate, and comparison of the estimated reoperation rate for VSI-directed cavity shaving alone to the historical reoperation rate.

Figure.

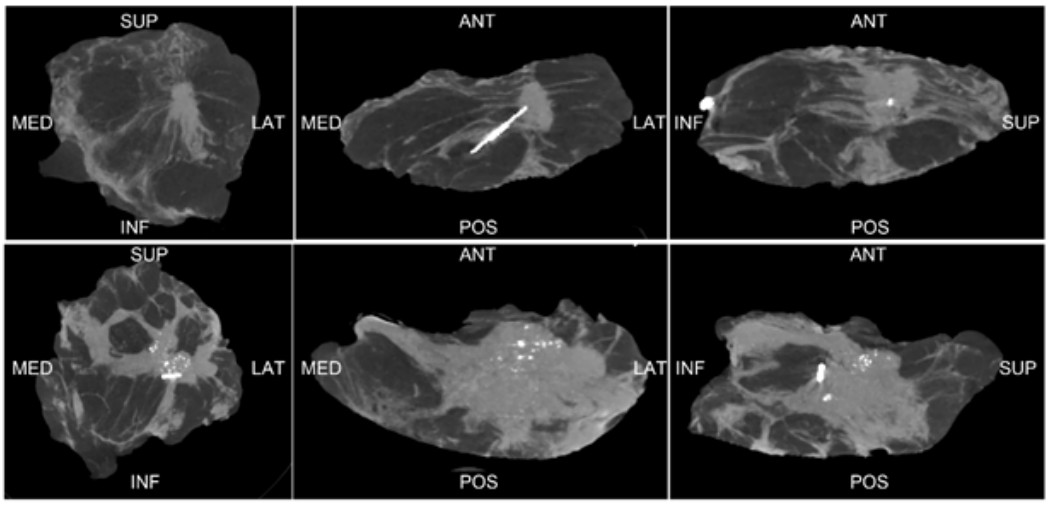


Figure 1. Example VSI images showing a spiculated mass (top row) and micro-calcifications (bottom row). Cross-sectional images are displayed within coronal (left), axial (middle), and sagittal (right) planes.

Age Extremes

1385063 - Racial Disparities in Initial Detection and Presentation of Breast Cancer in Patients Age 40-50

Polina Zmijewski, Neeral Patel, Catherine Parker, Rachael Lancaster
University of Alabama at Birmingham, Birmingham, AL

Background/Objective: Racial disparities in outcomes have been demonstrated in multiple surgical specialties, as well as in breast surgery. Our aim in this study was to determine if racial disparities exist in initial detection and presentation of young women with breast cancer.

Methods: Patients of the interdisciplinary breast clinic of a large quaternary academic medical institution from 2017-2021 were identified. All female patients with diagnosed breast cancer between 40 and 50 years of age were included. In situ cancers were excluded from our analysis. Patients with previous history of breast cancer were also excluded. Chi-square was used to examine categorical variables.

Results: We collected data on 212 patients from our interdisciplinary breast clinic: 61.3% of patients were White, 27.3% were African American, 3% were Hispanic or Latino, and 4.7% were Asian. Patients belonging to groups under-represented in medicine (URM) were more likely to present with a palpable lesion than non URM patients (72% vs. 57% p=0.04). There was no statistically significant difference in rate of HER2 positivity (14% vs. 15.7 % p=0.7) or triple-negative cancers (20 vs. 22% p=0.8). Interestingly, URM patients had a lower rate of mastectomy relative to non-URM patients (41.3 vs. 58% p=0.03). There was no statistically significant difference in presentation with > Stage II cancer, grade 3 disease, need for radiation post-mastectomy, or need for chemotherapy between groups. There was no difference noted in in rate of genetic mutations. Interestingly, URM patients had a higher incidence of a previous history of yearly screening MRI (64.1 vs. 46.5% p=0.03) as well as a higher incidence of yearly mammographic screening (71.7% vs. 50.4% p=0.008).

Conclusions: URM patients between the ages of 40 and 50 years of age are more likely to present with a palpable lesion than as a result of a screening mammography, although severity of disease based on hormone receptor status, grade, stage, and need for aggressive treatment does not differ by race in our dataset. Interestingly, despite having palpable lesions at presentation, URM women were more likely to have had yearly screening mammograms or MRIs than their non URM counterparts, suggesting that tumors in URM women may progress more rapidly.

1386280 - Management and Outcomes of Breast Lesions with Atypia (High-risk Lesions) in Women Under 40 Years of Age

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Background/Objective: Some indeterminate breast lesions are considered high risk due to their potential association with malignancy. It is recommended that a diagnostic excision is performed when such high-risk lesions are diagnosed. While it is accepted that these women are at higher risk of developing breast cancer in the future, there are limited data on the long-term outcomes of women with this diagnosis.

Methods: A retrospective review was conducted of a prospectively maintained database of all indeterminate lesions diagnosed in a single tertiary referral breast unit. Patients aged 39 and younger with a diagnosis of atypia of the breast from 2004-2016 were included. The aim of this study was to describe patient characteristics, determine cancer upgrade rates, and assess the development of breast cancer during follow-up.

Results: There were 31 women aged under 40 years old diagnosed with atypical hyperplasia during this time period. This diagnosis was made either by core needle biopsy (CNB) or diagnostic excision (DxEx). An initial CNB was performed in 29 patients. Twenty-two had atypia on this initial biopsy, and 15 of these patients went on to have atypia confirmed on DxEx. Six patients were upgraded to atypical hyperplasia at DxEx, having been diagnosed with an indeterminate lesion without atypia at CNB. Two patients were diagnosed with atypia after proceeding directly to DxEx. Two patients with atypia at CNB did not proceed to DxEx. One patient was upgraded to a diagnosis of ductal carcinoma in situ (DCIS) at DxEx, following a diagnosis of atypical intraductal epithelial proliferation (AIDEP) at CNB. No patients were upgraded to invasive carcinoma at DxEx. Presenting symptoms included a lump (19), bloody nipple discharge (4), mastalgia (2), breast abscess (1), and nipple ulceration (1). Four patients were asymptomatic. There were 55% of patients diagnosed with atypia who had a family history of breast cancer. The mean duration of mammographic surveillance for these patients with atypia was 6.6 years (range 0-17 years). Four patients (13%) were diagnosed with invasive breast cancer during follow-up. The mean time to a diagnosis of cancer was 5.6 years (range 4-7 years). All cancers developed in the ipsilateral breast. Three patients had a family history of breast cancer. Two of the cancers were invasive lobular carcinoma. The initial DxEx reported lobular carcinoma in situ (LCIS)/atypical lobular hyperplasia (ALH), and fibroadenoma with focal in situ lobular neoplasia. The other 2 cancers that developed during follow-up were invasive ductal carcinoma. One of these patients had borderline atypical ductal hyperplasia (ADH) on CNB and the other had ALH/LCIS diagnosed on DxEx.

Conclusions: These data demonstrate a considerable number of patients in this young cohort will go on to develop breast cancer following the diagnosis of a high-risk breast lesion. We currently recommend annual mammographic surveillance following this diagnosis. Family history may warrant more frequent

follow-up or risk reducing chemoprevention. Further research is warranted to clarify the most appropriate management and follow-up of patients under 40 with atypia.

1387062 – Frailty Analysis and Outcomes of Breast Cancer Surgery in Elderly Patients Aged 85 and Older

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Background/Objective: With increasing life expectancy, surgeons are more frequently faced with managing breast cancer in geriatric patients. Tailoring treatments with respect to health status, life expectancy, and patient preference is particularly salient in the population aged 85 and older. We aimed to review the outcomes of surgery in this age group and associations with frailty, comorbidities, and surgical decision-making.

Methods: Patients aged ≥85 years who were diagnosed with breast cancer at our institution from January 2010 to December 2019 were identified through retrospective review of the electronic medical record and pathology database. Patient history, frailty (using modified frailty index-11 of greater than 2 to define high frailty), surgical and clinical management, as well as cancer recurrence and survival were analyzed. Statistical comparisons were performed with Mann–Whitney U test and chi-squared test.

Results: A total of 91 patients (median age 87, range 85-99) with breast cancer were identified, of which 12 (13%) had an ipsilateral breast cancer recurrence (IBTR), and 14 (15%) had a history of contralateral breast cancer. A palpable mass was the presenting symptom in 55% of all patients. Eighty-two (90%) of the cancers were invasive (78% ductal, 16% lobular, and 6% other histology), and 9 (10%) were DCIS. Tumor markers were 85% ER+/HER2-, 7.5%. ER+/HER2+, and 7.5% triple-negative. Clinical stage of the surgical group was distributed as: 0 (13%), I (44%), II (32%), III (11%). Seventy-one patients underwent surgery, of which 75% received lumpectomy and 25% mastectomy. Sentinel node biopsy was performed in 28% and axillary dissection in 13%. Seventeen percent of patients received adjuvant radiation therapy, and 28% received and tolerated adjuvant endocrine therapy. There were no major surgical complications, and only 7% had minor resolvable wound complications. The percentage of patients with high frailty was similar between the surgical and non-surgical groups (20% vs 25%); however, patients who underwent surgery had a significantly lower ASA class than non-surgical patients (mean 2.52 vs 2.90, $p<0.05$). The 3-year and 5-year overall survival was 81% and 61% in the surgical group versus 63% and 36% in the non-surgical group. Among the surgical cohort, frailty (mean 1.36 vs 2.75, $p<0.01$) and ASA class (mean 2.44 vs 2.83, $p<0.05$) were significantly lower in patients who lived at least 3 years versus those who passed within 3 years. Within 5 years of surgery, local recurrence, axillary recurrence, and distant metastasis were observed in 16%, 2%, and 5% of patients, respectively.

Conclusions: Patients aged 85 years or older seem to benefit from surgical intervention and have a superior overall survival than those who forgo surgery. Five-year local disease control was achieved in

84%, despite the omission of radiation therapy and systemic therapy in the majority of these older patients. Surgery alone provides low-risk excellent local control of disease in geriatric patients with breast cancer, including those with significant frailty and comorbidities.

1387212 - Anatomy vs Biology: What Guides Chemotherapy Decisions in Older Patients with Breast Cancer?

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Background/Objective: Older patients with breast cancer represent a heterogenous population. Several studies have demonstrated that de-escalation of therapy, such as omitting sentinel lymph node biopsy (SLNB), may be appropriate for some. The importance of tumor biology has become increasingly recognized as a key determinant of outcomes, and tools including the Oncotype DX Recurrence Score (RS) have been used for treatment decisions. With this shift in perspective, the relevance of anatomic staging has been questioned. Therefore, we evaluated differences in chemotherapy receipt and survival between older patients with breast cancer based on RS and SLNB receipt/result.

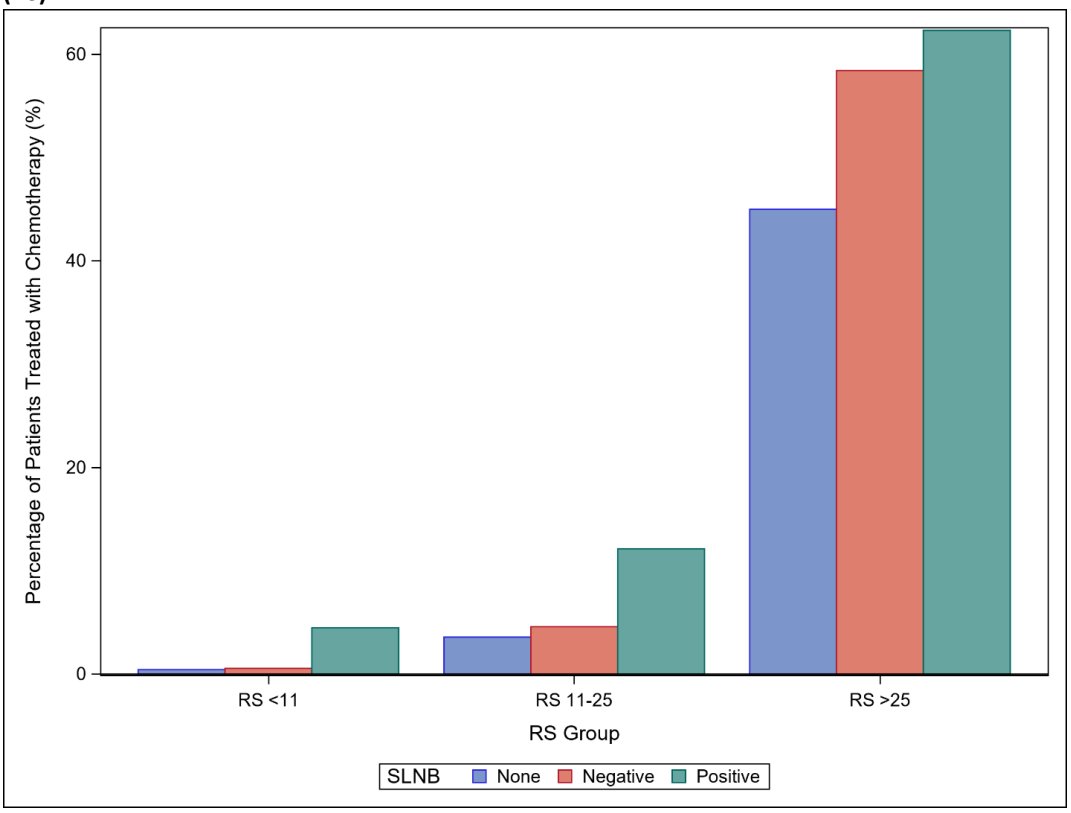
Methods: Patients aged >65 diagnosed with pT1-2/cN0/M0 hormone receptor-positive (HR+)/HER2- breast cancer (2010-2019) who had a numeric RS score available and underwent breast surgery were selected from the National Cancer Database. SLNB was defined as removal of 1-5 LN; patients with >5 LN removed were excluded. Patients were grouped by RS as low (<11), intermediate (11-25), or high (>25). SLNB receipt/result was stratified as SLNB not performed (none), 1-5 SLN removed and negative (SLNB), or 1-5 SLN removed with at least 1 positive (SLNB+). Logistic regression was used to identify factors associated with chemotherapy receipt. Unadjusted overall survival (OS) was estimated using the Kaplan-Meier method. Cox proportional hazards models were used to estimate the association of SLNB group with OS after adjustment for available covariates.

Results: Of the 75,428 patients included, most were aged <75 (49.6% age 65-69, 32% age 70-74, 14.1% age 75-79, 4.3% age 80+). The majority had an intermediate RS (58.2% vs 27.9% low, 13.8% high) and were SLNB– (85.1% vs 11.6% SLNB+, 3.3% none). Of those who were SLNB+ (n=8735), most were pN1 (99.7%). Chemotherapy was recommended for 13,442 patients (17.8%), although 64.6% (n=8690) of those received it. Most patients who received chemotherapy were younger (58.1% age 65-69) whereas 48.5% of those who did not receive chemotherapy were aged 65-69. No significant differences in Charlson-Deyo comorbidity scores were noted between those who did and did not receive chemotherapy (p=0.24). Patients receiving chemotherapy were more likely to have pT2, grade 3, pN+ disease, and/or high RS (all p<0.001). Performance of SLNB was common across all RS groups (96.4-96.8%), and SLNB+ rates were similar (low: 11.9%; intermediate: 11.9%; high: 9.6%). Rates of chemotherapy increased with RS (SLNB+: low: 4.5%; intermediate: 12.1%; high: 62.3%; Figure). After

adjustment, chemotherapy receipt was still more likely with higher RS [low: REF; intermediate: OR 5.3 (95%CI 4.5-6.3); high: OR 118.3 (95%CI 99.5-140.6)] and SLNB+ [(none: REF; SLNB–: OR 1.2 (95%CI 1.0-1.5); SLNB+: OR 3.0 (95%CI 2.4-3.8). After adjustment, SLNB receipt/result was only associated with OS among those with an intermediate RS [none: REF; SLNB–: HR 0.7 (95%CI 0.6-0.8); SLNB+: HR 0.9 (95%CI 0.8-1.2)].

Conclusions: Factors associated with chemotherapy receipt in older patients with breast cancer are similar to those of slightly younger patients. However, SLNB receipt/result was associated with survival for those with an intermediate RS, but not for those with a low or high RS, suggesting that a SLNB may indeed be unnecessary for select older patients.

Figure. Rates of chemotherapy receipt by sentinel lymph node biopsy (SLNB) receipt/result and recurrence score (RS)



1388308 - Impact of Genomic Testing and Chemotherapy on Survival in Women Diagnosed with Breast Cancer Under Age 40

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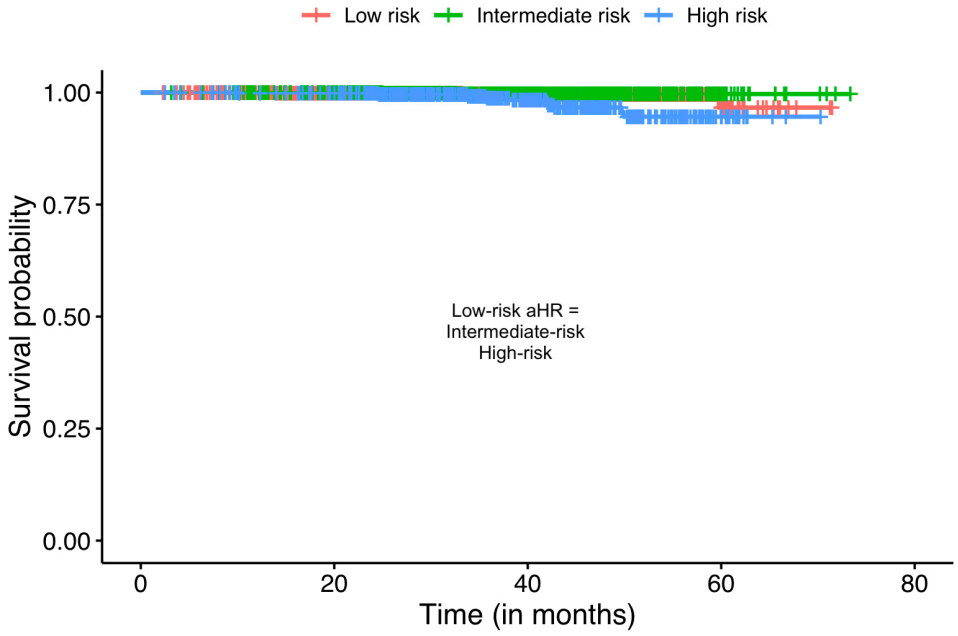
Background/Objective: Adjuvant chemotherapy reduces the risk of distant recurrence in breast cancer with greater benefit in younger women. Genomic assays are routinely used to predict chemotherapy benefit in node-negative hormone receptor-positive (HR+) / HER2/neu negative (HER2-) breast cancer, but women ≤40 years old are under-represented in clinical trials validating these assays. We hypothesized that the prevalence of genomic testing in this population has increased over time and influences chemotherapy decision-making, and explored associations between genomic assay score, chemotherapy, and survival.

Methods: Women ≤40 years old diagnosed with HR+/HER2- node-negative (T1-2, N0) breast cancer between 2010-2019 in the National Cancer Database were included. Diagnoses occurring between 2010-2014 were combined due to low number of patients in each individual year. Patient, tumor, and treatment characteristics, as well as genomic testing utilization and risk scores were evaluated. Genomic risk scores were categorized as low-, intermediate- or high-risk according to levels available in the test (e.g., oncotype: low, intermediate, or high; MammaPrint: low or high only). Kaplan–Meier curves were used to show the overall survival (OS) difference by groups, such as by genomic testing risk group. Adjusted OS was calculated using time-dependent Cox proportional hazards model adjusting for pT stage and grade.

Results: Among 5,617 women, 67.7% underwent genomic testing with testing increasing over time (53.9% before 2015 vs. 71.9% in 2019). Testing was more common among white women, those with T1c disease, intermediate grade, PR+, and lymphovascular invasion. Of those who underwent genomic testing, 51.9% were low-risk, 30.2% intermediate-risk, and 15.9% high-risk. Most patients did not receive chemotherapy (65%) with a trend toward decreasing use over time (48.4% before 2015 vs. 31.1% in 2019). Chemotherapy was more common among those with T2 disease, invasive ductal carcinoma, high grade, PR-, and lymphovascular invasion. Receipt of genomic testing was not associated with receipt of chemotherapy (p=0.52); however, chemotherapy use was associated with genomic risk score (p=<0.001). Chemotherapy use was 7.6% for low-risk compared to 56.7% of intermediate- and 85.8% of high-risk scores. On univariate analysis high-risk score was associated with increased risk of death compared to low-risk (Figure), but this was not significant on multivariable analysis (HR 2.38, 95% CI 0.67-8.42, p=0.18). There were no differences in OS comparing low- and intermediate-risk scores.

Conclusions: In young women with early-stage ER+/HER2- invasive breast cancer, there has been increased utilization of genomic assays over time. The genomic risk score is being incorporated into decision-making regarding systemic therapy despite lack of thorough validation in this age group. Longer follow-up in this ER+ cohort may result in survival curves that can demonstrate predictive value, but in the setting of decreasing use of chemotherapy over time, future studies need to evaluate how other therapies, such as ovarian suppression, may impact survival.

Figure. Unadjusted overall survival among women with early-stage node-negative hormone receptor-positive breast cancer stratified by genomic risk



1377428 - Surgical and Medical Complications After Mastectomy with or without Reconstruction in Women Over Age 70

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Background/Objective: One-third of all new breast cancer diagnoses occur after the age of 70. Although older women more frequently receive breast conservation than younger women, lack of regular screening leading to delays in diagnosis or multicentric disease may necessitate mastectomy due to extent of disease. Studies have demonstrated improved body image and mental health in women ≥65 who received post-mastectomy breast reconstruction (PMBR). In this context, it is important to examine the relationship between age and complications associated with PMBR. We hypothesized that the frequency of complications would not preclude PMBR for women ≥70 years.

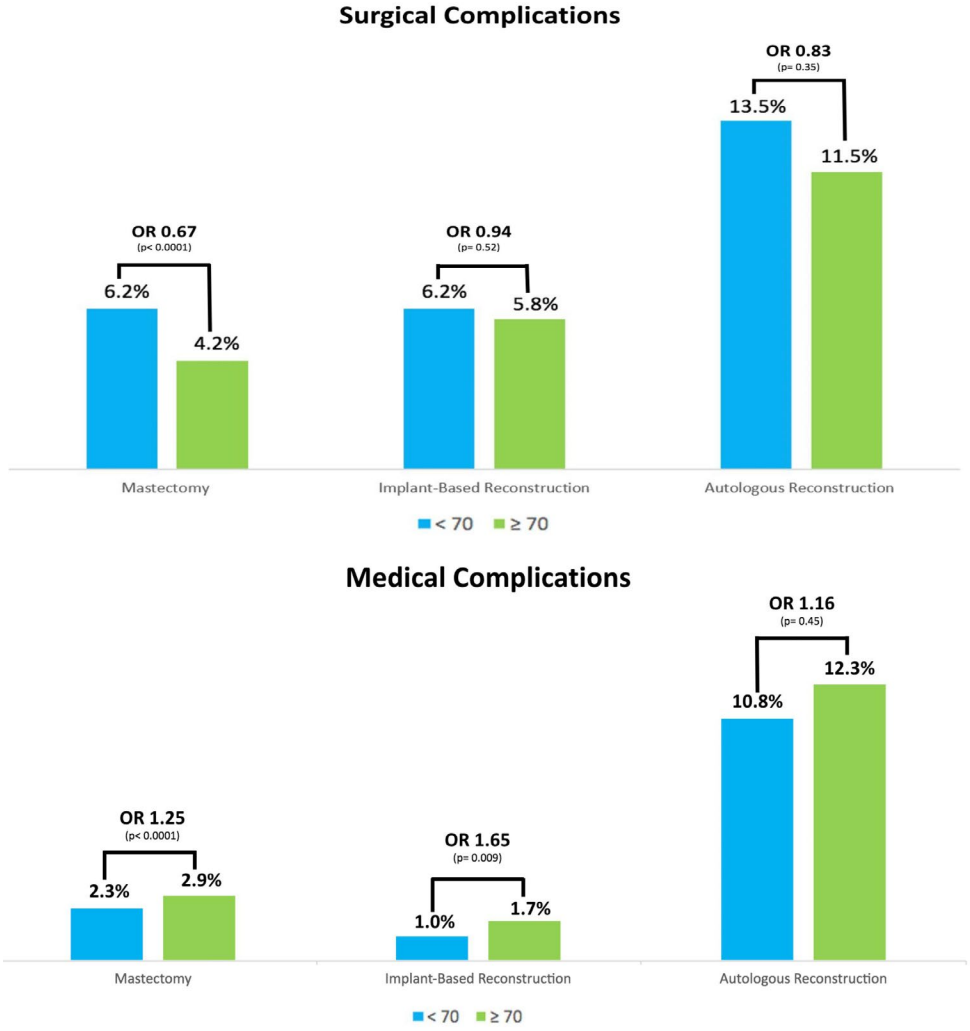
Methods: Women ≥18 years who underwent mastectomy, implant-based, or autologous breast reconstruction between 2012 to 2020 and were recorded in the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) Public Use File were included. When multiple NSQIP eligible procedures were performed simultaneously (e.g., mastectomy with immediate tissue expander [TE]) the more complex CPT code was recorded and all subsequent 30-day outcomes were linked to that procedure. Implant-based reconstruction included TE or implant placement >30 days after mastectomy, and subsequent TE to implant exchange. Post-operative complications were classified as surgical (deep space infection, unplanned return to operating room, wound dehiscence) or medical (acute kidney

injury, pneumonia, myocardial infarction, transfusion). Univariate and multivariable analyses were conducted to evaluate the relationships between age, type of surgery, comorbidities, and complications.

Results: Of 164,344 cases, 72.3% were coded as mastectomy, 20.2% implant-based, and 7.5% autologous breast reconstruction. The majority of patients were white (67.8%), non-diabetic (89.4%), non-smokers (89.2%), functionally independent (98.6%), and had a BMI <30 (64.1%). Surgical and medical complications were uncommon (6.4% and 2.7%, respectively). Surgical complications increased with case complexity (5.7% mastectomy alone, 6.2% implant-based, 13.5% autologous), but not with age (Figure). On multivariable regression adjusting for comorbidities, surgical complications were significantly lower for women ≥70 years compared to those <70 years for mastectomy (OR 0.67, 95% CI 0.62-0.71, p<0.001), but there were no significant differences for implant-based (OR 0.94, 95% CI 0.76-1.15, p=0.52) or autologous (OR 0.83, 95% CI 0.56-1.23, p=0.35) breast reconstruction. Medical complications were higher for autologous reconstruction (10.8%) than mastectomy (2.4%) or implant-based reconstruction (1.1%). The risk of medical complications was higher for those ≥70 years compared to those < 70 years for mastectomy (OR 1.25, 95% CI 1.15-1.36, p<0.001) and implant-based (OR 1.65, 95% CI 1.13-2.40, p=0.009), but there was no significant difference for autologous reconstruction (OR 1.16, 95% CI 0.79-1.70, p=0.45).

Conclusions: The frequency of surgical complications after mastectomy with or without reconstruction does not differ according to age, but medical complications are increased following mastectomy and implant-based reconstruction, suggesting that patient selection remains critical. Breast reconstruction in women ≥70 years should be routinely discussed and should be offered if it aligns with patient desires and medical risk profile. Future studies are necessary to better understand how physical, sexual, psychosocial well-being and breast satisfaction influence decision-making in addition to surgical and medical risks, and how these values and preferences can be incorporated into patient-provider discussions about breast reconstruction.

Figure. Surgical and medical complications following mastectomy, implant-based, and autologous reconstruction in women <70 and ≥70 years of age



Benign

1387022 - Vacuum-assisted Excision of Breast Benign Masses in Replacement of Open Surgery

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Background/Objective: We are facing a growing number of benign breast lesion needing complete excision. Vacuum-assisted excision is a substitute of surgery with the same therapeutic value, but with considerable advantages, such as no need for general anesthesia, no scarring, and high patient satisfaction.

Methods: From 2014 to 2022, 895 consecutive cases of vacuum-assisted excision of breast masses, performed by 1 surgeon under ultrasound, mostly with therapeutic intention, was analyzed in a retrospective manner.

Results: The excised masses were 77.14% fibroadenoma, 20.51% papilloma, and 6.46% fibrocystic changes. Maximum volume for safe and complete fibroadenoma removal was calculated to be 20 ml. Complete removal rate was 99.55%, and upgrade to cancer rate was 0.78%. Mean follow-up time was 30.25 months. Advancing age was in concordance with more prevalence of papilloma versus fibroadenoma. P-value was 0.001. No major complications were reported.

Conclusions: This is the first vacuum-assisted excision study reported by a breast surgeon and performed by therapeutic intention rather than diagnostic one as far as we know. Complete excision rate of benign breast masses was higher, and upgrade to malignancy rate was lower than reported series, as was expected. Vacuum-assisted excision is a reliable, cost-effective, safe, and scarless substitute to open surgery of benign breast masses and should be considered by breast surgeons for therapeutic intention, which is totally different from its application by breast radiologists for diagnostic measures.

Table. Age distribution of pathologic results
PA=papilloma, FA= Fibroadenoma IGM= idiopathic granulomatous mastitis, FCC = fibrocystic changes, Path =pathology

AGE Range	NUMBER	PERCENT	patients number / Path result	Most common path result
13-20	81	9.03%	76 FA – 3 PA – 2 phyllodes	FA 93.82% -PA 3.70%
21-30	267	29.76%	238 FA - 18 PA - 4 FCC - 1 Invasive ductal carcinoma – 1 fatnecrosis – 1 Hematoma - 4 IGM	FA 89.13% - PA 6.74%
31-40	337	37.56%	228 FA - 72 PA - 28 FCC – 4 Invasive ductal carcinoma – 1 LCIS – 2 Phyllodes – 1 fat necrosis - 1 IGM	FA 67.65%, PA 21.36%
41-50	161	17.94%	75 FA – 64 PA – 16 FCC- 1 PASH - 2 fat necrosis – 1 LCIS – 2 Invasive ductal carcinoma	FA 46.58%, PA 39.75%
51-60	38	4.23%	10 FA - 17 PA - 9 FCC - 1 invasive cancer- 1 DCIS	FA 26.31% - PA 44.73%
61-71	11	1.22%	8PA ,2 FCC, 1 IGM	FA 0%, PA72.7%

1386950 - Granulomatous Mastitis: Optimizing Staging Based on Clinical Parameters

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Background/Objective: Granulomatous mastitis is a rare chronic inflammatory disease of unknown etiology. The lack of guidelines has caused an irrational use of antibiotics and prevented proper diagnostic procedures (i.e., biopsies), possibly hiding other pathologies, such as cancer. A proper diagnosis and clinical staging are imperative to provide appropriate treatment and management. Therefore, this study proposes a stages classification based on the clinical presentation and the use of treatments described by research centers. We intend to standardize inflammatory disorders of breast management through the proposed staging.

Methods: We extracted retrospective patients with a diagnosis of inflammatory disorders of the breast from January 2017 until June 2022 from private practice in Quito-Ecuador. Three types of mastitis diagnosed by biopsy, or absence of it, were included: granulomatous mastitis (GM), chronic mastitis (CM), and undetermined mastitis (UM). Then, according to the treatment provided, we categorized them into 6 groups: 1) spontaneous [no treatment], 2) mild [only corticoids], 3) moderate [short period of corticoids and antibiotics], 4) severe [long period of corticoids and antibiotics], 5) surgical [surgical drainage plus corticoid and antibiotics], and 6) referred [inclusion of methotrexate or treat concomitant pathologies]). We correlate clinical outcomes (Table) with the categories, using Pearson correlations for continuous variables and Spearman correlations for categorical variables. The correlations were performed on all the cases and compared the 3 types of mastitis.

Results: We identified 109 cases of mastitis, 39 GM, 19 CM, and 51 UM. All cases had a weak correlation with age (inverse), erythema, lactation, and foci number; mildly correlated with mass size, diagnostic method, remission time, laterality, and mastitis type (inverse); and highly correlated with collection and remission type. The mass size was correlated mildly with GM and highly with UM. Also, GM and UM were mildly associated with the collection. Remission type highly correlates with GM and CM, while UM showed a mild association. GM was correlated highly with remission time and mildly associated with the diagnostic method.

Conclusions: Our results indicate that the proposed classification performs well to stage mastitis, correlating well with pathology characteristics, diagnostic methods, and remission outcomes. Our classification was better correlated with the GM; the most important clinical aspect is the presence of collection and adherence to the treatment (expressed in the remission time). The mass size and biopsy procedure were well correlated with this staging. Treating according to this staging allowed for the most remissions and adequate time. We believe that the lack of biopsies in the UM misclassified possible GM as a UM. Finally, a clinician must determine when to refer the condition or proceed with surgical treatment.

Table. Outcomes correlations and mastitis type comparisons with the proposed staging

Variable	*All Mastitis*	*Granulomatous*	*Chronic*	*Undetermined*
Mastitis Type (Number of cases)	-0.46 (<0.001)*	--	--	--
Spontaneous	18	1	4	13
Mild	43	11	8	24
Moderate	18	6	3	7
Severe	12	6	3	3
Surgical	4	4	--	--
Referred	14	11	1	2
Age (years)	-0.24 (0.012)*	-0.15 (0.351)	-0.17 (0.482)	-0.29 (0.037)
Spontaneous	45.0 ± 15.1	33.0 ± --	43.5 ± 11.6	46.4 ± 16.6
Mild	36.7 ± 10.7	38.7 ± 9.6	35.6 ± 13.3	36.2 ± 10.6
Moderate	33.7 ± 5.8	31.0 ± 4.2	33.3 ± 3.5	35.6 ± 6.9
Severe	37.3 ± 4.1	38.0 ± 5.6	35.7 ± 2.1	37.7 ± 2.1
Surgical	34.3 ± 6.1	34.2 ± 6.1	--	--
Referred	33.9 ± 5.3	34.3 ± 5.3	38.0 ± --	30.0 ± 5.7
Pregnancies (#)	-0.03 (0.757)	-0.08 (0.621)	-0.13 (0.614)	-0.17 (0.230)
Spontaneous	2.7 ± 2.1	2.0 ± 0	2.3 ± 2.2	2.8 ± 2.3
Mild	1.6 ± 1.5	2.5 ± 2.0	0.8 ± 1.0	1.5 ± 1.3
Moderate	1.8 ± 1.0	2.2 ± 1.1	1.3 ± 0.6	1.8 ± 1.0
Severe	2.4 ± 1.2	2.7 ± 1.6	1.7 ± 0.6	2.7 ± 0.6
Surgical	2.7 ± 1.2	2.7 ± 1.2	--	--
Referred	1.8 ± 1.0	2.0 ± 1.0	1.0 ± --	1.0 ± 0
Mass Size (cm)	0.40 (<0.001)*	0.38 (0.020)*	0.14 (0.574)	0.50 (<0.001)*
Spontaneous	1.3 ± 1.2	0 ± --	2.1 ± 0.9	1.1 ± 1.2
Mild	2.5 ± 2.3	2.6 ± 1.6	3.4 ± 1.8	2.1 ± 2.7
Moderate	3.6 ± 1.8	3.3 ± 1.8	4.0 ± 3.6	3.6 ± 1.2
Severe	3.1 ± 1.7	3.1 ± 1.6	1.7 ± 0.6	4.7 ± 1.5
Surgical	2.8 ± 2.1	2.8 ± 2.1	--	--
Referred	4.4 ± 1.1	4.2 ± 1.1	5.0 ± --	5.0 ± 1.4
BMI (kg/cm²)	0.12 (0.284)	0.03 (0.878)	0.20 (0.457)	0.29 (0.093)
Spontaneous	24.8 ± 4.5	22.2 ± --	23.8 ± 3.6	25.8 ± 5.3
Mild	26.1 ± 4.5	26.3 ± 4.5	26.4 ± 4.5	25.9 ± 4.7
Moderate	27.9 ± 3.7	26.0 ± 1.9	28.9 ± 7.3	29.8 ± 3.4
Severe	28.5 ± 4.9	28.5 ± 4.4	28.4 ± 7.5	28.4 ± 5.3
Surgical	26.3 ± 4.3	26.4 ± 4.3	--	--
Referred	26.5 ± 3.3	25.8 ± 3.2	25.5 ± --	30.2 ± 0.9
Remission time (days)	0.49 (<0.001)*	0.52 (0.006)*	0.34 (0.197)	0.34 (0.070)
Spontaneous	20.0 ± 14.1	--	20.0 ± 14.1	--
Mild	24.4 ± 29.5	24.9 ± 21.9	28.2 ± 49.8	22.1 ± 20.9
Moderate	62.3 ± 50.8	49.2 ± 40.8	73.3 ± 56.9	67.4 ± 58.6
Severe	100.7 ± 126.2	197.5 ± 263.9	80.0 ± 99.0	50.0 ± 34.6
Surgical	150.0 ± 106.8	150.0 ± 106.8	--	--
Referred	113.1 ± 111.3	145.0 ± 135.2	60.0 ± --	60.0 ± 0
Remission type (%)	0.67 (<0.001)*	0.52 (0.001)*	0.83 (<0.001)*	0.48 (0.001)*
Spontaneous	(1) 93.3	(1) --	(1) --	(1) 100.0
	(2) 6.7	(2) 100.0	(2) --	
	(3) --	(3) --	(3) 100.0	
Mild	(1) 92.9	(1) 81.8	(1) 100.0	(1) 95.7
	(2) --	(2) --	(2) --	(2) --
	(3) 7.1	(3) 18.2	(3) --	(3) 4.3
Moderate	(1) 61.1	(1) 50.0	(1) --	(1) 88.9
	(2) 5.6	(2) 16.7	(2) --	(2) --
	(3) 33.3	(3) 33.3	(3) 100.0	(3) 11.1
Severe	(1) 25.0	(1) 33.3	(1) --	(1) 33.3
	(2) 25.0	(2) 33.3	(2) 50.0	(2) --
	(3) 50.0	(3) 33.3	(3) 50.0	(3) 66.7
Surgical	(1) --	(1) --	--	--
	(2) 25.0	(2) 25.0		
	(3) 75.0	(3) 75.0		
Referred	(1) --	(1) --	(1) --	(1) --
	(2) 64.3	(2) 54.5	(2) 100.0	(2) 100.0
	(3) 35.7	(3) 45.5	(3) --	(3) --
Erythema (Yes %)	0.15 (0.010)*	0.24 (0.147)	0.17 (0.498)	0.18 (0.199)
Spontaneous	27.8	0.0	0.0	38.5
Mild	34.9	36.4	25.0	37.5
Moderate	38.9	66.7	0.0	33.3
Severe	41.7	33.3	0.0	100.0
Surgical	75.0	75.0	--	--
Referred	71.4	63.6	100.0	100.0
Collection (Yes %)	0.52 (<0.001)*	0.46 (0.003)*	0.45 (0.054)	0.44 (0.001)*
Spontaneous	11.1	0.0	0.0	15.4
Mild	46.5	36.4	75.0	41.7
Moderate	72.2	100.0	66.7	55.6
Severe	83.3	83.3	66.7	100.0
Surgical	75.0	75.0	--	--
Referred	92.9	90.9	100.0	100.0
Lactation (Yes %)	0.28 (0.003)*	0.19 (0.259)	0.33 (0.175)	0.21 (0.141)
Spontaneous	72.2	100.0	75.0	69.2
Mild	65.1	81.8	39.5	66.7
Moderate	88.9	83.3	100.0	88.9
Severe	100.0	100.0	100.0	100.0
Surgical	75.0	75.0	--	--
Referred	100.0	100.0	100.0	100.0
Diagnostic method (%)	0.38 (<0.001)*	0.41 (0.012)*	--	--
Spontaneous	(1) 72.2	(1) 0.0	(1) 0.0	(1) 100.0
	(2) 27.8	(2) 100.0	(2) 100.0	(2) 0.0
Mild	(1) 55.8	(1) 0.0	(1) 0.0	(1) 100.0
	(2) 44.2	(2) 100.0	(2) 100.0	(2) 0.0
Moderate	(1) 50.0	(1) 0.0	(1) 0.0	(1) 100.0
	(2) 50.0	(2) 100.0	(2) 100.0	(2) 0
Severe	(1) 25.0	(1) 0.0	(1) 0.0	(1) 100.0
	(2) 75.0	(2) 100.0	(2) 100.0	(2) 0.0
Surgical	(1) 0	(1) 0.0	--	--
	(2) 100.0	(2) 100.0		
Referred	(1) 14.3	(1) 0.0	(1) 0.0	(1) 100.0
	(2) 85.7	(2) 100.0	(2) 100.0	(2) 0.0
Laterality (Unilateral %)	0.49 (0.006)*	0.38 (0.253)	--	0.33 (0.207)
Spontaneous	100.0	100.0	100.0	100.0
Mild	87.5	100.0	--	100.0
Moderate	--	--	--	--
Severe	60.0	50.0	100.0	--
Surgical	--	--	--	--
Referred	50.0	50.0	--	--
Foci (Unifocal %)	0.27 (0.007)*	0.03 (0.882)	0.41 (0.085)	0.29 (0.057)
Spontaneous	92.9	0.0	100.0	69.2
Mild	100.0	100.0	100.0	100.0
Moderate	83.3	66.7	100.0	88.9
Severe	66.7	50.0	100.0	66.7
Surgical	75.0	75.0	--	--
Referred	83.3	88.9	0.0	100.0

Note: Data presented as correlation coefficient (significance level). *Statistically significant correlation $p > 0.05$. Remission Types: (1) Healed, (2) It complicate, (3) Relapse, (4) Missing. Diagnostic Method: (1) Clinical, (2) Biopsy. Laterality: (1) Unilateral, (2) Multilateral. Foci: (1) Unifocal, (2) Multifocal.

1385974 – 23-Year Experience with Granulomatous Mastitis: Does It Prevent Breast Cancer?

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Background/Objective: Granulomatous mastitis (GM) is an inflammatory condition of the breast typically considered to be rare; however, it is seen regularly at our institution. We report on our experience spanning 23 years. An observation was made recently that none of the patients with GM have developed breast cancer. We also observed a similar group of patents with breast cancer had no prior history of GM. The purpose of this study is to report and follow up from a previous 15-year review presented at this conference and to further examine the hypothesis that GM may prevent breast cancer.

Methods: Institutional review board approval was obtained. Two groups of patients were reviewed. The first group (GM) was identified by using the terms "granulomatous mastitis," "inflammation," "breast abscess," and diagnosis code "N61," in a database search from our electronic medical record system for the time period of 1998-2021. The second group of patients (breast cancer) was found by a similar search using terms "breast cancer." A retrospective chart review was completed for evaluation of disease course of GM and risk factors for breast cancer for both groups. The comparison between the 2 groups was limited to patients under 50 years old.

Results: In a single institution, a database search through our electronic medical record systems from 1998 to 2021 yielded 451 patients, of whom 167 patients had a pathologically confirmed GM and were eligible for the study. A retrospective chart review was completed for each patient. This group was found to be largely Hispanic and 25-45 years old. None of the patients on follow-up were found to have breast cancer. Out of 1709 patients treated for breast cancer in the same time period, 243 were identified to be Hispanic and under 50 years old and included in the study for comparison. None of the patients in the breast cancer group had a history of GM. Risk factors for breast cancer were compared between the 2 groups. The breast cancer group tended to be slightly older, more likely nulliparous, and BRCA-positive compared to the GM group. Other risk factors remained similar between the 2 groups.

Conclusions: We compared the 2 similar groups of patients and confirmed that none of the patients in the first group, GM, developed breast cancer at follow-up. Conversely, in the second group with breast cancer, matched for age and ethnicity, we found that none had a history of GM. While the GM group may be at a lower risk for breast cancer because of age and multiparty, we theorize that GM may further provide risk reduction against breast cancer. Some possible theories are that the chronic inflammation, prolonged use of NSAIDs or the presence of Corynebacterium associated with GM may be factors in the prevention of breast cancer in the GM patients. We propose that further large population studies as well as scientific studies be conducted.

1385527 - Obesity , Diabetes Mellitus and Insulin Resistance: An Evolving Link for Delayed-Onset Lactation?

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Background/Objective: Nonlactation/delayed lactation leads to high incidence of lactational mastitis, abscess (short term) and breast or ovarian cancer (long term) in mothers. In non-breast-fed children, there is higher incidence of malnutrition, ARI, and under 5 mortality. Faulty feeding techniques and nipple abnormalities are common but correctable factors. After excluding the correctable causes, a subset of patients continue to show “delayed-initiation” or “non-initiation” of lactation. The global epidemic of “obesity” has emerged as a new public health issue. Recent studies have shown that there is a cause-effect link between the two. Maternal obesity is a well-established risk factor for insulin resistance. Recent studies have shown that insulin plays a direct role in lactogenesis by secretary differentiation, activation, and mature milk production. Thus, insulin resistance is likely to induce delayed/non-initiation of lactation. Our aim was to evaluate the association between obesity-diabetes-suspected insulin resistance and delayed lactation.

Methods: Study Place: Lactation and paediatric breast health clinic. Study Type: Prospective observational. Inclusion criteria: 1. Mothers in whom there was initiation of lactation after 72 hours known as delayed lactation (DL) 2. Mothers in whom there was non-initiation of lactation (NL). Exclusion criteria : 1. Presence of breast abnormality 2. Faulty feeding technique 3. Neonatal congenital abnormality 4. Premature baby 5. Separation of mother and child at birth. Duration of study: 2 months. Factors evaluated: 1. Diabetes 2. Hypertension 3. Hypothyroidism 4. BMI 5. Hyperlipidemia. The association between the risk factors and NL/DL was statistically evaluated using Chi-square test with SPSS software version 27.0.0.

Results: Thirty-two mothers were observed over a period of 2 months. Ten out of 32 had hypothyroidism. Of these, in 4 (25.0%) mothers, lactation was not achieved (p=0.4456). Eighteen had hypertension. There was no initiation in 12 (75.0%) mothers (p=0.0325). Eighteen had diabetes mellitus with no initiation in 12 (75.0%) mothers (p=0.0325). Twenty-twp had hyperlipidemia with DL/NL in 16 (72.7%) mothers (p< 0.0001). Twenty-four had obesity and DL/NL in 16 (66.6%) mothers (p=0.0010).

Conclusions: Published data suggests that among primipara, the incidence of DL is 31%, 43%, and 52%, respectively among women with normal BMI, overweight, or obese. This study establishes that diabetes, obesity, hypertension, and hyperlipidemia are independent risk factors for DL/NL. The last 3 factors are markers of insulin resistance. The study conclusion is based on a small sample size. Study of insulin level and insulin sensitive gene expression is likely to establish the hypothesis strongly. Obesity-diabetes and suspected insulin resistance leads to higher chances of DL/NL. The study not only has a major impact on maternal and child health, but also puts forward a new concept in understanding the physiology of breast in the light of the role of insulin in breast glandular functions.

1387788 - No Scar Necessary: Low Upgrade Rates with Surgery for Radial Scars

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Background/Objective: There are no definitive guidelines for the surgical management of radial scars/complex sclerosing lesions (RSLs). Many RS found on core needle biopsy (CNB) are surgically excised. We sought to determine upgrade rates to high-risk lesions (HRLs) and cancer in a multi-institutional retrospective cohort study to determine patients who may avoid surgery.

Methods: All patients diagnosed with RS on CNB between the years 2002-2022 were examined. The primary outcome was upgrade rate to cancer and/or HRL on excisional biopsy. DCIS was included in the cancer subgroup. HRLs included ADH, ALH, and LCIS. Secondary outcomes included association between size on initial imaging and upgrade rate to cancer and/or HRL, number of biopsy cores vs risk of upgrade to cancer and/or HRL, and presence of atypia and risk of upgrade to cancer and/or HRL. Baseline imaging with mammogram and/or ultrasound was used to determine size of lesion. Patients with concomitant HRLs found on CNB were excluded from the study.

Results: A total of 333 patients with RS were identified for analysis. Of these, 147 patients underwent excisional biopsy, and 186 were followed with imaging. The overall upgrade rate to cancer was 2.7% (4/147). The upgrade rate to a HRL was 10.2% (15/147). The average number of core biopsy samples for patients who did not have an HRL/cancer on excisional biopsy was 6.9+/-2.4 versus 5.7+/-1.4 for those who were upgraded to HRL/cancer (OR: 0.77, p=0.028). Specifically, 15 of 19 (79%) patients with HRLs/cancer had <6.9 core biopsy samples. Four of 19 patients (21%) with HRLs/cancer were found to have atypia on core needle biopsy (p=0.005). The average lesion size on imaging for patients not upgraded to a HRL/cancer was 1.2cm+/-0.9 vs 1.2cm+/-0.6 for those who were upgraded on excisional biopsy (p=0.92). Median time to follow-up imaging for patients who did not undergo excisional biopsy was 19 months [IQR: 10,27], and 98% of these patients continued to have benign imaging findings, and no patients had cancer on subsequent biopsy.

Conclusions: To our knowledge, this represents the largest study to date examining potential risk factors and risk of upgrade to cancer and/or high-risk lesions in patients diagnosed with RSLs on CNB. Overall, the risk of cancer upgrade on excisional biopsy remained very low, and the risk of upgrade to other high-risk lesions was approximately 10%. We found that patients with fewer samples obtained on core needle biopsy were significantly more likely to upgrade to invasive carcinoma and/or high-risk lesions on excisional biopsy. Consistent with the literature, those with atypia on CNB were more likely to have upgrade to invasive carcinoma or high-risk lesion. Size on initial imaging had no influence on upgrade rates. Based on our data, the majority of patients should not be undergoing excisional biopsy for RSLs. The most high-risk patients are those with atypia on core needle biopsy and those with inadequate sampling.

1387804 - Radiographic Progression of Atypical Lobular Hyperplasia on Needle Core Biopsy Undergoing Active Surveillance

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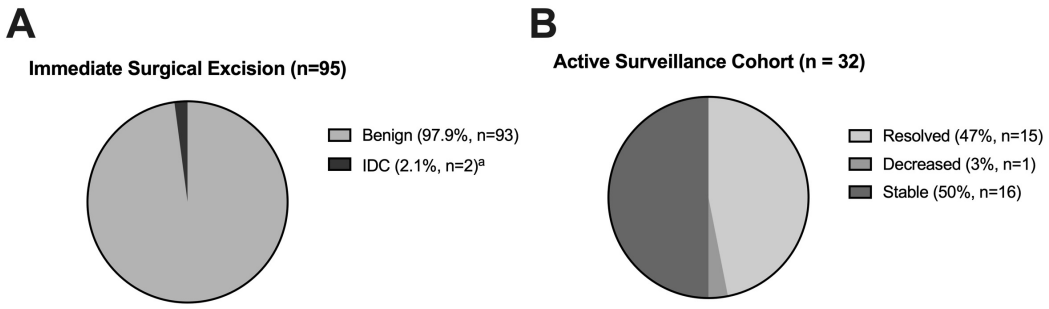
Background/Objective: Atypical lobular hyperplasia (ALH) diagnosed on needle core biopsy (NCB) is often surgically excised due to malignancy upgrade rates of 1-5%. Therefore, there are few studies that have examined the detailed radiographic progression of pure ALH undergoing active surveillance. We investigated the rates of upgrade to malignancy for immediate excision of ALH on NCB, as well as the rates and characteristics of radiographic progression of ALH under active surveillance (AS).

Methods: We retrospectively reviewed the imaging and pathology records of 127 patients with ALH diagnosed on NCB from 2015-2021 at Weill Cornell Medicine. Of patients who had immediate excision of ALH (within 6 months of NCB), we determined the malignancy upgrade rate. For the AS cohort, we examined rates of radiographic progression on 6-month interval imaging (e.g., increased calcifications or distortion on mammography, or increased lesion size on ultrasound or MRI).

Results: The mean age of patients was 57 (±12) years, and 89% of lesions were mammographically screen-detected (n=113). Of 127 patients with ALH on NCB, 75% (n=95) underwent immediate excision while 25% (n=32) underwent AS. The upgrade rate among patients who underwent immediate excision was 2.1% (n=2), both upgrading to invasive ductal carcinoma (IDC, T1N0 and T1Nx). Among the 32 ALH lesions that underwent AS, median follow-up time was 22.5 (range 6-71) months. No ALH lesions progressed on imaging, and all remained stable (50%, n=16), resolved (47%, n=15), or decreased in size (3%, n=1).

Conclusions: In our cohort, ALH diagnosed on NCB had a low upgrade rate to malignancy of 2.1%. Of patients undergoing AS, no ALH lesions progressed on imaging at a median follow-up time of 22.5 months (range 6-71). Given the low the risk of upgrade to malignancy (2.1%), and no radiographic progression of patients undergoing AS in our study, we suggest that AS may be an alternative to surgery for patients with ALH on NCB, with surgery reserved for lesions that demonstrate radiographic progression. As multiple international prospective trials are investigating AS for low-risk DCIS, our results suggest that AS should be the preferred treatment option for patients with ALH on NCB.

Figure. A. Upgrade rate to malignancy of immediately excised atypical lobular hyperplasia (ALH). B. Radiographic findings of ALH under active surveillance with a median follow-up of 22.5 months (range 5-71). No lesions demonstrated radiographic progression.



1387297 - Granulomatous Mastitis: Presentation and Practice Patterns of an Endemic Disease at an Academic Breast Center

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Background/Objective: Granulomatous mastitis remains a rare inflammatory benign breast disease that can mimic breast abscesses or cancer in presentation and poses diagnostic and therapeutic challenges. The objective of this study was to evaluate presentation and management patterns of granulomatous mastitis, a disease endemic to the area, at a tertiary breast care center.

Methods: This study was a single-institution, retrospective chart review of female patients aged 18-89 years with an electronic medical record diagnosis of granulomatous mastitis between 2017-2022.

Results: Overall, 89 patients were identified with a median age of 36.5 (IQR=10). The majority were Hispanic (n=76; 85.4%). Management included: 33 (37.1%) patients receiving >1 surgical interventions, 78 (87.6%) antibiotics, 19 (21.6%) short-term immunosuppression, and 9 (10.1%) long-term immunosuppression. Median disease course was 9.5 months (IQR=20). Patients who underwent surgical procedures had longer disease courses with a median duration of 19 (IQR=26) months vs. 8 (IQR=26) months without surgery (p=0.03). Patients with longer intervals from symptom onset to breast clinic referral also had longer disease courses (median time to breast clinic referral between 0-3 months: 6 (IQR=15) month duration vs. 4-6 months: 10 (IQR=18.5) months vs. >6 months: 31.5 (IQR=36.75) months, p=0.002). Use of antibiotics, short-term, and long-term immunosuppression had no significant impact on length of disease.

Conclusions: Although different medical management strategies did not generate differences in granulomatous mastitis outcomes, surgical interventions were associated with longer disease courses and should be avoided. Early referral to specialized breast centers is associated with shorter symptom

duration, supporting the need for continued improvements in early identification and diagnosis of granulomatous mastitis.

1388344 - Characterization of Idiopathic Granulomatous Mastitis at a Large Urban Public Hospital

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Background/Objective: Idiopathic granulomatous mastitis (IGM) is a rare, benign, relapsing chronic inflammatory disease of the breast predominately in Hispanic and Asian woman of childbearing years. Its etiology is unknown; however, several factors have been associated such as infection, autoimmune, pregnancy/lactation, oral contraceptives, and hyperprolactinemia. First described in 1972 by Kessler and Wolloch, IGM was noted to mimic breast cancer as it can present with a palpable mass and suspicious findings on breast imaging studies. Histologically after biopsy completion, which is diagnostic, IGM consists of noncaseating granulomas around the lobules and ducts of the breast. Corynebacterium has also been demonstrated to be associated with IGM, the most common type being *Corynebacterium kroppenstedtii*. Therapeutic management can be challenging and typically consists of observation, antibiotics, corticosteroids, nonsteroidal anti-inflammatories (NSAIDs), incision and drainage, and rarely, surgical excision. Optimal management is controversial, and recurrence is common. The current study describes the experience of IGM in a large, urban public hospital.

Methods: After obtaining institutional board approval, a retrospective chart review of IGM patients from 2015 to 2022 was conducted. We identified 57 patients with a pathologic diagnosis of granulomatous mastitis after patients underwent a core needle biopsy. Demographic information, including ethnicities, and therapeutic management was studied.

Results: Fifty-seven patients with IGM were identified from 2015 to 2022. The ages ranged from 20 to 55 years old, with a mean age of 37 years old. Nearly all patients had unilateral disease, with only 1 patient having metachronous bilateral disease. The most common physical finding was the presence of a breast mass (82.4%) and/or abscess/drainage (65%). Approximately 37 women had a breast mass and abscess/drainage (65%). One 23-week pregnant 23-year-old woman presented with GMENA – IGM, erythema nodosum, and arthritis. Cultures were obtained for 19 patients; 12 patients had no growth (63%), 4 Corynebacterium (21%), 1 Klebsiella (5.2%), 1 Gemella morbillorum (5.2%), and 1 Staph epidermis (5.2%). The majority of women were of Hispanic descent (86%). There were 3 African Americans, 2 Bengali, 1 African, and 1 Philippine woman. Many of the Hispanic woman were predominately from Mexico (61%), particularly Puebla Mexico (12%). There were 3 women from the Dominican Republic, 2 from Puerto Rico, 2 from Bangladesh, 1 from Senegal, and 1 from Ecuador. Most patients were treated with antibiotics (74%) and/or corticosteroids (30%). Treatment with antibiotics and corticosteroids occurred in (26%). Most patients ultimately, after some episodes of recurrence, eventually had resolution (74%), although some patients were lost to follow-up. However, recurrence remained common (37%).

Conclusions: This study confirms the propensity of IGM to afflict Hispanic women particularly of Mexican descent and may be associated with a particular region in Mexico. Most common presentation is a breast mass and abscesses. Overwhelming cultures are negative, but the most common organism was from the Corynebacterium family. IGM was most commonly treated with antibiotics and corticosteroids, with the majority of cases resolving after periods of relapse.

1388304 - Clinical Presentation, Management, and Outcomes of Adenomyoepithelioma: A Single-institution Experience

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Background/Objective: Adenomyoepithelioma (AME) is a rare, benign breast disease with varying clinical and imaging presentations and difficult histologic classification, making it challenging to form concrete diagnostic criteria. Treatment typically includes surgical resection, as some case studies note potential for recurrence and malignant transformation. Through this retrospective chart review, we aim to describe the clinical presentation, management, and outcomes for patients at a single hospital system.

Methods: We conducted an IRB-approved retrospective chart review. Participant criteria included patients with a diagnosis of or differential including breast AME from 2016-2022 who received treatment at our institution. Data collected included demographic information, clinical presentation, imaging, histologic findings, treatment, and outcomes. A descriptive analysis was performed.

Results: Sixteen patients were identified with or with a differential including breast AME, and 1 was ultimately excluded as expert outside pathology review determined findings were not consistent with true AME. Of the 15 patients included, 9 were post-menopausal, with an age range from 40 to 89 years, and follow-up from 1-52 months. Lesion size ranged from 1.2 to 32mm. Five (33.3%) patients presented with concern for a breast mass and 3 (20%) with breast pain. The remaining patients were asymptomatic. Seven (46.7%) patients had masses seen on both mammogram and ultrasound, and 4 (26.7%) were seen as an asymmetry or calcifications on mammogram. Thirteen patients underwent image-guided biopsy, and the remaining 2 underwent surgical biopsy or excision for diagnosis. Subsequent lumpectomy was performed in 8 of the 13 patients who underwent image-guided biopsy with negative margins. The remaining 5 patients underwent observation. Of the 9 patients who underwent image-guided biopsy and resection, AME was confirmed in 3 (33.3%), 2 (22.2%) were found to have invasive cancer, and 1 (11.1%) was found to have atypical ductal hyperplasia. No patients were found to have metastatic AME or recurrent disease.

Conclusions: AME is a rare breast lesion with variable presentation and elusive diagnosis. While management typically includes surgical resection, our study suggests that observation may be a safe alternative, with no evidence of metastatic or progressive disease.

1381485 - Cellular Atypia as Predictor of Upgrade of Radial Scars/Complex Sclerosing Lesions to Ductal Carcinoma In Situ or Invasive Carcinoma Following Excisional Biopsy – Is This Practice Changing?

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Background/Objective: Radial scars and complex sclerosing lesions (RS/CSL) are histologic diagnoses made following breast biopsy or surgical excision. Currently, these proliferative lesions are recommended for excision due their risk of harboring occult malignancy. The rate of upgrade of these lesions to malignancy, following formal excision, ranges from 0-40%. The presence of cellular atypia is the most significant reported risk factor. Our study aims to determine the frequency of diagnostic upgrade of RS/CSL to DCIS or invasive breast cancer following surgical excision. We hypothesize that RS/CSL without biopsy findings of cellular atypia are less likely to harbor malignancy relative to those with atypia. This holds potential to impact current practice as this would suggest that RS/CSL with atypia should continue to be excised whereas RS/CSL without atypia can potentially be observed with close imaging follow-up.

Methods: Our study is a retrospective cohort investigation of patients undergoing breast biopsy between 2010 and 2022 in our urban health care system. Patients in this study include those with a histologic diagnosis of RS/CSL, with or without cellular atypia, on image-guided core needle biopsy. Inclusion criteria include adult males and females >18 years of age with a histologic diagnosis of radial scar or complex sclerosing lesion, with or without atypia, on image-guided core needle biopsy.

Results: We identified 79 patients meeting inclusion criteria. Sixty-nine out of 79 patients were diagnosed with RS (87.34%) compared to 10 out of 79 with CSL (12.66%). Of these 79 patients, 6 patients had upgraded diagnosis to DCIS (7.59%) compared to 0 patients (0%) upgraded to invasive cancer. Of these 6 patients upgraded to DCIS on excision, 1 patient demonstrated atypia on initial core needle biopsy (17%). Six out of 6 patients upgraded to DCIS were initially diagnosed as RS compared to 0 out of 6 diagnosed as CSL on core needle biopsy. Logistic regression modeling was performed to assess associated malignancy risk relative to cellular atypia, race, diagnostic modality for core needle biopsy, previous history of biopsy or excision, and personal/family history of breast and/or ovarian cancer.

Conclusions: In this study, the cumulative upgrade rate of RS/CSL lesions of 7.59% is consistent with the reported literature. We identify a positive trend of upgrade associated with cellular atypia. Our data suggest that surgical excision among patients diagnosed with RS/CSL should be individualized. The implications from this study are potentially practice changing as this suggests that RS/CSL with atypia should be excised. Lesions without atypia can be offered the option of close follow-up with serial imaging. We will further refine our findings with prospective enlargement of our sample size.

Table. Baseline characteristics and clinical/radiologic variables of interest in patients diagnosed with radial scar/complex sclerosing lesion on core needle biopsy

		All patients (n = 79)
Race/ethnicity	White Non-white	59 (74.68%) 20 (25.32%)
Initial diagnosis on core needle biopsy	Radial scar (< 1 cm) Complex sclerosing lesion (> 1 cm)	69 (87.34%) 10 (12.66%)
Type of core needle biopsy	Stereotactic Ultrasound-guided MRI-guided	35 (44.30%) 34 (43.04%) 10 (12.66%)
Previous history of biopsy/excision		26 (32.91%)
Personal history of breast/ovarian cancer		3 (3.80%)
Family history of breast/ovarian cancer		29 (36.71%)

1336282 - A Retrospective Evaluation of the Association Between Multiple Breast Lesions of Uncertain Malignant Potential Found During Core Needle Biopsy and Upstage to Malignancy

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Background/Objective: The management of atypical ductal hyperplasia (ADH), flat epithelial atypia (FEA), radial scar (RS), or intraductal papilloma (IDP) diagnosed at core needle biopsy (CNB) is controversial due to variable upstage rate (UR). Many studies have evaluated factors associated with upstage to malignancy during surgical excision (SE), but few have evaluated the association between UR and the presence of multiple lesions in 1 CNB specimen. Our aim is to investigate UR when combination diagnoses (CD) are discovered to individualize surgical management.

Methods: We performed an IRB-reviewed and exempted retrospective analysis of women 18 and older who underwent CNB followed by SE between January 1st, 2010, and April 15th, 2022, at our tertiary breast center using an IRB-approved patient repository. We included patients found to have at least 1 of 4 primary diagnoses (ADH, FEA, RS, IDP) on CNB, as each diagnosis triggers surgical consultation for excision. Because our pathologists report all unequivocally present pathological diagnoses in specimens, we evaluated for the presence of CD, defined as 1 of the primary diagnoses associated with either lobular neoplasia (LN) or an additional primary diagnosis. SE pathology was evaluated for upstage to invasive or in situ carcinoma. Patient demographics and lesion characteristics were recorded. We excluded males, patients who did not undergo SE, and those without 1 of the 4 primary lesions, such as pure LN, because LN doesn't prompt surgical consultation. Basic descriptive statistics were used to determine UR, Chi-squared to compare frequency of outcomes, and a regression analysis to evaluate multiple variables. A nomogram was created from the regression to provide visual interpretation of upstage risk.

Results: A total of 719 patients underwent 757 excisional biopsies. Mean age was 55.4, and median was 54.0. There were 490 patients who had pure lesions including 101 ADH, 52 FEA, 141 RS, and 197 IDP. There were 266 who had CD. UR for all biopsies was 12.5% (95/757). For pure lesions, UR was 24.8% (25/101) for ADH, 9.6% (5/52) for FEA, 1.4% (2/141) for RS, and 7.1% (14/197) for IDP. There was no difference in UR by age (p=0.07), race/ethnicity (p=0.76), family history (p=0.21), personal history of atypia (p=0.68), BMI (p=0.75), mammographic density (p=0.53), imaging characteristics that prompted needle biopsy (p=0.36), or symptomatic vs. screen detection (p=0.17). Factors associated with increased UR included larger lesions (14.1 vs. 10.2 mm, p=0.01), personal history of breast cancer (p=0.04), and greater distance from nipple (mean 73.6 vs 63.2 mm, p=0.03). CD experienced higher UR than pure lesions (9.4% (46/491) pure vs. 18.4% (49/266) CD, p=0.001). Out of all combinations, ADH+LN had the highest UR (35.7%, p=0.001). RS+atypia CD had a higher UR than RS+non-atypia CD (28% vs 2.9% p=0.001) In multivariate analysis, CD still experienced statistically higher UR (RR unadjusted 95% CI 2.48 (1.37-4.46).

Conclusions: Combination diagnoses were associated with UR, and ADH with LN had the highest UR overall.

Table. Upstage rate by diagnosis

Did the Patient Upstage during SE?	No	Yes	Total	UR (%)	p-value
All pure lesions (ADH, FEA, RS, IDP)	445	46	491	9.4	
All Combination Diagnoses	217	49	266	18.4	**0.001**
Atypical Ductal Hyperplasia					
Pure ADH	76	25	101	24.8	
ADH and FEA	71	14	85	16.5	0.247
ADH and RS	6	2	8	25.0	0.285
ADH and IDP	21	5	26	20.8	0.295
ADH and LN	18	10	28	35.7	**0.001**
All ADH combinations (ADH with FEA, RS, IDP, or LN)	112	30	142	21.1	0.506
Flat Epithelial Atypia					
Pure FEA	47	5	52	9.6	
FEA with ADH	71	14	85	16.5	0.247
FEA with RS	7	3	10	30.0	0.094
FEA with IDP	2	0	2	0.0	0.592
FEA with LN	17	2	19	10.5	0.787
All FEA combinations (FEA with ADH, RS, IDP, or LN)	94	18	112	16.1	0.268
Radial Scar/Complex Sclerosing Lesion					
Pure RS	139	2	141	1.4	
RS with ADH	6	2	8	25.0	0.285
RS with FEA	7	3	10	30.0	0.094
RS with IDP	34	1	35	2.9	0.076
RS with LN	6	2	8	25.0	0.285
All RS combinations (RS with ADH, FEA, IDP, or LN)	52	8	60	13.3	**0.001**
Intraductal Papilloma					
Pure IDP	183	14	197	7.1	
IDP with ADH	21	5	26	20.8	0.295
IDP with FEA	2	0	2	0.0	0.592
IDP with RS	34	1	35	2.9	0.076
IDP with LN	10	0	10	0.0	0.228
IDP with Unspecified Atypia	4	1	5	20.0	0.614
All IDP combinations (IDP with ADH, FEA, RS, LN, or unspecified atypia)	69	7	76	9.2	0.559
CNB specimen with 3 or more diagnoses	2	1	3	33.3	

Table 1 - Upstage rate (UR) after surgical excision (SE) by diagnosis for atypical ductal hyperplasia (ADH), flat epithelial atypia (FEA), radial scar (RS), intraductal papilloma (IDP), and lobular neoplasia (LN), and unspecified atypia.

1387888 - Trends and Predictors of Atypical Ductal Hyperplasia Upgrade: A Twenty-year Experience

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Background/Objective: Atypical ductal hyperplasia (ADH) is a benign proliferative breast lesion, and surgical excision of ADH is often recommended to rule out underlying malignant disease. With improvements in imaging and biopsy technique, we hypothesized that the rates of ADH upgrade may have decreased over the past decade. The aim of this study was to evaluate the trends in ADH upgrade rates at our institution over time and identify clinicopathologic factors that are associated with upgrade to invasive disease.

Methods: Retrospective review of a prospectively maintained institutional database was used to identify women diagnosed with ADH by core needle biopsy between 2004 and 2022. All cases had been presented for multidisciplinary review and recommendation for management was based on standardized imaging and pathology criteria. Clinical variables, imaging and pathology data were collected for each ADH diagnosis. Trends in ADH upgrade to in situ and invasive disease and clinicopathologic factors associated with upgrade were analyzed using Chi-squared and Fisher's exact test as appropriate. Multivariate analysis for predictors of pathologic upgrade were evaluated using logistic regression.

Results: There were a total of 975 ADH cases identified between 2004 and 2022. Of these, 362 (37.1%) met our multidisciplinary criteria for excision and thus met inclusion criteria for this study. Median age at surgical excision was 57.10 years. The surgically excised cohort consisted of 232 (64.1%) White patients, 49 Black (13.5%), 41 Hispanic (11.3%), and 31 Asian (8.6%) patients (6 other and 3 unknown). Thirty-three (9.1%) of the ADH diagnoses coincided with a palpable lesion. Seventy-nine (21.8%) patients had a distant or concurrent history of in situ or invasive breast cancer. Of the surgically excised cases, 24 (6.6%) were detected via magnetic resonance imaging (MRI) and thus underwent an MRI-guided core biopsy. A total of 96 (26.5%) patients were found to have upgrade on final surgical pathology; 72 (75.0%) with in situ disease and 24 (25.0%) with invasive disease. When compared across quartiles of time, no significant trends were noted in rates of upgrade overall or in the proportion of DCIS to invasive upgrades. Patient age, year of diagnosis, imaging modality for detection, and whether the lesion was palpable were not significantly associated with overall pathologic upgrade. More patients with history of breast cancer (n=79) were found to have in situ or invasive cancer on surgical pathology compared to those without a breast cancer history (43.0% vs. 21.9%; $p<0.001$). On multivariate analysis, having a history of breast cancer was associated with an increased odds of overall (OR 2.42; $p=0.002$) and invasive upgrade (OR 4.61; $p=0.001$), but not upgrade to in situ disease ($p=0.19$), and age over 70 years was associated with increased odds of in situ upgrade (OR 2.77; $p=0.02$).

Conclusions: In women selectively referred for excision based on standardized imaging and pathology criteria, the incidence of upgrade for ADH lesions diagnosed by core needle biopsy has remained relatively unchanged over the last 2 decades. A personal history of breast cancer is strongly associated with risk of upgrade to invasive cancer.

Table. Demographics and rates of ADH upgrade

Variable	ADH on biopsy	(%)	Upgrade (n)	(%)	p-value	Invasive (n)	(%)	p-value	DCIS (n)	(%)	p-value
Age					0.067			0.658			0.075
≤50	111	30.7	22	19.8%		6	5.4%		16	14.4%	
51-60	110	30.4	28	25.5%		6	5.5%		22	20.0%	
61-70	96	26.5	28	29.2%		9	9.4%		19	19.8%	
≥70	45	12.4	18	40.0%		3	6.7%		15	33.3%	
Year of diagnosis					0.972			0.83			0.921
2003-2007	21	5.8	6	28.6%		2	9.5%		4	19.0%	
2008-2012	100	27.62	25	25.0%		7	7.0%		18	18.0%	
2013-2017	129	35.64	35	27.1%		7	5.4%		28	21.7%	
2018-2022	112	30.94	30	26.8%		8	7.1%		22	19.6%	
Biopsy type					0.367			0.911			0.244
MRI	25	6.91	9	36.0%		2	8.0%		7	28.0%	
Stereotactic	259	71.55	65	25.1%		17	6.6%		48	18.5%	
US Core	73	20.17	20	27.4%		5	6.8%		15	20.5%	
FNA	1	0.28	1	100.0%		0	0.0%		1	100.0%	
UNK	4	1.1	1	25.0%		0	0.0%		1	25.0%	
Palpable					1.000			1.000			0.496
No	329	90.88	87	26.4%		22	6.7%		65	19.8%	
Yes	33	9.12	9	27.3%		2	6.1%		7	21.2%	
History of breast cancer					<0.001			0.002			0.055
No	283	78.18	62	21.9%		12	4.2%		50	17.7%	
Yes	79	21.82	34	43.0%		12	15.2%		22	27.8%	

Complications

1385823 - Frequency and Characteristics of Bleeding Complications After Breast Cancer Surgery: Who Is at Risk?

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Background/Objective: Bleeding is a common post-operative complication. The goal of this study is to analyze the frequency of post-operative bleeding events after breast cancer surgery and identify patients at risk.

Methods: We conducted a cross-sectional analysis of patients 18 years or older in the ACS-NSQIP database who experienced post-operative bleeding after surgery for breast cancer during the years 2016-2020. Univariable logistic regression was used to identify demographic and clinical factors associated with post-operative bleeding.

Results: A total of 202,386 patients met inclusion criteria. Out of these, 2,227 (1.1%) experienced post-operative bleeding complications, defined by either the need for transfusion only (n=1,012, 45%), return to the operating room for evacuation of hematoma (n=1,029, 46%) or both (n=186, 8%). The overall mean population age was 56.7 years. Patients who experienced bleeding complications were younger with a mean age of 55.7 ($p<0.01$). Sixty-seven percent of patients were white, 11% Black, 9% Hispanic and 5.5% Asian. Mean BMI was 29.2 and median total operation time was 72 minutes. Average length of stay was less than 1 day without bleeding event and 3.1 days for patients who bled ($p<0.01$). Pre-operative comorbidities associated with post-operative bleeding included higher ASA status (bleeding event rate was 1.3% for ASA3, compared with 0.5% for ASA1, $p<0.01$), disseminated cancer (2.8%, $p<0.01$), known bleeding disorder (3.3%, $p<0.01$), recent weight loss (3.7%, $p<0.01$), renal insufficiency (9.5%, $p<0.01$), dialysis (4.4%, $p<0.01$), need for pre-operative transfusion (4.4%, $p<0.01$), and SIRS or sepsis (5.4%, $p<0.01$). Black patients had a higher risk of post-operative bleeding events compared with white (OR=1.69, CI=1.51-1.90). Among Black patients, smoking status (0.9%, $p=0.03$) and recent pneumonia (2.2%, $p=0.01$) were also significantly associated with bleeding complications which was not observed in the overall population. Mastectomy was associated with an 8-fold increase of post-operative bleed when compared with lumpectomy (OR 8.5, CI 7.1-9.3). Patients who had mastectomy had an additional 4-fold increase in risk for post-operative bleeding complication with the addition of reconstruction (OR 4.2, CI 3.85-4.6). For patients who had lumpectomy, no difference in risk of bleeding complication was observed for oncoplastic vs. standard lumpectomy. Any lymph node surgery increased bleeding risk more than 6-fold (OR 6.4, CI=5.6 to 7.2). Bleeding risk was 5 times greater with axillary dissection compared with sentinel lymph node biopsy (OR 5.3, CI 4.5-6.1).

Conclusions: Bleeding events for breast surgery are overall rare. They are influenced by certain patient comorbidities and type of procedure, including mastectomy, reconstruction, and axillary surgery. Identification of at-risk patients may enable for improved pre-operative patient education and surgical decision-making.

1384592 - Surgical Wound Complications in Breast Cancer Patients After Neoadjuvant Chemotherapy

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Background/Objective: In general, surgical procedures to treat breast cancer are associated with a low rate of wound complications. Procedures with the lowest likelihood of wound complications include breast-conservation surgeries, and the highest include mastectomies with reconstruction. Neoadjuvant chemotherapy is increasingly utilized in the treatment of breast cancer, particularly in triple-negative and HER2/neu-positive subtypes. Various regimens may include taxanes, anthracyclines, and immune checkpoint inhibitors. Although tumors may be downstaged, adverse effects for agents such as docetaxel, cyclophosphamide, and doxorubicin include neutropenia, which could affect wound healing. The anti-tumor effects of the immune checkpoint inhibitor pembrolizumab have also been described to cause wound complications. The purpose of this study was to evaluate the incidence of wound complications associated with breast cancer surgery after neoadjuvant therapy.

Methods: Our institutional IRB-approved breast cancer database was queried for patients enrolled from 1/2017-10/2022 who received neoadjuvant therapy followed by surgery for breast cancer. Variables of interest included patient demographics, tumor characteristics, neoadjuvant therapy regimen, type of surgery, patient co-morbidities, and wound complications. Our definition of a wound complication included any patient who required additional wound care, re-operation, or antibiotic. Autologous reconstruction with donor site wound complications were included in this study.

Results: During our study period, a total of 139 patients received neoadjuvant chemotherapy followed by breast cancer surgery. Of these patients, 87 (63%) had mastectomy procedures, with 77% also undergoing immediate reconstruction. Eighty-one percent of these patients had implant-based reconstruction, with the rest being autologous. Seventy-five percent of patients underwent axillary lymph node dissection. All patients had pre-operative cytotoxic chemotherapy. Sixty patients received anti-HER2 therapy. Seven patients received immune checkpoint inhibitors. Seven patients (5%) had wound complications. Only 1 of these patients underwent breast-conserving surgery. The majority of the complications were superficial surgical site infections (71%). Out of all patients who underwent any breast surgery with axillary lymph node dissection, 6% had wound complications. One hundred percent of patients with wound complications had received taxanes, and 43% had also received an anthracycline. Five percent of patients who received anti-HER2 therapy developed wound complications. The rate of wound complications was the same in patients who received cytotoxic therapy without HER2-targeted treatment. No patients who received an immune checkpoint inhibitor developed wound complications. There was no single chemotherapeutic agent that was associated with wound complications. Twenty-nine percent of patients with wound complications had diabetes, and 71% were smokers.

Conclusions: The surgical complication rate at our institution after neoadjuvant therapy was 5%. This compares favorably with the national average of 4% for wound complications after breast surgery.

Patients who receive neoadjuvant chemotherapy should not be deterred from surgery out of concern for wound complications. As neoadjuvant regimen increasingly consist of immune checkpoint inhibitors, it is important to note that they do not appear to increase the rate of post-surgical complications, although further studies with larger sample sizes are required. Emphasis should be placed on optimizing medical comorbidities and chronic disease.

Table. Patients receiving neoadjuvant chemotherapy before breast cancer surgery Jan. 2017 - Oct. 2022

Variables	Total Population	N=139	Wound Complication Population	N=7
	N	%	N	%
Gender				
Female	138	99.28	7	100
Male	1	0.72	0	0
Average Age	50.61		54.27	
Race				
African American	20	14.39	0	0
Asian	11	7.91	2	28.57
White	86	61.87	5	71.43
Hispanic	16	11.51	0	0
Native Hawaiin/Pacific Islander	0	0	0	0
American Indian	0	0	0	0
Unknown/Other	6	4.32	0	0
Diabetes				
Yes	10	7.19	2	28.57
No	129	92.81	5	71.43
Smoking				
Yes	57	41.01	5	71.43
No	82	58.99	2	28.57
Type of Surgery			0	0
Lumpectomy	0	0	0	0
Lumpectomy + NeedleLoc	0	0	0	0
Lumpectomy + Pre-Op Loc	0	0	0	0
Lumpectomy + SLND	18	12.95	0	0
Lumpectomy + ALND	34	24.46	1	14.29
Excisional bx	0	0	0	0
TM	0	0	0	0
TM + SLND	12	8.63	0	0
TM + ALND	66	47.48	5	71.43
NS	0	0	0	0
NS + SLND	5	3.6	1	14.29
NS + ALND	4	2.88	0	0

Reconstruction after Mastectomy				
Yes	67	77.01	3	50
No	20	22.99	3	50
Type of Reconstruction				
Implant	46	68.66	0	0
Autologous	21	31.34	3	100
Type of Neoadjuvant				
Chemotherapy	139	100	7	100
Hormonal	21	15.11	0	0
Targeted Therapy	67	48.2	3	42.86
Other	5	3.6	0	0
Noeadjuvant Chemo types				
AC	3	2.16	0	0
ACT	55	39.57	3	42.86
ACT Carbo	5	3.6	0	0
ACT Nivolumab	2	1.44	0	0
ACT Zoladex	1	0.72	0	0
ECT	1	0.72	0	0
Pembro CT Pembro AC	4	2.88	0	0
Pembro CT Pembro EC	1	0.72	0	0
Taxol	3	2.16	1	14.29
TC	2	1.44	0	0
TC AC	2	1.44	0	0
TCH	3	2.16	0	0
TCHP	16	11.51	2	28.57
THP	8	5.76	1	14.29
THP AC	31	22.3	0	0
THP AC Nivolumab	2	1.44	0	0

1387678 - External Validation of the Breast Cancer Surgery Risk Calculator (BCSRc): A Predictive Model for Post-operative Complications

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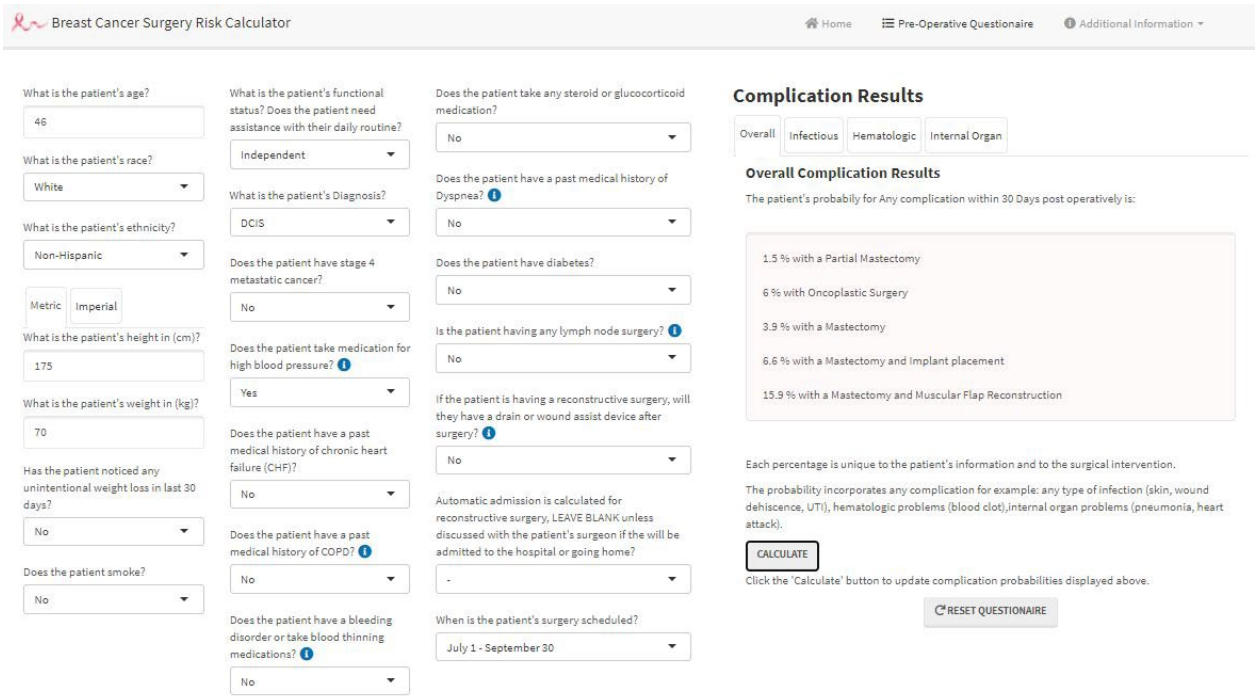
Background/Objective: The breast cancer surgical risk calculator (BCSRc) is a prognostic tool that determines a breast cancer patient's unique risk of acute complications following each possible surgical intervention. When used in the pre-operative setting, it can help stratify patients with an increased complication risk and enhance the patient-physician informed decision-making process. The objective of this study was to externally validate the 4 models used in the BCSRc on a large cohort of patients who underwent breast cancer surgery.

Methods: The BCSRc was developed on a retrospective cohort from the National Surgical Quality Improvement Program (NSQIP) database from 2005-2018. Four models were built using logistic regression and machine learning methods to predict the following composite outcomes: overall, infectious, hematologic, and internal organ complications. This study obtained a new cohort of patients NSQIP utilizing participant user files from 2019-2020. The 4 predictive models computed risk estimates for each patient and compared its predictive accuracy on observed rates of complication. The area under the curve, or concordance statistic, the Brier score, and Hosmer-Lemeshow goodness of fit test measured model performance, accuracy, and calibration; respectively.

Results: Women who were undergoing surgery for breast cancer, either ductal carcinoma in situ (DCIS) or invasive breast cancer, met inclusion criteria. Of those, data from 192,095 women were used in the development of the BCSRC, and the validation cohort included 71,240 women. The area under the curve for each model improved on external validation (all above 0.70). Accuracy, or Brier scores, were all between 0.04-0.003. Model calibration using the Hosmer-Lemeshow statistic found all p-values above 0.05. All these model coefficients will be updated on the web-based breast cancer surgical risk calculator (BCSRc) platform – the Figure shows its appearance: www.breastcalc.org.

Conclusions: The BCSRc was previously developed and now shows excellent external-validation measures. Its performance and calibration have shown further validity for its use in the clinical setting. Collectively, this prognostic tool can enhance the decision-making process and help stratify patients with an increased complication risk and improve expectations during the decision-making process.

Figure.



1388318 - Comparable Outcomes of Tumescent Dissection in Mastectomies

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Background/Objective: The operative technique for mastectomy has evolved significantly over the past 140 years. The main objective, removal of all breast tissue with adequate healing, has not changed. We sought to compare outcomes associated with tumescent dissection (TM) versus standard electrocautery dissection in mastectomy patients.

Methods: Beginning in January 2018, a single surgeon at a high-volume academic breast center adopted the technique of tumescent dissection for all mastectomies. TM involves the injection of a lactated ringer's solution with epinephrine into the subcutaneous plane using a spinal needle or a tumescent pump with a blunt needle. A small incision is fashioned, and Gourney scissors are introduced to develop the subcutaneous plane across the entire breast. In nipple-sparing mastectomy, the scissors are used to transect the ducts at the base of the nipple. The remainder of the case is completed through the appropriate incisions and using electrocautery to raise the breast off the muscle and divide the edges to free the gland. We performed a retrospective cohort study of adults who received mastectomy by this single surgeon between January 2018 and October 2020. The primary outcome was complication rate. Secondary outcomes included operative time and time to recurrence. Chi-squared analysis was used to compare complication outcomes by dissection approach (TM vs. standard electrocautery). Two-sample

t-test was used to compare operative times by dissection approach. Log-rank testing was used to compare time to recurrence by dissection approach.

Results: Among the 242 patients that underwent mastectomy, 105 patients had a single mastectomy, and 137 patients had bilateral mastectomies. Mastectomy was performed for invasive malignancy in 191 patients, for ductal carcinoma in situ in 40 patients, and for prophylaxis in 14 patients. One hundred sixty patients had reconstruction. Of the patients who underwent standard dissection, 60.40% had a complication compared to 43.7% of TM patients (p=0.012). Types of complications differed by dissection approach (Table). The majority of all complications were associated with reconstruction in the electrocautery group, 66.1%, compared to 49% in the TM group, p=0.033. Similarly, there were fewer cases of delayed wound healing in the TM group who had reconstruction at 6.1% compared to 21% in the electrocautery group, p= 0.005. Infection rate was significantly higher within TM group who had reconstruction, 14.3%, compared to 3.2% in the electrocautery group, p=0.023. Otherwise, there was no significant association between reconstruction and hematoma, seroma, nipple areolar necrosis, and re-exploration. Patients who received TM had a mean operative time of 216.09 minutes compared to electrocautery mastectomy mean operative time of 250.16 minutes, with a mean difference in time of 34.07 minutes (p=0.016). There was no difference in time to recurrence based on dissection approach (p=0.243).

Conclusions: Tumescent mastectomy is feasible and yields comparable results with decreased rates in infections and delayed wound healing in patients without reconstruction compared to electrocautery dissection. Additionally, tumescent mastectomies have shorter length of operative time, which could also reduce the risk of complications associated with increased time under anesthesia. There was no difference in time to malignancy recurrence compared to standard technique.

Table. Differences in patient characteristics and outcomes by dissection approach

Characteristic	Standard (n=101)	Tumescence (n=141)	*p-value*
Mastectomy			
Single	50.50%	38.30%	0.059
Bilateral	49.50%	61.70%	0.059
Nipple-Sparing	23.76%	24.82%	0.850
Reconstruction	61.39%	69.50%	0.188
Smoking Status at Time of Surgery	2.97%	4.26%	0.602
All Complications	60.40%	43.97%	0.012
Infection	3.96%	12.06%	0.027
Hematoma	6.93%	10.64%	0.322
Nipple Areolar Complex Necrosis	13.86%	9.22%	0.258
Wound Healing	17.82%	6.38%	0.005
Seroma	6.93%	4.96%	0.518
Operative Takeback	1.98%	3.55%	0.474

1339737 – Seasonal Variation in Surgical Site Infection After Mastectomy

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Background/Objective: The incidence of surgical site infections (SSI) for clean operations is about 3%. Breast surgery is considered to have low morbidity and mortality. It is not established whether seasonal variation affects surgical site infections after breast operation as it does for some other operations. This study seeks to address this question.

Methods: The American College of Surgeons National Quality Improvement Program (ACS NSQIP) database was searched for all patients who underwent mastectomy for breast cancer with or without lymph node biopsy or dissection between 2008–2018. Patients were stratified by quarter of admission, the incidence of surgical site infection (SSI), other major complications, and unplanned readmission.

Results: A total of 50,384 patients had mastectomy with or without lymph node dissection for breast cancer in the study period. There were 11,905 operations in the first quarter, 11,158 in the second quarter, 11,456 in the third quarter and 11,442 in the fourth quarter of the year. The average rate for SSI was 2%, which did not vary by season. Other major complications or unplanned readmission were also stable throughout the year. The major complication rate including SSI was 6.4% . Average length of stay was 1.5 days, which also remained stable throughout the year. There were no significant differences in age, race, BMI, or smoking status between seasons. There were no significant differences in the mean operative time, use of general anesthesia, length of hospital stay, ASA class, functional status, co-morbidity incidence, discharge destination or status as elective surgery across the quarters.

Conclusions: Mastectomy and sentinel node biopsy is indeed an operation with low risk for surgical site infections. In this retrospective review over a 10-year period, there was no seasonal variation in the incidence of SSI following mastectomy and its variations. To date, this may be the first study to describe the lack of a seasonal effect on SSI for breast operations. It is hoped this will give reassurance to patients who are considering the timing of procedures in the future.

Table. Medical and surgical complications of 50,384 patients who underwent mastectomy or lymph node dissection for breast cancer stratified by quarter of admission

Variable	1st Quarter N (%)	2nd Quarter N (%)	3rd Quarter N (%)	4th Quarter N (%)	p-value
Major complications	808 (6.23)	785 (6.40)	867 (6.87)	770 (6.15)	0.084
Superficial surgical site infection	282 (2.17)	309 (2.52)	329 (2.61)	292 (2.33)	0.107
Deep incisional surgical site infection	99 (0.76)	97 (0.79)	116 (0.92)	89 (0.71)	0.287
Wound disruption	62 (0.48)	71 (0.58)	70 (0.55)	59 (0.47)	0.546
Medical complications					
Acute renal failure	2 (0.02)	4 (0.03)	2 (0.02)	9 (0.07)	0.048
Bleeding requiring transfusion	196 (1.51)	169 (1.38)	179 (1.42)	176 (1.41)	0.821
Sepsis	46 (0.35)	57 (0.46)	65 (0.52)	58 (0.46)	0.268
Reoperation (2012-2018)	376 (4.42)	350 (4.32)	384 (4.57)	315 (3.86)	0.126

1387936 - Low Complication Rates of Ambulatory Mastectomy: Follow-up Results to a Previously Reported Ambulatory Mastectomy Program

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Background/Objective: In 2019, we reported the results of a small series of 19 patients who underwent ambulatory mastectomy using a protocol devised by a multidisciplinary team. We defined ambulatory mastectomy as mastectomy with day of surgery discharge. The aim of this study is to evaluate the complication rates of ambulatory mastectomies in a larger patient cohort.

Methods: An ambulatory mastectomy clinical protocol was developed by a multidisciplinary team in 2018. Patients with significant medical co-morbidities or expected lengthy procedural times were not eligible. We conducted a retrospective analysis of outcomes of patients who underwent intended ambulatory mastectomy between January 2018 and March 2022.

Results: Three hundred forty-five patients underwent ambulatory mastectomy. The majority of patients were discharged on the day of surgery (n=321, 93%). Our average post anesthesia care unit (PACU) time was 3.6 hours. Twenty-four patients (6.9%) were admitted for overnight observation. The most common reasons for overnight observation were bleeding (n=8, 2.4%), severe pain (n=4; 1.2%), and severe nausea (n=3; 0.8%). Four (1.1%) patients required a hematoma evacuation on post-operative day (POD) 0. This was recognized by 2-6 hours of recovery time. There were 2 patients who were clinically symptomatic with concerns for possible bleeding who were admitted overnight requiring a hematoma evacuation on POD 1 (0.6%). The overall 30-day complication rate was 6.0% (n=21). The most common complications were hematoma (3.0%; n=10) and mastectomy flap ischemia (1.8%, n=6). There were 2 (0.6%) readmissions or emergency room visits within the 30-day post-operative period for a wound infection requiring incision and drainage POD 19 and cellulitis POD 2.

Conclusions: Ambulatory mastectomy is a safe and viable option for patients who require mastectomy with proper patient selection, institutional guidelines with defined protocols, and patient buy-in. Our 4-year patient cohort had a low incidence of return to the operating room and need for readmission. Based on these findings, patients undergoing ambulatory mastectomy should be observed for 5-6 hours to assure clinically significant post-operative bleeding requiring a return to the OR does not occur.

Table. Ambulatory mastectomy outcomes

	N	%
Discharge on day of surgery	321	93.0
Admission for overnight observation	24	6.9
Reason for overnight observation		
Post-operative bleeding	8	1.5
Hematoma evacuation on POD 0	3	0.9
Hematoma evacuation on POD 1	2	0.6
Intraoperative instability (supraventricular tachycardia)	1	0.3
Severe nausea	3	0.9
Severe pain	4	1.2
Severe weather event	1	0.3
Late surgical time	2	0.6
Urinary retention	3	0.9
Tachycardia	2	0.6
Complication types by post-operative day 30		
No complications	324	94.0
Complications	21	6.0
30 day re-admission	2	0.6
Complication type		
Post-operative bleeding	10	3.0
Hematoma evacuation on POD 0/1	6	1.8
Mastectomy flap ischemia	6	1.8
Mild ischemia	4	1.2
Severe intraoperative ischemia leading to delayed reconstruction	2	0.6
NAC superficial epidermolysis	2	0.6
Wound dehiscence	1	0.3
Wound infection	2	0.6

CPM

1386147 - Race-based Differences in Satisfaction and Well-being After Contralateral Prophylactic Mastectomy

Sara Myers[1], Solange Bayard[2], Audree Tadros[1], Varadan Sevilimedu[1], Jonas Nelson[1], Tiana Le[1], Paula Garcia[1], Monica Morrow[1], Minna Lee[1]

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Background/Objective: Bilateral mastectomy for treatment of unilateral breast cancer has increased. As little is known regarding racial differences in quality of life (QOL) after contralateral prophylactic mastectomy (CPM), we utilized the validated BREAST-Q patient reported outcome (PRO) measure to characterize associations between race, and post-operative satisfaction and well-being.

Methods: Patients with Stage I-III unilateral breast cancer receiving mastectomy with immediate reconstruction at our institution between 2016-2022 were eligible. BRCA1/2 mutation carriers were excluded. BREAST-Q surveys, administered pre-operatively and post-operatively at 6 months, 1 year, 2 years, and 3 years as part of routine care, were used to assess QOL. Response rates ranged from 24-66%. We assessed whether the relationship between race, and the domains of satisfaction with breasts and psychosocial well-being (both scored from 0-100) differed by receipt of CPM or unilateral mastectomy. The association between race and satisfaction with breasts and psychosocial well-being for women who received CPM was then evaluated adjusting for pre-operative scores and predetermined confounders using general estimating equations for longitudinal data.

Results: Of 3334 women included, 70% identified as white (4.6% Hispanic), 10% identified as Black (0.6% Hispanic), 11% identified as Asian, and 9% declined to answer. Overall, 2040 (61%) underwent unilateral mastectomy, and 1294 (39%) received bilateral mastectomy. Forty-three percent of White women, 27% of Black women, and 26% of Asian women chose CPM ($p<0.001$). Compared to White and Asian patients who received CPM, Black patients who underwent CPM were more likely to have higher BMI ($p<0.001$), have autologous reconstruction ($p=0.006$), and receive postmastectomy radiation (PMRT) ($p<0.001$) (Table). There was no association between race and the domains of satisfaction with breasts or psychological well-being for patients who received unilateral ($p>0.9$ and $p>0.9$, respectively) or bilateral mastectomy ($p=0.8$ and $p=0.9$, respectively). Among patients undergoing bilateral mastectomy, when controlling for relevant clinical and treatment factors, there were no race-based differences in satisfaction ($p=0.8$) or psychological well-being ($p=0.5$). In multivariable analyses, PMRT was negatively associated with both satisfaction with breasts (coefficient -11, 95% confidence interval [CI] -15, -7.2, $p<0.001$) and psychological well-being (coefficient -5.8, 95% CI -9.9, -1.6, $p=0.007$), and a previous history of anxiety or depression was associated with lower psychological well-being scores after CPM (coefficient -6.8, 95% CI -11, -2.6, $p=0.002$).

Conclusions: In this cohort of patients undergoing mastectomy for unilateral breast cancer, Black and Asian women chose CPM less frequently than White women. Differences in satisfaction with breasts and psychological well-being at 3-year follow-up were not associated with race, but rather, treatment

variables, particularly the receipt of PMRT. Further investigations with a larger and more diverse population are needed to validate these findings.

Table. Clinical and treatment characteristics

	CPM only						
	White (n=1002)	Black (n=94)	Asian (n=90)	p	CPM (n=1294)	Unilateral (n=2040)	p
Age, years, median (IQR)	48 (42, 54)	48 (41, 54)	48 (41, 54)	0.074	47 (41, 54)	52 (45, 61)	<0.001
Race, n (%)							
White					1002 (77.4%)	1322 (64.8%)	
Black					94 (7.3%)	249 (12.2%)	
Asian					90 (7%)	262 (12.8%)	
Unknown/other					108	207	
Ethnicity, n (%)							<0.001
White non-Hispanic					932 (72%)	1156 (56.7%)	
White Hispanic					52 (4%)	102 (5%)	
Black non-Hispanic					89 (6.9%)	218 (10.7%)	
Black Hispanic					3 (0.2%)	17 (0.8%)	
Other/unknown					218 (16.8%)	547 (26.9%)	
BMI, median (IQR)	25.3 (22, 29)	29.2 (25.1, 32)	23.3 (20.8, 26.6)	<0.001	25.4 (22, 29.2)	26 (22.9, 30.1)	<0.001
Marital status, n (%)							<0.001
Married/partnered	793 (79%)	43 (45.7%)	67 (74.4%)		972 (75.1%)	1393 (68.3%)	
Divorced/separated/widowed	76 (7.6%)	16 (17%)	4 (4.4%)		104 (8%)	225 (11%)	
Single	129 (12.9%)	35 (37.2%)	19 (21.1%)		210 (16.2%)	406 (19.9%)	
Unknown	4	0	0		8	16	
Smoking status, n (%)				0.003			0.7
Current smoker	41 (4%)	2 (2.1%)	0		48 (3.7%)	89 (4.4%)	
Former smoker	264 (26.3%)	15 (16%)	17 (18.9%)		323 (25%)	512 (25.1%)	
Non-smoker	610 (60.9%)	73 (77.7%)	70 (77.8%)		821 (63.4%)	1293 (63.4%)	
Unknown	87	4	3		102	146	
History of anxiety or depression, n (%)	119 (11.9%)	4 (4.2%)	2 (2.2%)	0.002	132 (10.2%)	202 (9.9%)	0.8
Reconstruction, n (%)				0.006			<0.001
Free flap	169 (16.9%)	28 (30.9%)	15 (16.7%)		233 (18%)	652 (32%)	
Tissue expander/implant	832 (83%)	65 (69.1%)	75 (83.3%)		1058 (81.8%)	1388 (68%)	
Unknown	1	1	0		3	0	
Stage, n (%)				0.017			<0.001
0	191 (19%)	15 (16%)	17 (18.8%)		238 (18.4%)	391 (19.2%)	
1	393 (39.2%)	26 (27.7%)	32 (35.6%)		495 (38.3%)	675 (33%)	
2	265 (26.4%)	30 (31.9%)	28 (31.1%)		356 (27.5%)	673 (33%)	
3	45 (4.5%)	12 (12.8%)	3 (3.3%)		66 (5.1%)	143 (7%)	
Unknown/other	108	11	10		139	158	
Postmastectomy radiation, n (%)	247 (24.7%)	43 (45.7%)	21 (23.3%)	<0.001	347 (26.8%)	623 (30.5%)	0.021
Adjuvant chemotherapy, n (%)	411 (41%)	45 (47.9%)	37 (41.1%)	0.4	545 (42.1%)	773 (37.9%)	0.015
Adjuvant endocrine therapy, n (%)	676 (6.6%)	64 (68%)	56 (62.2%)	0.6	869 (67.2%)	1474 (72.3%)	0.001

Abbreviations: IQR, interquartile range; BMI, body mass index

1387823 - Radiologic and Pathological Concordance: A Comparison of Patients Undergoing Risk-reduction Mastectomy

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Background/Objective: The aim of this study was to examine the concordance between pre-operative breast imaging and final surgical pathology for women having bilateral prophylactic mastectomy (BPM) for risk reduction versus women with unilateral breast cancer electing to have contralateral prophylactic mastectomy (CPM).

Methods: We performed a retrospective cohort study of women having BPM for risk reduction and women with unilateral Stage 0-III breast cancer choosing to have CPM at our urban, academic center between 2015 and 2021. Surgical indications (e.g., elevated lifetime breast cancer risk, breast cancer),

demographic information, surgical details (e.g., sentinel lymph node biopsy [SLNB]), imaging (mammogram, ultrasound, MRI), and pathologic data were collected. We performed a descriptive analysis to examine the 2 cohorts.

Results: A total of 127 women (mean age 40.3) underwent BPM for risk reduction (100 for a pathogenic variant, 26 for a strong family history of breast cancer, 1 for previous mantle radiation), while 84 women (mean age 44.7) with unilateral breast cancer (20 ductal carcinoma in situ (DCIS), 64 invasive breast cancer) chose to have a CPM. Among the risk-reduction group, 2 patients had disease (2 DCIS of low volume (<1cm extent), 0 invasive breast cancer), 3 had atypical ductal hyperplasia (ADH), and 11 (9%) had lobular neoplasia (10 atypical lobular hyperplasia (ALH), 1 lobular carcinoma in situ) on final pathology. These 16 patients were assessed with pre-operative mammogram and MRI within a mean of 5.6 months before surgery. Four patients received a subsequent targeted ultrasound, of whom 2 underwent biopsy revealing fibroadenoma and atypia with final diagnoses of ALH. The 1 patient with a pre-operative diagnosis of atypia received a unilateral SLNB. The patients with ADH or DCIS had no suspicious findings on pre-operative imaging (BI-RADS 1-3). Two patients with suspicious pre-operative imaging (BI-RADS4), 1 having the biopsy showing atypia, were found to have LCIS and ALH, respectively. Among the CPM group, 3 patients were found to have DCIS also of low volume, 3 had ADH, 0 invasive breast cancer, and ten patients (12%) had lobular neoplasia (all ALH). Two DCIS patients had suspicious pre-operative imaging with negative pre-operative biopsy. All 3 ADH patients had suspicious findings on pre-operative imaging, of whom 2 had a pre-operative biopsy showing atypia and received SLNB. Of the ten patients with ALH, 1 had suspicious pre-operative imaging with a benign biopsy and received a SLNB, and a second patient had a SLNB at their request.

Conclusions: In women undergoing bilateral prophylactic mastectomy for risk reduction and women with unilateral breast cancer having a contralateral prophylactic mastectomy, we observed no invasive breast cancers on final pathology of the prophylactic breast. If present, disease was low-volume DCIS, and the most common finding was atypia (ADH/ALH). While numbers are small, it is interesting that pre-operative imaging did not identify disease in the BPM group, whereas suspicious imaging findings were seen in the CPM group with disease. Our data support the omission of routine SLNB during prophylactic mastectomy, particularly for patients undergoing purely risk-reduction bilateral mastectomy and mammogram/MRI performed within 6 months.

1388237 - The Partners' Perspective in Contralateral Prophylactic Mastectomy Decision-making

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Background/Objective: The rate of contralateral prophylactic mastectomy (CPM) continues to rise despite no improvement in survival, an increased risk of surgical complications, and negative effects on body image and quality of life. The aim of this study was to explore the experiences of the partners of women who undergo CPM and their role in the surgical decision-making process.

Methods: This study was part of an investigation into the factors motivating women with early-stage unilateral breast cancer and low genetic risk to opt for CPM. Participating women were asked for permission to invite their partners to take part in interviews about their own experiences. In-depth interviews with partners were conducted using a semi-structured topic guide developed by the study team. We conducted a thematic analysis of the data. To our knowledge, there are no studies exploring partners' perceptions and roles in surgical decision-making.

Results: Thirty-five of the 45 women interviewed for the original study were partnered. Fifteen of their partners, all of whom were men, agreed to be interviewed. Most partners perceived their role to be strong and logical while suppressing their own emotions and keeping appointments focused on curing the cancer. Most had independently researched treatment options. Some partners inwardly hoped their wives would choose a bilateral mastectomy to minimize the risk of perceived recurrence. However, all felt strongly that the final decision was up to their partners. While the women said that peace of mind was a primary factor in their decision-making and acknowledged that their risk of recurrence was low, their partners more often framed the decision for CPM as one of life versus recurrence or death. Thus, while the women reported an unexpected disappointment with their reconstructed breasts, their partners were simply happy their wives were alive, and the aesthetic effects of CPM were negligible by comparison. Some men expressed a preference for their partners' pre-surgical breasts but felt their partners' bodies had betrayed them, which allowed them to be content with the reconstructed breasts. This theme of betrayal was echoed by the women interviewed. In the early recovery period, some partners noted the stress of managing housework, meal preparation, and childcare.

Conclusions: The experiences of male partners of women who undergo CPM provide insight into how couples navigate complex treatment decision-making, both together and separately. While both men and women prioritized minimizing any risk of recurrence, male partners did not freely express these preferences, and universally deferred to their partners to make the final surgical decision. As highlighted by the men's mischaracterization of CPM decision-making as life or death, there may be a benefit to including partners in pre-surgical and post-surgical counseling to mitigate any miscommunication regarding the expected oncologic and surgical outcomes related to recovery and survivorship.

1329034 - Contralateral Prophylactic Mastectomy in a Rural Population: A Single-institution Experience

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Background/Objective: The rate of contralateral prophylactic mastectomy (CPM) for unilateral breast cancer has increased significantly over the last 20 years. This is despite evidence that CPM provides no survival benefit except in specific populations at the highest risk for developing contralateral breast cancer and is associated with higher rates of complications. Studies have suggested there may be elevated rates of CPM in rural populations, but reasons behind this are unclear. A previous study that had been performed at our institution found that 22% of patients with unilateral breast cancer chose to undergo bilateral mastectomy (BLM) from 2000-2009. The aims of this study were to evaluate the trend of bilateral mastectomy at a single institution serving a largely rural population and identify factors that may be contributing to CPM. We hypothesized that the rate of CPM will have increased since our last study period, specifically among younger patients and those seeking breast reconstruction, and would have a higher rate of complications than those that underwent unilateral mastectomy (ULM) alone.

Methods: A retrospective review of patients who underwent mastectomy at our institution from 2017-2021 was performed, utilizing our prospectively enrolled tumor registry database. Patients with incomplete records were excluded. Statistical analysis utilized frequencies and percentages, descriptive statistics, chi-square analysis, and independent sample t-tests.

Results: Four hundred seventy-three patients were included, with 64.27% of patients undergoing BLM. Of the BLM patients, 20.7% had clinically significant genetic mutations, 18.8% had a family member with breast cancer diagnosed under the age of 50 years, and 7.2% had bilateral breast cancer. Patients who underwent BLM were significantly younger, more likely to have undergone genetic testing, have a family history of breast cancer, have smaller tumors (<T2), and undergo reconstruction, when compared to unilateral mastectomy alone (Table). The rate of patients with genetic variants of unknown significance was 26.4% in both groups. The BLM group had a higher rate of overall complications, wound complications, revisions after reconstruction, and removal of implants (Table). The rate of CPM was calculated by excluding patients with known risk-factors for developing contralateral breast cancer and was found to be 46.71%.

Conclusions: The results of this study suggest that patients are increasingly choosing to undergo bilateral mastectomy for the treatment of unilateral breast cancer, with the rate of CPM doubling over the past decade at a single institution serving a largely rural population. This is despite the diagnosis of small tumors in younger patients and the absence of high-risk factors for the development of contralateral breast cancer. Similar to published literature, those that undergo CPM are more likely to undergo reconstruction and have a higher rate of complications. Identifying the characteristics of patients choosing CPM in a largely rural population and the increased risks they face allows for a better

understanding of this trend to guide conversations with patients on their goals of surgical breast cancer management.

Table. Comparison of bilateral and unilateral mastectomy patients

	Bilateral Mastectomy (N=304)	Unilateral Mastectomy (N=169)	*p*-value
Age at diagnosis[a]	55.6 (12.2)	65.8 (11.6)	**<0.001**
Age of diagnosis ≤45 years	58 (19.1%)	7 (4.1%)	**<0.001**
Tumor size			
<T2	193 (63.5%)	89 (52.7%)	
≥T2	111 (36.5%)	80 (47.3%)	**0.02**
Genetic testing	178 (58.6%)	53 (31.4%)	**<0.001**
BRCA1+	9 (3.0%)	2 (1.2%)	**<0.001**
BRCA2+	14 (4.6%)	6 (3.6%)	**<0.001**
Other clinically significant genetic mutations	40 (13.2%)	7 (4.1%)	**<0.001**
Variants of unknown significance	47 (26.4%)	14 (26.4%)	1.0
Total clinically significant mutations	63 (20.7%)	15 (8.9%)	**<0.001**
Family history of breast cancer	191 (64.3%)	79 (47.9%)	**<0.001**
Family history of breast cancer under age 50 years	57 (18.8%)	14 (8.3%)	**0.002**
Family history of breast cancer over age 50 years	174 (57.2%)	69 (40.8%)	**<0.001**
Number of relatives with breast cancer*	1.22 (0,2)	0.68 (0,1)	**<0.001**
Number of relatives with breast cancer under age 50 years*	0.23 (0,0)	0.09 (0,0)	**0.002**
Number of relatives with breast cancer over age 50 years*	0.99 (0,2)	0.59 (0,1)	**<0.001**
Reconstruction performed	188 (61.8%)	55 (32.5%)	**<0.001**
Revision after reconstruction	90 (29.6%)	20 (11.8%)	**<0.001**
Implant removal	35 (11.5%)	6 (3.6%)	**<0.001**
Any complication	112 (36.8%)	47 (27.8%)	**0.046**
Wound infection	26 (8.6%)	6 (3.6%)	**0.04**
Wound dehiscence	35 (11.5%)	10 (5.9%)	**0.047**
Disease status at last follow-up			
No evidence of disease	294 (96.7%)	160 (94.7%)	
Ongoing treatment	4 (1.3%)	1 (0.6%)	
Recurrence	6 (2.0%)	8 (4.7%)	0.18

Notes. [a]Reported as averages (standard-deviation).

*Outcomes were obtained using Independent-Samples Mann-Whitney U Test; outcomes are reported as mean (interquartile ranges of 25%, and 75%).

Bold indicates $p < 0.05$, statistically significant.

DCIS

1369778 - Supraparamagnetic Iron Oxide (Magtrace®) for Axillary Mapping in Patients with Ductal Carcinoma In Situ Undergoing Mastectomy: Single-institution Experience

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Background/Objective: Background axillary management of patients with a diagnosis of DCIS who wish to undergo mastectomy is in need of refinement. Current guidelines recommend upfront sentinel lymph node biopsy during the index operation due to the potential of upstaging to invasive cancer on final pathology. More recent evidence suggests that the use of supraparamagnetic iron oxide dye (Magtrace®) can prevent unnecessary axillary surgery in this patient population, while offering the opportunity for delayed sentinel lymph node biopsy in the event of tumor upstage to invasive cancer. There are limited data regarding the use of Magtrace® outside of clinical trials. This study outlines a single institution's 12-month experience using Magtrace® for axillary mapping in patients undergoing mastectomy for DCIS.

Methods: This is a retrospective, single-institution, cross-sectional study. All medical records of patients who underwent mastectomy for a diagnosis of DCIS from August 2021 to July 2022 were reviewed. All patients who had Magtrace® injected at the time of the index mastectomy were included in the study. Descriptive statistics of demographics, clinical information, pathology results, and interval sentinel lymph node biopsy were performed.

Results: A total of 31 participants underwent 35 mastectomies for DCIS. The median age of the participants was 61 years (IQR=16; range 25 to 73 years), and the majority of participants were female (96.8%). The most common indication for mastectomy was patient choice (42.9%) followed by diffuse extent of disease (28.6%). On final pathology, 68.6% (24/35) of mastectomy specimens had DCIS without any type of invasion, 20% (7/35) had invasive cancer, and 11.4% (4/35) microinvasive disease. Of the 7 cases with upgrade to invasive disease, 2 (28.6%) of them underwent interval sentinel lymph node biopsy. Each case was reviewed to discuss the role of sentinel node biopsy in the patient's treatment. For the 2 patients who underwent interval SLNB, Magtrace® signal was easily detected on the skin surface in 1 patient and in the axilla in both patients. For the remaining 5 patients who did not undergo interval SLNB, 4 of them met the criteria for the American Board of Internal Medicine (ABIM) Choosing Wisely recommendations. The last patient was reviewed at a multidisciplinary tumor board and was considered low risk based on her age and tumor biology (Table).

Conclusions: The use of supraparamagnetic iron oxide dye can prevent unnecessary axillary surgery in patients with DCIS undergoing mastectomy. Most patients operated on for DCIS did not have invasive disease. In most of those who did have invasive or microinvasive disease, the addition of sentinel node biopsy was not a factor in adjuvant decision-making. The use of Magtrace® and delayed sentinel node biopsy affords the opportunity to avoid unnecessary axillary surgery and is a valuable step forward in

axillary management. More data will be beneficial to evaluate the adoption, use, and performance of this new technology outside of a clinical trial setting.

Table. Characteristics of patients with incidental invasive breast cancer in mastectomy specimen

	Sentinel Node Biopsy	No Sentinel Node Biopsy
Number of Cases	2	5
Age/Age Range	42 & 59	69-73
Hormone Receptor Status	1Triple Negative and 1ER+/HER2-	All ER+/HER2-
Average Tumor Size in mm (range)	5 (3-7)	3.6 (2.5-4.5)
Decision process	Multidisciplinary Tumor Board	Choosing Wisely Recommendation*

**One patient aged 69 years with ER+/PR+/HER2- was discussed at multidisciplinary tumor board and considered low risk for lymph node metastasis*
ER: estrogen receptor
PR: progesterone receptor
HER2: human epidermal growth factor 2

1384306 - Hormonal Receptor Discordance Between Primary Ductal Carcinoma In Situ and Subsequent Recurrences

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Background/Objective: Ductal carcinoma in situ (DCIS) is a heterogenous disease that can be classified into different molecular subtypes according to estrogen receptor (ER) and progesterone receptor (PR). In invasive breast cancer, there are significant discrepancy rates of ER, PR, and HER2 status between primary and recurrent tumors, and hormone receptor loss is associated with worse overall survival. Hormone receptor discordance between primary DCIS and recurrence has not been thoroughly investigated.

Methods: Patients in a community academic health system diagnosed with DCIS from January 2011 to December 2021 were identified. An IRB-approved retrospective chart review was performed. Pathology was reviewed to determine ER and PR status of both primary DCIS and recurrences. All patients had DCIS initially with no evidence of invasive component. Patients were grouped by recurrence type and ER and

PR discordance was compared. Effect of radiation therapy, hormone therapy, and menopause status on ER and PR discordance was analyzed. All comparisons were made with 2 sample t-tests for continuous variables and chi-square or Fisher's test for categorical variables.

Results: A total of 917 patients were diagnosed with DCIS, 40 patients (4.4%) had recurrences of either DCIS or invasive breast cancer. Four patients were excluded due to lack of ER status. Mean age at diagnosis was 57.9 years, 77.8% were initially ER+, 63.9 were initially PR+. Mean time to recurrence was 4.9 years. Twenty-one (58.3%) had a recurrence of DCIS, 10 (27.8%) had recurrence of Stage I invasive cancer, 2 (5.6%) had recurrence of Stage II invasive cancer, and 3 (8.3%) had metastatic disease recurrence. Patients were grouped according to type of recurrence; DCIS, Stage I-III, and Stage IV. The prevalence of ER and PR discordance was 33.3% and 47.2%, respectively. There was no significant difference in ER discordance between groups (p=0.424); however, there was a trend in differences in PR discordances (p=0.205). There was a more significant trend in PR receptor discordance when comparing DCIS and any invasive cancer recurrence (p=0.194). Of patients with discordances, 58.3% were primary ER+ with conversion to ER- relapse, and 52.3% were primary PR+ with conversion to PR-. There was no significant association between radiation therapy, hormone therapy, or menopause and ER or PR discordances (p=0.172, 0.968, and 0.885 respectively).

Conclusions: ER discordance was 33.3%, and PR discordance was 47.2%. There was no statistically significant association between ER or PR discordance and different types of recurrences, though there was a trend toward an association between PR discordance and invasive breast cancer recurrence. It is important to note that despite close follow-up, 41.7% of patients had invasive cancer recurrence, and 8.3% had metastatic disease. Further studies are indicated to evaluate the impact of biomarkers, such as PR discordance, after primary DCIS to understand potential prognostic and treatment implications.

Table. Comparison of ER and PR discordance rates between types of recurrences after initial diagnosis of DCIS

Primary/Relapse n (%)	DCIS/DCIS n = 21	DCIS/Stage 1-3 n = 12	DCIS/Stage 4 n = 3	Total n = 36	p
ER Discordance	8 (38.1%)	4 (33.3%)	0 (0)	12 (33.3%)	0.424
ER Status primary tumor/relapse					
Primary pos/relapse pos	11 (52.4%)	7 (58.3%)	3 (100%)	21 (58.3%)	
Primary pos/relapse neg	6 (28.6%)	1 (8.3%)	0 (0)	7 (19.4%)	
Primary neg/relapse pos	2 (9.5%)	3 (25.0%)	0 (0)	5 (13.9%)	
Primary neg/relapse neg	2 (9.5%)	1 (8.3%)	0 (0)	3 (8.3%)	
PR Discordance	8 (38.1%)	7 (58.35)	2 (66.7%)	17 (47.2%)	0.24
PR Status primary tumor/relapse					
Primary pos/relapse pos	10 (47.6%)	4 (33.3%)	0 (0)	14 (38.9%)	
Primary pos/relapse neg	6 (28.6%)	3 (25.0%)	0 (0)	9 (25%)	
Primary neg/relapse pos	2 (9.5%)	4 (33.3%)	2 (66.7%)	8 (22.2%)	
Primary neg/relapse neg	3 (14.3%)	1 (8.3%)	1 (33.3%)	5 (13.9%)	
Any Discordance					0.739
No	11 (52.4%)	5 (41.7%)	1 (33.3%)	17 (47.2%)	
Yes	10 (47.6%)	7 (58.3%)	2 (66.7%)	19 (52.8%)	

1388175 - A Comparative Analysis of Changes in Treatment Recommendation for Black and White Patients with Ductal Carcinoma In Situ Using a 7-gene Predictive Biosignature: Analysis of the PREDICT Study

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Background/Objective: Previous studies have demonstrated that compared with White women, Black women are more likely to have second tumors (invasive and noninvasive) in either breast and die of IBC after DCIS. Although multiple studies have presented results on the treatment of invasive breast cancer, there are very few studies examining the impact of race/ethnicity on the treatment of DCIS. Thus, there is a need to further determine whether biologic or clinicopathologic factors are associated with the recommendation of therapy in patients from different races/ethnicities in DCIS. In this study, we evaluated the decision impact for RT recommendations incorporating the 7-gene predictive biosignature by race (White vs. Black) in women with DCIS enrolled in the PREDICT study.

Methods: The PREDICT study was a prospective, multi-institutional registry for patients who received DCISionRT testing as part of their routine care. The registry included females, age 26 and older who were diagnosed with DCIS and were candidates for BCS and eligible for adjuvant RT or systemic therapy. Treating physicians completed treatment recommendation forms before and after receiving test reports to capture surgical, radiation, and endocrine therapy treatment (HT) recommendations and patient preferences. The primary endpoint was to identify the proportion of patients where testing led to a change in RT recommendation. Additional analyses included changes in recommendations in patient subgroups based on race/ethnicity. Changes in RT recommendation were analyzed by the McNemar test.

Results: Analysis was performed in 2,308 patients treated at 63 clinical sites. Overall, 80% of the patients were, and 12% patients were Black. No significant differences were observed in the distribution of Black and White in clinicopathological factors, where the median age was 63 in Whites and 62 in Black people, with 34% of Whites and 28% of Black people having nuclear grade 3. Overall RT recommendations were changed significantly in 39% and 37% of White ($p<.001$) and Black patients ($p=0.003$), respectively. Pre-test the rates of RT recommendation were not different between the Black and White patients ($p=.8$). Post-testing there was a significant difference in the net change of RT recommendation in Black ($p=.01$) and White ($p<0.001$) patients, where Black patients had a 10% higher rate of RT recommendation when compared with White patients ($p=0.004$). Furthermore, 33% of the Black women and 41% of White women who were recommended to receive RT pre-testing were not recommended to receive RT post-testing ($p=0.10$). In addition, 46% of Black women who were initially not recommended to receive RT pre-testing were recommended to receive RT post-testing in contrast to

33% of White women (p=.04). In contrast, there were no significant differences observed in proportion in the DS groups 0-2, 2-4 and >4 by Black vs White (p=.7).

Conclusions: This analysis demonstrates significant changes in recommendations to add or omit RT based on the 7-gene predictive biosignature in 2,308 patients. Black patients had significantly higher rates of RT recommendation compared to White women with similar biosignature scores, suggesting that clinicians may be influenced by prior reports of greater risk in the Black population.

Table. Impact of the 7-gene predictive biosignature on adjuvant radiation recommended by Black or White race

		RT Recommended			Pre- to post-test change in RT recommended		Total change in RT Recommended	
Clinical factor	**Patients (n)**	**Pre-test (%)**	**Post-test (%)**	**Net change (%)**	**Yes to no (%)**	**No to yes (%)**	**Overall change (%)**	**p-Value**
All Cases								
White	1853	71%	51%	-20%	41%	33%	39%	<0.001
Black	264	72%	61%	-11%	33%	46%	37%	0.003
DS 0-2								
White	910	72%	29%	-43%	64%	10%	49%	<0.001
Black	130	77%	39%	-38%	53%	13%	44%	<0.001
DS 2-4								
White	660	65%	66%	1%	25%	50%	34%	0.74
Black	89	66%	75%	9%	17%	60%	31%	0.13
DS > 4								
White	283	80%	89%	9%	7%	73%	20%	0.001
Black	45	69%	96%	27%	0%	86%	27%	0.001

Disparities

1385160 - Overcoming Barriers and Improving Access to Care: Lessons Learned from 6 Years of Patient Navigation

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Background/Objective: Limited access to care, socioeconomic factors, and bias in cancer care delivery have been implicated in racial and ethnic disparities in breast cancer outcomes. Patient navigation programs have emerged as a strategy to overcome barriers to access to care among patients from medically underserved communities. This study evaluates 6-year findings and outcomes of a robust breast health outreach and navigation program in New York City and identifies specific interventions to successfully reach patients from underserved communities and guide them through the entire continuum of breast care including screening, breast cancer treatment, clinical trial participation, and survivorship.

Methods: Culturally competent patient navigators work both within the hospital setting as well as within communities in the greater New York Metropolitan area in partnership with community-based organizations and health clinics to reach women with limited access to care and provide diagnostic services and treatment at no cost to qualified patients. Qualifications include New York state residency, lack of adequate insurance, income requirement, and age ≥40, or <40 and at increased risk of breast cancer or have a breast concern. The program performs internal outreach within the hospital system and external outreach directly to communities. Both on-site and off-site screening and treatment are offered to improve access, and dedicated clinical trial coordinators determine eligibility for clinical trials. Genetic counseling is also provided including a telehealth option. Transportation, childcare, and other support services are provided to reduce barriers to care. Breast cancer-specific templates within the electronic medical records allow navigators to document their encounters and barrier assessments as well as to track resource allocation and health outcomes.

Results: At the end of 6 years, the program provided 19,979 patients with breast health education and enrolled 3,370 patients in navigation (Table). A total of 1,863 women were navigated to a breast health appointment, and 56 were diagnosed with breast cancer through the program. The engagement rate improved over time, with only 10% engagement in year 1 and 57% engagement in year 6. Most women in the program are Hispanic (48%) or Black (43%). The program enrolled 289 breast cancer patients and accrued 22 to clinical trials. Transportation concerns were the most commonly cited barrier among program participants, with 52.8% of patients reporting missed doctor visits due to lack of transportation. Needing assistance with reading materials was also frequently reported (33.3%), as well as inadequate income (22.8%), and unstable housing (22.2%).

Conclusions: Patient navigation programs improve access to care among patients from medically underserved communities through direct engagement and providing resources to address barriers to

care. Through both internal and external outreach as well as partnership with community organizations and clinics, navigation programs can maximize patient recruitment and breadth of support services to help women with breast cancer receive comprehensive care. Programs should assess the unique barriers to care within their communities to tailor support services and track program outcomes to identify areas for improvement.

Table. 6-year program outcomes

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	6-Year Total
Provided breast health education	3,976	7,976	3,610	2,224	1,274	919	19,979
Enrolled in navigation	383	433	621	760	549	521	3,370
Engagement rate	10%	5%	17%	34%	43%	57%	17%
Navigated to breast health appointment	123	184	312	386	305	375	1,863
Diagnosed through program	4	3	4	8	26	11	56
Newly enrolled navigated breast cancer patients	22	38	26	59	87	57	289
Clinical trial accruals	2	6	3	6	5	0	22

1385649 - Breast Cancer Challenges and Opportunities for Advocacy in Southern Ethiopia: A Qualitative Study

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Background/Objective: Breast cancer mortality worldwide is highest in sub-Saharan Africa, though an estimated one-third of deaths in the next decade are preventable with earlier detection and improved treatment. Advocacy groups and patient advocates have influenced research, public policy, and cultural awareness about the disease and treatment, yet there has been limited mobilization in many areas of sub-Saharan Africa, including Ethiopia. We sought to explore opportunities for advocacy work in Hawassa (southern Ethiopia) where the majority of patients with breast cancer (BC) present with late-stage disease and interventions to improve outcomes are needed.

Methods: Twenty-five participants from 4 local districts ("kebeles") in Hawassa city were selected as possible key contributors to future advocacy work. A phenomenological qualitative study design was

used. Semi-structured in-depth interviews were held for 2 clinicians, 2 local health bureau managers, 2 media managers, and 3 religious leaders. Two focus group discussions were conducted: one included 7 BC patients and the other group consisted of 2 health extension workers (HEW), 3 members of the "women's development army" (WDA), 2 community leaders in health issues, 1 kebele leader, and 1 traditional healer. Transcripts of audio recordings were coded using Atlas ti software, and analysis was performed for thematic content.

Results: Our study was the first time most participants had assembled to discuss challenges related to BC and opportunities to effect change. Many participants referred to patients as "victims" and BC as a "killer disease" or "curse." The perceptions of prognosis and treatment were more favorable among patients, health care providers, and religious leaders than other participants with less exposure to medical care for BC. Five dominant themes emerged: lack of funding and political commitment to prioritize BC on the health care agenda; community preferences for traditional medicine and religious practice over standard medical care; inadequate knowledge about BC in the community and stigmas about treatments such as mastectomy; insufficient media dissemination of information; and patient challenges with financial toxicity of treatment, transportation, and social isolation. The overwhelming majority of participants recognized great and urgent need to mobilize support for patients and address community awareness about BC. The majority identified opportunities for work with HEW, the WDA, and "family health teams" at the local level. Community and religious leaders were concerned about challenges and were willing to collaborate in advocacy. Patients, providers, and religious leaders were identified as key sources of information, positive messages, and leadership.

Conclusions: Recommendations for advocacy work in Hawassa include: lobbying local policy makers to recognize BC as a health priority; including BC within the "health extension package" of programs in primary care settings; initiating resource appropriate programs to increase earlier detection; launching small group discussion sessions in the community to change stigmas of the disease and treatments; working with media to disseminate messages that are inclusive of people who live in remote areas and speak different languages; improving availability, affordability, and access to care; and assisting patients with psycho-social support. Community-based BC advocacy projects may contribute toward increasing earlier detection and improving care.

1385579 - A Comparative Analysis of Breast Cancer Characteristics, Treatments, and Outcomes in Arabic/Middle Eastern Women and Six Other Ethnicities: A Study of the American Society of Breast Surgeons Mastery of Breast Surgery Registry

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Background/Objective: Disparities in breast cancer and its management among different ethnic groups and races have been well described and their effect on outcomes have been studied in several groups such as Caucasians, Asians, and African Americans. However, studies looking at breast cancer specifics in American women of Arabic/Middle Eastern (ArME) descent are scarce in literature. The Mastery of Breast Surgery (MOBS) is an online registry from the American Society of Breast Surgeons (ASBrS) that is utilized by over 1600 surgeons, most of whom are in the United States, and contains cancer-related data for more than 178,000 cases categorized by race. Our goal is to compare breast cancer characteristics, treatments, and outcomes, among ArME women to those of 6 other ethnicities as defined in the MOBS registry.

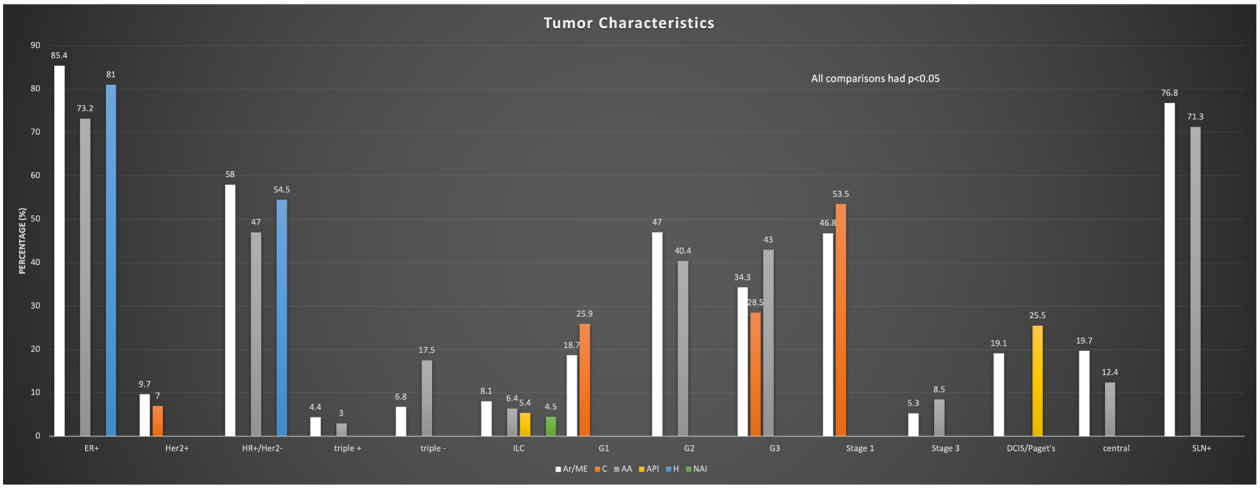
Methods: We reviewed de-identified data of all cancers entered in the MOBS, with an earliest year of diagnosis of 1950, in 7 ethnic groups: ArME (n=901), Caucasian (C) (n=139,089), African American (AA) (n=17,051), Native American/Indian (NAI) (n=404), Indian (I) (n=635), Hispanic (H) (n=11,048), and Asian/Pacific Islander (API) (n=6,318). We used descriptive statistics and chi-square and Fisher's exact tests to assess the associations between factors. We looked at 8 quality measures as defined in the MOBS, treatment variations, biological and histological subtypes, stage, grade, tumor location in the breast, local recurrence rates, and mortality as entered in the registry by July 26th, 2021.

Results: Some of the statistically significant ($p<0.05$) findings were: More ArME women were 50 years old or younger at diagnosis compared to all other 6 ethnicities. They had more invasive lobular cancers compared to AA, API, and NAI. Their cancers were more triple-positive, grade 2, Stage III, metastasized to sentinel lymph nodes, and located in central breasts compared to AA. They had more estrogen receptor-positive cancers than AA and H, more HER2-positive and grade 3 cancers than C, and more hormone receptor-positive HER2-negative cancers than AA and H. There were no differences in tumor characteristics between ArME and I. More ArME women were treated with tamoxifen compared to AA and C, and were recommended chemotherapy and hormonal therapy compared to C. Implant reconstruction was more common in ArME compared to AA, whereas flap reconstruction was more common in ArME compared to C. More ArME women underwent a sentinel lymph node biopsy compared to AA, API, H, and NAI, and a lumpectomy compared to NAI. No ArME women were reported dead and that was significant compared to AA, C, and NAI. More ArME women were reported alive with disease compared to C, API, H, and I. There were no reported ipsilateral breast recurrences in ArME and that was significant compared to API.

Conclusions: Despite the limitations of this registry study, it shows that ArME women have significant differences in tumor biology, presentation, treatments, and outcomes compared to other ethnicities.

Further studies are needed to investigate these differences and to understand the impact on management and outcomes they may have.

Figure. Tumor characteristics among Arabic/Middle Eastern women to those of 6 other ethnicities as defined in the MOBS Registry



1386909 - Alcohol and Breast Cancer: Risk Denial and Risk Relativization Among US Women

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Background/Objective: Previous research suggests a low awareness of the link between alcohol use and cancer. Risk denial (RD) refutes the detrimental impacts of alcohol use on breast cancer, and risk relativization (RR) minimizes the risk of the impact of alcohol on breast cancer relative to other risk factors for breast cancer. However, there is a gap in the literature studying US women's knowledge of the health risks of alcohol consumption. In this study, we assessed women's knowledge of alcohol use as a risk factor for breast cancer.

Methods: A cross-sectional online survey of 5027 diverse US women aged ≥18 years was conducted (Awareness of the Alcohol and Breast cancer Link (ABLE) ABLE cohort). Using principal component analysis of 7 questions, we constructed RD and RR scores. Multivariable linear and logistic regression models were used to determine associations of RD and RR scores with sociodemographic characteristics and drinking habits.

Results: Of the 5027 women surveyed, 2883 (57.6%) acknowledged the risks of alcohol consumption; however, most were uncertain (n=2015; 40.5%) or denied (n=1736; 34.9%) alcohol as a risk factor for breast cancer. Multivariable linear regression analysis revealed that RD score was inversely related to age, race, and education level and that RR score was inversely related to age and race. Specifically, RR and RD scores decreased with increasing age (F-test p=0.02 and p<0.001). Black women had higher RR

and RD scores than white women (RR: 0.26 [95% CI 0.12-0.41]; RD: 1.86 [95% CI 1.49-2.23]). Women with a bachelor's degree had lower RD scores than those with lower education levels (-1.77 [95% CI -2.39- -1.14]). Yearly income of $35,000 to $49,999 (RD: -0.61 [95% CI -1.05- -0.16]) and $50,000 to $74,999 (RD: -0.60 [95% CI -1.13- -0.25]) were associated with lower RD scores. In the logistic regression, higher RD score was associated with increased daily drinking (odds ratio [OR]: 1.13 [95% CI 1.11-1.16]) and heavy episodic drinking (OR: 1.11, 95% CI [1.08-1.13]).

Conclusions: This study suggests that many US women are unaware of or deny the increased risk of breast cancer with alcohol use, particular minority races, younger women, and those with less education. Women with higher RR scores believe that other risk factors (e.g., BRCA, cigarette smoking) have a greater impact on breast cancer risk than alcohol use. Targeted education campaigns are necessary to bridge this critical knowledge gap.

1387041 - Disparities in Breast Cancer Diagnosis and Treatment in the Greater Jerusalem Area

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Background/Objective: The principle of equity is that quality of care should not vary based on patients' race or ethnicity. In reality, cancer incidence and outcomes vary between ethnic groups due to multiple factors. Early detection of breast cancer (BC) correlates not only with improved prognosis, but also with less aggressive surgical and medical treatment. With improving awareness and accessibility to BC screening, we aim to compare breast cancer stage at diagnosis between Arab and Jewish women in the greater Jerusalem area.

Methods: We conducted a retrospective observational study, including women diagnosed with BC who underwent surgery in a tertiary referral center. Demographic, clinical, and pathologic data were collected from electronic medical records.

Results: We included 289 patients, 53 (18.3%) of Arab and 236 (81.7%) of Jewish origin. Patients were analyzed according to initial treatment – upfront surgery or neoadjuvant systemic therapy (NST) (n=97 (33.6%) and n=192 (66.4%) respectively, with similar rates of NST among Jewish (33.9%) and Arab (32.1%) patients (p=0.93). Ethnic groups were comparable in age, histologic type, estrogen receptor (ER) status and rate of HER2-enriched tumors. Arab patients had higher rates of progesterone receptor (PR) positivity (p=0.05). In the group treated with upfront surgery, a statistically significant difference in tumor stage, nodal status, and overall stage at diagnosis was found: 14 (39%) of Arab and 94 (63%) of Jewish patients had pathological Stage 0-I (p=0.009). Rate of breast-conserving surgery was comparable between the ethnic groups. There were higher rates of hormone-sensitive invasive tumors in Arab patients in this group (ER: Arab 100%, Jewish 88% p=0.024; PR: Arab 94%, Jewish 66% p=0.001). In the NST group, there was no statistically significant difference in tumor stage, nodal status, and stage at diagnosis. In this group, however, Arab patients were more likely to undergo axillary dissection vs. Jewish patients (24% vs. 16%, p=0.019).

Conclusions: In early breast cancer treated with upfront surgery, Arab women with breast cancer are diagnosed at a more advanced stage compared to Jewish women. This did not translate, however, to significant differences in extent of surgery. In the group of patients who were treated with neoadjuvant systemic therapy, stage at diagnosis was similar in both groups. Future identification of extent and causes of disparities in diagnosis and treatment of breast cancer between the Arab and Jewish population will enable the health system to focus on efforts of correcting inequality.

Table. Disparities in breast cancer diagnosis and treatment

	Arab (n=53)	Jewish (236)	Total (292)	p-Value
Upfront surgery n=192				
Mastectomy n (%)	2 (5.6)	16 (10)	18 (9.4)	0.53
ALND n (%)	4 (11)	4 (2.7)	8 (4.2)	0.096
Pathologic stage 0-1 (%)	14 (39)	94 (63)	108 (56.3)	**0.009**
Neoadjuvant systemic therapy n=97				
Mastectomy n (%)	5 (29)	21 (26)	36 (26.8)	0.77
ALND n (%)	4 (24)	12 (16)	16 (17.4)	**0.019**
Clinical stage 0-1 (%)	2 (12)	11 (14)	13 (13.4)	1.0

ALND – axillary lymph node dissection

1386993 - Self-reported Health Literacy and Barriers to Accessing Care at a Safety Net Breast Surgical Oncology Clinic

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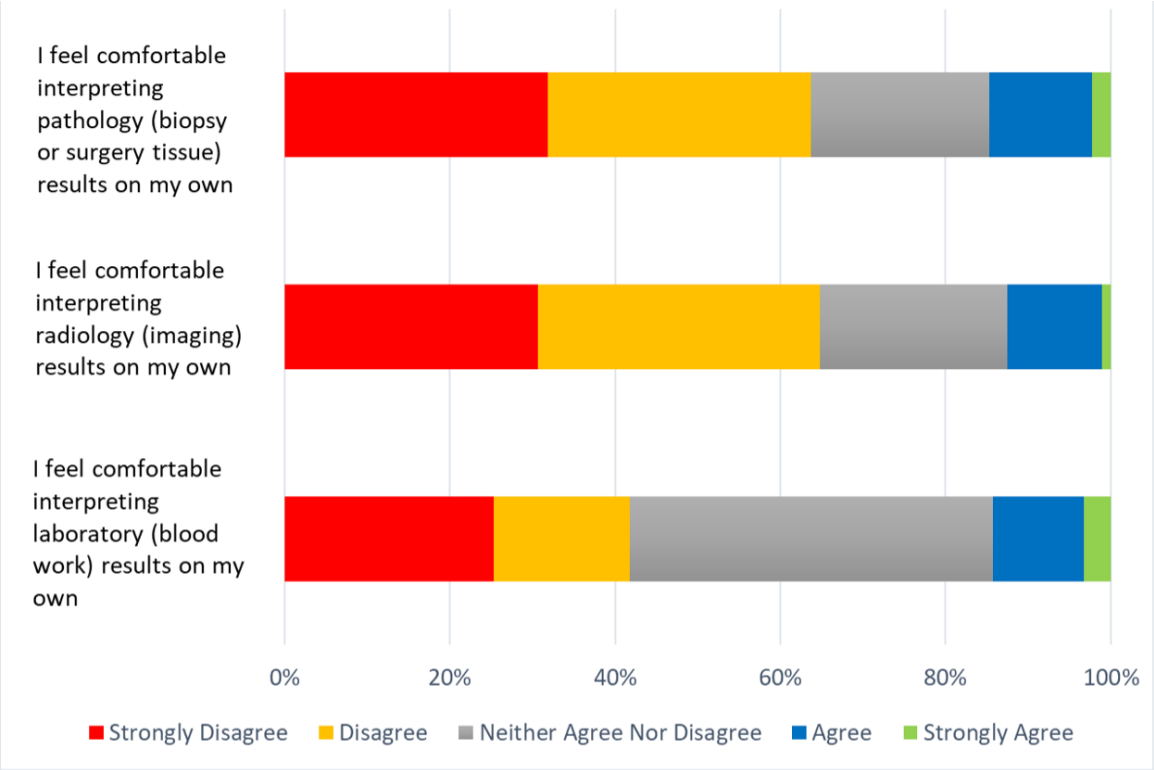
Background/Objective: Safety net health systems (SNHs) provide critical access to surgical care for patients with breast diseases. However, patients who receive treatment at SNHs miss more clinic appointments, demonstrate worse comprehension of their medical conditions, and face disparate

oncologic outcomes after breast cancer treatment. In this study, we examined self-reported health literacy and barriers to accessing care at a breast surgery clinic within an SNH.
Methods: Adult female patients presenting for care to an urban SNH from August to October 2022 were invited to complete a validated health literacy questionnaire, in either English or Spanish. Patients self-reported their demographic characteristics including age, education level, preferred language, race, ethnicity, health insurance type, and visits with their primary care provider. They were also queried on perceived barriers they encounter in accessing breast clinic appointments. Descriptive statistics were reported.

Results: Of the 127 patients in clinic, 95 completed the survey with a completion rate of 75%. The median age of respondents was 50 years (IQR 43-59). Thirty-one percent of patients reported their race as White, 22% as Black, 3% as American Indian, 5% as Asian, 14% as other, and 26% as no race. Sixty-one percent of respondents identified as Hispanic. Forty-five percent of respondents reported Spanish as the preferred language compared to 54% for English, and 41% reported needing a medical interpreter for clinic appointments. Forty-two percent of respondents had less than a high school education. Fifty-six percent disclosed using public health insurance, while 32% reported being uninsured, of whom 85% were receiving public financial assistance for their medical bills. Most patients had an active primary care physician (82%) and had seen their primary care physician within the past 18 months (83%). In the health literacy questionnaire, 23% of patients reported requiring frequent assistance with reading hospital materials, 23% reported feeling uncomfortable filling out medical forms, and 10% reported problems learning about their medical condition because of difficulty understanding written information. Furthermore, as demonstrated in the Figure, 41%, 65%, and 64% of respondents reported feeling uncomfortable interpreting laboratory, radiology, and pathology results, respectively. When asked about barriers to attending clinic appointments, patients reported inability to take time away from work (13%), inability to take time away from children or family (12%), inability to find transportation to clinic (24%), physical disability (12%), and inability to afford payment (11%).

Conclusions: Large proportions of patients seeking surgical care for breast diseases at an urban SNH had not completed high school, lacked health insurance, and were not proficient in English. This population demonstrated low health literacy and reported a unique set of barriers to attending clinic appointments, putting them at risk for disparities in understanding and accessing their surgical care. SNHs must consider these challenges and work to mitigate them to provide equitable breast surgical care.

Figure. Self-reported comfort with interpreting medical results reported by patients of a breast clinic within a safety net health system



1387842 - Retrospective Evaluation of Health Disparities in De Novo Metastatic Breast Cancer

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Background/Objective: De novo metastatic breast cancer (dnMBC) is currently considered treatable but incurable. It is estimated that 6% of invasive breast cancers in the United States are metastatic at diagnosis, affecting greater than 150,000 women. Health disparities in all stages of breast cancer are thought to alter treatment modality, outcomes, and mortality. However, a lack of understanding pertaining to race/ethnicity, socioeconomic status (SES), insurance status, and geographic location still remains. The purpose of this study was to determine the impact that race/ethnicity and SES have on rates of dnMBC, potential delay in diagnosis, and initial treatment offered in a unique city where 65% of the population is Black compared to the national average of 12%.

Methods: A retrospective analysis of all new breast patients at a large cancer clinic between 2017 to 2022 was conducted. One hundred eighty-six patients were identified as having dnMBC. These patients presented with a new diagnosis of metastatic breast cancer or had imaging confirmation of metastatic

disease within 3 months of diagnosis. All patients with a history of prior breast cancer were excluded. Variables including age, race/ethnicity, ZIP code, insurance, marital status, education, employment, tumor type, receptor status, time from symptom to diagnosis, initial treatment, and date of death were included in the data analysis.

Results: One hundred eighty-six females were identified with a diagnosis of dnMBC. One hundred two were Black (54.8%) compared to 81 White (43.5%). The median age at diagnosis was younger in Black patients at 58 (range 21-90) compared to 66 (range 25-92) in White patients. Black patients were more likely to live alone at 28.3% (26/92) compared to White patients at 21.7% (15/69). White patients were more likely to continue their education beyond high school (34/60, 56.7%) compared to Black patients (28/60, 46.7%). There was no difference identified in time from symptom to diagnosis between patients of different race/ethnicity (mean 24.7 weeks). Black patients had a much higher rate of triple-negative disease (23/101, 22.8%) compared to White patients (7/81, 8.6%). White patients were more likely to have hormone receptor-positive tumors (69/80, 86.3%) compared to Black patients (68/80, 67.3%). We found no difference in initial treatment modality based on race/ethnicity (non-parametric chi-square = 2.4, p=.12) with 58% (n=100) of patients receiving chemotherapy, 29% (n=51) hormone therapy, and 10% (n=17) combination therapy. When stratifying treatment modality by age, in those age 65 and above (n=84), 40.5% (n=34) received chemotherapy, 42.9% (n=36) hormone therapy, and 14.3% (n=12) combination therapy. This is in contrast to those less than 65 (n=87), where 75.9% (n=66) received chemotherapy, 17.2% (n=15) hormone therapy, and 5.7% (n=5) combination therapy.

Conclusions: Despite dnMBC being more prevalent in Black patients compared to White patients, we found no difference in time-to-diagnosis from symptom onset or initial treatment modality provided.

1387697 - Demographic Determinants of Pathologic Complete Response After Neoadjuvant Chemotherapy in Breast Cancer

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Background/Objective: Pathologic complete response (pCR) is often utilized as a proxy for overall prognosis in breast cancer. Based on our observations of West Texas breast cancer patients, we hypothesize that obese, Hispanic breast cancer patients are less likely to achieve pCR after neoadjuvant chemotherapy (NAC) when compared to non-Hispanic and non-obese patients. Whereas significant differences in pCR are reported depending on biological tumor profiles, the role of demographic variables in such prediction is less clear.

Methods: A prospective institutional database was queried between January 2018 and September 2022 to identify patients undergoing neoadjuvant chemotherapy (NAC). Data were gathered on completion of therapy, comorbidities, and final surgical pathology. Statistical analysis was conducted using R statistical software (version 4.1.3). Categorical variables were analyzed using $\chi 2$ or Fisher's exact test and

continuous data were analyzed using t-tests with Welch-Satterthwaite correction. Multiple linear regressions were used to study interactions between therapy, ethnicity, and obesity and pCR.

Results: A total of 124 patients were offered NAC; 112 (90.3%) who underwent resection post-NAC were included in the analysis. Overall, 26 (23.2%) had pCR; 4 (14.8%) in ER+/HER2- group; 17 (65.4%) in HER2+ group; and 5 (19.2%) in TN group. Forty-five (40.2%) patients were Hispanic; 62 (55.4%) were obese. Univariate analysis did not show significant association between ethnicity, obesity, and ability to achieve PCR. The interaction model showed no association of obesity with pCR in non-Hispanics; however, Hispanic women with obesity had higher odds of residual disease (OR = 0.191 [0.029, 1.157]; p=0.076). Hispanic women with normal BMI had higher odds of achieving pCR (OR=4.16 [1.126, 16.868]; p=0.036). The results were consistent even after controlling for confounding variables such as age, co-morbidities, and clinical T and N stages.

Conclusions: Few studies have been performed investigating outcomes in obese, Hispanic breast cancer patients outside of the clinical trial patient population. Obesity is a risk factor for failure to achieve PCR in Hispanic women undergoing NAC. The contrary was observed in non-obese Hispanic patients as they had higher odds of achieving PCR. Studies with larger groups are needed to validate this observation. Further studies evaluating the role of BMI in drug resistance would be important among this ethnic minority.

Table. Demographic determinants of pCR after NAC

Variable	Non-PCR (n = 86)	PCR (n=26)	t-statistic/ χ^2	p-value
Age	57.92 ± 12.40	58.81 ± 13.51	0.300	0.766
BMI	31.49 ± 6.29	31.17 ± 6.71	-0.121	0.904
Race				
White	79 (91.9%)	23 (88.5%)		0.695
Non White	7 (81.1%)	3 (11.5%)		
Ethnicity				
Hispanic	32 (37.2%)	13 (50.0%)	0.879	0.349
Non Hispanic	54 (62.8%)	13 (50%)		
Tumor Profile				
ER+	59 (68.6%)	13 (50.0%)	2.254	0.133
HER2+	30 (34.9%)	17 (65.4%)	6.425	**0.011**
Triple neg	20 (23.3%)	5 (19.2%)	0.027	0.870
Clinical Tumor stage T1 T2 T3 T4	 24 (27.9%) 33 (38.4%) 21 (24.4%) 4 (4.7%)	 6 (23.0%) 9 (34.6%) 8 (30.8%) 3 (11.5%)		0.86
Clinical Node stage N0 N1 N2 and above	 42 (48.8%) 39 (45.3%) 2 (2.3%)	 12 (46.2%) 14 (53.8%) 0 (0)		0.520

1387626 - What Should Breast Surgery Texts Be Teaching About Racial Disparities?

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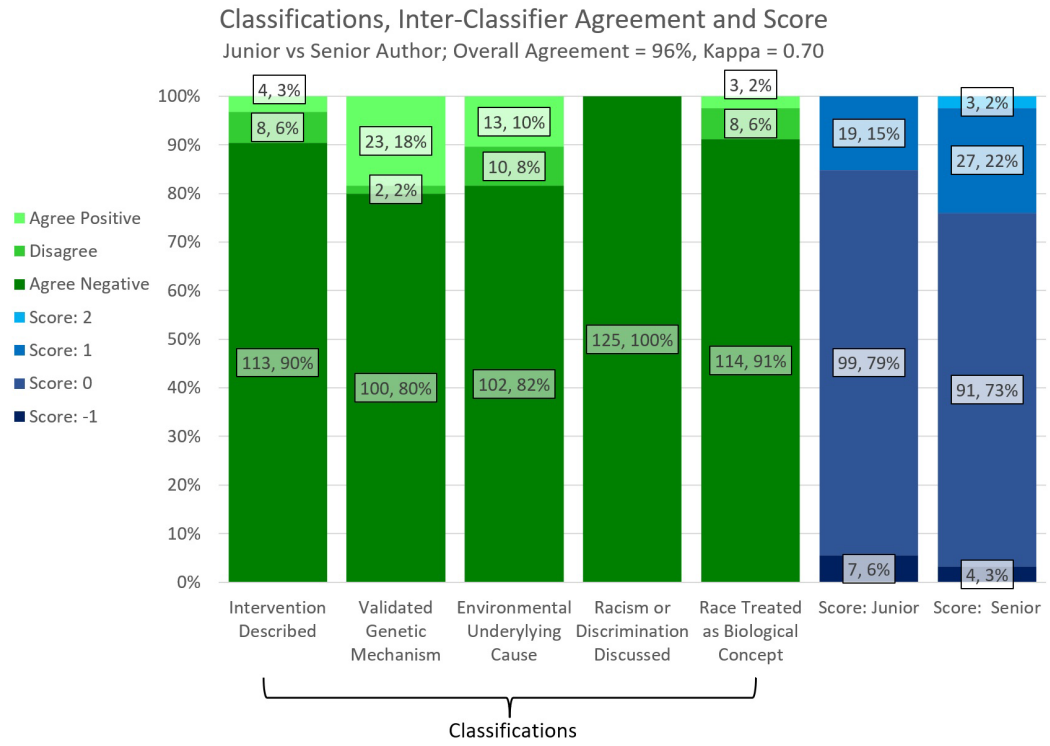
Background/Objective: Black women are 40% more likely to die from breast cancer than White women, and part of this gap may be attributable to treatment disparities. Improving education of physicians is one possible approach to correcting the treatment disparity. In this study, we analyzed the content of current breast surgery texts, with the hypothesis that they rarely teach either the true underlying causes of disparities or corrective interventions.

Methods: Doody's Core Titles, an industry-standard list of texts recommended for medical libraries, was purchased for 2022. All texts that directly addressed breast surgery from the general surgery and surgical oncology lists were obtained, excluding technical guides and atlases. ASBrS official statements and suggested articles were also included as separate texts. Search terms for race and ethnicity were chosen by a multidisciplinary team that used the UK's Information Specialist Sub-Group recommendations as a starting point. Passages using these terms or direct references to race, ethnicity, disparities and discrimination were extracted. Passages that described medical differences between racial/ethnic groups were classified based on whether they (a) discussed a disparity-correcting intervention, (b) discussed a validated genetic mechanism (such as BRCA genes), (c) discussed environmental contributors to the disparity, (d) explicitly discussed racism or discrimination, and/or (e) conflated race and biology by describing race itself as a causal factor in the disparity. A heuristic score was calculated by granting 1 point for (a), (c), and (d), and subtracting a point for (e). Overall agreement between 2 authors' independent classifications and Cohen's Kappa were calculated. (Figure) We did not attempt to determine validity of empirical claims about racial associations; we only describe what was discussed.

Results: In reviewing 8 textbooks, 33 ASBrS statements, and 55 available ASBrS-recommended articles, a total of 125 passages were found to discuss disparities. The most frequently discussed groups were Black (22%) and White (21%), followed by Asian (16%), Hispanic (10%), Jewish (Ashkenazi, 8%), and Native Americans (2%). The remaining 21% referred to disparities without discussing specific groups. The distributions of classifications and scores are shown in the figure. Seventy-six percent of passages received a score of 0, and the mean score was 0.17. No text explicitly discussed racism or racial discrimination. Overall agreement was 96%, with a Cohen's Kappa of 0.70 indicating "substantial agreement."

Conclusions: Breast surgery textbooks frequently remark on differences among racial groups. However, this study found that texts largely do not provide any conception of the underlying causes of racial disparities or any means of addressing them. Future editions of breast surgery textbooks should strive to incorporate detailed discussion for true causes (including racism) and corrective interventions. This may help set the stage for further interventions and research on ameliorating racial disadvantages.

Figure.



1387655 - Disparities in Refusal of Adjuvant Radiation for Breast-conserving Therapy

Tej Patel[1], Bhav Jain[2], Neha Vapiwala[3], Fumiko Chino[4], Oluwadamilola Fayanju[3], Edward Dee[4]

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Background/Objective: Breast-conserving therapy (BCT), defined as lumpectomy followed by adjuvant radiotherapy (RT), has been associated with similar outcomes compared with mastectomy among patients with early-stage (T1-2N0) breast cancer. Nevertheless, certain populations experience barriers to receipt of BCT and may refuse RT due to factors including but not limited to inadequate access to adjuvant RT, long distances to treatment facilities, and bias in provider recommendations. We used the National Cancer Database (NCDB) to assess factors associated with refusal of adjuvant RT among patients receiving lumpectomy.

Methods: We performed a retrospective cohort analysis of women ≥18 years old diagnosed with cT1-2N0M0 disease in the National Cancer Database (NCDB) from 2004-2017 who underwent lumpectomy for removal of the primary tumor. Our study assessed women who identified as White, Black, Asian American, Native Hawaiian or Pacific Islander, and Native American, with White patients as the referent value given large sample size. The primary dependent variable was refusal of RT, which was coded in the NCDB as “radiation therapy was not administered; it was recommended by the patient's physician, but

this treatment was refused by the patient, the patient's family member, or the patient's guardian. The refusal was noted in patient record." Multivariable logistic regression defined adjusted odds ratios (ORs) of refusing RT by relevant sociodemographic variables, as well as race*clinical stage and race*comorbidity burden interaction terms. All statistical testing was 2-sided, and the results were deemed statistically significant at p<.05.

Results: Of the 580,192 women who underwent lumpectomy, 29,527 (5.09%) refused recommended RT. In the adjusted analysis, Black (OR: 1.07 [95% CI: 1.02-1.12], p=0.06) and Native Hawaiian or Pacific Islander (OR: 1.35 [95% CI: 1.04-1.74], p=0.025) women were more likely to refuse RT than White women. Older age, lower educational attainment, greater distance from treatment facility, uninsured status, greater comorbidity burden, and higher clinical stage were also associated with refusal of RT (p<0.05 for all, Table). The interactions between race and clinical stage as well as race and comorbidity burden were only significant for Black patients (p interaction <0.05 for both).

Conclusions: In this evaluation of women with early-stage breast cancer treated with lumpectomy, we found that Black and Native Hawaiian or Pacific Islander race, as well as low educational attainment, large travel distances, and more severe disease, were associated with a greater likelihood of refusing RT despite provider recommendation. Although patients' concerns about RT may contribute to suboptimal shared decision-making, ineffective patient education, patient mistrust, and logistical barriers to RT receipt (e.g., distance, appointment times, treatment duration) are all potential contributors to these disparities. Efforts are needed to develop patient education materials informed by cultural humility as well as to reduce structural barriers to RT access, particularly for minoritized populations.

Table. Association between sociodemographic characteristics and refusal of radiation therapy among women with cT1-2N0M0 breast cancer receiving breast-conserving surgery, 2004-2017

	aOR (95% CI)					
Characteristic	**All Patients**	***P* Value**	**cT1 Only**	***P* Value**	**cT2 Only**	***P* Value**
No.	580,192	–	477,672	–	102,520	–
Race						
White	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
Black	1.07 (1.02-1.12)	.006	1.06 (1.00-1.12)	.03	1.06 (0.97-1.16)	.22
Native American	1.05 (0.82-1.34)	.72	1.04 (0.79-1.37)	.79	1.01 (0.59-1.72)	.97
Asian American	0.94 (0.85-1.04)	.23	0.92 (0.82-1.02)	.12	1.05 (0.86-1.29)	.64
Native Hawaiian or Pacific Islander	1.35 (1.04-1.74)	.03	1.22 (0.89-1.66)	.22	1.84 (1.14-2.97)	.01
Age	1.09 (1.08-1.10)	<.001	1.10 (1.09-1.10)	<.001	1.08 (1.07-1.09)	<.001
Zip Code-Wide Percent Without High School Education						
29.0% or more	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
20.0% to 28.9%	1.03 (0.99-1.08)	.15	1.03 (0.98-1.08)	.20	1.02 (0.93-1.12)	.67
14.0% to 19.9%	1.04 (1.00-1.09)	.06	1.04 (0.99-1.10)	.10	1.04 (0.94-1.15)	.47
Less than 14.0%	1.07 (1.02-1.12)	.009	1.07 (1.01-1.13)	.02	1.06 (0.95-1.19)	.30
Zip Code-Wide Median Household Income						
Less than $30,000	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
$30,000 - $34,999	0.98 (0.94-1.03)	.42	0.98 (0.93-1.03)	.44	0.99 (0.90-1.10)	.91
$35,000 - $45,999	0.95 (0.90-0.99)	.02	0.95 (0.90-1.00)	.05	0.94 (0.85-1.05)	.28
$46,000 +	0.85 (0.81-0.90)	<.001	0.86 (0.81-0.91)	<.001	0.84 (0.74-0.94)	.003
Charlson-Deyo Comorbidity Coefficient						
0.00	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
1.00	1.11 (1.07-1.14)	<.001	1.09 (1.05-1.14)	<.001	1.16 (1.08-1.26)	<.001
2.00	1.38 (1.39-1.47)	<.001	1.38 (1.29-1.48)	<.001	1.41 (1.23-1.61)	<.001
≥3.00	1.67 (1.52-1.83)	<.001	1.63 (1.47-1.81)	<.001	1.84 (1.52-2.22)	<.001
Insurance Status						
Not Insured	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
Private/Managed Care	0.50 (0.44-0.56)	<.001	0.53 (0.46-0.61)	<.001	0.47 (0.38-0.58)	<.001
Medicaid	0.95 (0.83-1.08)	.44	0.98 (0.83-1.15)	.77	0.93 (0.74-1.18)	.56
Medicare	0.53 (0.47-0.60)	<.001	0.57 (0.49-0.66)	<.001	0.49 (0.40-0.61)	<.001
Other Government	0.53 (0.44-0.64)	<.001	0.52 (0.42-0.66)	<.001	0.64 (0.45-0.92)	.02
Unknown	0.49 (0.41-0.59)	<.001	0.52 (0.42-0.64)	<.001	0.45 (0.32-0.64)	<.001
Distance from Treatment Facility						
0 to <10 mi	1 [Reference]	N/A	1 [Reference]	N/A	1 [Reference]	N/A
10 to <20 mi	1.04 (1.00-1.06)	.03	1.03 (1.00-1.07)	.08	1.06 (0.98-1.14)	.13
20 to <50 mi	1.13 (1.08-1.17)	<.001	1.13 (1.08-1.18)	<.001	1.13 (1.03-1.24)	.007
≥50 mi	1.22 (1.15-1.30)	<.001	1.22 (1.14-1.31)	<.001	1.23 (1.07-1.41)	.004
Year of Diagnosis	1.10 (1.09-1.10)	<.001	1.11 (1.10-1.12)	<.001	1.06 (1.05-1.07)	<.001
Clinical Stage						
cT1	1 [Reference]	N/A	–	–	–	–
cT2	1.18 (1.13-1.22)	<.001	–	–	–	–

Each model was also adjusted for rurality/urbanicity, facility location, receipt of hormone therapy, and analytic stage in addition to the covariates above. All significant covariates are presented in the table (minimum threshold $P < .05$).

1387255 - BeneFIT: Uptake in Activity in Breast Cancer Patients Following Exercise Oncology Program Implementation in a Diverse Patient Population

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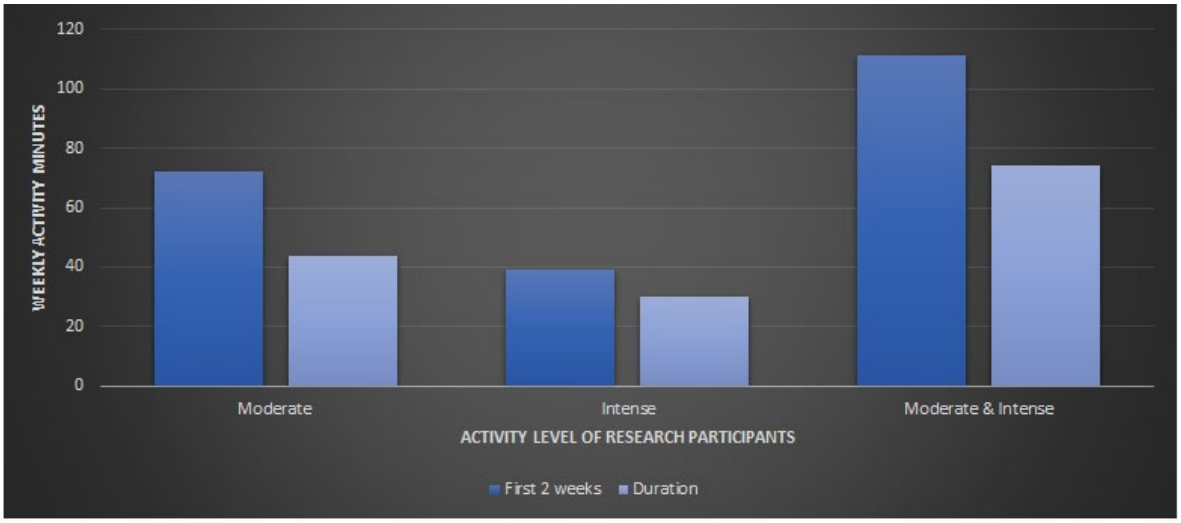
Background/Objective: Exercise oncology has been shown to be an effective measure to improve breast cancer outcomes. Prior exercise oncology research has been conducted in homogenous patient cohorts. This study sought to determine if exercise oncology could be implemented in a low-cost manner to improve outcomes of racially and socioeconomically diverse patients.

Methods: Patients were enrolled in the study who had been diagnosed with breast cancer within the past year. Research participants were provided with FitBIT digital activity tracking devices after completing baseline biometrics and psychosocial questionnaires regarding mental health and cancer-related quality of life. Patients were monitored at baseline of activity, then underwent counseling to initiate activity with a goal of 150 minutes weekly of moderate activity, the current ASCO guideline. Exercise activity data were digitally captured for 1 year duration.

Results: Exercise oncology research participants (n=24) were racially diverse: 66% of subjects self-identified as Black, 4% as Asian, 16% other and, 12% white. Majority of patients were obese, with a mean BMI 30.8. Patients reported depression symptoms, with the majority of patients reporting mild depression, mean of 5.6 on PHQ-9. Anxiety was prevalent with a mean of 6.5, mild anxiety on the GAD-7 anxiety scale. Patients demonstrated disordered sleep with a sleep quality scale mean of 32. A total of 29.2% of the research study patients live below the regional poverty index; they self-reported income <$30,000/year, under the poverty level for this region of $29,219 for a 1-person household. Forty-five percent of patients indicated income of <$50,000 annually. After measuring baseline activity, patients in the first 2 weeks following digital activity data capture were close to achieving the goal of 150 minutes of moderate activity weekly with a mean of 110 minutes of moderate and intense activity weekly. Activity declined following the first 2 weeks of activity with a mean of 73.8 moderate and intense activity over the entirety of the duration of data capture for 52 weeks. Patients performed predominantly light activity over the duration of the year of captured exercise data.

Conclusions: Breast cancer patients were motivated to initiate exercise into their cancer treatment. Attrition of moderate activity declined after initial uptake in activity. This finding suggests that measures to improve activity and maintain activity after initiation is needed for longstanding maintenance of 150 minutes of exercise weekly. A program to deliver automated prompts to patients to achieve exercise goals weekly could be useful to decrease program attrition. Patients experiencing socioeconomic poverty and mental health issues in conjunction with their cancer treatment face the physiologic toll of oncology treatment and surgery, as well as socioeconomic and psychologic barriers to achieving the standards of oncologic treatment. The high levels of depression, anxiety, and poverty in the patients may preclude patients achieving their exercise goal. Further research regarding the interplay of poverty and mental health is needed to diversify existing literature and improve care of socioeconomically and racially diverse breast cancer patients.

Figure. Activity in breast cancer patients after implementing exercise program



1387601 - The Impact of Family and Social Support on Adherence to Mammogram Screening Among Appalachian Breast Cancer Patients

Jordan Tasman[1], Jillian Lloyd[2], Ashton Brooks[2], Patricia Roberson[1]

[1]The University of Tennessee College of Nursing, Knoxville, TN, [2]University of Tennessee Medical Center, Knoxville, TN

Background/Objective: Breast cancer patients in Appalachia are faced with substantial geographic and economic disparities that disproportionately impact their access to health care personnel and resources, such as mammogram screening facilities. Regular mammogram screening is critical for early detection of breast cancer, which in turn can improve stage at diagnosis, treatment outcomes, and reduce risk of breast cancer mortality. With Appalachian sociocultural barriers and the critical implications of regular mammogram screening on breast cancer outcomes, it is necessary to examine how other levels of influence (i.e., interpersonal) can impact adherence to recommended screening behaviors among this population. The study aimed to evaluate the impact of family functioning, social support, and relationship satisfaction on prior adherence to mammogram screening among Appalachian breast cancer patients.

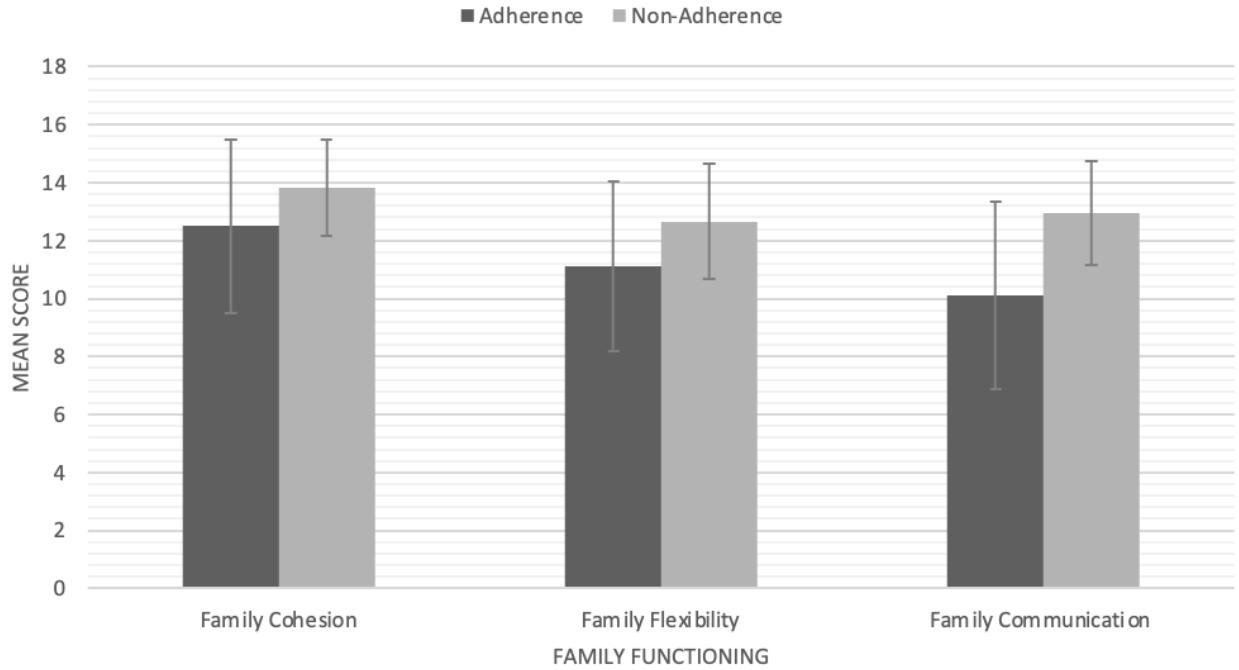
Methods: A combined prospective and retrospective cross-sectional study recruited 61 Stage I-III estrogen receptor-positive (ER+) breast cancer patients at our institution, between 2020 to 2021. The retrospective review identified patient's mammogram screening and characteristics (BI-RAD and density) over the 3 years prior to their diagnostic mammogram. Prior adherence was coded into a dichotomous "yes/no" variable for patients over the age of 40 that received prior annual mammograms based on the standards set forth by the American Cancer Society, American College of Radiology, and the International Agency for Research of Cancer and Society. Patients prospectively completed self-reported measures of family functioning, social support, and relationship satisfaction, before primary

treatment. A t-test was conducted to evaluate the statistical link between prior mammogram adherence and patient's perceived family functioning, social support, and relational quality.

Results: Analysis demonstrated a significant interaction between prior mammogram screening adherence and family functioning including family cohesion (p=.048), family flexibility (p=.012), and family communication (p=.001; see Figure for mean differences in these results). Specifically, breast cancer patients who did not adhere to prior mammogram screening standards reported significantly higher levels of healthy family functioning, whereas patients who did adhere to prior mammogram screening standards reported significantly lower levels of healthy family functioning. Overall social support and relationship satisfaction were not significantly linked to prior mammogram adherence.

Conclusions: Our study demonstrates that individuals' perceived family functioning has an impact on mammogram screening behaviors in Appalachia. Patients with healthy family functioning did not adhere to prior mammogram screening whereas patients with perceived problematic family functioning had greater prior adherence. This interesting association may be attributed to Appalachia's collectivist culture and strong familial ties that can have unintended consequences, especially for women who are traditionally known as the primary caretaker in Appalachian families. This could potentially cause women to deprioritize their own health care needs while exerting their time and focus on the care of their family. This highlights the complexity of understanding individual health behaviors and the need for future research and interventions to account for individual, interpersonal and community level factors.

Figure. Family functioning and mammogram adherence



*NOTE: T-TESTS REVEAL THAT THERE ARE STATISTICALLY SIGNIFICANT (P < .05) MEAN DIFFERENCES BETWEEN ADHERENCE AND NON-ADHERENCE FOR THESE THREE FAMILY FUNCTIONING MEASURES.

1388326 - Clinical, Treatment and Outcome Characteristics of Non-White and White Triple-negative Breast Cancer Patients

Langfeier Liu[1], Nicholas Lewis[1], Junmin Whiting[2], Weihong Sun[2], Susan Hoover[2]

[1]University of South Florida School of Medicine, Tampa, FL, [2]Moffitt Cancer Center, Tampa, FL

Background/Objective: Triple-negative breast cancer (TNBC) is a more aggressive subtype of breast cancer that lacks expression of the estrogen receptor, progesterone receptor, and human epidermal growth factor receptor 2. While prior research suggests that a racial disparity exists in the presentation and outcomes of TNBC, it is unclear whether the disparity is due to difference in disease presentation, progression, or other factors. Studies investigating this disparity have also focused on the differences between Black and white patients. Similarly, this study aims to demonstrate the differences/similarities among TNBC patients based on race.

Methods: A single-institution, IRB-approved retrospective review of 667 TNBC patients from 2010-2020 was conducted. Patients who had a previous diagnosis of TNBC or who did not undergo primary surgery at the institution were excluded. Demographics, clinicopathological characteristics, treatment, and recurrence were collected. Wilcoxon rank sum test and Chi-square test (or Fisher exact test if applicable) were used to test the association of outcome variables and predictive variables.

Results: Of the 667 patients, 508 (76.2%) were classified as white and 159 (23.8%) as non-white, where non-white included Black, Asian, other, and mixed races. Non-white patients were younger at time of diagnosis (52.34 [21.5, 83.4] vs 57.91 [24.3, 95.4], p<0.001) and were more likely to have a BRCA mutation (6.3% vs. 4.7%). Non-white patients were more likely to be treated with neoadjuvant chemotherapy (62.3% vs 50.6%, p=0.01), while white patients were more likely not to receive chemotherapy (17.9% vs 8.2%, p=0.005). Non-white patients had higher rates of adjuvant radiation therapy (69.8% vs 61.2%, p=0.05), as well as slightly higher rates of clinical trial enrollment (17% vs 12.6%). Non-white patients underwent axillary node dissections at significantly higher rates (35.8% vs 26.8%, p=0.028), whereas white patients had marginally higher sentinel lymph node biopsy rates (72% vs 66%). When comparing histology, non-white patient and white patients had no significant differences. Non-white patients were more likely to have a pathological T stage of T3 or T4 (6.8% vs 2.4%, p=0.070), while white patients were more likely to have T1 or T2 tumors. Similarly, non-white patients had higher rates of N1 disease, whereas non-white patients had comparably higher rates of N0 disease. Non-white patients also had higher tumor grade 3 (93.5% vs. 88%, p=0.05). Rates of reconstruction were similar between the 2 cohorts, but white patients were slightly more likely to have undergone immediate reconstruction (65.2% vs. 58.9%). While the local recurrence rate between the 2 groups was similar (8.8% of non-white patients vs. 9.6% of white patients), non-white patients had a higher rate of distant recurrences (14.5% vs 11.6%).

Conclusions: Non-white patients with TNBC on average presented with more advanced disease, required more intensive treatment interventions, like axillary dissection, chemotherapy and radiation and had higher tumor grade and higher pathological T stage when compared to their white counterparts. Further examination is required to evaluate the disparities between these 2 groups and potential influencing factors, be they genetic, environmental, or otherwise.

1388413 - Distance Doesn't Matter? A Geospatial Analysis of Breast Cancer Patients and Treatment Facility in Georgia

Katherine McElroy[1], Chandler McLeod[1], Sofia Awan[2], Geetanjali Saini[1], Keerthi Gogineni[3], Justin Luningham[4], Ritu Aneja[1], Lily Gutnik[1]

[1]The University of Alabama at Birmingham, Birmingham, AL, [2]Georgia State University, Birmingham, AL, [3]Emory School of Medicine, Birmingham, AL, [4]The University of North Texas Health Science Center, Birmingham, AL

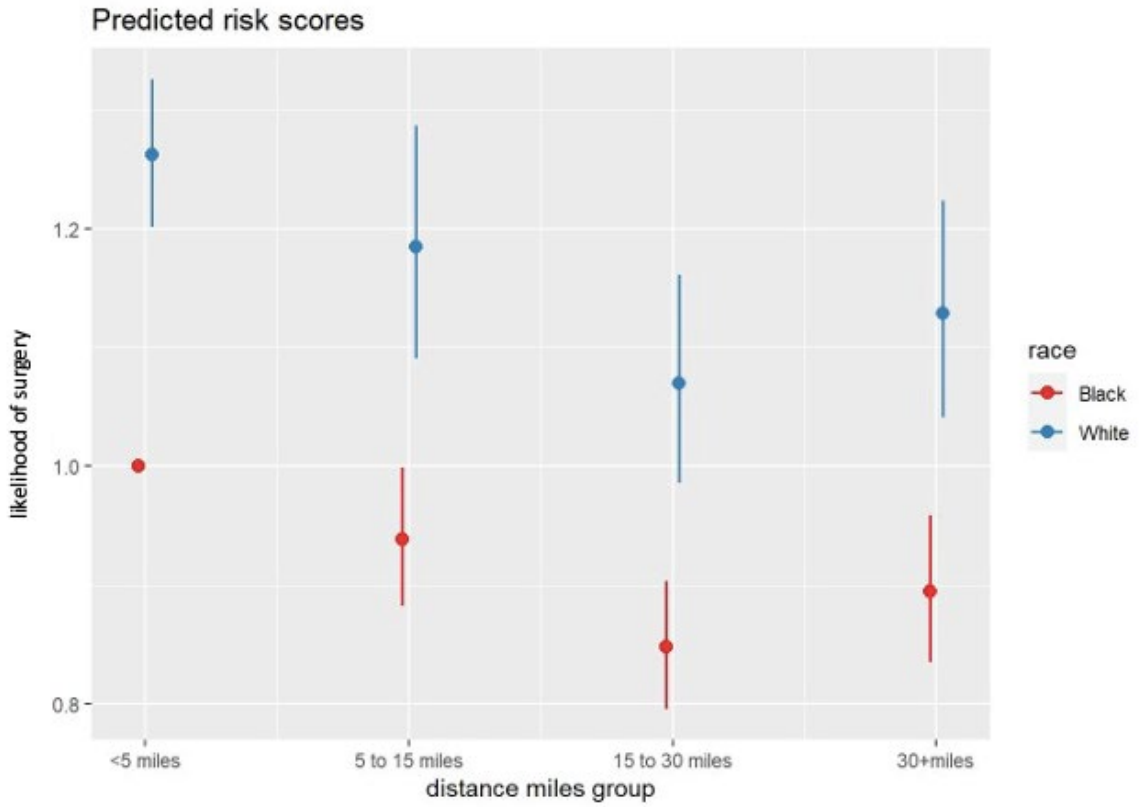
Background/Objective: Black breast cancer patients, on average, have worse outcomes than White patients, and multi-factorial explanations persist at the patient, provider, community, and health system level. Our study aims to evaluate the impact of distance to treatment center on time to surgery for breast cancer patients in Georgia.

Methods: A retrospective chart review of 19,230 de-identified breast cancer patients who underwent surgery at urban and rural treatment centers in Georgia from 2004-2019 was conducted. Five-digit ZIP code and treatment center coordinates were utilized for crow-fly analysis of distance to treatment center. Area deprivation index (ADI) is a geospatial indicator of relative socioeconomic deprivation comprised of 17 neighborhood-level indicators. Pearson's chi squared and analysis of variance examined associations between distance to treatment center and patient characteristics. Cox proportional hazards regression assessed the relationship between time from diagnosis to surgery with distance and race while controlling for ADI, age group, hospital, stage, grade, smoking, and alcohol history as well as estrogen receptor, progesterone receptor, and human epidermal growth factor receptor 2 status.

Results: A total of 10,599 patients were included in our analysis (8,631 neoadjuvant patients excluded due to impact on surgery timing). Black patients had shorter distances to treatment facility than White patients (24.1 v. 33.1 miles, $p<0.01$) yet showed increased time from diagnosis to surgery (64.7 v. 51.3 days, $p<0.01$). When controlling for ADI and distance in Cox regression, White patients showed significantly higher likelihood for surgery (HR: 1.26, 95%CI: 1.20-1.33), implying longer time from diagnosis to surgery for Black patients.

Conclusions: Black breast cancer patients in Georgia experienced prolonged time to surgery compared to White patients, despite living closer to their treatment centers and regardless of ADI. This finding suggests that distance is not a key driver of cancer disparities, but additional local limiting factors (i.e., unreliable transportation infrastructure, patient provider relations) contribute to prolonged time from diagnosis to surgery. Further work is needed to elucidate these factors to help guide future disparity aimed interventions.

Figure. Relative likelihood of shorter time to surgery (predicted risk score) by race and distance (fitted from Cox proportional hazards model, with adjustment for confounders, p<0.01)



1380492 - The Impact of Racial Designation in the Gail Breast Cancer Risk Model: Experience in a Single-institution, High-risk Program

Charity Glass[1], Fisher Katlin[2], Marybeth Hans[2], Lydia Pace[3], Claire King[3], Eshita Sharma[3], Alison Laws[2], Robert Pride[4], Elizabeth Mittendorf[2], Tari King[2], Olga Kantor[2]

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Background/Objective: Racial/ethnic disparities in breast cancer care and outcomes are well described. Differences in care may begin as early as breast cancer risk assessment. The Gail model is a common tool used to assess risk; however, it is known to perform poorly in non-White women. To explore this further, we examined how Gail-model determined 5-year risk distribution changed in our clinic population when all other risk factors were kept the same, but race was changed to Non-Hispanic White (NHW).

Methods: All patients presenting to a comprehensive breast center with non-specific breast complaints from 2017-2020 had 5-year and lifetime Gail risk scores calculated from a routine intake survey. Race/ethnicity was self-reported. The Gail model incorporates age, race/ethnicity, age of menarche, age at first birth, family history of breast cancer, number of previous breast biopsies, and whether any biopsy showed atypical hyperplasia, to estimate a woman's 5-year and lifetime risk for breast cancer. For this analysis, patients with high-risk lesions (atypical hyperplasia or lobular carcinoma in situ) were excluded. The Gail model score was calculated for all patients with their self-reported race and then re-calculated for all patients using a race designation of NHW. Chi-square analysis was used to test for differences in risk between races. Elevated-risk was defined as >=1.67% 5-year risk of breast cancer.

Results: A total of 2,930 patients were included. There were 2,500 (85.3%) patients who identified as NHW, 187 (6.4%) as Non-Hispanic Black (NHB), 143 (4.9%) as Hispanic, and 100 (3.4%) as Asian-Pacific Islander (API). Of the overall population, 1,723 (58.9%) were identified as elevated 5-year risk by the Gail model, including 1,613 (64.6%) NHW, 35 (18.7%) NHB, 20 (14.0%) Hispanic and 55 (55.0%) API patients. When the Gail score was re-calculated at the individual patient level replacing race/ethnicity with NHW, there was an increase in the frequency of non-White patients meeting the criteria for elevated 5-year risk. Among NHB, Hispanic and API patients the percentage of women classified as being at elevated risk increased from 18.7% to 64.6%, 14.0% to 40.6% and 55.0% to 70.0%, respectively (all p-values <0.01). The Figure reflects the shift in distribution towards higher 5-year Gail risk in the race-adjusted and re-calculated models.

Conclusions: Changing the racial designation in the Gail model to NHW increases the percentage of women identified as high-risk by 45.9%, 26.6% and 15% in our NHB, Hispanic and API populations, respectively. Failure to identify women of color at elevated risk for breast cancer could contribute to long-term outcome disparities by not directing minority women to appropriate high-risk screening and potential risk-reducing interventions. As medicine moves to eliminate the inappropriate use of race in clinical decision-making, further study should investigate whether its use in the Gail model leads to underestimation of breast cancer risk in non-White populations.

FIGURE. Five-year Gail Risk Distribution by race

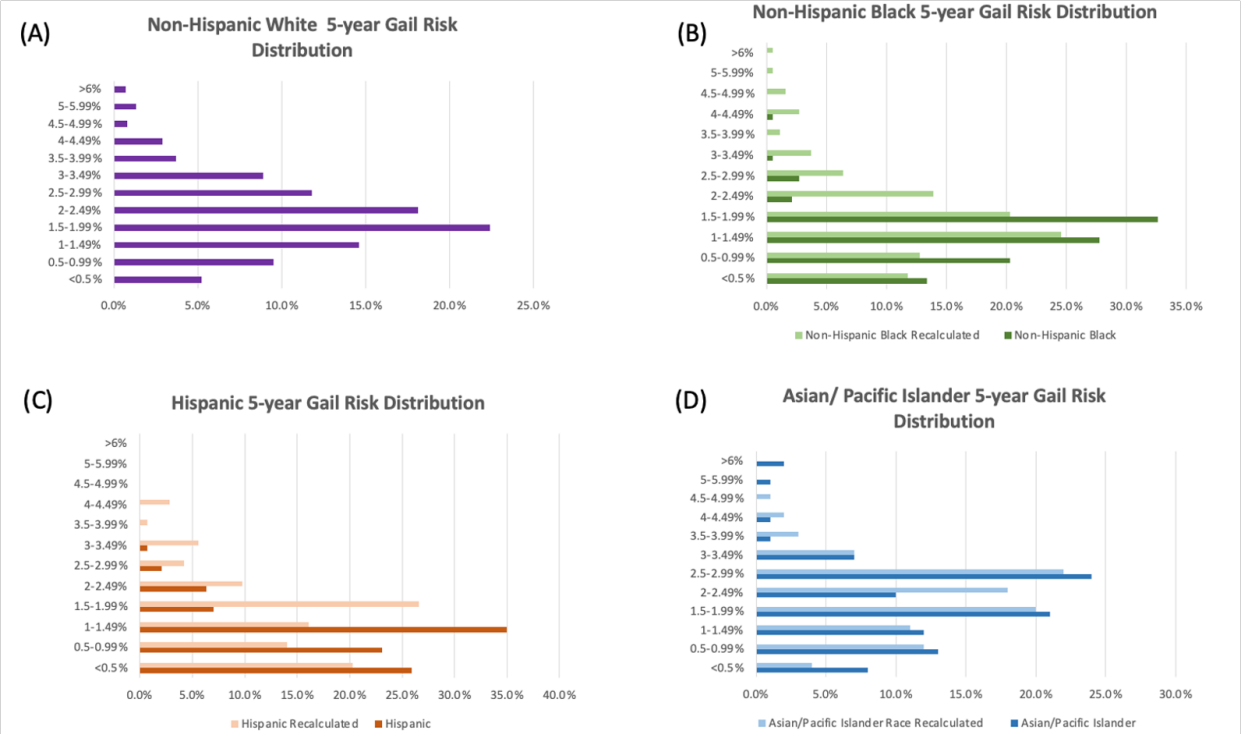

Figure: Bar graphs show the 5-year Gail risk distribution for (A) Non-Hispanic Whites (NHW) (B) Non-Hispanic Blacks with self-reported race and recalculated with race designated as NHW (C) Hispanics with self-reported race and recalculated with race designated as NHW and (D) Asian-Pacific Islander with self-reported race and recalculated with race designated as NHW.

1377368 - Characteristics of Breast Cancer in Native American Women: Analysis of an Understudied and Ill-defined Population

Kendra Modell Parrish[1], Samantha Thomas[2], Astrid Botty van den Bruele[2], Gayle DiLalla[2], Maggie DiNome[2], Carolyn Menendez[2], Laura Rosenberger[2], E. Shelley Hwang[2], Jennifer Plichta[1], Akiko Chiba[2], Hannah Woriax[2]

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Background/Objective: Breast cancer presentation among Native Americans has been marginally studied. The Indian Health Service (IHS) provides care for 2.6 of the 5.2 million Indigenous People of the United States (US). There are over 200 non-federally recognized tribes that cannot receive care at IHS facilities. While the National Cancer Database (NCDB) has American Indian race documented, most Native Americans are excluded in these databases due to logistical issues. Due to this paucity of data, we sought to quantify the characteristics of breast cancer among recorded Native Americans.

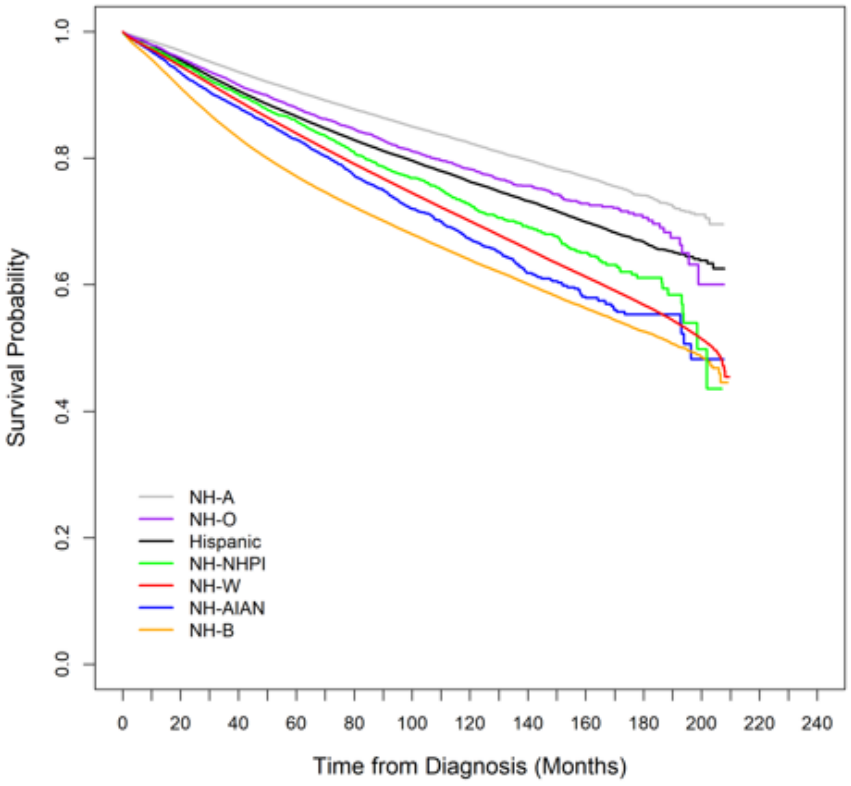
Methods: Adult female patients diagnosed with invasive breast cancer were selected from the NCDB (2004-2019). Patients were classified by reported race/ethnicity as: Non-Hispanic Asian (NH-A), Non-Hispanic Other (NH-O), Hispanic (H), Non-Hispanic Native Hawaiian or Other Pacific Islander (NH-NHPI),

Non-Hispanic White (NH-W), Non-Hispanic American Indian or Alaskan Native (NH-AIAN), and Non-Hispanic Black (NH-B). Patient demographic, disease, and treatment characteristics were compared between groups. Unadjusted overall survival (OS) was estimated using the Kaplan-Meier method with log-rank tests to compare groups. Cox proportional hazards models were used to estimate the association of race/ethnicity with OS after adjustment for available covariates.

Results: We identified 2,605,809 women in the NCDB with invasive breast cancer with known race/ethnicity, of whom 7,112 (0.27%) identified as NH-AIAN. Median follow-up time was 84.2 months. Among NH-AIAN patients, the median age was 59, 46.6% had income <$48,000, 55.8% had government insurance, 36.4% and 36.9% received treatment at facilities in South or West, respectively, 78.4% had invasive ductal carcinoma, and 54.4% were hormone receptor+/HER2-. After adjustment, NH-AIAN patients had worse OS compared to H (hazard ratio (HR)=1.47, 95% CI 1.34-1.62), NH-A (HR=1.64, 95% CI 1.49-1.81), NH-O (HR=1.46, 95% CI 1.30-1.63), and NH-W (HR=1.13, 95% CI 1.04-1.24), but similar OS compared to NH-B (HR=1.02, 95% CI 0.93-1.11) and NH-NHPI (HR=1.12, 95% CI 0.95-1.33). Among NH-AIAN patients, the following factors were associated with worse OS: none vs. private health insurance (HR=2.04, 95% CI 1.35-3.1), comorbidity score ≥2 vs. 0 (HR=2.34, 95% CI 1.8-3.06), grade 3 vs. 1 (HR=1.63, 95% CI 1.25-2.11), and cM1 vs. cM0 (HR=2.44, 95% CI 1.59-3.75). Unadjusted 5-year mortality rates for race/ethnicity groups were 9.4% (95% CI 9.2-9.6%) for NH-A, 12% (95% CI 11.4-12.7%) for NH-O, 13.4% (95% CI 13.2-13.6%) for H, 14.1% (95% CI 13.1-15.3%) for NH-NHPI, 16.1% (95% CI 16-16.1%) for NH-W, 17% (95% CI 16-18.1%) for NH-AIAN, and 22.9% (95% CI 22.7-23%) for NH-B (log-rank $p<0.001$) (Figure).

Conclusions: In the NCDB, only 0.27% of the group is classified as NH-AIAN, although NH-AIAN represents approximately 1.7% of the US population. This underscores that current methods disarrange >50% of Native Americans. Of those who were identified as NH-AIAN, breast cancer factors and biology showed significant disparity of OS. This may reflect an increased burden from social determinants of health. Research to accurately identify NH-AIAN patients is needed to describe potentially modifiable causes of these differences in this little-studied population. This study serves as a foundation to further describe and understand the disease course and lived experience of breast cancer in Native Americans.

FIGURE. Unadjusted overall survival by race/ethnicity, patients diagnosed 2004-2018



Race/Ethnicity	Total	Deaths (%)	Overall Survival Rate (95% Confidence Interval)			Log-Rank P-Value
			12- Month	36-Month	60-Month	
NH-A	78702	9501 (12.1%)	0.982 (0.981-0.983)	0.943 (0.941-0.945)	0.906 (0.904-0.908)	
NH-O	11754	1657 (14.1%)	0.976 (0.973-0.979)	0.926 (0.921-0.931)	0.88 (0.873-0.886)	
Hispanic	135719	22436 (16.5%)	0.974 (0.974-0.975)	0.916 (0.915-0.918)	0.866 (0.864-0.868)	
NH-NHPI	4893	926 (18.9%)	0.97 (0.965-0.975)	0.91 (0.901-0.918)	0.859 (0.847-0.869)	<0.001
NH-W	1890725	437739 (23.2%)	0.967 (0.967-0.967)	0.901 (0.901-0.902)	0.839 (0.839-0.84)	
NH-AIAN	6435	1469 (22.8%)	0.962 (0.957-0.967)	0.89 (0.882-0.898)	0.83 (0.819-0.84)	
NH-B	271311	75056 (27.7%)	0.947 (0.947-0.948)	0.847 (0.845-0.848)	0.771 (0.77-0.773)	
All Patients	2399539	548784 (22.9%)	0.966 (0.965-0.966)	0.897 (0.897-0.898)	0.835 (0.835-0.836)	

Abbreviations: NH-W=Non-Hispanic White, NH-B=Non-Hispanic Black, NH-A=Non-Hispanic Asian, NH-AIAN=Non-Hispanic American Indian or Alaskan Native, NH-NHPI=Non-Hispanic Native Hawaiian or other Pacific Islander, NH-O=Non-Hispanic Other.

1383707 - Young Women with Breast Cancer: Impact of Insurance Status on Surgical Approach and Effect on Recurrence and Survival

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Background/Objective: Social determinates of health, which include insurance status, race, and ethnicity, have been shown to play a role in health care decision-making and overall health care outcomes. Previously, our group has reported a significant relationship between race and surgical approach in young women with breast cancer, with African American race being associated with lumpectomy (OR 2.26, 95% CI 1.49-3.43, p<.001). We now aim to evaluate the association between insurance status and surgical approach, and the effect on recurrence-free survival (RFS) and overall survival (OS).

Methods: We performed a retrospective review of women ≤40 years old included in the Young Women's Breast Cancer Database at a single institution. Women diagnosed with non-metastatic breast cancer between 2010 and 2019 who underwent surgical treatment, either lumpectomy or mastectomy, were included in the analyses. Patients were classified based on insurance status, race, ethnicity, receptor status, and surgical approach. Descriptive statistics and multivariable logistic regression analysis were performed. Survival analyses were performed using the Kaplan-Meier technique and Cox Proportional Hazard model.

Results: We identified 700 women eligible for analysis. Of these women, 77.1% had private insurance (n=544), 1.6% had Medicare (n=11), 13.3% had Medicaid (n=93), and 6.6% were uninsured (n=46). The majority of women, 68.6%, were Caucasian (n=480), while 26.3% were African American (n=184). Reported ethnicity was 67.4% non-Hispanic (n=472), 5.3% Hispanic (n=37), and 27.3% unknown (n=191). Disease stage at presentation was 86.4% Stages 0-II and 10.9% Stage III. Of patients with invasive cancer, 16.2% were HR+/HER2+ (n=98), 50.8% HR+/HER2- (n=307), 7% HR-/HER2+ (n=42), and 20.4% HR-/HER2- (n=123). There was no difference in local or distant disease recurrence rates between surgical approach groups, lumpectomy, and mastectomy (13% vs 16.4%, p=0.22). Likewise, there was no difference in death rates between approach groups (6.5% vs 10.7%, p=0.07). On univariate analysis, there was no significant effect of health insurance status on surgical approach (p=0.49). On multivariable interaction analysis, performed to control for previously reported significant effects of African American race on surgery type, there was no effect of insurance status on surgical choice (p=0.83); this holds true among all races. Similarly, there was no effect of insurance and ethnicity on surgical choice (p=0.57). There was a statistically significant difference in OS between Medicaid and private insurance [HR = 2.38 (95% CI 1.11- 5.096), p=0.004] and between Medicare and private insurance [HR=6.80 (95% CI 2.02-22.94), p=0.004], adjusted for stage and molecular subtype. There was no significant association between insurance status and RFS, adjusted for stage and molecular subtype (p=0.09).

Conclusions: Overall health insurance status was not associated with surgical approach in young women with breast cancer. This conclusion holds true after adjusting for race and ethnicity. Private insurance was found to be associated with increased OS when compared to Medicaid or Medicare; however,

insurance status was not found to effect RFS. Continued research and data collection efforts are needed to facilitate a better understanding of the effects of insurance, as well as race and ethnicity on surgical approach and subsequent OS and RFS in young women with breast cancer.

Table. Patient demographics, and univariate and multivariable logistic regression analysis of effects of insurance status, race, and ethnicity on surgical approach in young women diagnosed with breast cancer

Demographic Characteristics, n (%)	**Overall N=700**	**Lumpectomy N=260**	**Mastectomy N=440**
Age, year		36±4	36±3.7
Insurance Status			
Private Insurance	544 (77.7)	197 (36.3)	347 (63.7)
Medicare	11 (1.6)	4 (36.4)	7 (63.6)
Medicaid	93 (13.3)	25 (37.6)	58 (62.4)
Uninsured	46 (6.6)	22 (47.8)	24 (52.2)
Factor	**OR**	**95% CI**	**P-Value**
Univariate			
Private Insurance Vs Uninsured	0.54	0.29 - 1.02	0.06
Medicare Vs Uninsured	0.54	0.14 - 2.15	0.39
Medicaid Vs Uninsured	0.58	0.27 - 1.21	0.14
Self-pay Vs Uninsured	0.24	0.02 - 2.32	0.22
Multivariable			
Insurance Status and Race			0.83
Insurance Status and Ethnicity			0.57

1375748 - Representation and Reporting of Sociodemographic Variables in Studies Using the BREAST-Q

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Background/Objective: patient-reported outcome measures (PROMs) are integral to understanding the quality of care from a patient's perspective. Previous studies show that certain patient populations are underrepresented in PROMs leading to poor generalizability. The BREAST-Q was developed in 2009 specifically to assess health-related quality of life for patients undergoing cosmetic, oncologic, and reconstructive breast surgery. While it has been translated into more than 30 languages, it is largely unknown which patient populations are completing this PROM. This systematic review of studies using the BREAST-Q aims to (1) assess the adequacy of sociodemographic reporting and (2) assess the sociodemographic characteristics of study populations.

Methods: The search strategy was implemented with 12 electronic databases and ClinicalTrials.Gov. The studies included used BREAST-Q as an outcome measure from January 2009 to November 2021. Validation studies and systematic reviews were excluded. Independent text screening and data extraction was performed using Covidence software with conflict resolution by a separate reviewer. The inclusion criteria of the included studies were assessed to determine if patients were excluded based on sex, gender, and/or language comprehension. We recorded the number of studies that explicitly provided BREAST-Q translations. We assessed the number of studies that reported the following sociodemographic variables: gender, sexual orientation, marital status, race, ethnicity, immigrant status, health literacy, education level, insurance, disability status, and religion. The sociodemographic characteristics of study populations within US studies (where data were available) was compared to 2021 US census data.

Results: A total of 500 papers were included. Mean of the mean participant's age was 47.6 years old. Biological sex was an inclusion criterion in 225 (44.6%) of papers with explicit differentiation from gender in 5 (2.2%) papers. Gender identity was an inclusion criterion in 6 (1.2%) papers. Sixty-three papers (12.6%) excluded patients that did not speak or write the national language. Of those that did not, only 2 papers (0.005%) explicitly reported that translated versions/translators were available. The frequency of sociodemographic variable reporting is demonstrated in the Figure. Black/African Americans represented 12.5% and Asians represented 6.7% (compared with 13.6% and 6.1% of the US population respectively). Hispanic patients were under-represented at 9.3% (18.9% of US population). Participants whose highest education was a high school diploma were also under-represented at 15.8% (US national average of 38.8%). Although lowest income brackets were heterogeneously defined, 19.4%

of participants had incomes below $38,500. In comparison, the US 2021 census reports 25.2% of households have an average income <$25,000.

Conclusions: This systematic review identified a lack of sociodemographic reporting in breast surgery research. Certain populations such as elderly patients, those requiring translations, non-Caucasians, Hispanics, and those of lower income or education status are underrepresented in studies using the BREAST-Q as a PROM. This significant research gap will continue to perpetuate systematic exclusions and negatively impact care in these populations unless the research community takes action.

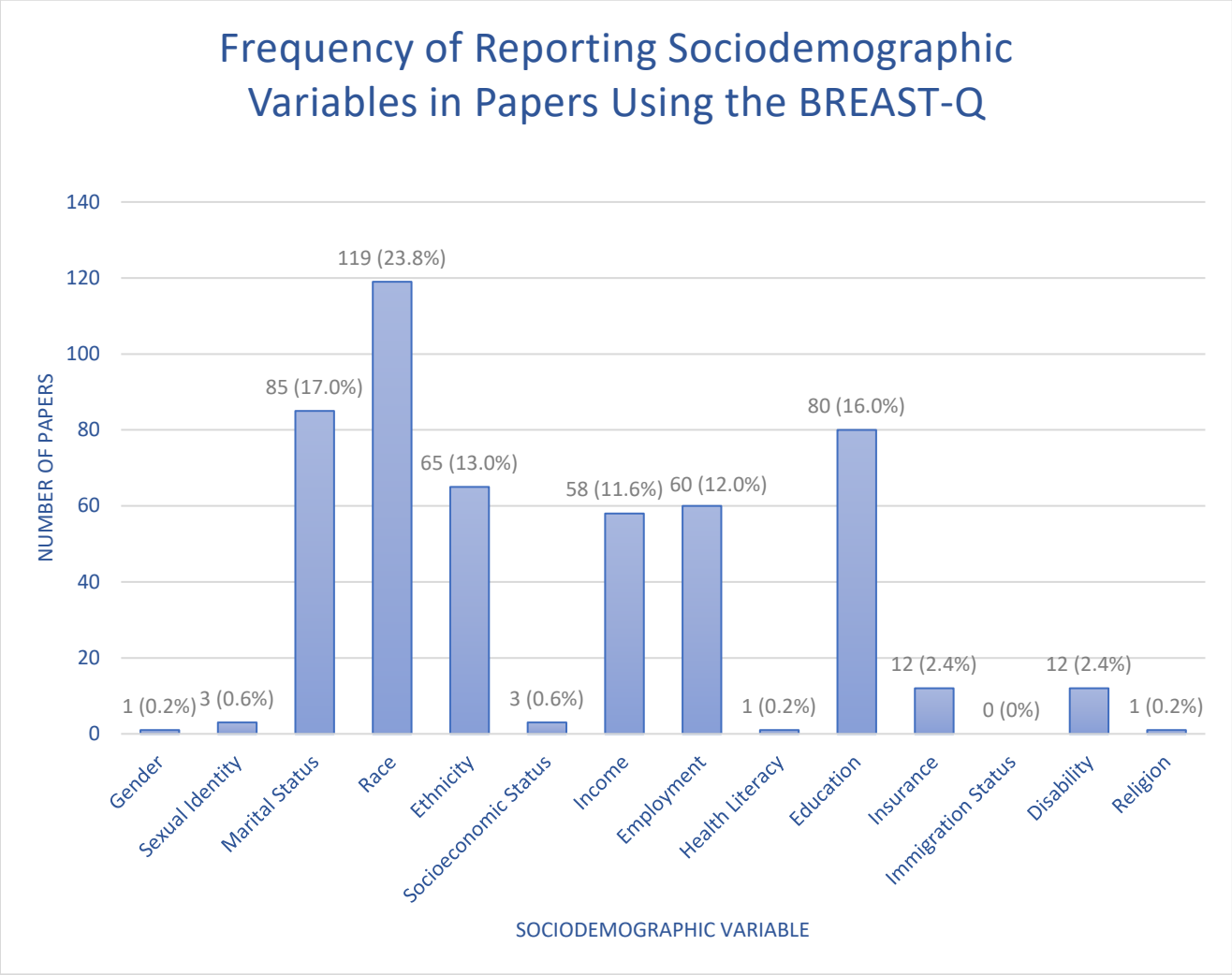

Figure 1. Frequency of Reporting Sociodemographic Variables in Papers Using the BREAST-Q

1387953 - Assessing Presentation and Time-to-Treatment Initiation in US Hispanic Breast Cancer Patients with Different Health Insurances

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Background/Objective: The Hispanic population is increasing every year in the United States (US), and breast cancer is the leading cause of female-related cancer death in this population. Delays in presentation and treatment have been associated with advanced stage of disease and poorer outcomes. Studies have proposed several possible causes for this, including socioeconomic factors and access to health care. The type of insurance coverage can be a factor as to whether a patient presents for evaluation or treatment.

Methods: A total of 187 Hispanic breast cancer patients treated at our academic center from January 2016 to September 2022 were reviewed. Only adult females over the age of 18 were selected for the study. Patients were divided into 2 main groups: Medicare/private insurance vs non-insured/Medicaid insurance. The main goal was to identify potential differences in presentation and time-to-treatment among Hispanic patients with different insurance types.

Results: The average time from presentation to tissue diagnosis was 18.74 days (SD 22.03) in the Medicare/private insurance group and 20.78 days (SD 25.27) in the non-insured/Medicaid group. There were no significant differences in the average time-to-treatment days in either group. There was a higher percentage of patients presenting with a palpable mass (63%, p-value <0.00001) in the non-insured/Medicaid group. Those patients diagnosed with breast cancer under the age of 50 had a higher percentage of presenting with a palpable mass and having a positive family history of breast cancer.

Conclusions: Breast cancer in the US Hispanic population is an understudied area, especially those in potential high-risk communities with limited access to health care. Even though not statistically significant, there was a delay of an average of 10 days from presentation to treatment in the non-insured/Medicaid group, which may have an impact in progression of staging or mortality. The most significant difference found between the 2 groups was a higher presentation with palpable masses in the non-insured/Medicaid group, which may reflect the lower utilization of mammography screening in this population. Given the long-term implications for morbidity and mortality with a later stage of diagnosis, future studies are needed to better identify those Hispanic patients who are not insured and do not obtain regular screening or those who should be assessed for high risk.

1387877 - The Results of a Long-term Breast Cancer Partnership Between a US Academic Medical Center and an Oncology Clinic in Honduras

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Kentucky, Lexington, KY, [5]St. Luke's Surgical Associates, Duluth, MN, [6]Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI, [7]Park Nicollet Methodist Hospital, St Louis Park, MN, [8]Centro de Cancer Emma Romero de Callejas, Tegucigalpa, Francisco Morazan, Honduras, [9]University of Minnesota, Minneapolis, MN

Background/Objective: Breast cancer mortality rates are disproportionately high in low- and middle-income countries (LMIC) because many patients experience extended delays to diagnosis and treatment. Breast cancer characteristics and treatment are largely unknown in the Central America-4 region (Honduras, El Salvador, Guatemala, and Nicaragua), which is the largest LMIC region in the Western hemisphere. The objective of this report is to describe breast cancer characteristics and patients in Honduras through a unique partnership between a US academic medical center and an oncology clinic in Honduras.

Methods: Most breast cancer patients were initially evaluated at an oncology clinic in Tegucigalpa, Honduras; patients were then referred to a surgical center outside the city. The surgical center is a non-governmental organization that is associated with a US academic medical center. Breast cancer surgical brigades from the US occurred approximately every 3 months. Post-operative surgical care was delivered at the surgery center by the full-time Honduran staff. Post-operative oncologic care was delivered at the oncology clinic. We performed a retrospective analysis of patients treated through this partnership. We included patients who underwent breast cancer surgery between 2016-2022. Age, cancer stage, type of surgery, and post-operative complications were determined. We also assessed the following time intervals: patient symptoms to initial physician consultation, initial physician consultation to receiving a biopsy, and biopsy to undergoing surgery. We excluded patients with Stage IV breast cancer. A logistic regression model was used to assess factors associated with Stage III breast cancer.

Results: We identified 92 patients who met our inclusion criteria. The median age was 53 years, with 12% of the cohort diagnosed below age 40 years. The median time interval between patient symptoms and initial physician consultation was 2 months. The median time interval from initial consultation to receiving a biopsy was 15 days (diagnostic interval). When excluding patients who received neoadjuvant chemotherapy, the median time interval between receiving a biopsy to surgery was 1 month. The median stage at diagnosis was Stage II. Overall, 95% of patients underwent mastectomy. Axillary management included sentinel lymph node biopsy (SLNB) alone, 47%; axillary lymph node dissection (ALND), 43%; and no axillary surgery, 10%. Post-operatively, 21% of patients had complications including wound infection and dehiscence; 1 patient had to return to the OR for tissue debridement (Table). When controlling for time between symptoms to physician visit and index times (first half vs second half of cohort), younger age (≤53 years) was associated with higher rates of Stage III cancer (p=0.04).

Conclusions: Long-term partnerships between US academic medical centers and local oncology clinics in LMICs may reduce delays to breast cancer surgical treatment. In fact, this partnership may be a contributing factor to the acceptable diagnostic interval (≤60 days is recommended) observed in this study. We found that most breast cancer patients received timely surgical treatment with acceptable post-operative complications. Additionally, many patients were spared ALND with the use of SLNB (blue

dye only). Moreover, this partnership has led to unique education and capacity-building activities. This partnership model may be impactful in other LMICs.

Table. Demographics of patients with breast cancer treated through a partnership between a US academic medical center and an oncology clinic in Honduras (2016 – 2022)

Demographics (n=92)	
Median age (years)	53
Median time intervals	
Symptoms and initial physician visit (months)	2
Initial physician visit and biopsy (days)	15
Biopsy to surgery (patients with neoadjuvant chemotherapy excluded) (months)	1
Stage	%
Stage 0 (n=1)	1
Stage 1 (n=10)	13
Stage 2 (n=35)	45
Stage 3 (n=31)	40
Procedure Type	%
Mastectomy (n=87)	95
Lumpectomy (n=4)	5
Axillary Lymph Node Dissection (n=39)	43
Sentinel Lymph Node Biopsy (n=43)	47
No Axillary Procedure (n=9)	10
Post-operative complications (%) (n=19)	21

1388010 - Surgical Decision-making in an Ethnically Diverse Population with Variants of Unknown Significance

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Background/Objective: The increased utilization of multigene panel testing has led to increased identification of variants of unknown significance (VUS), especially within racial/ethnic minorities compared to non-Hispanic Whites. The surgical decision-making following diagnosis of a variant of unknown significance (VUS) in genes implicated in breast cancer is not well understood, particularly within an ethnically diverse Hawaiian population. This study aims to examine how the presence of VUS affects the surgical management of ethnically diverse patients at risk for breast cancer.

Methods: A retrospective chart review of women ≤45 diagnosed with breast cancer at a single institution in Honolulu, Hawaii between 2016 and 2020 was performed. Information regarding ethnicity, age at diagnosis, family history of cancer, type of surgery, and genetic testing result were extracted.

Patients were excluded based on no genetic testing prior to surgery, presence of bilateral breast cancer, upstage at surgery, and non-diagnostic results. Statistical analysis consisted of Fisher's exact testing of all available data, followed by pairwise comparisons as appropriate.

Results: A total of 119 patients were found to have pathogenic or variants of unknown significance after genetic testing. Exclusions were applied to 7 patients with bilateral breast cancer, 9 patients who upstaged at surgery, 2 patients with non-diagnostic VUS, and 14 patients who did not receive genetic testing prior to surgery. Sixty-seven (77%) patients were found to have VUS, and 20 (23%) patients had pathogenic mutations (PM). Twenty-six (38%) of the VUS mutations were found to be in high or moderate penetrance genes. Patients with PM mutations received either a bilateral mastectomy (n=16, 80%) or lumpectomy (n=4, 20%). Eleven patients with VUS received bilateral mastectomy (16%), 36 lumpectomy (54%), 19 unilateral mastectomy (28%), and 1 patient did not pursue surgery (2%). Patients with a PM mutation were more likely to undergo bilateral mastectomy than patients with VUS, across all stages ($p<.001$).

Conclusions: Despite stage, patients with pathogenic mutations are significantly more likely to receive bilateral mastectomy compared to patients with VUS, highlighting the importance of genetic testing for surgical decision-making. While the clinical significance of VUS remains unknown, it was not found to be a significant predictor of bilateral mastectomy in our cohort. Increasing utilization of genetic testing in ethnically diverse populations is vital to understanding the pathogenicity of VUS, which could potentially influence surgical decision-making in this population.

1388087 - Evaluation of Awareness About Breast Reconstruction and Conservation Among Breast Cancer Patients in a Low-Resource Setting

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Background/Objective: Significant disparity exists in breast reconstruction and conservation rates in low- and middle-income countries as compared to West. Main reasons attributed are perceived lack of awareness and "hand-to-mouth existence" situations of most patients that makes survival itself take precedence over perception of aesthetics, sexual attractiveness, and quality of life. Aim: To study awareness about breast reconstruction and conservation among patients of breast cancer at a low-resource setting.

Methods: Female breast cancer patients attending the breast cancer clinic and consenting to participate in the study were included. Sample size was calculated based on a presumed awareness of about 20% regarding breast reconstruction. A total of 250 patients needed to be assessed for a 95% confidence interval. Over a 2-year period, 485 patients were included in our study. The patients were given a predesigned awareness proforma in a language understandable to them to assess their awareness about breast reconstruction and conservation. They were subsequently counseled regarding breast reconstruction/conservation. After counseling, they were given the choice of whether or not to have breast reconstruction surgery/conservation. Patients refusing reconstruction were asked the reasons for

the same. The quantitative data were compared by the student t test and the qualitative data were compared by the Chi square test. The quantitative data has been presented as mean+/-standard deviation and the qualitative data has been presented in the form of frequencies. P value <0.05 was considered as significant.

Results: Mean age of our patients was 47 years (range: 18-82 years). Only about 15% (n=71) of patients were aware about breast reconstruction/conservation, and 70% (n=50) among them had only heard about reconstruction/conservation while 30% (n=21) had enough information regarding the reconstruction/conservation to make an informed choice. The most common source of information for these 71 patients regarding breast reconstruction/conservation was internet illiteracy, low socioeconomic status, rural background, older age negatively correlated with awareness about breast reconstruction. (Table) After awareness assessment, in-depth counselling of patients regarding different breast reconstruction options/conservation was undertaken. After counselling, when patients were asked if they would like to opt for reconstruction/conservation, about 49% (n=239) answered in affirmative. Among the 246 patients who refused reconstruction/conservation, 61% cited old age, 26% socioeconomic status, and 13% fear of complications risking delay in adjuvant treatment as the reasons for refusal.

Conclusions: Awareness about breast reconstruction and breast oncoplasty is extremely low in developing countries resulting in marked disparity in breast reconstruction/conservation rates in developing countries. However, after counselling, a significant proportion of same women consented for breast reconstruction/oncoplasty. Educational intervention through print and social media are essential to improve care treatment in low-resource settings.

Table. Factors influencing awareness about breast reconstruction/conservation among breast cancer patients

		YES	NO	Pr
AGE	<50 Years	45	260	0.000
	>50 Years	16	154	
LITERACY	<Graduate	28	361	
	Graduate			0.000
	>Graduate	38	58	
SOCIOECONOMIC STATUS	Low	9	61	0.000
	Middle & above	62	223	
PROFESSION	Home maker	50	392	0.000
	Working	21	22	
RESIDENCE	Rural	4	147	0.000
	Urban	71	414	

Genetics

1386125 – The Impact of Surgeon-initiated Genetic Testing on Time to Surgery for Women Newly Diagnosed with Breast Cancer

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Background/Objective: Pre-operative genetic testing can delay surgical decision-making and prolong time to resection for patients newly diagnosed with breast cancer. Because treatment delay is associated with decreased survival, the goal of this study is to evaluate the impact of the introduction of surgeon-initiated genetic testing at the time of initial consultation.

Methods: Surgeon-initiated genetic testing for patients newly diagnosed with breast cancer was introduced at our institution in June 2021. Previously, genetic counselors or medical oncologists had performed it. Patients who had surgeon-initiated genetic testing were compared with patients who had genetic testing performed by non-surgeons from June 2019-2022 using a retrospective institutional database. We excluded patients who were referred for neoadjuvant systemic therapy or who underwent surgery prior to receipt of genetic testing results.

Results: A total of 144 patients met inclusion criteria. Of these, 93 patients were tested by a surgeon and 51 by a non-surgeon. The average age was 54.8 years (56 for surgeon-tested (ST) and 52 for non-surgeon tested (NST), p=0.04). Eighty-six percent of these patients were white, 9% Hispanic, and 5% Black; race distribution was equal among groups. There were 9.4% of NST patients who tested positive for a mutation compared to 5.5% of ST, with each group having a total of 5 pathogenic mutations identified. ST patients had a much shorter time to initiation of the genetic testing process with an average 1 day, compared to 8 days for NST (p=0.001), and the mean time from initial consultation to test results was 11 days and 21 days respectively (p=0.05). Mean time to surgery was 11 days faster for ST (34 vs 45 days, p=0.001). These patients were also more likely to have breast conservation (76 vs 49%, p<0.001). This significant difference was also seen in the time from consultation to surgery for the lumpectomy group, with 31 days for ST and 43 days for NST (p=0.03).

Conclusions: When a breast surgeon completed genetic testing, it led to a significantly shorter time to testing, result availability, and surgery. Given the important role of genetic testing in treatment of breast cancer patients, our results show the importance in breast surgeon-led pre-operative genetic testing.

1387130 - High PARP7 Expression Is Associated to Estrogen Response, Immune Suppression, Less Cell Proliferation, and Better Survival in Breast Cancer

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Background/Objective: Poly-ADP-ribose polymerases (PARP) are a family of 17 enzymes that have been shown to related to DNA repair. One of these enzymes, PARP7, was recently shown to increase cancer cell proliferation. In in-vitro studies, PARP7 inhibition has been shown to increase type 1 interferon and CXCL10 subsequently leading to tumor regression. Another study has linked PARP7 inhibition to an increase in estrogen receptor signaling and increased cell proliferation in estrogen-positive breast cancer. While these findings have been proven by in-vitro studies, it has yet to be translated in a clinical setting. We investigated how PARP7 expression impacts breast cancer patients.

Methods: Clinical and transcriptomic data of breast cancer patients were obtained from the Molecular Taxonomy of Breast Cancer International Consortium (n=1904), The Cancer Genome Atlas (n=1090), and Gene Expression Omnibus (n=3069) databases. The median value was used to divide each cohort into high and low PARP7 expression.

Results: High PARP7 expression was noted to have an overall survival benefit in TCGA and GSE96058 cohorts (both $p<0.05$). Earlier-stage breast cancer was associated with higher PARP7 expression in TCGA ($p<0.05$). In single cell sequence, PARP7 was predominated expressed in epithelial cells compared to other cell types consistently in 2 cohorts (both $p<0.001$). Hallmark collection gene set enrichment analysis demonstrated significant enrichment of estrogen response early, estrogen response late, and androgen response gene set to high PARP7 breast cancer, consistent in 3 cohorts (FDR <0.15 and NES >1.4). In agreement, estrogen-positive cancers had a higher expression of PARP7 in comparison to HER2-positive and triple-negative cancers ($p<0.001$). Although PARP7 was reported to inhibit type 1 interferon, interferon beta, and CXCL10 by in-vitro studies, we found no correlation between PARP7 and type 1 interferon expressions in none of the cohorts. However, we did see significant decrease in interferon beta-1 in TCGA and GSE96058 and significant decrease in CXCL10 in all 3 cohorts ($p<0.001$). PARP7 high breast cancer had significantly less infiltration of CD8, CD4, Type 1 T-helper cells, B cells, M1 macrophages, dendritic cells, and mast cells in more than 2 cohorts ($p<0.05$). On the other hand, there was no correlation between PARP7 expression and cytolytic activity. Higher PARP7 expression was associated with less tumor proliferation, lower Nottingham histological grade, and lower Ki67 expression consistently in all 3 cohorts ($p<0.001$). Consistent with PARPs known for their role in DNA repair, we found that high PARP7 had significantly lower intra-tumoral heterogeneity, homologous recombination deficiency, silent and non-silent mutations, number of segments, altered fractions, aneuploidy, and SNV and Indel neoantigens ($p<0.001$). Cell proliferation-related gene sets; E2F targets, G2M checkpoint, and MYC targets V1 and V2, were significantly enriched to PARP7 low expressing breast cancer in more than 2 cohorts (FDR <0.15 and NES <1.4).

Conclusions: High PARP7 expression is associated with increased overall survival, estrogen and androgen response, and lower cell proliferation. These results indicate PARP7 may have additional roles in breast cancer patients contrary to what has been proven in in-vitro studies.

1388325 - Exploring Breast Surgeons' Attitudes on Universal Genetic Testing: A Qualitative Study

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Background/Objective: The American Society of Breast Surgeons (ASBrS) recently released a consensus statement that genetic testing should be made available to all patients with a personal history of breast cancer. It is not clear, however, if physicians feel comfortable with universal genetic testing (UGT), nor if they have sufficient knowledge to interpret results and manage them appropriately. The purpose of this study is to explore breast surgeons' attitudes toward UGT for all newly diagnosed breast patients and identify knowledge deficits about genetic testing among physicians.

Methods: Breast surgical oncologists were identified and recruited through email invitation. Participants were consented by project team members and scheduled for a 30- to 45-minute semi-structured Zoom interview. Breast oncology surgeons were eligible if they: (a) were surgical oncology trained; or (b) were breast surgical oncology trained; or (c) had dedicated a significant portion of their surgical practice to breast oncology. Transcripts were uploaded into the qualitative analysis software, Dedoose, where they were exhaustively and iteratively coded. Codes were then organized into higher order categories and themes and data saturation was assessed.

Results: Thirty-one surgeons completed the qualitative interview, and 83.9% of participants were female. Practice settings included academic (41.9%), community-based (41.9%), hybrid (12.9%), and private practice (3.2%). Most practiced in the Midwest (71.0%). The majority (90.3%) reported having a structured genetics program, and 74.2% reported having on-site genetics access. The majority (96.8%) referred their patients to genetics for counseling. Only 9.7% reported having participated in a formal genetics training, while 32.3% reported some other type of genetics training (e.g., fellowship genetics rotation). The most common elicited theme about UGT was the logistics of ordering UGT. Most surgeons felt in-house genetic services improved access and preferred ordering genetic testing through a genetic counselor or physician. A minority of surgeons (25.8%) order UGT for all their newly diagnosed breast cancer patients, and approximately half (48.4%) of the breast surgeons reported making referrals for genetic testing based on NCCN guidelines. The second most common theme was surgeon perceptions related to the amount of specific genetics training and knowledge of the genetic panels. The majority of respondents (71.0%) reported not having specific genetic testing training, and 64.5% thought that it was needed for surgeons. Less than half of surgeons (38.7%) felt comfortable discussing genetic mutations, and the majority of them were in practice for >15 years. Lastly, 41.9% of the surgeons expressed concern about psychosocial effects of UGT on patients.

Conclusions: Many surgeons expressed concerns about the ASBrS genetic testing guidelines mainly related to discomfort with their training and psychosocial impact on their patients. Future work is needed to determine how to improve surgeon's expertise and comfort level in UGT for all newly diagnosed patients.

1381692 - Breast Cancer Outcomes in Women with gBRCA Mutation-associated Ovarian Cancer

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Background/Objective: Women with ovarian cancer (OC) are offered germline genetic testing for mutations in BRCA1 and BRCA2 genes. Those carrying a pathogenic variant are at increased risk of developing breast cancer (BC), yet there are no specific guidelines for managing BC risk in this context. The aim of this study was to analyse long-term BC-related outcomes of patients diagnosed with gBRCA pathogenic variant associated OC.

Methods: Local approval was granted. The hospital clinical genetics database was interrogated to identify women with a germline BRCA1/2 pathogenic variant and OC between January 2010-March 2020. Patient demographics, OC treatment, and BC outcomes were analysed.

Results: A total of 148 women were diagnosed with OC and BRCA1/2 pathogenic variant in the study period. Forty-seven patients were excluded as they had genetic diagnosis but didn't have treatment at our institution, leaving 101 women. Sixty-four (63.3%) had pathogenic BRCA 1 variant and 37 (36.6%) pathogenic BRCA 2 variant. Median age at diagnosis of OC was 52 years (IQR 46–61). Seventy-four (73.3%) were FIGO Stage III/IV OC. Twenty-two (21.8%) women had PARP-inhibitors as part of their management. Fifty-five (54.4%) women developed OC recurrence at median follow-up of 30 months (IQR 18-54). Twenty-one (21%) women had BC. Thirteen (12.9%) had BC before OC, 3 (3%) synchronous with OC, and only 5 (4.9%) after OC. Two (2%) women had bilateral risk-reduction mastectomy (RRM) before the diagnosis of OC. Of the 13 women with BC before OC, only 4 had BRCA testing at the time of BC diagnosis, the remaining 9 were tested at the time of the subsequent OC diagnosis. Six (7.2%) patients underwent RRM after treatment for OC. Four patients were FIGO Stage I-II. Median time from OC to RRM was 41 months (19-79). Two had no reconstruction, 2 had implant-based, 2 had autologous reconstruction. One patient had an ovarian recurrence treated, and currently, all patients are disease-free (median follow-up 30 months). After excluding those who were diagnosed with BC before/synchronous with OC and those who have undergone RRM, there were 77 patients. At a median follow-up of 62 months, 4 (5.2%) women have been diagnosed with BC, 1 has developed metastatic BC.

Conclusions: Risk of OC recurrence was high. The incidence of BC in women who previously had OC was only 5.3%, likely due to the competing risks of OC-related death and possibly due to the impact of PARP-inhibitors on BC risk. Thirteen percent of women had BC before OC. Testing for mutations at the time of BC diagnosis provides an important opportunity to prevent OC by undertaking risk-reduction ovarian surgery. RRM can safely be undertaken in carefully selected patients; however, we recommend reserving this for women who have a favourable OC prognosis and at least 2-3 years of disease-free survival after OC treatment. PARP inhibitors have demonstrated to improve overall survival in OC. This

cohort spans the change in OC treatment landscape with the introduction of PARP inhibitors. It is important to monitor changes in OC prognosis and adapt recommendations about RRM in women with OC and a pathogenic variant BRCA accordingly.

1367009 - Screening Practices for Breast and Non-breast Cancers in High-risk Mutation Carriers

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Background/Objective: High-risk patients with pathogenic germline mutations have increased cancer screening guidelines. This study examines the current National Comprehensive Cancer Network (NCCN) screening practices for cancers in mutation carriers.

Methods: An institutional retrospective chart review of patients with known BRCA1, BRCA2, ATM, CHEK2, BARD1, BRIP1, PALB2 mutations were identified. Recommended screening based on NCCN guidelines for each mutation for breast and non-breast cancers were analyzed.

Results: Of 659 total patients analyzed, 253 had a BRCA2 mutation, 220 had a BRCA1 mutation, 58 had a PALB2 mutation, 51 had an ATM mutation, 48 had a CHECK2 mutation, 14 had a BRIP1 mutation, and 10 had a BARD1 mutation. Of eligible BRCA1 mutation carriers, 55% received at least half of recommended screening breast imaging. Twenty-seven of these patients had a family history of pancreatic cancer, of which only 2 (7%) were screened. Of eligible BRCA2 mutation carriers, 51% received at least half of recommended screening breast imaging. Fifty-four of these patients had a family history of pancreatic cancer; 14 (26%) were screened. Of eligible ATM mutation carriers, 43% received at least half of recommended screening breast imaging. Twelve of these patients had a family history of pancreatic cancer; 2 (16.6%) were screened. Of eligible CHEK2 mutation carriers, 57% received at least half of recommended screening breast imaging. Twenty-two (73%) of these patients had a colonoscopy as recommended. Of eligible BARD1 mutation carriers, 60% received at least half of recommended screening breast imaging. Of eligible BRIP1 mutation carriers, 37% received at least half of recommended screening breast imaging. Of eligible PALB2 mutation carriers, 64% received at least half of recommended screening breast imaging. Thirteen of these patients had a family history of pancreatic cancer, 2 (15%) were screened.

Conclusions: While recommended breast cancer screenings are being completed at higher rates, there is a need for more streamlined protocols for other cancers in this high-risk population.

1381325 - A Digital Hereditary Cancer Risk Assessment Tool Increases Identification of Patients for Genetic Testing in an Interdisciplinary Breast Cancer Clinic

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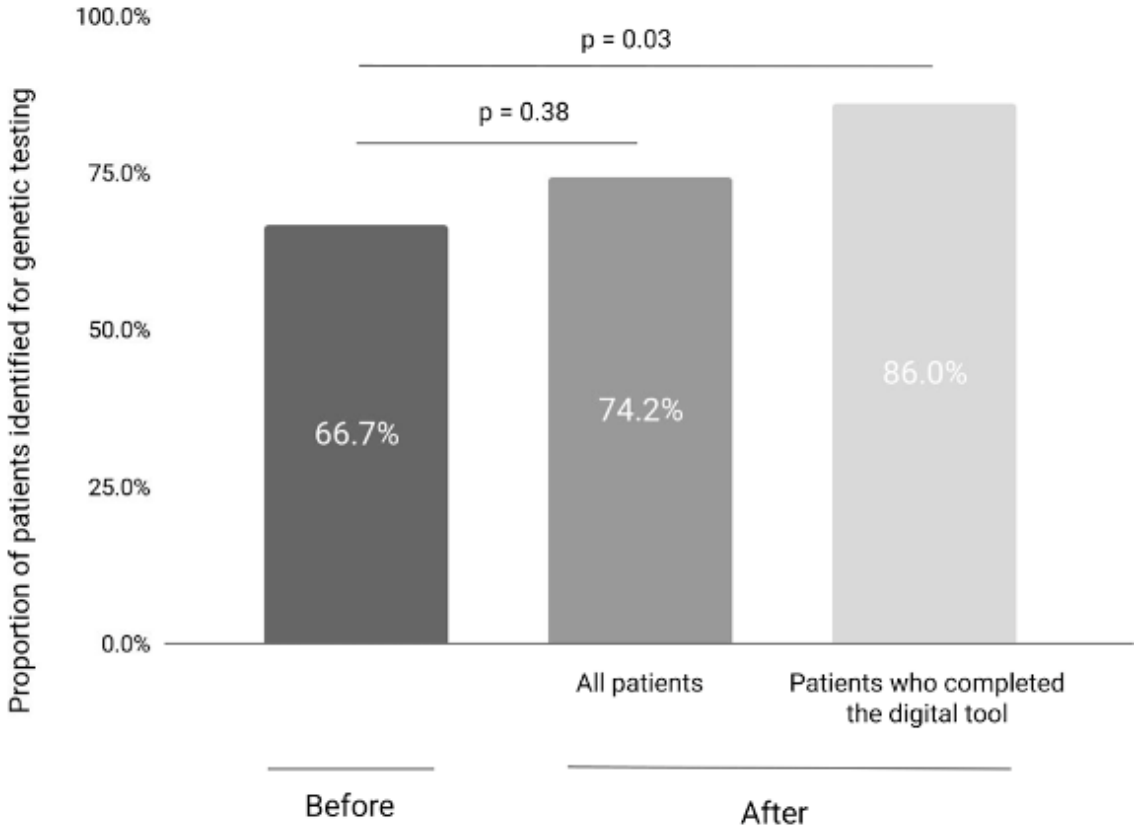
Background/Objective: Up to 10% of patients with breast cancer have a hereditary risk for additional cancers. However, patients continue to be under-identified for genetic testing by their care team. Valid and scalable approaches are needed to assist non-genetics clinicians in assessing whether a patient meets criteria for genetic testing. Furthermore, insurance coverage for genetic testing often depends on such assessments. RISE Risk Assessment Module: Hereditary Cancer is a brief, patient-administered digital tool that has been clinically validated for assessing if patients meet criteria for genetic testing. This digital tool was introduced in an interdisciplinary breast cancer clinic to support non-genetics clinicians in identifying patients for genetic testing. The clinic includes a breast surgeon, a radiation oncologist, and a medical oncologist, but not a genetic counselor. We aimed to investigate 1) the efficacy of the digital tool in identifying patients for genetic testing and 2) how patients using the tool met criteria for genetic testing.

Methods: We used a before-after study design, comparing the proportion of patients identified for genetic testing in the before group (before the digital tool was implemented) and the after group (after the digital tool was implemented). A retrospective chart review was performed on consecutive patients (before group: June 2021, after group: July to October 2022). For the before group, we extracted whether the patient had been identified for genetic testing by clinicians in the breast cancer clinic. For the after group, we extracted whether the patient had been identified for genetic testing by the digital tool, demographics, and how they met criteria for genetic testing.

Results: In the before group, 20/30 (66.7%) patients were identified by their care team for genetic testing, compared to 49/66 (74.2%) of patients in the after group identified by the digital tool (p=0.38). Of the patients in the after group who completed the digital tool (57/66 (86.0%)), 49/57 (86.3%) were identified for genetic testing by the digital tool (vs. 66.7% in the before group; p=0.03). Of those who did not complete the digital tool, 4/9 (44.4%) already had genetic testing pending. The mean age in the after group was 61.7 (SD=14.0), and nearly all were female (54/57; 94.7%). There was no association between age and completing the digital tool. Most patients (36/49; 73.5%) would not have met criteria for genetic testing without assessment of their family history of cancer. For these patients who met criteria in part due to their family history, the mean number of family members with cancer that contributed to the patient meeting criteria was 1.9 (SD=1.0).

Conclusions: A hereditary cancer risk assessment digital tool is a feasible and effective way to identify patients for genetic testing in an interdisciplinary breast cancer clinic without a genetic counselor. Family history assessment may be a key part of how the tool can support non-genetics clinicians in identifying patients for genetic testing.

FIGURE. Improvement in identification of patients for genetic testing in an interdisciplinary breast cancer clinic through implementation of a digital tool



1388020 - Racial Differences in Estrogen Receptor Signaling Pathway Activity in Breast Cancer Patients Selected for Short-course Pre-operative Hormone Therapy: A Window-of-Opportunity Trial

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Background/Objective: Epidemiological studies demonstrate racial disparities in breast cancer survival in the United States. Mortality for hormone receptor-positive breast cancer is 19% higher among Black women compared to White women, despite a lower incidence among Black women. These differences have been partially attributed to differences in tumor biology and treatment response. The purpose of this window-of-opportunity trial was to assess changes in tumor gene expression in response to a short course of hormone therapy.

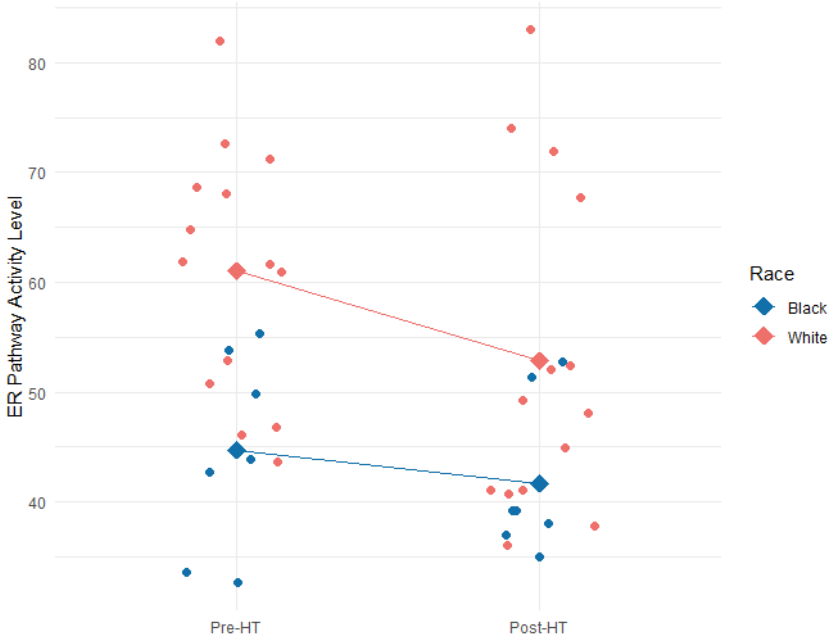
Methods: In this single-institution study, 31 patients with estrogen receptor-positive breast cancer by immunohistochemistry (ER+) who received a short course of hormone therapy (HT) ranging between 2

and 6 weeks prior to surgery in 2019 were enrolled. Male patients and premenopausal women received tamoxifen, and postmenopausal women received letrozole or exemestane. Using a novel, mRNA-based quantitative PCR assay called OncoSIGNal, the activity of 4 signal transduction pathways (androgen receptor (AR), estrogen receptor (ER), PI3K and MAPK) were measured in pre- and post-HT samples. Signaling pathway activity was reported on a standardized scale of 0 to 100, with 100 being the highest activity. Differences in signaling pathway activity were compared between White and Black patients using t-tests with alpha level=0.05. Unadjusted differences in the effect of HT on signaling pathway activity for White and Black patients were assessed using a generalized estimating equation regression model.

Results: Pre- and post-HT specimens were collected for 23 patients with ER+ breast cancer, of whom 14 (60.9%) self-identified as White, 7 (30.4%) Black, and 2 (8.7%) Asian. Black patients had lower ER pathway activity at baseline compared to White patients (44.7 vs. 61.0, p=0.002). Following HT, there was a reduction in ER pathway activity for both Black and White patients, and Black patients again were observed to have lower ER pathway activity compared to White patients post-HT (41.7 vs. 52.8, p=0.033) (Figure). The magnitude of change in ER pathway activity was smaller for Black patients compared to White patients, but this did not reach statistical significance. There were no significant differences AR, PI3K, or MAPK pathway activity between White and Black patients, at baseline or following HT.

Conclusions: Compared to White patients, Black patients who received a short course of hormone therapy (HT) for ER+ breast cancer had tumors with lower ER signaling pathway activity at baseline and following HT. Although all tumors were ER+ by immunohistochemistry, there were measurable differences in ER pathway activity between White and Black patients. There was a trend toward a smaller effect size of HT among Black patients. The novel findings of this small observational study are hypothesis generating, and further investigations are needed investigate their clinical impact on treatment response and racial differences in breast cancer epidemiology.

Figure. Estrogen receptor pathway activity, by race, before and after short-course hormone therapy



Imaging

1384692 - Utility of Breast MRI in Assessing Response to Neoadjuvant Endocrine Therapy and Altering Surgical Management

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Background/Objective: MRI has been used to assess response to neoadjuvant chemotherapy in estrogen receptor-positive (ER+), HER2-negative (HER2-) breast cancer patients. However, studies have not evaluated the utility of MRI in assessing neoadjuvant endocrine therapy (NET) response in these patients. We aimed to determine the utility of MRI in assessing tumor response after NET and evaluate its impact on surgical management.

Methods: A retrospective review of 41 postmenopausal women with ER+, HER2- breast cancer enrolled in the FELINE trial (prospective, randomized, multi-center, placebo-controlled trial comparing NET with aromatase inhibitor ± CDK4/6 inhibitor) was performed. Baseline MRI (MRI-0) and US, MRI after Cycle 3 of NET (MRI-3), US at the end of 6months of treatment (EOT), and final surgical pathology were evaluated. Response pattern between MRI-0 and MRI-3 was categorized as partial response (PR), stable disease (SD), complete response (CR), or progressive disease (PD). PR was further sub-classified as a concentric or non-concentric response depending on shrinkage of the tumor size. The initial and final surgical plans were identified by chart review of breast surgical oncologist clinic notes. Descriptive statistics, linear regression models, Chi-square, Fisher's exact tests, t-tests, and Pearson correlation coefficients were performed.

Results: There is a significant linear correlation between the size of the tumor on MRI-3 to EOT US and to final pathologic tumor size ($p<0.01$ and $p<0.05$, respectively). PR was the most common response pattern on MRI-3, seen in 35/41 (85.3%) patients. Of the patients with a PR, 25 (71.5%) had a concentric response, and 10 (28.5%) had a non-concentric response. Zero patients had CR or PD. Nineteen of 41 (46.3%) patients had a surgical plan at the initial visit. For 2 of the 19 (10.5%) patients, the plan changed at the mid-treatment visit; however, this was unrelated to MRI-3 results. Of 22/44 (50%) patients who did not have a surgical plan at the initial visit, 19 (86.3%) reported necessity of MRI-0 to develop initial plan. No PR patients had a new surgical plan or change in surgical management based on MRI-3 results. No patients with PR changed from mastectomy to lumpectomy due to MRI-3 results.

Conclusions: Although a linear correlation between tumor size on MRI-3 and final surgical pathology is present, MRI-3 did not alter surgical management. While most patients have PR to NET, even those with concentric response on MRI-3 did not have a change in surgery, and no patients converted from mastectomy to lumpectomy. Based on our results, baseline MRI is often utilized for development of a surgical plan, but subsequent MRI-3 should be used selectively as it does not alter surgical management even though it correlates with surgical pathology.

1385057 - Breast Cancer Screening and BI-RADS Assessment Category Trends in a Safety Net Population Before and During the COVID-19 Pandemic

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Background/Objective: Little is known about how social determinants of health affected the breast cancer screening clinical pathway during the coronavirus disease 2019 (COVID-19) pandemic. Our study sought to compare trends in breast cancer screening and Breast Imaging Reporting and Data Systems (BI-RADS) assessment categories in a safety net patient population before and during the COVID-19 pandemic.

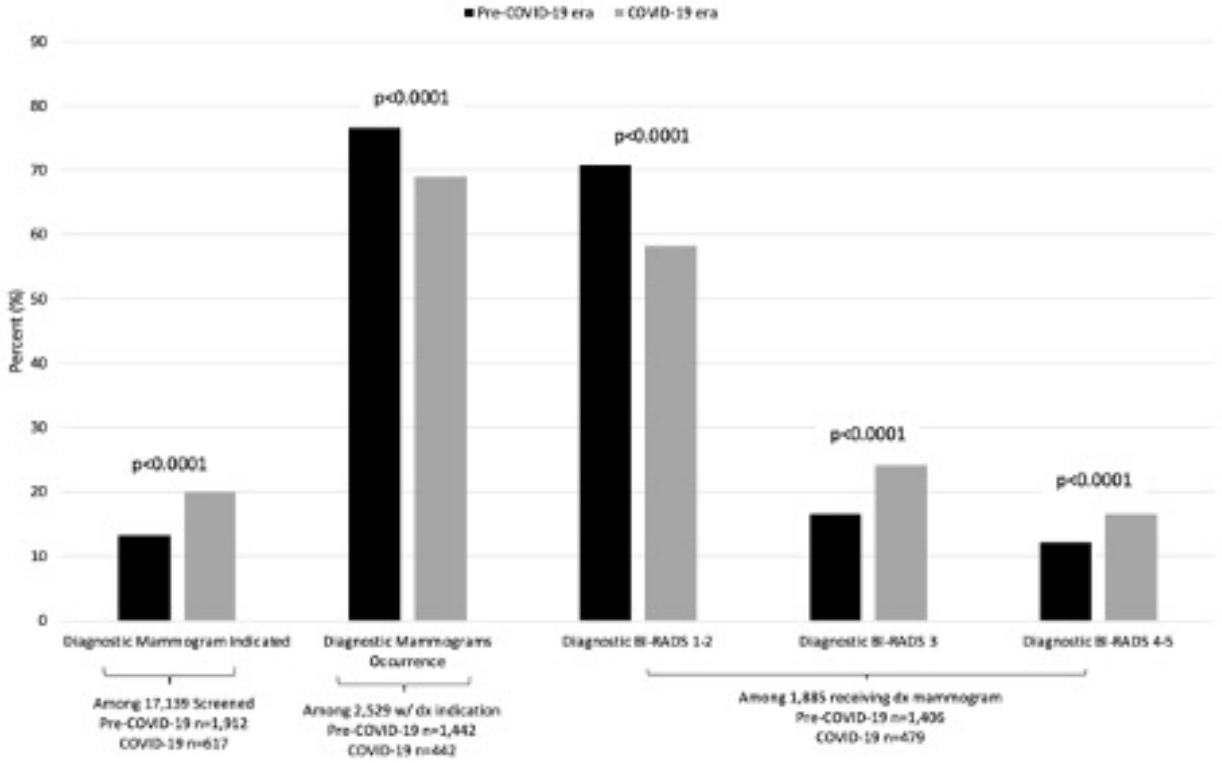
Methods: Our tertiary-care safety-net single center retrospective cohort study evaluated women ≥18-years-old with no known breast cancer diagnosis who received breast cancer screening between March 2019 and December 2020. Screening mammograms were assigned a BI-RADS assessment category (0, 1, 2). For patients assigned BI-RADS 0, we further evaluated for the receipt of diagnostic work-up and subsequent BI-RADS categorization. The screening BI-RADS score, completion of diagnostic mammogram, and diagnostic BI-RADS score were compared between the pre-COVID-19 era (3/1/2019-3/19/2020) and COVID-19 era (3/20/2020-12/30/2020). Categorical variables were compared by chi-square analysis and ordinal variables were compared by Wilcoxon test.

Results: Among the 17,193 patients identified, 13,948 (80.0%) patients had screenings during the pre-COVID-19 era, and 3,286 (20.0%) patients had screenings during the COVID-19 era. In the COVID-19 era, patients were younger (median age 57 years vs 60 years, p<0.0001) and more likely covered by private insurance (65.4% vs 60.5%, p<0.001). There was no difference in race between the 2 groups. Compared to the pre-COVID-19 era, the COVID-19 era demonstrated a greater proportion of patients with studies categorized as BI-RADS 0 (20.2% vs 13.3%, p<0.0001) and a lower proportion of BI-RADS 1 (61.3% vs 64.5%, p<0.0001) and BI-RADS 2 (18.4% vs 22.1%, p<0.0001). Among the 2,529 (14.7%) requiring a diagnostic mammogram (BI-RADS 0), 1,885 (74.5%) underwent the exam. The Figure shows this did differ between the pre-COVID-19 and COVID-19 era (76.62% vs. 69.02 %, p<0.0001). Patients who completed diagnostic evaluations were younger (53 years vs 57 years, p<0.0001) during the COVID-19 era compared to the pre-COVID-19 era. There were no differences in race and insurance between the pre-COVID-19 era and COVID-19 era. The COVID-19 era included a smaller proportion of patients with studies classified as BI-RADS 1 (25.5% vs 34.2%, p<0.0001) and BI-RADS 2 (25.9% vs 29.8%, p<0.0001) and a larger proportion of BI-RADS 3 (28.0%% vs 21.5% p<0.0001) and BI-RADS 4 (17.8% vs. 13.2%, p<0.0001) when compared to the pre-COVID-19 era.

Conclusions: In a safety net hospital, the screened population during the COVID-19 pandemic had a higher rate of private insurance but no significant difference by race prior to and during the COVID-19 pandemic, suggesting that insurance coverage is critical to ensuring access to such services. Fewer patients returned for recommended diagnostic workup from an abnormal screening exam during the

COVID-19 pandemic as compared to those prior to the onset of the pandemic, perhaps related to fear of exposure to COVID-19. Race likely did not differ between the screening eras due to efforts to provide equitable care among diverse racial groups served by our safety net hospital. We recommend ensuring patients return for diagnostic mammograms by providing patient education regarding breast cancer screenings.

Figure. Breast cancer screening trends: Pre-COVID-19 era vs COVID-19 era



1387052 - The Role of BI-RADS 4 Subcategories in Predicting Malignancy: A Systematic Review and Meta-analysis

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Background/Objective: Breast lesions categorized as BI-RADS (Breast Imaging Reporting and Data System) 4 by the American College of Radiology (ACR) encompass a wide range of likelihood of malignancy with tissue diagnosis as concordant management recommendation. This study aims to determine the malignancy rate (MR) and diagnostic value of BI-RADS 4 subcategories in predicting malignancy and to be used as a guide for surgeons and referring clinicians for management of patients with BI-RADS 4 classification.

Methods: Two independent researchers conducted a literature search of relevant studies. All titles, abstracts, and full-text versions were reviewed and screened for eligibility. Eligible studies included those reporting MR of BI-RADS 4 subcategories as confirmed by histopathologic finding. Data extraction and encoding was performed. The QUADAS-2 tool was used to independently appraise the risk of bias of each eligible study. Meta-analysis was performed using Review Manager 5.3 and Stata MP 14 software. Sub-analyses of MR were performed by: 1) study design, 2) imaging modality used, and 3) biopsy technique.

Results: Forty-three full-text studies were included. All studies were observational, and mean age ranged from 39 to 60 years. The malignancy rates of BI-RADS 4A, 4B, and 4C are 8%, 36%, and 73%, respectively. The MR of BI-RADS 4 is highly variable by subcategory, and differ by imaging modality utilized. All subcategories have high sensitivity in detecting malignancy (4A 99.15%, 4B 89.59%, 4C 66.40%), low specificity in detecting malignancy for BI-RADS 4A (27.35%), acceptable specificity for 4B (79.59%), and high specificity for 4C (96.02%). When sub-analyses were performed, the MR of BI-RADS 4A (56%) and 4B (58%) when using the combination of the 3 imaging modalities exceeded the likelihood of malignancy set by the ACR (4A: >2% to ≤10%, 4B: >10% to ≤50%). The MR of BI-RADS 4C was 95% when using MRI alone and exceeded the >50% to <95% likelihood of malignancy. These findings could be explained by the higher sensitivity of breast MRI in detecting malignancy in breast lesions as compared to mammography and ultrasound.

Conclusions: The malignancy rates of BI-RADS 4 subcategories are within the limits set by the ACR, except for those wherein the combination of all 3 imaging modalities were utilized. Current management recommendation for BI-RADS 4 is tissue diagnosis, even when the lower limit of likelihood of malignancy is 2%. BI-RADS 4A has low specificity based on this meta-analysis, which means that 72.65% of biopsied lesions were benign as confirmed through histopathology. Using BI-RADS 4B as a cutoff for malignancy, unnecessary biopsies can be reduced while minimizing missed out malignancies. Furthermore, additional imaging in patients with BI-RADS 4A can improve cancer detection rate. Although breast MRI was found to increase diagnostic accuracy, its use may be costly for low-resource settings. Cost-effectiveness analysis for additional imaging in BI-RADS 4A patients is recommended. Future studies are recommended to control the effects of variables that can potentially affect the malignancy rate.

Table. Summary of diagnostic values and malignancy rates of BI-RADS 4 subcategories

BI-RADS 4 SUBCATEGORY	SENSITIVITY	SPECIFICITY	OVERALL MALIGNANCY RATE	MALIGNANCY RATE*	LIKELIHOOD OF MALIGNANCY**
4A	99.15% (96.76-99.78%)	**27.35%** (17.94-39.32%)	8% (6-9%)	56% (43-68%)	>2 to ≤10%
4B	89.59% (83.27-93.71%)	79.59% (68.58-87.44%)	36% (32-40%)	58% (42-73%)	>10% to ≤50%
4C	66.40% (54.72-76.37%)	96.02% (93.64-97.53%)	73% (67-78%)	89% (8-100%)	>50% to <95%

Values presented at 95% CI.
* Sub-analyses with all three imaging modalities combined (Mammogram, Breast Ultrasound, Breast MRI)
** Range of Likelihood of Malignancy, American College of Radiology, BI-RADS 5th Edition

1387338 - Implementation of a Novel Patient Decision Aid for Women with Elevated Breast Cancer Risk Considering MRI Screening: A Pilot Study

Crystal Chu[1], Caleigh Smith[2], Mark Smolkin[1], Janelle Gorski[3], Randy Jones[1], Patricia Hollen[1], Lynn Dengel[1]

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Background/Objective: Despite the known value of adding magnetic resonance imaging (MRI) to breast cancer screening in high-risk patient populations, patients experience significant decisional conflict when considering this supplemental screening. The goal of this pilot study was to assess the effectiveness of a developed patient decision aid (PDA) in improving informed shared decision-making regarding breast cancer screening in a high-risk population.

Methods: Our PDA was developed and modified following international models with consultation from 5 experts to verify its content and readability. The PDA was administered among a consecutive sample of high-risk (Tyrer-Cuzik lifetime risk >20%) patients presenting to a comprehensive breast center for screening. Patients with known breast cancer history or pathologic mutation were excluded. The PDA was administered following initial consultation with their care provider and then reviewed in a follow-up discussion at the same patient visit.

Results: Twenty-four patients participated with a median age of 44 years (range 26-66). Prior to use of the PDA, 16 patients (67%) were unsure of whether to add MRI to their screening, 6 preferred MRI (25%), and 2 patients declined MRI (8%). Following PDA use, 13 of the initially undecided participants (81%) established a preference, with 11 electing to include MRI and 2 electing to omit. Of the participants with an initial preference, they all maintained the same decision following use of the PDA. Prior to the PDA, the median decisional conflict score among participants was 25% (range 0-60%) compared with 0% (range 0-25%) after the PDA. In evaluating the experience, 96% of participants considered the tool helpful, and 92% endorsed greater peace of mind about their decision following use of the PDA. The health care providers agreed that the tool was helpful and reported using the answers to guide their screening recommendations. In 3 instances, physicians' slight preferences for screening approach changed after reviewing the PDA. In 7 instances, physicians transitioned from no preference to a slight preference for their patient to pursue MRI versus not. While for 71% of visits the provider reported increased time required for consultation, the providers reported the PDA was easily incorporated into clinic workflow for all visits.

Conclusions: Our PDA was highly effective in reducing decisional conflict and supporting high-risk women in establishing a breast cancer screening preference. This approach was feasible and acceptable to both patients and providers and was easily integrated into clinical practice.

1387339 - Ultrasound Measurement of Breast Lymphedema Among Patients from Ethnically and Racially Diverse Backgrounds: A Multi-institutional Study

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Background/Objective: Breast lymphedema (BLE) is a frequent, quality of life (QoL)-impacting complication of breast cancer treatment. Incidence estimates vary from 10-90%, largely due to use of subjective definitions in the absence of a standard classifier. We expanded a pilot study of objective, ultrasound-based quantification of BLE to patients who were from traditionally underrepresented communities of color in a multi-institutional academic medical center cohort. Here we present reliability assessments and initial estimates of prevalence and severity by racial/ethnic groups.

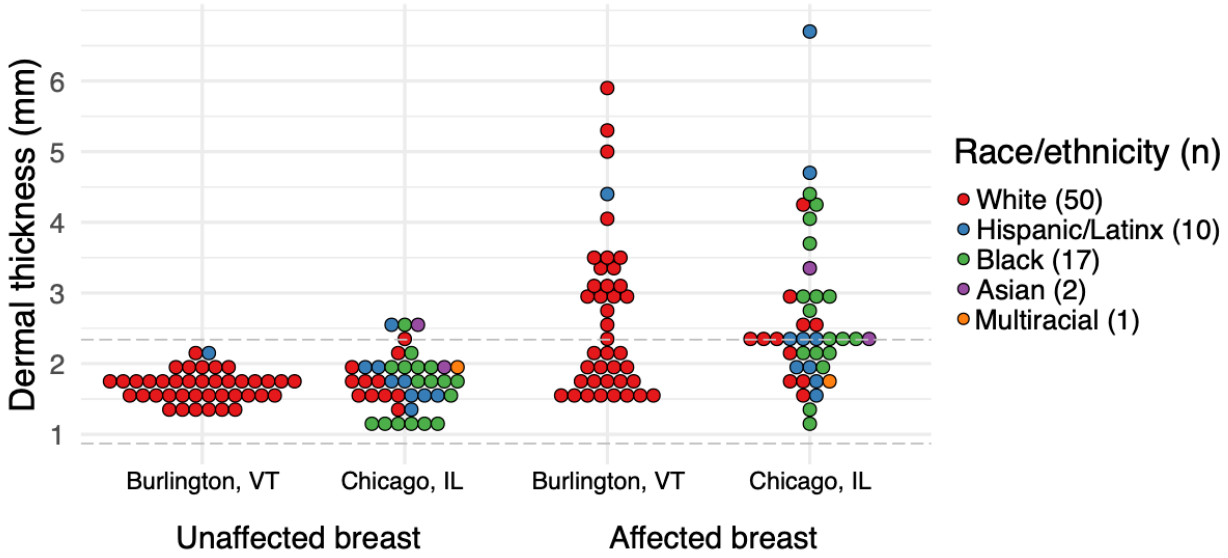
Methods: We enrolled 80 patients: 40 each from an academic center in Burlington, VT and in Chicago, IL. At each institution, 30 patients had a diagnosis of unilateral breast cancer and were treated with breast-conservation surgery and radiation; 10 patients had a benign breast condition without intervention. Chicago patients were enrolled with an emphasis on increasing ethnic and racial diversity. We used point-of-care ultrasound to measure dermal thickness of affected and unaffected breasts at the 6 o'clock position. We quantified the extent of BLE as the difference in dermal thickness between breasts. We considered BLE present if the dermal thickness difference exceeded the highest value observed in the control group (0.5mm). Patients reported QoL impact using modified DASH questionnaires and physicians reported findings from lymphedema-related physical exam.

Results: Characteristics of invasive patients were similar between institutions, with only minor imbalances in BMI, tumor size, radiation boost, and radiation dose. Distributions of ultrasound measurements were similar between institutions and according to patient race/ethnicity. Dermal thickness measurements on unaffected breasts were consistent with published normal ranges, suggesting good fidelity and transportability of the ultrasound method. Overall, 43 (72%) of the 60 invasive patients developed BLE. BLE was somewhat less prevalent among women from communities of color (prevalence=62%, 95% CI: 40%, 80%) than among White women (prevalence=77%, 95% CI: 61%, 88%), yielding a prevalence ratio of 0.80 (95% CI: 0.55, 1.17). The prevalence ratio was similar after adjustment for BMI, tumor size, and radiation parameters. Patients from communities of color were somewhat more likely to have higher dermal thickness difference values (mean=1.36mm) compared with White patients (mean=1.17mm). Among patients with ultrasound-defined BLE, 38% of patients from communities of color reported an impact on at least 1 QoL domain, compared with 73% of White patients (prevalence ratio=0.52, 95% CI: 0.25, 1.08).

Conclusions: Our racially and geographically diverse pilot study suggests that ultrasound-based comparison of dermal thickness is an objective, robust, and transportable method for quantifying BLE in women with unilateral breast cancer. While we did not observe a conclusive difference in the prevalence of BLE among patients from ethnically and racially diverse backgrounds compared to White patients, patients from communities of color showed more pronounced breast lymphedema, on average, as measured by dermal thickness difference. Patients who are White were also more likely than

patients from communities of color to report an impact on their QoL. Definitive prospective studies are required to further develop ultrasound as a measurement tool for BLE and to determine how incidence and severity of BLE vary in racially and geographically diverse patient populations.

Figure. Distribution of breast dermal thickness measurements by point-of-care ultrasound among all patients (invasive and control), according to breast status (unaffected or affected), institution (Burlington, VT or Chicago, IL), and patient race/ethnicity. Dashed horizontal lines depict normal range of healthy breast dermal thickness reported by Shi et al in a sample of 137 women with unknown race/ethnicity distribution



1387372 - Preferences and Values of Women with Elevated Lifetime Breast Cancer Risk Regarding Addition of MRI to Their Breast Cancer Screening

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Background/Objective: The National Comprehensive Cancer Network guidelines recommend consideration of MRI for high-risk women with lifetime breast cancer risk of 20% or greater. For patients where there is clinical equipoise, individual preferences, values, and risk tolerance are critical aspects to informed shared decision-making regarding screening. The purpose of this pilot study was to elicit descriptive data about patient preferences related to their perceived risk and desired screening approach.

Methods: This pilot study employed a mixed methods design. Our sample included women evaluated at a comprehensive breast center with an estimated 20-30% lifetime breast cancer risk by Tyrer-Cuzik v.8. Patients with a known pathologic mutation or personal history of breast cancer were excluded. We

administered an interactive patient decision aid assessing preferences and values related to their breast cancer risk, decision-making style, and screening options. The decision aid was reviewed by experts for content validity and readability prior to enrolling patients.

Results: Twenty-four women were enrolled with a median age of 44 years (range 26-66). Seventeen patients (71%) agreed that they are very worried about having or getting breast cancer. Twenty patients (83%) endorsed being willing to undergo any and all imaging to make sure they do not have breast cancer. Twenty-two patients (92%) would be happy to have a negative biopsy after MRI, and only 1 would be upset to have gone through an unnecessary test. Nineteen (79%) feel that they would wish they used MRI if they went with a mammogram alone and developed cancer. Only 5 (21%) endorsed claustrophobia or problems sitting still for medical tests. Nineteen patients (79%) feel that their screening choice is a personal decision, and they should not worry about the impact on relatives and friends. Fifteen (63%) preferred to make an independent decision about screening without input from family and friends, while the remainder reported seeking guidance from family and friends. Fourteen patients (58%) reported wishing their health care provider would tell them whether to get an MRI, while the remaining patients preferred to make an independent decision.

Conclusions: Breast cancer screening preferences and perceptions of breast cancer risk in this population of moderately high-risk women varied, but a vast majority of patients endorsed being willing to undergo all additional tests and imaging necessary for optimal breast cancer screening. These data help to elucidate patient attitudes that may contribute to decisional conflict, highlighting targets for counseling to increase knowledge and provide clarity for patients and physicians around relevant values, expectations, and resources.

1387613 - Unscreened and at Risk: The COVID-19 Pandemic's Effect on Breast Cancer Surveillance

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Background/Objective: On March 26, 2020, early in the COVID-19 pandemic, the American Society of Breast Surgeons and the American College of Radiology released a joint statement in which they recommended postponing all breast screening exams, effective immediately. Although this was felt to be necessary at the time given the unprecedented spread of COVID-19 and the strain on the health care system, there is now concern that this may have led to a delay in diagnosis, treatment, and an increase in unnecessary follow-up diagnostic imaging. The aim of this study is to evaluate the effects of delaying breast imaging due to the COVID-19.

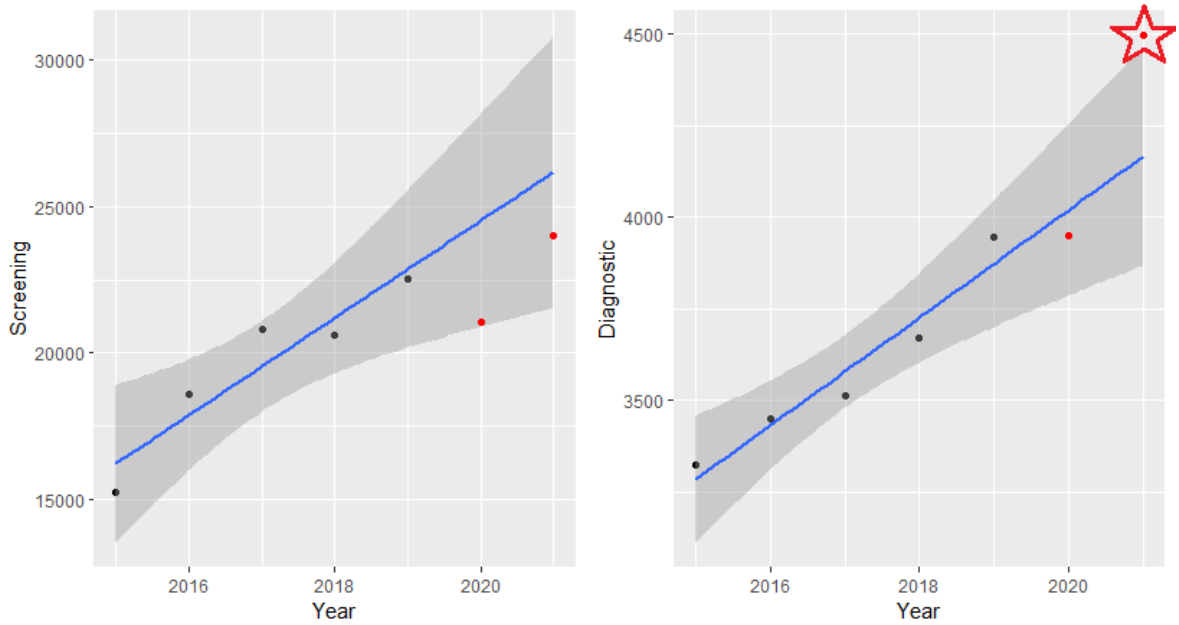
Methods: The Mammography Quality Standards Act (MQSA) database for a single hospital system's imaging centers was used to obtain data regarding the number of mammograms (screening and diagnostic) over the selected years from 2015 to 2021 and the BI-RADS scores for mammograms in a pre-COVID group compared to a post-COVID group. Pre-COVID was defined as 1/1/2019-3/27/2020. March 27th was the date that the hospital largely stopped all routine screening mammograms and

delayed many diagnostic imaging. Post-COVID was defined as 3/28/2020 – 6/30/2021. Analysis was performed using R statistical software version 4.1.2. Trend line analysis using data from 2015 to 2019 was used to observe any potential change in screening and diagnostic mammograms from 2020 forward. The distribution of BI-RADS results from pre-COVID to post-COVID was tested using a chi-squared test. Odds-ratio tests were used to investigate each BI-RADS result individually.

Results: The number of screening mammograms in 2020 were lower when compared to years 2015-2019 but fell just within the 95% confidence interval for the trend line with a total of 21,061 (CI 20,895 – 28,153). However, the number of diagnostic screenings in 2021 was significantly higher compared to years 2015-2020 and fell outside of the 95% confidence interval of the model fit, with a total of 4,496 (CI 3,869 – 4,466) (Figure). Odds-ratio tests were used to investigate each BI-RADS result individually, with BI-RADS 1 (1.04, CI 1.01 – 1.07) and BI-RADS 3 (1.14, CI 1.04 – 1.26) having significantly higher odds post-COVID. BI-RADS 4 was found to be more prevalent in the post-COVID group, however not statistically significant (1.09, CI 0.99 – 1.20).

Conclusions: The results of this study indicate that the effect of cancelling imaging at the onset of the pandemic in 2020 led to a rebound increase in diagnostic imaging in 2021. Additionally, there was a significant increase in BI-RADS 3 imaging in the "post-COVID" cohort. A lack of comparison screens from 2020 could explain the need for more diagnostic screens in 2021. This could also explain the increase in BI-RADS 3 readings due to a gap in comparison imaging between 2019 and 2021. Future studies will include identifying the reasons for increased diagnostic imaging in 2021 and ultimately evaluating whether the increase in BI-RADS 3 and 4 in this cohort of patients led to an increase in cancer diagnoses.

Figure. Screening and diagnostic mammograms, 2015-2021



1387728 - Can the Clinical Utility of iBreastExam, a Novel Device, Aid in Optimizing Breast Cancer Diagnosis? A Systematic Review

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Background/Objective: Early detection of breast cancer significantly dictates the mortality rates and the treatment outcome. In lower- and middle-income countries (LMICs), breast cancer presentation is usually late-stage, contributing to a higher mortality rate. Multiple factors contribute to late presentation and a higher mortality rate in LMICs, ranging from a lack of early clinical evaluation, screening, and diagnosis to limited treatment options, resulting in underdetection and, consequently, lower incidence and higher mortality. To bridge some of these concerns, a portable, cost-effective, easy-to-use, handheld Intelligent Breast Exam (iBE), which is a wireless, radiation-free device, can be an invaluable screening tool in resource-limited settings. Despite promising results, prior studies have demonstrated a wide range of iBE sensitivity. While multiple studies evaluating the clinical utility of iBE have been conducted across the globe, there are no cumulative studies evaluating the iBE's performance. Therefore, a systematic review was conducted to summarize the state of current technologies, benchmark the existing performance of this screening device, and understand areas for improvement. This review aims to determine the clinical utility and applicability of iBE compared to clinical breast exam (CBE), ultrasound, and mammography and discuss its strengths and weaknesses in optimizing breast-cancer screening.

Methods: A systematic review was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Four electronic databases were searched: PubMed, Cochrane Library, Web of Science, and Google Scholar. The electronic search strategy included the following keywords: "iBreastExam," "iBreast[space]Exam," "iBE," "low resource," and "piezoelectric fingers" in "breast cancer."

Results: The review included 11 studies with a total sample size of 16052 breasts from 8025 women and 1 man. The mean age of the individuals ranged from 42 to 58 years old. The sensitivity and specificity of the iBE ranged from 34.3%-86% and 59%-94%, respectively. For malignant lesions, iBE demonstrated a moderate to higher diagnostic capacity ranging from 57% - 93% and could identify tumor sizes spanning from 0.5cm-9cm.

Conclusions: Our findings underscore the potential clinical utility and applicability of iBE as a pre-screening and triaging tool, which may aid in reducing the burden of patients undergoing diagnostic imaging and preventing overutilization of hospital resources in LMICs, where resources are already scarce. Furthermore, iBE has been shown to diagnose cancers as small as 0.5cm, which can be a boon in early detection and reduce mortality rates. However, the encouraging results of this systematic review should be interpreted with extreme caution due to the device's low sensitivity and high false-positive rates. Nonetheless, future studies with a larger sample size having different breast mass sizes and densities are recommended using the iBE Gen II to determine whether there are any improvements over its predecessor in diagnosing breast masses, which will further aid us in defining the potential efficacy of iBE.

Table. Study findings of iBreastExam vs. diagnostic imaging for positive exam detection

Study	Classification of finding	iBE vs. diagnostic imaging				
		Sensitivity	Specificity	NPV	PPV	Accuracy
Mango et. al. (2022)	Any positive finding	63%	59%	56%	66%	61%
	Suspicious finding [a]	86%	50%	98%	14%	53%
Valdez et. al. (2022)	Positive finding by quadrant	20%	92%	97.2%	7.7%	89.7%
	Positive finding by breast	60%	78%	96.6%	15.8%	76.9%
Clanahan et. al. (2020)	Any positive finding	34.3%	80.3%	94%	11.9%	77.0%
Nair et. al. (2020)	Any positive finding	86%	91%	98%	49%	90.5%
Costa et. al. (2020)	Any positive finding	73.9%	88%	25.8%	94.6%	84.1%
Somashekhar et. al. (2016)	Any positive finding	84%	94%	98%	60%	93.1%
Broach et. al. (2016)	Positive finding by quadrant	85.7%	89.4%	95.6%	70.2%	88.6%
	Malignancy [b]	83%	74.5%	99%	10.6%	74.9%
Xu et. al. (2013)	Any positive finding	87%			72%	
	Malignancy [c]	80%				
Xu et al. (2016)	Any positive finding	96%				
	Malignancy [c]	94%				

[a] BIRADS 3-5

[b] BIRADS 0, 4-6

[c] Pathology confirmed, or BIRADS 4-6

1387764 - Subgroup Analyses of Breast Conservation vs Mastectomy in the Utility of Nodal Basin Staging Ultrasound in Early-stage Breast Cancer

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Background/Objective: Nodal basin staging ultrasound can guide treatment decisions for early-stage breast cancer (BC) patients, yet its usage has not been consistent. Our program implemented a routine nodal basin staging ultrasound protocol for all newly diagnosed BC patients in 2013, and our previous study demonstrated the impact of this protocol on pathologic staging as well as rates of neoadjuvant chemotherapy (NAC), axillary radiation, and axillary lymph node dissection (ALND) for early-stage BC patients. We aimed to perform subgroup analyses on the same metrics based on receptor status and breast surgery type (lumpectomy vs. mastectomy, reconstruction vs no-reconstruction).

Methods: We performed a retrospective review of patients with clinical Stage I and II BC from 2009-2012 and 2015-2018. The pre-intervention group included patients in 2009-2012 who did not undergo routine nodal basin ultrasound whereas the post-intervention group included patients in 2015-2018 who did undergo routine nodal basin ultrasound. We then compared the distribution of patients based on receptor status as well as pathologic staging and rates of neoadjuvant chemotherapy (NAC), axillary radiation, and axillary lymph node dissection (ALND) pre- and post-intervention for patients undergoing lumpectomy, mastectomy, and mastectomy with and without reconstruction. Chi square and Mann Whitney U Tests were used for the statistical analyses.

Results: There were 586 patients in the pre-intervention group and 1,232 patients in the post-intervention group. There was no statistically significant difference in the distribution of receptor status and clinical staging between the 2 groups. There was no difference in the rate of neoadjuvant chemotherapy between pre-and post- intervention group in either lumpectomy or mastectomy patients. We found a statistically significant difference in the rate of axillary radiation in the lumpectomy patients, while there was a statistically significant difference in the rate of axillary dissection in the mastectomy patients pre- and post-intervention. We also found a difference in the distribution of pathologic staging in our mastectomy patients. For those patients undergoing mastectomy with reconstruction, we found a statistically significant difference in the rate of axillary dissection as well as in the distribution of pathologic staging pre- and post-intervention. We found a statistically significant difference in the rate of neoadjuvant chemotherapy for those undergoing mastectomy with no reconstruction pre- and post-intervention.

Conclusions: Our study demonstrated a higher rate of axillary radiation in the lumpectomy patients and a higher rate of axillary dissection in the mastectomy patients after our adoption of a nodal basin staging ultrasound. Our study also suggests a downstaging effect in the pathologic staging for mastectomy patients pre-and post-intervention. The routine use of nodal basin ultrasound is an important tool in treatment decisions for early-stage breast cancer.

1387797 - Impact of Imaging After Neoadjuvant Chemotherapy on Surgical Management of Breast Cancer

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Background/Objective: Neoadjuvant chemotherapy has been used in a variety of cancer treatments to transform inoperable tumors to operable tumors. Within breast cancer treatment, it has successfully been used to increase the rates of breast-conservation therapy. There have been several studies that have evaluated the accuracy of various imaging modalities predicting pathologic complete response, but very few have evaluated if imaging after completion of neoadjuvant chemotherapy impacts surgical management. We hypothesized that repeat imaging after neoadjuvant chemotherapy would increase rates of breast-conservation therapy and decrease the rate of positive margins needing re-operation.

Methods: A retrospective chart review was performed on patients between 18-89 years of age at the time of their breast cancer diagnosis, who underwent neoadjuvant chemotherapy between 2013 and 2021. Data collected included demographics, tumor characteristics, stage at diagnosis, genetic testing, surgery performed, margin status, reoperation, and whether or not patients had imaging after neoadjuvant chemotherapy. Categorical variables were analyzed by Fisher's exact test. Continuous variables were analyzed by independent T-test.

Results: A total of 192 patients were reviewed. All patients were female, and ages ranged from 24 to 85, with most patients being in their fourth or fifth decade of life. Thirty-five percent of the patients had triple-negative tumors, and 45% had HER2+ tumors. Fifty-six patients (30%) had positive genetic panels, 14 of which were BRCA-positive (7%). When comparing patients who had imaging after neoadjuvant chemotherapy to those who didn't, there was no statistically significant difference between age, race, stage at diagnosis, tumor characteristic, or genetic testing results. Those who had imaging prior to surgery were more likely to have a partial mastectomy over mastectomy (p=0.036). There was no statistically significant difference in margin status or conversion to mastectomy.

Conclusions: Our study suggests that imaging after neoadjuvant chemotherapy corresponds to a statistically significant increased rate of partial mastectomies, without increasing the need for re-excisions or conversions to mastectomies. This study is limited by its sample size, and further research is needed to determine how much of a role repeat imaging has in surgical management of breast cancer.

Table. Patient and tumor characteristics with surgical outcomes

	Patients Who Did Not Receive Imaging Post-Neoadjuvant (n=46)	Patients Who Received Imaging Post-Neoadjuvant (n=146)	P Value
Age (Median, 95% CI)	49 (95% CI: 45-53)	51 (95% CI: 48-55)	0.57
Age at Diagnosis			
20-29	2 (4.3%)	7 (4.8%)	0.61
30-39	7 (15.2%)	22 (15.1%)	
40-49	17 (37.0%)	35 (24.0%)	
50-59	8 (17.4%)	42 (28.8%)	
60-69	9 (19.6%)	27 (18.5%)	
70-79	3 (6.5%)	10 (6.8%)	
80-89	0 (0%)	3 (2.1%)	
Race			
Caucasian	26 (56.5%)	89 (61.0%)	0.87
African American	16 (34.8%)	45 (30.8%)	
Asian	4 (8.7%)	10 (6.8%)	
Hispanic	0 (0%)	1 (0.7%)	
Other	0 (0%)	1 (0.7%)	
Sex			
Male	0 (0%)	0 (0%)	-
Female	46 (100%)	146 (100%)	
Cancer Type			
Invasive Ductal Carcinoma	42 (91.3%)	143 (97.9%)	0.058
Invasive Lobular Carcinoma	4 (8.7%)	3 (2.1%)	
Stage at Diagnosis			
Tis/0	0 (0.0%)	1 (0.7%)	0.48
Stage I	9 (19.6%)	30 (20.5%)	
Stage II	23 (50.0%)	86 (58.9%)	
Stage III	14 (30.4%)	27 (18.5%)	
Stage IV	0 (0.0%)	2 (1.4%)	
Genetic Testing			
Not Tested	20 (43.5%)	54 (37.0%)	0.34
Negative	11 (23.9%)	51 (34.9%)	
BRCA (+)	3 (6.5%)	11 (7.5%)	
VUS	7 (15.2%)	24 (16.4%)	
Other (Chek2, p53, NBN, APC)	5 (10.9%)	6 (4.1%)	
Tumor Characteristics			
HER2 Positive	24 (52.2%)	63 (43.2%)	0.31
Triple Negative	16 (34.8%)	51 (34.9%)	1.00
Surgery			
Partial Mastectomy	11 (23.9%)	61 (41.8%)	0.036
Mastectomy	35 (76.1%)	85 (58.2%)	
Nodal Surgery			
None	1 (2.2%)	2 (1.4%)	0.17
SLNB	31 (67.4%)	116 (79.5%)	

1388381 - MRI Study of Non-wire Localisation Devices for Clinically Occult Breast Tumor Localization

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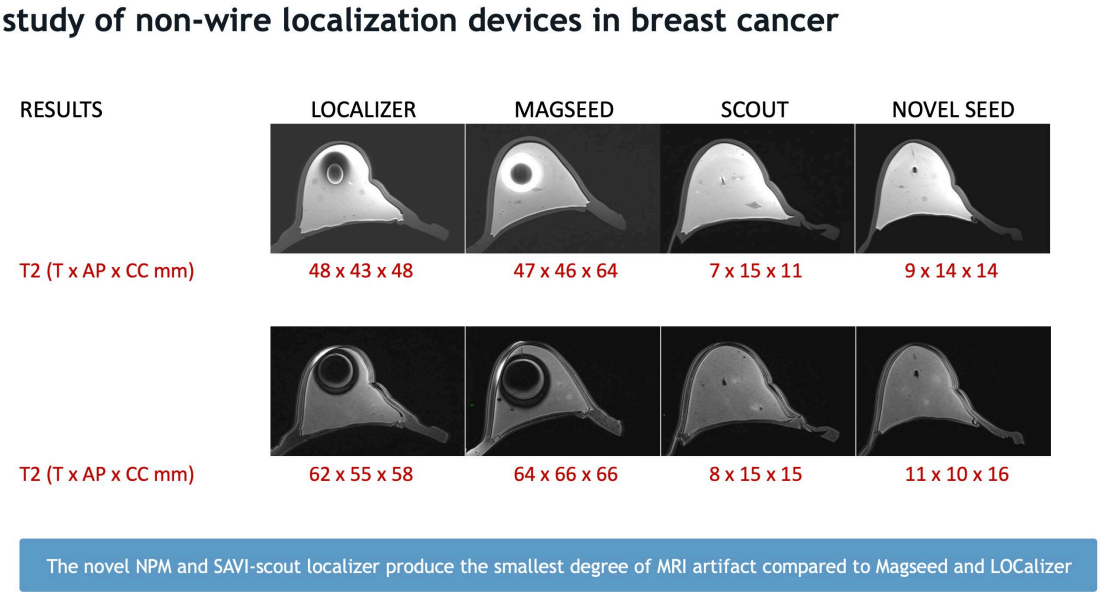
Background/Objective: Wire localisation (WL) has been the standard of care for clinically occult breast tumor localisation since the 1970s. Whilst WL remained reliable, well tolerated, and cost effective, they were often painful and required close coordination of radiological and theatre scheduling. As a result, alternative localization techniques have been developed and are now widely adopted. Neoadjuvant chemotherapy (NACT) has enabled de-escalation in axillary management (targeted axillary dissection) and may facilitate increased breast-conserving surgery. This requires localization prior to commencement of NACT. Magseed® is a small (1mm x 5mm) paramagnetic seed that has been used in both the breast and axillary lesion localization setting. It is, however, MRI conditional, and has a notable MRI artifact (4cm).

Methods: For the 4 different NWL devices (LOCalizer™, Magseed®Marker, Savi Scout®, and a novel paramagnetic seed (NPS)), were placed under ultrasound guidance into a CRIS model 073 multi-modality breast training phantom, centrally and in a vertical orientation, 3cm deep. Scanning was undertaken on 2 different MRI systems (Siemens 1.5T Magnetom Avanto and Siemens 3T Magnetom Verio). A T1-weighted 3D fast low angle shot (FLASH) sequence with fat suppression plus a 3D T2-weighted turbo spin echo (TSE) sequence were acquired on the Siemens 1.5T system. On the Siemens 3T an equivalent T1-weighted 3D FLASH sequence was acquired, but the T2-weighted TSE was a 2D sequence. The MRI artifact of each NWL was measured in 3 dimensions – transverse, AP, and CC recon (mm).

Results: For all devices, the MRI artefact was measured in the following planes - transverse x AP and craniocaudal. These are demonstrated in the Figure.

Conclusions: Based on these data, we feel it is possible to use Magseed Biopsy® at the time of biopsy in patients having NACT patients. This is the first description of this novel paramagnetic seed in an MRI setting, and we will be undertaking further research comparing imaging with other non-wire-guided technologies available. This novel paramagnetic technology produces a significantly reduced MRI artifact compared to previous Magseeds, enabling placement at time of biopsy in those patients undergoing NACT.

Figure. Siemens 3T T2 and T1 GRE sequences of LOCalizer, Magseed, SAVI-scout, and novel paramagnetic seed, with dimensions highlighted (transverse, AP, and CC reconstruction)



1388347 – Six-month Follow-up Imaging After a Benign Breast Biopsy Is in Question

Camille Swain, Carmen Lam, Michelle Pershing, Amy Maduram, Max Hall, Erica Villa, Ellen Neumann, Nicole Werwie, Kelly Mackessy, Deepa Halaharvi, Mark Cripe
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Background/Objective: Percutaneous breast biopsies number 1.5 million annually in the United States. Approximately 75% of the results are benign. The current National Comprehensive Cancer Network guidelines recommend patients undergo follow-up imaging at 6 or 12 months after a radiologic-pathologic concordant benign biopsy result. At our large, multicenter institution, 6-month follow-up imaging is currently common practice. However, the increased cost and potential anxiety to the patient may be unnecessary. The purpose of this study is to determine how often a malignancy is identified on 6 month-follow-up imaging after a benign percutaneous breast biopsy.

Methods: This study is an IRB-approved retrospective review of all patients between 2017-2021 who received a benign result after percutaneous breast biopsy at our multicenter institution. Inclusion criteria were women over 18 years of age and radiology-pathology concordance with the result. Patients who did not have 6-month follow-up post-biopsy imaging were excluded. The primary outcome of interest was the incidence of malignancy found on 6-month follow-up imaging after a benign breast biopsy. We evaluated cost as well as lesion imaging characteristics, biopsy needle gauge, number of cores obtained, and potential radiographic association of malignancy found on follow-up imaging.

Results: An interim analysis of 1662 patients meeting inclusion criteria indicates that only 6 (0.36%) were found to have malignancy at 6-month follow-up imaging. The 6 cancers included ductal carcinoma in situ (2) and invasive ductal carcinoma (4). Cost of diagnostic imaging varies; however, the self-pay

rates at our institution are $540.80 for a diagnostic mammogram, $554.45 for a unilateral breast ultrasound, and $1,491.75 for a breast MRI. On 6-month follow-up imaging, 47.1% of patients had an ultrasound, 32.3% had a mammogram, 18.9% had both mammogram and an ultrasound, and 1% had an MRI. Using self-pay rates, the estimated average per patient cost associated with 6-month follow-up imaging was $627.62 (SD: 263.48, min: $540.80, max: $2587.00). The majority of the core needle biopsies were vacuum assisted, 64.2%. The needle gauge sizes ranged from 8 gauge to 18 gauge with the most common being 14 gauge. The mean number of cores obtained was 4.3.

Conclusions: The incidence of malignancy identified on 6-month follow-up imaging after a benign percutaneous breast biopsy was less than 1% in our cohort. The additional cost to the health system was approximately $1,043,104 in our patients. Our results show that returning to age- and risk-appropriate screening instead of 6-month follow-up imaging is safe and appropriate for the majority of patients.

1388353 - Application of American Society of Breast Surgeons Consensus Axillary Management Guidelines for cT1-2N0 Cases with Positive Lymph Node Needle Biopsy: Should We Continue With Axillary Ultrasound?

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Background/Objective: Multiple landmark trials have been published in the past decade identifying opportunities to safely limit axillary surgery in cases of limited nodal metastasis. This has led the ASBrS to release official consensus guidelines on axillary management for breast cancer patients. Within these guidelines, targeted sentinel lymph node biopsy is recommended for cT1-T2, palpably node-negative patients with a positive lymph node core needle biopsy undergoing primary surgery, as many of these patients would otherwise meet ACOSOG Z0011 or AMAROS criteria to defer axillary lymph node dissection (ALND). However, many institutions perform axillary ultrasound for cN0 cases as part of the routine initial breast cancer work-up. We aim to define our institution's rate of cT1-T2, palpably node-negative but lymph node core biopsy-positive disease as well as the subsequent pathologic N-stage and attempt to identify clinicopathologic factors for which axillary ultrasound may be appropriately indicated.

Methods: Our IRB-approved database was queried from 2016-2020 for cT1-T2, palpably node-negative, cases undergoing primary surgery with ALND due to a positive lymph node core biopsy. Patient demographics, clinical characteristics, tumor biology, and staging were recorded.

Results: A total of 38 cases were identified. All were hormone receptor (HR)-positive/HER2-negative. Of these 38 cases, 22 were excluded by defined criteria leaving 16 for analysis - 5 were cT1, and 11 were cT2. No cases upstaged to pT3, and the average pathologic tumor size was 26mm. When stratified by pathologic N stage, 6 (37.5%) of the 16 cases were cN1a and would have had the option to avoid ALND had they not had axillary ultrasound and subsequent core biopsy. The mean clinical tumor size for the

pN1a versus pN2-3 cohort was not significant at 21.5mm and 19.7mm (p-value 0.67). The mean pathologic tumor size for the pN1a versus pN2-3 cohort was not significant at 24.8mm (p-value 0.68).

Conclusions: Even though the incidence of our patients who could have avoided ALND was less than the 50% reported rate, the opportunity for 37.5% of these cases to avoid the morbidity associated with ALND is not insignificant. The caveat is that some patients will ultimately require return to the OR for completion of ALND in the setting of N2-N3 disease, but the possible gain associated with safely avoiding ALND should not be underestimated. Our study is limited by small sample size, but it does show that tumor size does not reliably predict nodal positivity in T1 and T2 disease. As many of these patients remain pN1, ALND would not be indicated, which ultimately makes the axillary ultrasound unnecessary. These data highlight the need to better define appropriate indications for axillary ultrasound as part of the initial imaging work-up in a newly diagnosed breast cancer.

1383222 - Management of Lobular Neoplasia Diagnosed via MRI-guided Biopsy

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Background/Objective: Increasing use of breast MRI has led to the detection of more high-risk breast lesions (HRL). While the upgrade rate of mammographically detected HRLs are well established, less is known about the risk of upgrade identified by MRI. The objective of this study was to examine upgrade associated with MR detected LCIS and ALH, collectively known as lobular neoplasia (LN) and the outcomes of patients managed with surveillance.

Methods: A single-institution retrospective study between 1/2013 and 7/2022 of patients with LN diagnosed via MRI-guided biopsy was performed using an institutional database and a search of the electronic medical record. Patient demographics and imaging characteristics were obtained and summarized using descriptive analyses. For those who underwent excision, the final pathology was reviewed. For those who underwent surveillance, follow-up imaging and clinical encounters were reviewed for interval development of breast cancer. Upgrade rate was calculated based on upgrade at surgery or the development of cancer at the biopsy site during surveillance. Descriptive statistics were performed. Wilcoxon Rank Sum test and Fisher's exact test were used to compare features of the surgically upgraded cohort to the remainder of the surgical group.

Results: Over the study period, 109 MRI biopsies showing histopathological findings of LCIS and/or ALH were identified in 101 patients. Median age was 57 years (range 37-78). Fifty-three percent had a recently diagnosed breast malignancy, which was the most common indication for the MRI. Fifty-eight lesions underwent excision, while 51 lesions were managed with surveillance. Among the surveillance cohort, median follow-up was 24 months (range 0-101). The overall upgrade rate was 7.3% (8/109). Upgrades in the excised cohort consisted of pleomorphic LCIS (n=1), DCIS (n=4) and ILC (n=2), while 1 interval development of DCIS was observed at the site of biopsy in the surveillance cohort. Seven were detected as non-mass enhancement (NME) and 1 as a mass on MRI. Of this cohort, 54.9% (n=28)

received chemoprevention. Those with findings of NME and with larger size on MRI were more likely to undergo excision over surveillance (p=0.010 and p<0.001 respectively; Table), but these variables did not correlate with upgrade. No other variables were associated with upgrade.

Conclusions: In this contemporary cohort of MRI-detected lobular neoplasia, the upgrade rate to malignancy was quite low. In patients carefully selected for surveillance following integrated imaging and pathology review, omission of surgery for MRI-detected LN is safe. Larger cohorts are needed to determine factors predictive of risk of upgrade.

Table. Comparisons between surveillance and excision group

	Surveillance (N=51)	Excision (N=58)	Total (N=109)	p value
Age				0.408
Median (Range), yrs	58 (39- 78)	55.5(37-75)	57 (37-78)	
Lesion Characteristics				0.01
Non-mass enhancement	34 (66.7%)	51 (87.9%)	85 (78.0%)	
Mass	17 (33.3%)	7 (12.1%)	24 (22.0%)	
Lesion size (mm)				< 0.001
Mean (SD)	14(11.41)	21.96 (14.94)	18.06 (13.85)	
Location of lobular neoplasia				0.481
UOQ	20 (39.2%)	25 (43.1%)	45 (41.3%)	
UIQ	13 (25.5%)	14 (24.1%)	27 (24.8%)	
LOQ	8 (15.7%)	14 (24.1%)	22 (20.2%)	
LIQ	5 (9.8%)	3 (5.2%)	8 (7.3%)	
Central	5 (9.8%)	2 (3.4%)	7 (6.4%)	
PresenceofContralateralMalignancy				0.691
No	34 (66.7%)	36 (62.1%)	70 (64.2%)	
Yes	17 (33.3%)	22 (37.9%)	39 (35.8%)	
Presenceofipsilateralmalignancy				0.094
No	40 (78.4%)	36 (62.1%)	76 (69.7%)	
Yes	11 (21.6%)	22 (37.9%)	33 (30.3%)	

1342397 - Lymph Node Positivity: Predictor of Multicentricity on Pre-operative MRI?

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Background/Objective: Utilization of pre-operative breast magnetic resonance imaging (MRI) varies. MRI may detect previously occult multicentric or contralateral disease, which may change surgical management of breast cancer. The aim was to evaluate what patient factors may predict benefit of pre-operative MRI.

Methods: We performed an IRB-approved retrospective review of 420 patients with a new diagnosis of breast cancer who underwent pre-operative MRI from 2009 to 2014 at a single institution. Patients were divided into a cohort of no new disease detected on MRI versus those in whom new disease was detected. New disease included multifocal, multicentric, new axillary, or contralateral disease.

Results: Of 420 patients with a new diagnosis of breast cancer, 17% had new multicentric, multifocal, or contralateral disease detected on pre-operative MRIs. There was no difference between the 2 cohorts for age (p=0.23), race (p=0.45), family history (p=0.465), breast density (p=0.144), or hormone status (p=0.895). In univariable analysis hormone status (p=0.43, OR 0.76), family history (p=0.62, OR 1.14), and breast density (p=0.19, OR 1.5) did not predict detection of multicentric disease on MRI. Detection of positive nodes on mammogram or ultrasound prior to MRI was associated with detection of new disease on MRI (p=0.0003, OR 2.82). In multivariable analysis, age (p=0.61, OR 0.99), race (p=0.58, OR 1.26), family history (p=0.54, OR 0.82), breast density (p=0.83, OR 0.87), grade (0.87, OR 1.09), tumor size (p=0.37, OR 0.92), and use of neoadjuvant therapy (p=0.41, OR 0.72) were not predictive of detection of additional new disease. In multivariable analysis, the presence of positive nodes on ultrasound or mammogram was associated with finding new or multifocal disease on MRI (p=0.0005, OR 3.48 95% CI 1.72-6.99). In a multivariable logistic regression model containing covariates significant at the 0.25 level using stepwise selection method, pre-MRI positive nodes increased the likelihood of detection of new disease (p=0.0002, OR 3.04, CI 2.15-4.29). Pre-operative MRI resulted in unnecessary changes in surgical intervention for 22.2% of the no-new-disease-detected cohort and 6.9% of the new multicentric disease cohort (p<0.001).

Conclusions: In evaluating the utility of pre-operative MRI for patients with a new diagnosis of breast cancer, patients with nodal disease detected in their evaluation prior to MRI are most likely to have new multifocal, multicentric, or contralateral disease detected on MRI. Interestingly, family history, breast density, tumor grade, and tumor subtype were not predictive of detection of new disease on MRI. Improved tailoring of the use of pre-operative MRI is important as MRI can result in an increase in more radical or additional surgical intervention without oncologic benefit to the patient.

Table. Predictors of detecting new multicentric, multifocal and contralateral disease on MRI

	p-value	Odds Ratio	95% Confidence Limits	
Age	0.61	0.99	0.97	1.02
Race	0.58	1.26	0.56	2.82
Family history	0.54	0.82	0.43	1.55
Breast density	0.83	0.87	0.25	3.05
Preoperative imaging	0.08	7.18	0.78	66.00
Reason for MRI	0.37	2.19	0.39	12.36
Histology	0.44	0.72	0.31	1.66
Hormone status	0.62	0.75	0.24	2.31
Grade	0.87	1.09	0.39	3.05
Tumor size	0.37	0.92	0.77	1.10
Nodal status	0.0005	3.47	1.72	6.99
Neoadjuvant therapy	0.41	0.72	0.33	1.57

1352718 - Assessing the Accuracy of MRI in Predicting Pathologic Complete Response in Patients with Breast Cancer Undergoing Neoadjuvant Chemotherapy and the Impact of Chemotherapy Regimen on Disease Concordance

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Background/Objective: Post-neoadjuvant chemotherapy (NAC) MRI provides insight into breast cancer response to chemotherapy to help guide surgical management. This study aimed to investigate the accuracy of a post-NAC MRI radiographic complete response (rCR) in predicting pathologic complete response (pCR). The impact of cancer histological and molecular subtype and type of chemotherapy regimen utilized were also evaluated.

Methods: An IRB-approved retrospective analysis of women with breast cancer between 2014 and 2021 in a single health care system was conducted. Inclusion criteria were women aged 18 and over with biopsy-proven invasive breast cancer who completed NAC and underwent pre- and post-NAC MRI followed by surgical excision. Histologic (i.e., invasive lobular or ductal carcinoma) and molecular (HER2, ER, PR) subtype data and chemotherapy regimen information were collected. Surgical pathology was used to determine pathologic response. Accuracy, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of MRI were calculated. We used pCR as the gold standard. True negatives (TN) were defined as both rCR and pCR and true positives (TP) as no rCR and no pCR.

Results: A total of 154 women met inclusion criteria. Median age was 54, and the population was predominantly Caucasian (n=107). The receptor subtypes HER2, ER, and PR were present in 32.5%, 51.3%, and 39.6%, respectively. Most patients had invasive ductal carcinoma (91%). As seen in the Table, MRI had an accuracy of 71%, a NPV of 58%, and a PPV of 75.7%. Specificity was 48%, and sensitivity was 82.5%. When separated by age less than or equal to vs. greater than 50 years old, we found a sensitivity of 92.3%, NPV of 72.7%, and specificity of 32% in younger women. For older women, a sensitivity of 76.6%, NPV of 53.1%, and specificity of 62.9% was seen. When comparing the data by chemotherapy regimen subgroups, there was a statistically significant direct relationship between pCR and rCR for the Trastuzumab-based treatment group ($p<0.01$). For anthracycline-based treatment, there was a statistically significant inverse relationship between rCR and pCR ($p<0.01$).

Conclusions: Overall, our data agree with prior studies that show that although MRI is an important adjunct in the interdisciplinary treatment of breast cancer, it does not have sufficient accuracy to predict a pathologic complete response and negate surgical excision. When the data were categorized into age groups (50 years old), the NPV of MRI increased in younger women and decreased in older women, suggesting that MRI may be a superior test in a younger population. In regards to specific chemotherapy regimen, there was a statistically significant positive correlation for the trastuzumab-based treatment, while anthracycline-based therapy was found to have a statistically significant inverse correlation. This suggests that MRI may be better at detecting pCR in patients with HER2 receptor-positive breast cancer

compared to other molecular subtypes, although the small sample size precludes discrete statistical analysis.

Table. Results for sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy of post-NAC MRI by age

Characteristic	N	Accuracy	PPV	NPV	Specificity	Sensitivity
Overall	154	0.71	0.757	0.58	0.48	0.825
Age <=50 years	64	0.688	0.679	0.727	0.32	0.923
Age>50	90	0.725	0.83	0.531	0.629	0.766

1352998 - The Validity of the BI-RADS 3 Category Classification in the Modern Era

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Background/Objective: Breast Imaging Reporting and Data System (BI-RADS) is used to standardize the breast imaging terminology and to guide physicians' management based on findings. Historically, the BI-RADS 3 classification has been used to designate a probably benign mammographic finding, with risk of malignancy not exceeding 2%. The current recommendation for a BI-RADS 3 lesion is to obtain a short interval follow-up with repeat imaging every 6 months for 18 months.

Methods: We examined the use of BI-RADS 3 category classification in an academic community setting with fellowship-trained radiologists and/or high-volume mammogram readings. All mammograms were performed with the use of digital tomosynthesis. This was a retrospective, IRB-approved analysis of a total of 3,417 patients who had mammograms with BI-RADS 3 classification from March 2018 to December 2021. The percentage of BI-RADS 3 lesions, which were subsequently diagnosed as biopsy-proven cancer, was determined. These were analyzed based on cancer stage and image findings, which led to the diagnosis of cancer. Time from original BI-RADS 3 classification to diagnosis of cancer was determined.

Results: Of the 3,417 patients, 61 (1.8%) were found to have breast cancer during the period between March 2018 and December 2021. Forty-three (1.3%) received a BI-RADS 3 classification after a prior diagnosis of breast cancer. The most common reason for BI-RADS 3 was post-surgical or post-treatment changes, requiring short interval follow-up for stability. Eighteen (0.5%) patients had a BI-RADS 3 classification before their breast cancer diagnosis. Seven (0.2%) of these patients developed breast cancer in the contralateral breast rather than the BI-RADS 3-designated breast. Three (0.1%) patients developed cancer in the same breast, but in a different quadrant than the BI-RADS 3 finding. Eight (0.2%) patients with the BI-RADS 3 classification developed cancer in the same location as the initial BI-RADS 3 lesion. Of these, 5 were DCIS and presented as calcifications, and 3 were early-stage invasive cancers, which presented as suspicious abnormality, spiculated mass, or architectural distortion. Time

from initial BI-RADS 3 classification to cancer diagnosis ranged from 1-26 months with an average of 11.4 months.

Conclusions: In the modern era of digital tomosynthesis and specialized high-volume readers, BI-RADS 3 lesions signify far less malignancies than the expected 2%. Our study demonstrated a rate of 0.2%, with the majority of these being non-invasive cancers. Decreasing or eliminating the use of BI-RADS 3 category classification seems appropriate, thereby limiting the number of follow-up studies and decreasing both patients' anxiety and health care costs without compromising cancer diagnoses.

1376503 - Advanced Imaging for Screening Patients with Atypical Hyperplasia or LCIS

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Background/Objective: Advanced imaging modalities such as magnetic resonance imaging (MRI) and molecular breast imaging (MBI) are frequently utilized to screen high-risk patients, but their role is not fully established for patients with atypical hyperplasia (AH) or lobular carcinoma in situ (LCIS). In this study, we aim to evaluate the use of advanced imaging in breast cancer screening for patients with AH or LCIS.

Methods: With IRB approval, we retrospectively identified patients with AH or classical LCIS who underwent breast cancer screening at our institution from 2008-2021. Patients with current diagnosis of pleomorphic LCIS, ductal carcinoma in situ (DCIS), or invasive cancer in either breast, as well as those with any prior history of breast cancer were excluded. To avoid the possibility of missed cancer diagnoses, we included only patients whose high-risk lesions were excised. Via chart review, we evaluated impact of breast MRIs and MBIs performed for screening purposes.

Results: Of 443 patients matching our inclusion criteria from 2008-2021, 420 (94.8%) had screening mammography while the remainder had advanced imaging without mammography. A total of 224 patients (50.6%) were screened at least once with an advanced imaging modality, with a total of 582 advanced imaging studies. MRI was used more commonly than MBI (451 vs 138, respectively). In total, 2422 screening studies were performed, 1833 (75.7%) mammograms, 451 (18.6%) MRIs, and 138 (5.7%) MBIs. Results were negative or benign in 2070 (85.5%) studies, with suspicious findings in 352 (14.5%) that prompted further work-up. Recommendation for additional work-up was more common with MRI (20.4%) and MBI (22.5%) compared to screening mammography (12.5%), $p<0.001$. With median follow-up of 5.4 years, 43 cancers were diagnosed, of which 8 (18.6%, 95% CI: 9.7-32.6%) were mammographically occult and detected by advanced imaging alone: 2 (4.6%) by MBI and 6 (14.0%) by MRI. Compared to cancers detected with screening mammography, pathologic staging showed that those detected by advanced imaging were more frequently in situ (37.4 vs 34.3%) or small (T1mic/T1a-b in 50% vs 37.1%), and more often node-negative (N0/N0i+ in 100% vs 88.6%).

Conclusions: In this sample of screened women with AH or LCIS, approximately 20% of breast cancers were detected only by MRI and MBI, which should be considered in this patient population.

1387966 - Breast Cancer Risk Assessment and Screening Practices Reported via an Online Survey

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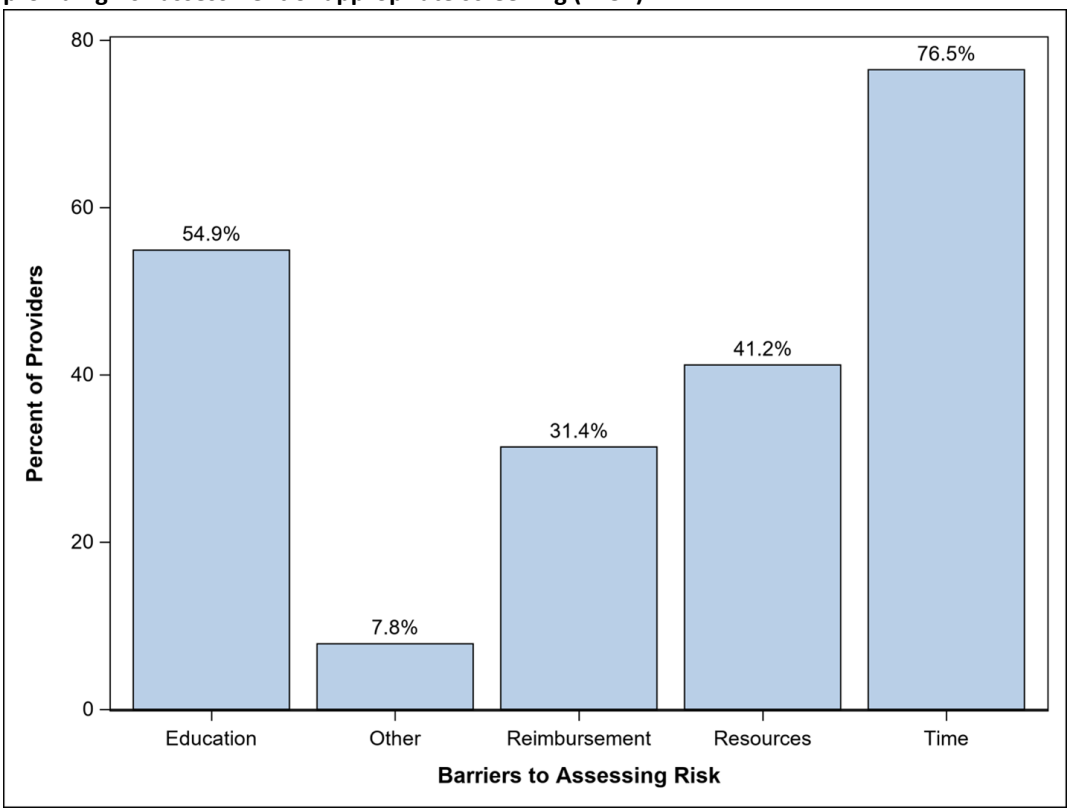
Background/Objective: Breast cancer screening guidelines differ between organizations, and significant practice pattern variations exist. Although screening can be tailored to personal risk, access to risk assessment education and resources varies. Previous evidence suggests that provider-level factors are the greatest contributors to risk assessment and screening practice variability. The aim of this study is to characterize provider factors associated with breast cancer risk assessment and screening practice patterns, and to assess perceived barriers to providing risk assessment.

Methods: An online survey was distributed to oncology and primary care providers at a single academic institution and publicly via social media (available 1/2022 to 8/2022). Respondents in the United States who care for adult women at risk of developing breast cancer were included. Responses were summarized with n (%) for all participants, and subgroup analyses were performed. Differences were tested using chi-square or Fisher's exact tests, as appropriate.

Results: Of the 143 completed surveys, most respondents were female (89.5%), aged ≤50 (79%), and White/Caucasian (79%). Most respondents were physicians (80.4%) and within their first 10 years of practice (58%). Residency/fellowship training in general surgery and/or breast surgery was common (40.9% and 47.8%, respectively). Training in primary care fields was less common (9.6% family practice, 9.6% internal medicine, 10.4% OB/GYN). While 96.5% discuss breast cancer screening with their patients, only 89.5% order screening mammograms. The majority (54.7%) do not stop referring patients for mammograms at a specific age, although 2.3% stopped at 70 years old, 23.4% at 75 years old, and 18.8% at 80 years old. Risk factor assessment was common (93%), typically performed at the first visit (51.1%). The most common risk factors routinely assessed were age (95.8%), family history of breast cancer (97.9%), and genetic test results (89.5%), while lactation history (51.7%) and age at first live birth (67.8%) were least common. The most common resources used for risk assessment were risk calculation tools, such as Tyrer-Cuzick (66.4%), and NCCN guidelines (44.8%), while other guidelines, such as USPSTF (9.1%), were uncommon. Respondents who were physicians and/or care for a higher percentage of female patients were more likely to routinely assess risk factors (both $p<0.05$). Many respondents (49%) offered genetic testing. High-risk patients were often managed by the provider themselves (35%) or referred to a specialty clinic at the same institution (31.5%). Most providers ordered supplemental screening (82.5%), which typically included breast MRI (96.6%) or whole-breast ultrasound (36.4%) Additional training in genetics or risk assessment was uncommon (16.8%), although the majority were interested but did not have time/resources (54.5%). While most did not perceive barriers to providing risk assessment or appropriate screening (64.3%), the most common barriers were time (76.5%) and education (54.9%; Figure). Barriers were more common among family practice or OB/GYN providers, those who work in an academic setting, and those who see fewer female patients (all $p<0.05$).

Conclusions: Breast cancer risk assessment and screening practices are highly variable. Although time is the major barrier to providing risk assessment, providers also need education. Primary care organizations should partner with breast cancer-focused societies for additional resources.

Figure. Greatest barriers to providing breast cancer risk assessment among those who perceived barriers to providing risk assessment or appropriate screening (n=51)



1388167 - Results of Magnetic Resonance Imaging Screening in Patients at High Risk for Breast Cancer

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Background/Objective: Breast cancer is the most common cancer in women with an estimated 250,000 new cases in the US per year. Early detection of breast cancer is associated with improved survival. Screening MRI as an adjunct to mammography is recommended by the American Cancer Society (ACS) for patients with a lifetime risk of breast cancer of 20% or greater. While the benefit of MRI screening in early detection of breast cancer is clear, MRI screening is also associated with an increased risk for false-positive results that may trigger biopsies or short-term follow-up exams. The purpose of this study was to utilize our institutional database of high-risk patients and assess the uptake of screening MRI examinations and the results of those screenings.

Methods: Our institutional IRB-approved High Risk Breast Cancer Consortium Database was queried for patients enrolled from 1/2017-10/2022 who were at high risk for breast cancer. Factors associated with high risk included patients who tested positive for high-risk mutations, family history of breast cancer, and patients with high-risk lesions, including atypical hyperplasias and LCIS. Variables of interest included the frequency of MRI screening, and the results of MRI exams, focusing on the frequency of a recommendation for biopsy, and the results of those biopsies.

Results: A total of 1093 patients were enrolled in the High-Risk Database during the study period. There were 228 patients in the database (21%) who had a mutation in the BRCA 1 or 2 genes. Thirteen high-risk patients (1%) developed cancer since 2017. There were 249 unique patients of the cohort (23%) who underwent breast MRI exams. Eighty-six unique patients (35%) underwent at least 1 core biopsy using MRI guidance as a result of their MRI. Forty-one percent of patients who underwent biopsies were BRCA mutation carriers. None of the resultant MRI guided core biopsies identified invasive or ductal carcinoma in situ lesions. Thirty-one percent identified high-risk lesions such as atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), intraductal papilloma, or radial scar, and 5.81% showed lobular carcinoma in situ (LCIS).

Conclusions: We found a low rate of screening MRI uptake in our cohort of patients at high risk to develop breast cancer. This may be due to variability of insurance authorization. Although no invasive or in situ diseases were detected on MRI guided core biopsies in this study, MRI screening did identify a significant number of high-risk lesions such as atypical ductal and lobular hyperplasia, and LCIS. The use of MRI surveillance as part of a comprehensive risk assessment in high-risk patients may identify high-risk lesions that may alter recommendations for therapeutic risk reduction strategies.

Localization

1387782 - Surgeon and Radiologist Evaluation of SmartClip™ Localization for Breast Conservation Surgery

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Background/Objective: The EnVisio SmartClip is an FDA-approved, electromagnetic localization system that provides 3-dimensional navigation for the surgical excision of soft tissue lesions in the breast. The purpose of this study was to analyze the accuracy and reproducibility of the localization and excision of benign and malignant breast lesions.

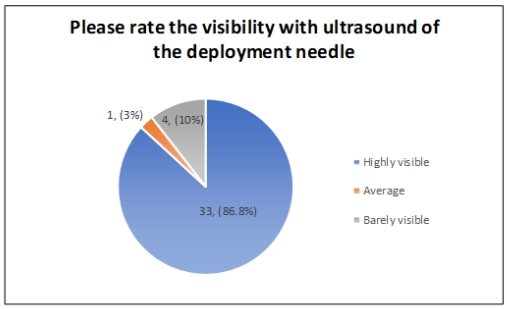
Methods: This is an IRB-approved, single-institution, prospective study from October 2020 through September 2022 of 38 women undergoing breast-conserving surgery utilizing the SmartClip for a single lesion greater than 5mm on mammogram or sonographic imaging. Surveys from performing fellowship-trained breast radiologists and breast surgeons were collected after image-guided localization and surgical excision. Survey responses regarding equipment useability, success of device deployment and excision, and accuracy relative to the target lesion were collected for analysis.

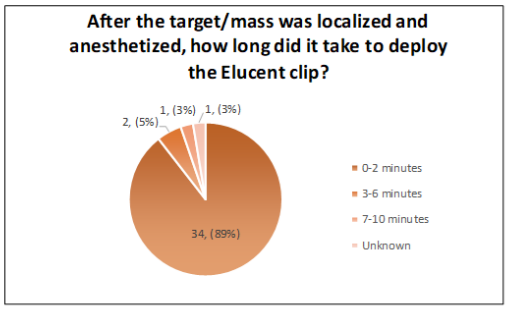
Results: A total of 76 survey responses from 9 radiologists and 4 surgeons were received. Radiologist survey responses indicated that the deployment needle and SmartClip were highly visible in 86.8% and 76.3% of procedures, respectively; 92.1% of responses indicated no difficulty in device deployment. Time from localization to deployment was 0-2 minutes in 89.5% of cases, 3-6 minutes in 5.3% of cases, and 7-10 minutes in 2.6% of cases with 97.4% of SmartClips in the correct location on post-procedure mammography. Three cases of clip migration occurred: 2 migrated <5mm and 1 migrated 6-10mm from the target lesion at localization. There were no instances of breast hematoma or clip migration after device deployment. Surgeon survey responses indicated that the heads-up display (HUD) was helpful in identifying the SmartClip 84% of the time with 76.3% of surgeons stating that the location on the HUD correlated well with the actual location of the clip. The targeted mass was within the resected specimen 97.4% of the time and 94.7% of surgical specimens contained the SmartClip. On specimen radiograph, 39.5% of SmartClips were within 0-1mm of the center of the target lesion, 18.4% were within 2-4mm, and 23.7% were within 5-10mm. A total of 47.5% of patients had a delay in the detection of the SmartClip from the hand piece, related to console calibration and large breast size. Despite these delays, mean time from incision to specimen radiograph was 23 minutes 49 seconds. One surgeon required ultrasound to localize the target because of a console malfunction.

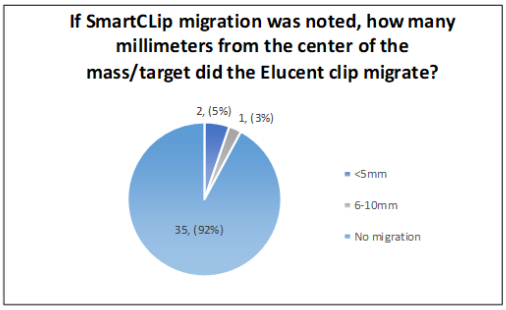
Conclusions: The SmartClip was successfully deployed in all cases with good visualization and ease of deployment that was reproducible and accurate. Surgical excision was successful in all cases despite delays in detection, console malfunction, and clip migration in the minority of cases. Based on the survey responses from radiologists and surgeons, the Envisio SmartClip is a reliable and efficient method of image-guided localization for benign and malignant breast lesions.

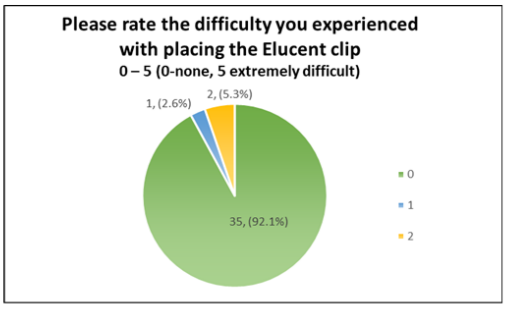
Figure. Elucent SmartClip survey data

Radiologist Survey Responses (9 radiologists, 38 surveys)

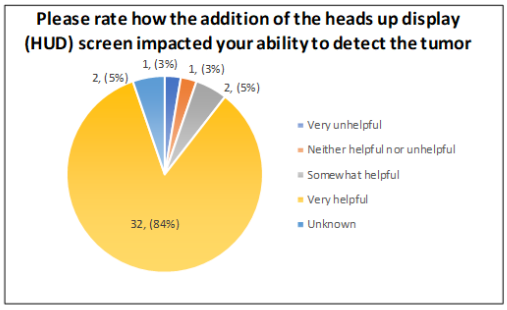


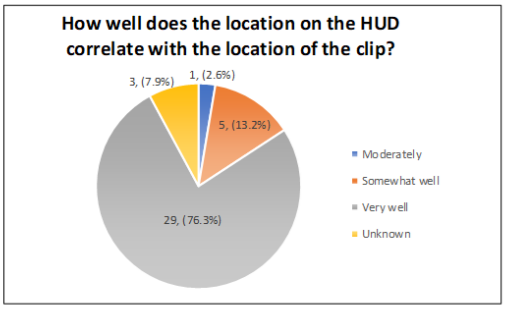


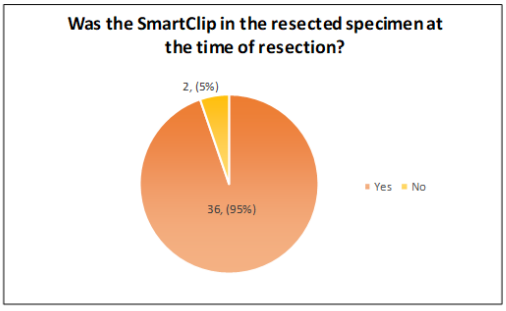


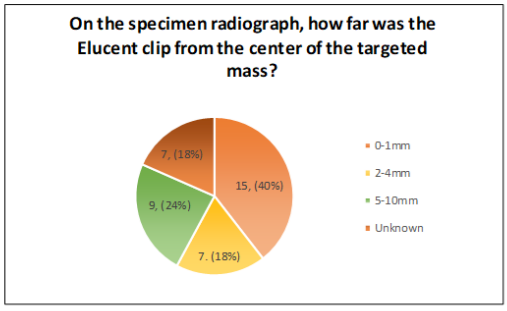


Surgeon Survey Responses (4 surgeons, 38 surveys)









1387718 - Intra-operative Ultrasound-guided Conserving Surgery for Breast Cancer: No More Time for Blind Surgery

Massimo Ferrucci, Francesco Milardi, Fabrizio Mpungu, Matteo Cagol, Maria Cristina Toffanin, Tania Saibene, Silvia Michieletto, Paola Del Bianco, Raffaello Grigoletto, Alberto Marchet
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Background/Objective: Despite all contemporarily available tumor localization methods, breast-conserving surgery (BCS) still remains a blind surgery. Intra-operative ultrasound (IOUS)-guided BCS allows real-time visualization during all phases of resection. We compared IOUS surgery with traditional surgery (TS) for palpable and non-palpable breast cancers (wire-guided surgery) with respect to oncologic and cosmetic outcomes.

Methods: This is a prospective observational cohort study conducted at Venetian Oncologic Institute between January 2021 and June 2022. Patients diagnosed with ductal carcinoma in situ or T1-2 primary invasive cancer, deemed suitable for BCS, were recruited. All types of breast tumors were enrolled: solid palpable, solid non-palpable, non-solid non-palpable, and post-neoadjuvant treatment lesions. The same surgeon performed all procedures. Eligible participants were randomly assigned to either IOUS or TS in a 1:1 ratio generating 2 homogeneous groups. Main outcomes were surgical margin involvement, re-operation rate, closest margin width, main specimen and cavity shaving margin volumes (routinely performed in all study cases), excess healthy tissue resection (defined as tumor volume to excision volumes ratio), calculated resection ratio (CRR), meant as specimen volume related to an optimal resection volume, and excision time. In the IOUS group, 3 6-month periods were identified to determine a learning curve.

Results: We enrolled 160 patients, 80 allocated to TS and 80 to IOUS. Median excision time was 7 minutes shorter after TS compared to IOUS (21.0 mins [IQR, 16.5-27.0] vs. 28.0 mins [23.2-31.5], respectively; p<0.001). IOUS significantly reduced both main specimen volume (24.3 cm3 [15.0-41.3] vs. 16.8 cm3 [10.5-28.9]; p=0.015) and global specimen plus cavity shaving margins volumes (31.5 cm3 [20.3-49.3] vs. 25.2 cm3 [15.6-36.8]; p=0.013). Better improvements on tumor volume to specimen volume ratio were seen after IOUS (4.7% [2.5-9.1] vs. 2.9% [0.8-5.2] after TS; p<0.001) reducing the excess of healthy tissue resected; similar results were observed on tumor volume to specimen plus cavity shaving margin volumes ratio (IOUS, 3.7% [1.8-7.0] vs. TS, 2.2% [0.6-4.2]; p=0.002]. IOUS yielded significantly better CRR (0.84 [0.46-1.20] vs. 1.14 [0.81-1.93] after TS; p<0.001) and higher clear resection margin rate (97.5% vs. 85% after TS; p=0.009), proving better tumor centralization in the specimen. Re-excision rate for positive margins was significantly higher after TS (12.5% vs. 2.5% after IOUS; p=0.032). Median minimal distance to the resection margin was significantly larger after IOUS (0.2 cm [0.1-0.4] vs. 0.1 cm [0.0-0.2] after TS; p<0.001). Besides decreased median operation times (29,7-28-26,2 mins) after IOUS over the 3 time periods, significantly improved specimen volumes and CRR were also observed, suggesting a learning curve of at least 6 months (25 cases).

Conclusions: IOUS is the only method allowing a true real-time resection margin visualization and running control during BCS. It showed clear superiority over TS both in oncologic and cosmetic outcomes for all breast cancer lesion types, with an acceptable learning curve. IOUS should be a priority skill to

develop for a modern breast surgeon and a technique to be implemented in all breast cancer centers. These results disfavor the paradigm of blind breast surgery.

Table. Intra-operative ultrasound-guided breast-conserving surgery vs traditional surgery: Main outcomes

		TS(N=80)	IOUS (N=80)	Total (N=160)	*p value*
Excision time (mins)	Median (Q1, Q3)	21.0 (16.5, 27.0)	28.0 (23.2, 31.5)	24.5 (18.0, 30.0)	***0.0001***
Main tumor dimension (cm)	Median (Q1, Q3)	1.4 (0.9, 1.9)	1.5 (1.1, 1.9)	1.4 (1.0, 1.9)	*0.1100*
Tumor Volume (cm^3)	Median (Q1, Q3)	0.7 (0.2, 1.8)	0.8 (0.4, 2.2)	0.8 (0.3, 1.9)	*0.1260*
Main Specimen Volume (cm^3)	Median (Q1, Q3)	24.3 (15.0, 41.3)	16.8 (10.5, 28.9)	22.0 (12.6, 33.9)	***0.0150***
Cavity shaving margins Volume (cm^3)	Median (Q1, Q3)	6.7 (3.0, 11.5)	5.3 (3.0, 7.8)	5.6 (3.0, 8.8)	*0.0790*
Specimen+Cavity shaving margins Volume (cm^3)	Median (Q1, Q3)	31.5 (20.3, 49.3)	25.2 (15.6, 36.8)	27.5 (17.9, 42.8)	***0.0130***
Tumor Volume/ Main Specimen Volume (%)	Median (Q1, Q3)	2.9 (0.8, 5.2)	4.7 (2.5, 9.1)	3.7 (1.6, 7.6)	***0.0001***
Tumor Volume/ Specimen+Cavity shaving margins Volume (%)	Median (Q1, Q3)	2.2 (0.6, 4.2)	3.7 (1.8, 7.0)	3.1 (1.3, 5.8)	***0.0020***
CRR (%)	Median (Q1, Q3)	114.0 (81.8, 193.2)	84.5 (46.0, 120.8)	99.0 (60.8, 141.0)	***0.0001***
Clear Margins	No	12 (15.0%)	2 (2.5%)	14 (8.8%)	***0.0090***
	Yes	68 (85.0%)	78 (97.5%)	146 (91.2%)	
Closest Margin Width (cm)	Median (Q1, Q3)	0.1 (0.0, 0.2)	0.2 (0.1, 0.4)	0.2 (0.1, 0.3)	***0.0001***
Re-Operation for positive margins	No	70 (87.5%)	78 (97.5%)	148 (92.5%)	***0.0320***
	Yes	10 (12.5%)	2 (2.5%)	12 (7.5%)	

1388320 - Isotropy of Seed Localisation for Breast-conserving Surgery – A Laboratory Assessment

Michael Boland[1], Paul Thiruchelvam[2], Daniel Leff[3]

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Background/Objective: The use of non-wire localisation (NWL) techniques has become more common in breast surgery in the last 10 years. Recently published data has suggested that different NWL techniques are equivalent with regard to tumour excision, localisation complication rate, and operative time. However there remains a paucity of data regarding the effects of isotropic factors on commonly used NWL techniques and the resulting effects on accurate excision of impalpable tumours. The aim of this study was to assess the effects of different isotropic forces on common NWL techniques.

Methods: Three different NWL systems were compared including - (i) Sentimag probe and magnetic seed (Endomag, Cambridge, United Kingdom), (ii) LOCalizer probe and RFID seed (Hologic, Massachusetts, United States), and (iii) Scout Radar Localisation Probe and seed (Merit Medical, Utah, United States). A series of sequential lab-based experiments were conducted to assess the effects of different isotropic factors on the ability of each system to accurately identify seed localisation. Systems were tested in real time in air (water for Scout system), followed by gelatine cubes, and finally in porcine tissue to simulate human tissue. Isotropic domains assessed included (i) distance from the seed, (ii) angulated distance from the seed, (iii) directionality, (iv) warm-up time, (v) heat (via electrocautery), (vi) pressure (via common forceps handling), and (vii) impact of headlight illumination.

Results: With all markers set in their preferred (single) orientation, the maximum detection distances of the Scout, Sentimag, and LOCalizer devices were 75mm, 50mm and 30mm, respectively. When the same markers were held at 45 degrees to the horizontal to assess the effect of angulated distances, the maximum detection distances for the Sentimag, Scout, and LOCalizer devices was 40mm, 30mm, and 30mm, respectively. To assess directionality, readings were taken rotating the seeds in a single plane every 45 degrees at 10 and 30mm distances from the detection probes; at 10mm, the LOCalizer probe demonstrated the lowest accuracy when set perpendicular to the seed with the Scout probe being the most accurate. At 30mm, only the Sentimag probe detected the seed when placed at all orientations through a 360-degree angle. All systems provided accurate readings within 15-30s of being activated. No observable effect was seen in any localization system when light energy was applied to each seed (LED headlight) or upon application of pressure (assessed using Alice and Babcock forceps–mean pressure 10.7 Newtons); however, the Sentimag device was not accurate when metal instruments were used. Direct contact between the seeds and a handheld activated electrocautery device resulted in complete loss of localisation signal in the LOCalizer and Scout devices but not with the Sentimag device.

Conclusions: This is the first study that has assessed the physical and isotropic properties of the 3 most commonly used NWL seeds on the market. All devices localise seeds with good accuracy, with Sentimag and Scout demonstrating excellent accuracy. The 3 devices have distinct characteristics when directionality is assessed, and surgeons should be mindful of the impact of this effect when localising individual seeds. Light and pressure seem to have little effect on seeds, but heat generated by electrocautery can impact readings when inadvertently applied directly to seeds.

1461700 - Fluorescence and Multispectral Imaging in Breast-conserving Surgery – Proof of Concept Trial

Martha Kedrzycki[1], Maria Leiloglou[2], Dhurka Shankthakumar[2], Vadzim Chalau[2], Paul Thiruchelvam[3], Daniel Leff[4], Daniel Elson[2]

[1]Imperial College London, Brighton, England, United Kingdom, [2]Imperial College London, London, England, United Kingdom, [3]Imperial College Healthcare NHS Trust, London, England, United Kingdom, [4]Imperial College London, St Mary's Hospital, England, United Kingdom

Background/Objective: The prevalent issue of close-positive tumor margins in breast-conserving surgery (BCS) remains unresolved, resulting in re-operative intervention in 21% of patients in the USA. Optical imaging has the potential to mitigate that risk through real-time intraoperative visual guidance. We developed 2 custom-made camera systems: firstly, a modifiable dual-color and fluorescence camera system for protoporphorin IX or indocyanine green (ICG) imaging, and secondly, a multispectral system (MSI) for imaging across 8 different scene colors. We evaluated and compared their diagnostic accuracy for tumor in excised specimens.

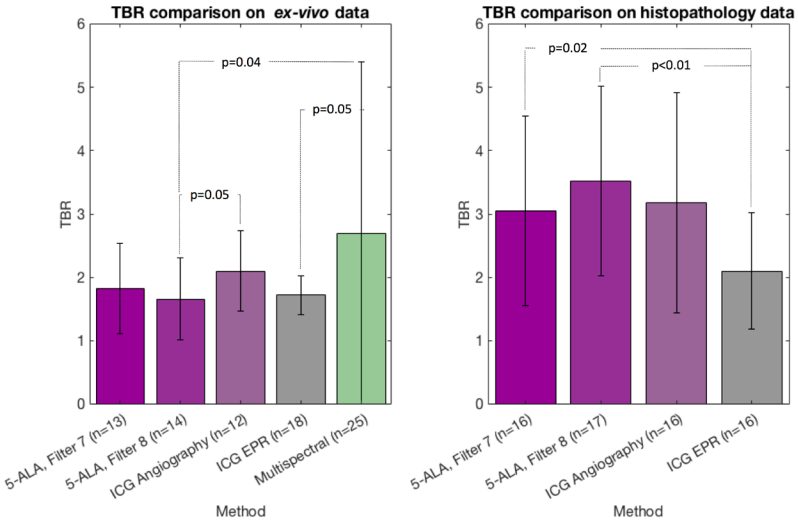
Methods: Eighty BCS patients were recruited to a single-centre, prospective, blinded feasibility study as approved by the UK Research Ethics Committee (REC 19/LO/0927). Seventy patients were allocated to fluorescence imaging: 40 using indocyanine green (ICG) and 30 using aminolevulinic acid (ALA), with 10

undergoing both fluorescence and multispectral imaging (MSI) using ALA. A further 10 patients were recruited for contrast agent-free MSI (REC 08/H0719/37). 5ALA fluorescence imaging was performed with 2 emission filters: a band-pass: 425-625nm (5-ALA|F7) and a short-pass <625 nm (5-ALA|F8). Outcomes including patient demographics (age, BMI), tumor data (size, location, type, grade, hormonal status, specimen margins), reoperation rate, and any adverse events were collected. Images were analyzed separately for freshly excised tissue (ex-vivo data) using both systems and histopathology cut-up specimens using just the fluorescence camera. To compare the tumor to background ratio (TBR=(mean in the tumour)/(mean in the healthy)) of the imaging methods in a pairwise approach, the t-test was used. The Kruskal-Wallis ANOVA analysis was employed to investigate any significant differences among the methods' tumor-detection accuracy.

Results: Patient and cancer demographics were comparable between studies. In the ex-vivo TBR comparisons, MSI (2.7±2.7) was statistically significantly better (p=0.04) than the ICG-enhanced permeability and retention (EPR (1.7±0.3) and the 5-ALA|F8 (1.7±0.7) methods (p=0.05). In the cut-ups, ICG EPR (2.1±0.9) underperformed (p=0.02) the 5-ALA|F8 (3.5±1.5) and (p<0.01) 5-ALA|F7 (3.1±1.5) methods. The ANOVA analysis revealed statistically significant differences in ex-vivo accuracy median values, with corresponding interquartile range (IQR), among: a) 5-ALA|F7 (0.97, IQR:0.04), 5-ALA|F8 (0.88, IQR:0.21), the ICG angiography (0.82, IQR:0.16) and EPR methods (0.69, IQR:0.22) with pChi-sq< 0.01, b) the MSI (0.85, IQR:0.13), the ICG angiography and EPR methods with pChi-sq=0.03, and c) the 5-ALA|F7 and the MSI methods with pChi-sq=0.02.

Conclusions: Optimizing accuracy in differentiating cancer from normal tissue via intraoperative real-time visual feedback during BCS has the potential to improve positive margin rates. In this proof-of-concept study, 5-ALA fluorescence imaging (Filter 7) was found to have the best accuracy in identifying tumor ex-vivo, despite the 5-ALA ex-vivo TBR being inferior to the MSI TBR. The results of this trial will be used to power further validation studies, followed by multicenter clinical trials to confirm efficacy in preventing positive margins and subsequent reoperations. The provision of real-time intraoperative guidance on ex-vivo margins will guide surgeons regarding targeted immediate cavity shave margins, potentially mitigating reoperation, thus resulting in a decrease in patient morbidity and hospital burden.

Figure. TBR pair-wise comparisons for the ex-vivo (left) and histopathology cut-up (right) specimens



1370973 - Sterile Black Ink Tattoo Identification of Biopsied Metastatic Breast Cancer Axillary Lymph Nodes: Results of a Multi-hospital Trial

Judy Tjoe[1], Peter Turk[2], Patrick Wilson[3], Elizabeth White[4], Nicole Abinanti[5]

[1]Novant Health, Greensboro, NC, [2]Novant Health, Charlotte, NC, [3]Presbyterian Pathology Group, PLLC, Charlotte, NC, [4]Novant Health, Winston-Salem, NC, [5]Mecklenburg Radiology Associates, Charlotte, NC

Background/Objective: In the breast cancer node-positive setting after neoadjuvant systemic therapy, axillary management includes retrieval of the biopsied clipped lymph node (cLN) to assess treatment response for adaptive local and systemic therapy. After neoadjuvant chemotherapy, sentinel lymph node biopsy (SLNB) is associated with an inherent false-negative rate of 12-14%, which can be reduced by using dual tracer, and taking at least 3 sentinel nodes at time of surgery. Often, the cLN is a SLN, but not always. Thus, cLNs are not always intraoperatively identified using SLNB mapping technique. Identifying the cLN can be accomplished with wire localization or placement of a wireless technology reflector, all of which are costly, require a second procedure, and uncomfortable for the patient. Tattooing of the biopsied cLN with sterile black ink at the time of percutaneous biopsy is an accepted option described in NCCN guidelines (NCCN Guidelines v4.2022, Invasive Breast Cancer, BINV-12). Published reports thus far describing tattooed LN identification describe a 79% success rate in identification of the cLN (Kim WH, et al. *BMC Cancer* (2019) 19:859). The goal of this study was to determine if similar success rates could be achieved in a large community health care system.

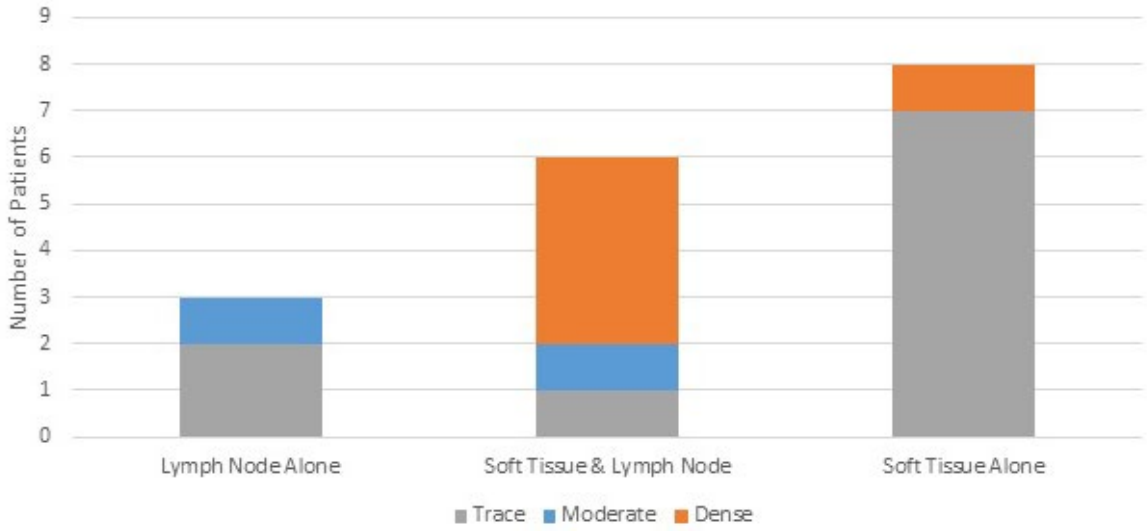
Methods: Between 1/8/21–2/2/22, 61 newly diagnosed Stage II-III invasive breast cancer patients with axillary lymph node metastases planning to undergo neoadjuvant systemic treatment were identified. Suspicious LNs were marked at time of biopsy with both microclip and tattoo (0.1-0.3mL sterile black ink via 25-gauge needle along anterior aspect of cLN). Forty-four patients were excluded with the following reasons: 16 (35%) did not receive neoadjuvant therapy; 11 (24%) were pN0 at time of pre-operative LN biopsy, 8 (17%) had distant metastatic disease, 4 (9%) left the system, 3 (7%) had recurrent cancer, and 2 (4%) had sterile black ink placement after neoadjuvant treatment. Two widely separated geographic markets within the health care system participated in the study involving 5 breast surgeons, 11 radiologists, and 10 pathologists. The cLN was evaluated for black ink both grossly (intraoperative identification of black ink described by surgeon within operative note or pathologist at time of frozen section), and histologically (all tattooed cLN slides reviewed by a single pathologist for study purposes).

Results: Of the 17 patients (ages 40-81) with analyzable information regarding tattoo placement, neoadjuvant chemotherapy, and subsequent surgical resection with pathologic lymph node evaluation, 10 cLNs (59%) were intraoperatively noted to be tattooed, with 4 cLNs (23%) described as “diffuse staining,” and 3 (18%) had no dye identified by the surgeon. Tattoo was grossly described in either the cLN only (3/17, 17.6%), surrounding soft tissue only (6/17, 35.3%), or both (8/17, 47.1%). All 17 cLNs (100%) contained black ink on final pathology described as “trace,” “moderate,” or “dense.”

Conclusions: While black ink was successfully identified histologically within all cLNs, in our experience, the tattoo technique did not reproducibly, nor discriminately, grossly identify cLNs intraoperatively, which is the intent of the tattooing technique. Perhaps greater surgical experience with the technique,

or limited number of radiologists performing the cLN tattoo for consistent technique, is required before black ink tattoo can replace wire- or reflector-cLN localization.

FIGURE. Anatomic location of tattoo noted at time of surgery



1388135 – Optically Enhanced Wireless Breast Lesion Localization Device for Use During Lumpectomy

Sunghoon Rho[1], Roy Stillwell[2], Patrick Fay[3], Alice Police[4], Thomas O'Sullivan[3]

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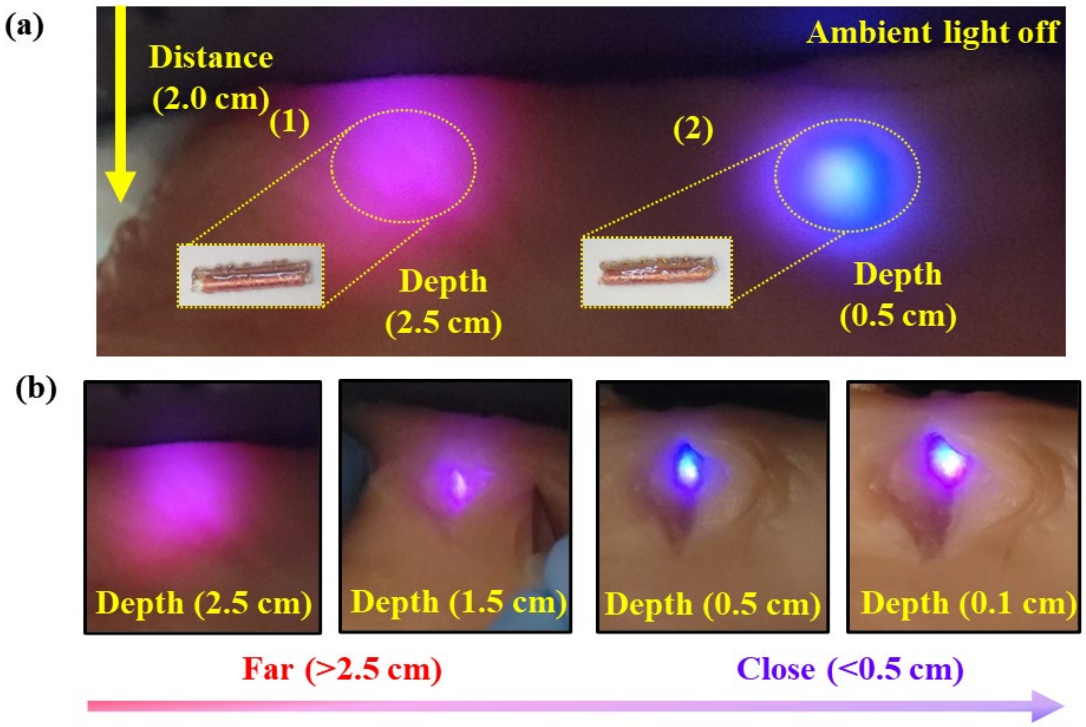
Background/Objective: Achieving negative margins on a lumpectomy specimen is critical for reducing the risk of local recurrence in invasive breast cancer. However, current wire-free localization modalities for nonpalpable lesions are currently not well-suited to differentiating multiple lesions in close proximity and can be difficult to use. To overcome these limitations, we developed an optically enhanced wire-free localization device for use during lumpectomy.

Methods: Our wire-free localization device is equipped with multi-colored, wirelessly-powered light-emitting diodes (LEDs) to provide the surgeon with precise visual position and distance guidance. After wireless excitation, red light emitting from the implant is visible through the skin before making an incision. Then, due to the significant differences in tissue optical absorption, different colors are visible as the surgeon approaches the localization implant. The 2 x 9mm prototype device currently fits into a 12-gauge needle, though additional miniaturization is possible, and it is excited wirelessly using a handheld 6W transmitter in the 6.78 MHz industrial, scientific, and medical (ISM) RF band. The device is encapsulated in a biocompatible epoxy with an impedance matching circuit and miniature receiver coil.

Results: We explored implant functionality and visibility in the laboratory using chicken breast tissue phantoms. Two implants were injected, 1 placed 2.5cm below the surface and the other at 0.5cm from the surface as shown in Figure panel (a). The transmitting antenna was placed laterally such that each implant was approximately 2cm away, as indicated by the yellow arrow. Figure panel (b) shows the apparent color change from red/pink to purple to blue as the device is approached indicating the position of the lesion. Specifically, the 2.5cm deep implant appears mostly red or pinkish. In contrast, the superficial device appears blue (or purple due to the mixing of red and blue).

Conclusions: We show that the implant is visible through >2.5cm of in vitro and ex vivo breast tissue phantoms using less than 6 W of transmitted power from a handheld antenna. The implant does not contain magnetic materials, which will minimize MRI artifacts. In addition, the implant utilizes 2 different-colored LEDs to provide precise visual guidance to indicate the lesion depth. Future work includes assessing the usability and performance of the optically enhanced localization technique in an intraoperative setting using human mastectomy specimens. Adding the sense of sight to a complex procedure may enhance the ability of the surgeon to perform targeted surgery and should be studied further.

FIGURE. Optically enhanced wireless breast lesion localization device for use during lumpectomy



1387914 - Accuracy of Non-wire-based Localisation Techniques Compared to Wire Localisation – 2-Year Data from a Single Unit in the United Kingdom

Anokha Joseph[1], Jasdeep Gahir[2], Bernadette Pereira[2], Leyla Swafe[2], Abbie Randall[2]

[1]University of East Anglia, London, England, United Kingdom, [2]North Middlesex University Hospital, London, England, United Kingdom

Background/Objective: Increased use of breast screening programmes and improved imaging has enabled early detection of breast cancer. As these lesions are small and non-palpable, they require localisation prior to surgery. Historically, these were localised with wires. However, disadvantages of wire localisation include logistical issues around wire placement on the day of surgery resulting in delay of the theatre list and wire migration resulting in excessive removal of normal breast tissue. Alternative localisation techniques to wire localization include Savi Scout and Hologic. These were increasingly used during the COVID pandemic as they could be inserted a few days prior to surgery. This enabled service delivery changes during the pandemic within the NHS, and allowed breast surgery to be conducted in another hospital in the private sector where no radiology was available on site.

Methods: This is a retrospective cohort study at a single centre of the accuracy of non-wire localisation compared with wire-based localisation among patients undergoing breast-conserving surgery following a breast cancer diagnosis. Patients undergoing mastectomy or requiring 2 different methods of localisation were excluded. We analysed data between April 2020 and April 2022. The primary outcome assessed was the percentage of margin positive rates, number of operations to achieve clear margins and specimen weights.

Results: A total of 99 cases were identified, out of which 46% (46/99) were wire-based localization, and 54% (53/99) were non-wire localisation. The average specimen weight in the wire localisation group was 22.2 grams compared with 32.6 grams in the non-wire localised group. The percentage rate of margin involvement was 17% (11/46) with wire localisation group and 18% (10/53) with non-wire localisation. The average number of re-operations required to achieve clear margins in the wire group is 1, compared with 1.14 in the non-wire group.

Conclusions: The logistical advantage with non-wire localisation means that the localiser can be inserted a few days prior to surgery, thus allowing effective utilisation of theatre lists and reducing patient anxiety on the day of surgery. It has enabled the breast service to run more smoothly. Non-wire-based localisation is as effective as wire-guided localisation. The slightly higher average weight of breast specimen in the non-wire localisation cohort may be due to the learning curve associated with the introduction of a new device, with surgeons taking bigger specimens to be safe. A larger, multi-centre study should be undertaken to compare the effectiveness of non-wire localisation.

LRR

1383757 - Sentinel Lymph Node Surgery for Locally Recurrent Breast Cancer After Prior Mastectomy

Amy Schulze, Tanya Hoskin, Mary Mrdutt, Robert Mutter, Tina Hieken
Mayo Clinic, Rochester, MN

Background/Objective: Current NCCN guidelines discourage repeat sentinel lymph node (SLN) surgery in patients with local recurrence (LR) of breast cancer, particularly for patients treated with prior mastectomy. The feasibility and potential benefits of repeat SLN surgery in patients with LR of breast cancer after previous breast-conserving surgery has been reported. Limited data exist, however, on SLN surgery for LR after mastectomy and prior axillary surgery. Thus, we undertook this study to address the feasibility and prognostic and therapeutic impact of SLN surgery among patients undergoing operation for post-mastectomy LR.

Methods: With IRB approval, from our prospectively maintained breast surgery database, we identified 73 patients with a post-mastectomy LR, and no evidence of distant metastatic disease, who had SLN surgery planned as a component of surgical treatment of the recurrence 9/2008-8/2022. Lymphatic mapping was performed using radioisotope with or without lymphoscintigraphy and/or blue dye. Successful SLN surgery success was defined as retrieval of at least 1 SLN. Statistical analysis was performed with Fisher's exact and Wilcoxon rank-sum tests.

Results: Of 73 patients, median age at diagnosis of recurrence was 54 (IQR 44-63) years, 13 had had a total mastectomy without reconstruction (18%), and the remainder had had reconstruction (45 implant-based, 12 flap-based, and 3 both) prior to the LR. SLN was successful in 65 cases (89%). Factors associated with successful SLN surgery are shown in the Table, with the type of prior axillary surgery having the greatest impact. Lymphoscintigraphy was performed in 65/73 (89%) cases, with 10/65 (15%) failing to map, 10/65 (15%) showing aberrant drainage, and 45/65 (69%) mapping only to the ipsilateral axilla. Sites of aberrant drainage included the contralateral axilla in 8 (80%), internal mammary chain in 2 (20%), and supraclavicular and infraclavicular nodes in 1 (10%) case each. Among successful cases, the median number of SLNs identified was 2 (range 1-4). In patients with SLNs removed, 10/65 (15%) were SLN-positive with >N0i+ disease. Among these patients, 5/10 (50%) proceeded to ALND. In patients where no SLN was identified, 1/8 (13%) proceeded to ALND. Seven of 10 SLN-positive patients and 50 of 55 SLN-negative patients received adjuvant radiotherapy including reirradiation in 6. Chemotherapy was administered in 31 (42%) and endocrine therapy in 50 (68%). After 28 months of median follow-up, 8 patients relapsed, including 2 who had failed SLN surgery, 2 SLN-positive, and 4 SLN-negative. The first site of relapse was local in 2, regional nodes in 0, distant in 5, and synchronous local/distant in 1.

Conclusions: SLN surgery for patients presenting with LR following prior mastectomy is feasible and informs multidisciplinary care in a substantial proportion of patients. ALND was avoided in the majority of patients, and no regional nodal recurrences were observed. Future studies should incorporate SLN

surgery to better tailor surgery and radiation based on both the anatomic extent of disease and tumor biology to optimize oncologic outcomes for this heterogeneous patient population.

Table. Patient, tumor, and treatment features in relation to success of SLN surgery

	SLN Identified (N=65)	SLN Not Identified (N=8)	Total (N=73)	p-value
Age at recurrence				0.32
Median (Range)	53 (28-83)	57 (44-82)	54 (28-83)	
Time to LR, months				0.03
Median (Range)	61.4 (6.7-416.8)	118.5 (43.5-359.8)	62.6 (6.7-417.8)	
BMI day of surgery				0.65
Median (Range)	26 (14-41)	28 (19-30)	27 (14-41)	
Index clinical T category				0.77
cT0/cTis	16 (25.8%)	1 (20.0%)	17 (25.4%)	
cT1	27 (43.5%)	3 (60.0%)	30 (44.8%)	
cT2	15 (24.2%)	1 (20.0%)	16 (23.9%)	
cT3	4 (6.5%)	0 (0.0%)	4 (6.0%)	
Index tumor nodal status				0.13
Node-negative	60 (93.8%)	6 (75.0%)	66 (91.7%)	
Node-positive	4 (6.3%)	2 (25.0%)	6 (8.3%)	
Prior axillary surgery for index tumor				<0.001
SLN only	59 (90.8%)	1 (12.5%)	60 (82.2%)	
ALND (±SLN)	6 (9.2%)	7 (87.5%)	13 (17.8%)	
Prior XRT (prior to initial post-mastectomy LR)				0.05
No	59 (90.8%)	5 (62.5%)	64 (87.7%)	
Yes	6 (9.2%)	3 (37.5%)	9 (12.3%)	
Primary mastectomy				0.34
No Reconstruction	13 (20.0%)	0 (0.0%)	13 (17.8%)	
Reconstruction	52 (80.0%)	8 (100.0%)	60 (82.2%)	
LR ER status				0.68
Negative	15 (23.1%)	1 (12.5%)	16 (21.9%)	
Positive	50 (76.9%)	7 (87.5%)	57 (78.1%)	
LR PR status				0.46
Negative	23 (35.4%)	4 (50.0%)	27 (37.0%)	
Positive	42 (64.6%)	4 (50.0%)	46 (63.0%)	
LR HER2 status				>0.99
Negative	52 (85.2%)	7 (87.5%)	59 (85.5%)	
Positive	9 (14.8%)	1 (12.5%)	10 (14.5%)	
LR Ki67				0.16
Median (Range)	13.3 (2.0-84.0)	8.9 (7.0-18.9)	13.0 (2.0-84.0)	
Neoadjuvant				0.48
Chemotherapy	11 (16.9%)	0 (0.0%)	11 (15.1%)	
Endocrine therapy	2 (3.1%)	0 (0.0%)	2 (2.7%)	
None	52 (80.0%)	8 (100.0%)	60 (82.2%)	
Redo SLN surgery technique				0.01
Radioactive Isotope & Blue Dye	53 (81.5%)	3 (37.5%)	56 (76.7%)	
Radioactive Isotope Only	12 (18.5%)	5 (62.5%)	17 (23.3%)	
Lymphoscintigraphy performed				0.59
No	8 (12.3%)	0 (0.0%)	8 (11.0%)	
Yes	57 (87.7%)	8 (100.0%)	65 (89.0%)	
Lymphoscintigraphy identified at least one SLN				<0.001
Not performed	8	0	8	
No	2 (3.5%)	8 (100.0%)	10 (15.4%)	
Yes	55 (96.5%)	0 (0.0%)	55 (84.6%)	

Lymphedema

1386791 - Does Delayed Axillary Lymph Node Dissection Decrease Success Rates of Immediate Lymphatic Reconstruction?

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Background/Objective: Management of the axilla has become increasingly complex and multidisciplinary discussions are often necessary to determine a consensus for treatment plans. Immediate lymphatic reconstruction (ILR) after axillary lymph node dissections (ALND) can be attempted to decrease the risk of lymphedema. ALND with ILR can be performed during the 1) immediate initial axillary operation (i.e., sentinel node intraoperatively evaluated and converted to ALND after frozen section results or planned ALND) or 2) delayed ALND after sentinel lymph node biopsy (SLNB) results indicate need for axillary dissection days to weeks later. In such situations of a delayed ALND, scar tissue and post-operative changes from the first axillary surgery may make the dissection more difficult, which could make ILR more challenging. The purpose of this study is to assess if there is any difference in ILR success rates when comparing immediate ALND vs. delayed ALND with ILR.

Methods: A retrospective review at a single institution was performed for patients with breast cancer who underwent ALND with attempted ILR from 2017-2022. Patients were categorized into 2 groups: Group 1 - immediate ALND with ILR (ILR attempted after planned ALND or SLNB intraoperatively evaluated and converted to ALND based on frozen pathology results) and Group 2 – delayed ALND with ILR (patients who had a recent axillary surgery such as SLNB and now requires a return to the OR for completion ALND days to weeks later). Patient characteristics, treatments received, ALND timing, usage of dye for axillary reverse mapping (ARM), and number of channels anastomosed were collected. The primary outcome was success rates at performing ILR. T-test was performed on continuous values and a chi-squared test was used for categorical variables. Statistical significance was set at $p<0.05$.

Results: Of the 98 patients included in our cohort, 87.8% (86/98) underwent immediate ALND and ILR (Group 1) while 12.2% (12/98) had delayed ALND and ILR (Group 2). There were differences in age with immediate ALND and ILR patients (Group 1) being younger and more likely to have received neoadjuvant chemotherapy ($p=0.01$ and $p=0.03$). No differences were seen in the number of successful ILRs performed between immediate versus delayed ALND with ILR ($p=0.23$). There were also no differences in the usage of axillary reverse mapping or number of channels anastomosed ($p=0.33$ and $p=0.85$) (Figure).

Conclusions: Management of the axilla has become increasingly complex requiring multidisciplinary input. Decisions not to perform intraoperative frozen evaluation of sentinel lymph nodes with reflex ALND may be considered more regularly to avoid overtreatment. Our study reassures surgeons that whether an ALND is performed at the index surgery or delayed, ILR success rates are not compromised.

Table. Comparison of immediate vs. delayed ALND with ILR

	Group 1: Immediate ALND with ILR (n=86)	Group 2: Delayed ALND with ILR (n=12)	
Age	50.5 ± 12.2	59.7 ± 7.2	**p = 0.01**
BMI	30.1 ± 7.1	31.3 ± 7.5	p = 0.60
Axillary Reverse Mapping Used (ICG, fluorescein, isosulfan blue, methylene blue)			p = 0.33
Yes	58	10	
No	28	2	
ILR repair			p = 0.23
Successful	85	11	
Failed	1	1	
Average Number of Channels	1.5 ± 0.8	1.6 ±1.1	p = 0.85
Neoadjuvant Chemotherapy			**p = 0.03**
Yes	57	4	
No	29	8	

1386808 - Trends in Immediate Lymphatic Reconstruction

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Background/Objective: Immediate lymphatic reconstruction (ILR) has had increasing popularity as an adjunct in axillary lymph node dissections (ALND) to decrease the risk of lymphedema. ILR can lower the risk of lymphedema from 30% to 3-13%. However, ILR often requires coordinating between 2 surgical specialties for the oncologic ALND and the microsurgery immediate lymphatic anastomosis. The purpose of this study is to assess the trend in frequency of ILR being performed after ALND at our institution.

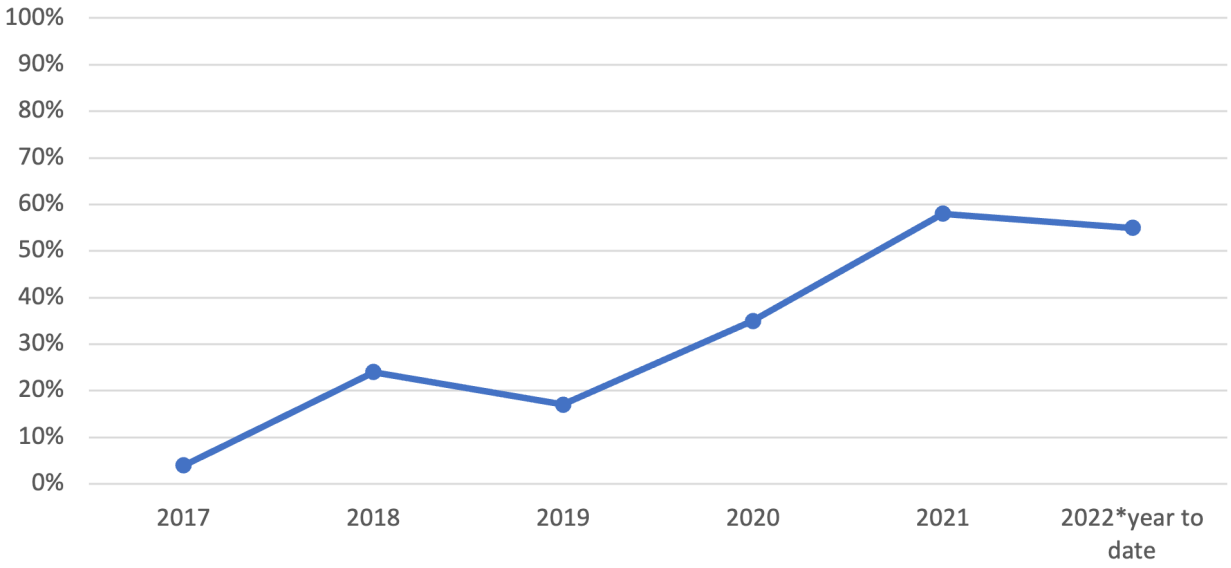
Methods: Breast cancer patients undergoing ALND from 2017-2022 were reviewed at our institution. An ILR program was first established in 2017 at our center in coordination between oncological breast surgery and plastic surgery. The frequency that ILR was performed with ALND was assessed and categorized for each year. Patient and tumor characteristics, type of breast surgery, and treatments received were collected.

Results: A total of 318 patients underwent ALND in our cohort, and 31% (97/318) of patients had ILR planned at the time of surgery. Average age of patients who received ILR was 52 years old, and average BMI was 30. Of the patients who received ILR, 22% (21/97) were clinically Stage I, 44% (43/97) clinically Stage II, 29% (28/97) clinically Stage III, and 5% clinically Stage IV (5/97). There were 61% (59/97) of patients in the ILR cohort who underwent neoadjuvant chemotherapy, and all patients received

adjuvant radiation therapy. ILR was performed with ALND in 4% of patients in 2017, 17% in 2019, and 58% in 2021 (Figure). When comparing the first year of the ILR program and the last complete year at our institution, the odds ratio of receiving ILR when an ALND was performed was 31.5 ($p<0.05$).

Conclusions: ILR continues to be performed more frequently for patients undergoing ALND at our institution. Implementation of an established ILR program at an institution can increase uptake of this procedure to potentially mitigate the lifelong complications of lymphedema in the setting of an ALND.

Figure. Percentage of ALND patients receiving ILR



1386355 - Evaluation of Lymphedema After Axillary Lymph Node Dissection with LYMPHA Procedure

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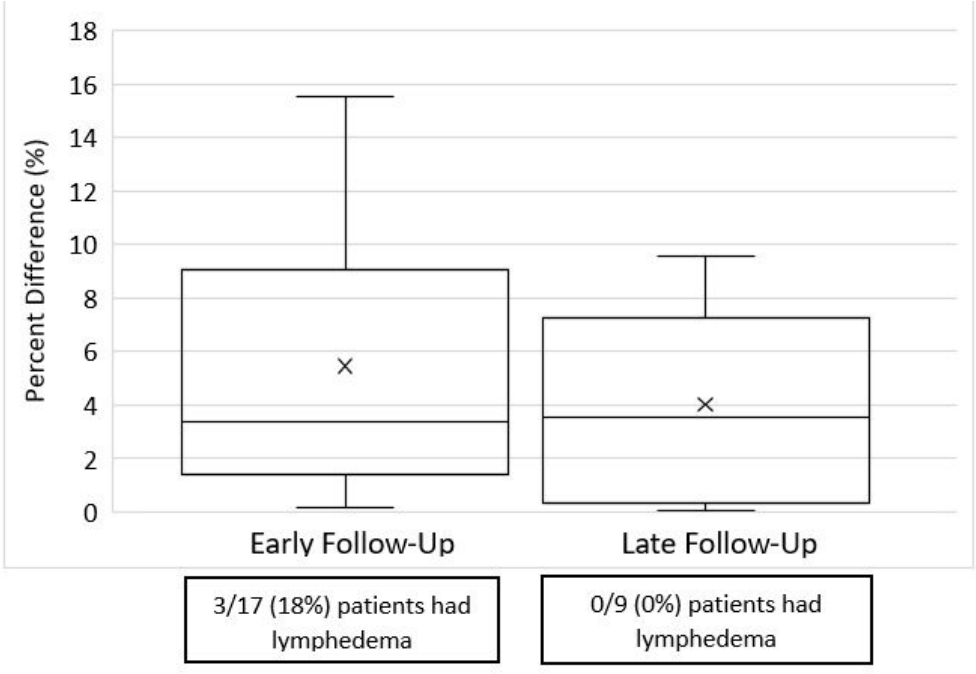
Background/Objective: Lymphedema is a chronic, disabling, and progressive condition that frequently occurs after axillary lymph node dissection (ALND). No curative treatment exists. The Lymphatic Microsurgical Preventive Healing Approach (LYMPHA) procedure is currently used to treat and prevent lymphedema in patients who require ALND with or without regional nodal irradiation (RNI). Current studies on the procedure have generally short follow-up time of 6-12 months, with the incidence of lymphedema peaking between 12-30 months after surgery [1]. The objective of this study was to investigate the outcomes of the LYMPHA procedure in preventing lymphedema in women after ALND with or without RNI. We hypothesized that patients who underwent LYMPHA with ALND would have a lower incidence of lymphedema compared to a historical rate of 30.1%[2] in patients with ALND and chest wall radiation/RNI.

Methods: Twenty-six adult women who were planning to undergo ALND with LYMPHA (25 breast cancer, 1 Burkitt's Lymphoma) were prospectively enrolled in the study between 8/2019 and 5/2020 at the Aesthetic and Reconstructive Institute at Orlando Health Cancer Institute. Of these 26 patients, 9 did not have follow-up arm measurements. The remaining 17 patients were 30-79 years of age, and 47% were overweight (BMI >30); 88% received radiation, 80% received (neo)adjuvant chemotherapy, 37% had <10 lymph nodes removed, 32% had 10-15 lymph nodes removed, and 31% had >15 lymph nodes removed, 37% presented with Stage II, and 63% presented with Stage III. Bilateral circumference arm measurements were taken every 4cm for 44cm starting at the ulnar styloid. Arm volume was calculated using the Frustum formula. The index arm volume was compared to the contralateral arm volume. A patient was deemed to have lymphedema if there was a >10% difference in the 2 arm volumes. Measurements were taken after LYMPHA procedure and can be broken into early follow-up (median=5 mo, IQR=1.6-6.9 mo, n=17) and late follow-up (median=27 mo, IQR=25-27 mo, n=9) time periods. Exact binomial tests with Clopper-Pearson 95% confidence interval were conducted at early and late follow-up time periods comparing the proportion of patients with lymphedema to a historic control (30.1%).

Results: Boxplots show lymphedema trends across time (Figure). Arm measurements revealed lymphedema in 18% (95% CI: 3.8-43%; p=0.178) of patients at the early follow-up time and 0% (95% CI: 0-33.6%; p=0.04) of patients in the late follow-up time. Of the 3 patients who had lymphedema at the early follow-up, 1 did not have additional measurements, and 2 no longer had lymphedema at late follow-up.

Conclusions: Among patients at high risk for lymphedema undergoing ALND, LYMPHA procedure appears to decrease the prevalence of lymphedema at 27-month median follow-up compared to historic control. Given the small sample size of our study, larger confirmatory studies are warranted.

Figure. Boxplots depicting mean (X), median, and interquartile range for the percent difference in arm (left) and hand (right) volumes over time



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1387756 - Lymphedema After Surgical Treatment for Breast Cancer: What Risk Factors Are Associated with Severe Disease?

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Background/Objective: Lymphedema among patients undergoing surgery for invasive breast cancer can have a devastating consequence on their quality of life. Current management for lymphedema focuses on early detection and early physical therapy interventions. To date, there are limited clinical markers to identify patients at risk for moderate to severe lymphedema after surgery. This study aims to identify clinical factors in patients with breast cancer that are at higher risk for developing more severe post-operative limb lymphedema.

Methods: We performed an IRB approved single-institution retrospective cohort study of breast cancer patients diagnosed with post-operative lymphedema from 2015-2020. We collected clinical, pathologic, treatment, and lymphedema/outcome variables for all patients. A univariate analysis was performed to establish a relationship between stage of lymphedema at presentation and patient characteristics using Fisher's exact test.

Results: We identified 129 patients with upper extremity lymphedema, with 62% of patients presenting with early-stage lymphedema (Stage 0/I, n=82), and 48% with moderate/severe lymphedema (Stage II/III, n=47). Among co-morbidities, insulin dependent diabetes was associated with Stage II or III lymphedema at presentation (p=0.03). While BMI and smoking status are known risk factors for lymphedema, they were not associated with a higher stage at presentation (p=0.78 and p=0.79 respectively). In addition, nodal stage (p=0.23), axillary surgery (sentinel node biopsy vs. axillary lymph node dissection, p=0.24 and p=0.26, respectively), and receipt of chemotherapy (p=1.0) or radiation (p=1.0) were not predictive of lymphedema severity at the time of presentation. Finally, the type of lymphedema therapy was significantly different between groups. Lymphedema patients in the Stage II and III group had significantly higher rates of manual lymphatic drainage (p=0.01) and pneumatic pumps (p<0.01).

Conclusions: While the majority of patients present with early-stage lymphedema, a substantial proportion of patients presented with moderate to severe stages of lymphedema (48%) and required more intensive interventions, including manual lymphatic drainage and pneumatic pumps. Our study identified insulin-dependent diabetes to increase risk for higher-stage lymphedema at presentation, while commonly associated risk factors did not. Our findings support the need for further study to identify additional risk factors to improve opportunities for early diagnosis and treatment to limit disease progression.

1387204 - Breast Cancer-related Lymphedema (BCRL) and Bioimpedance Spectroscopy: Long-term Follow-up, Surveillance Recommendations, and Multidisciplinary Risk Factors

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Background/Objective: Bioimpedance spectroscopy (BIS) has been identified as an efficacious tool for early detection of breast cancer-related lymphedema (BCRL), a dreaded side effect following breast cancer treatment, allowing early intervention to decrease persistent lymphedema rates. We aimed to provide long-term follow-up data on BIS and persistent BCRL to guide surveillance recommendations and define multidisciplinary treatment risk factors for BCRL.

Methods: A total of 149 females with breast cancer who had axillary lymph node dissection performed at a single academic institution 11/2014-11/2017 were analyzed. All patients had pre-operative baseline BIS measurements with post-operative follow-up every 3 months for 1 year, every 6 months for 1 year, and then annually. BIS >3 standard deviations above baseline (>10 points, abnormal BIS) triggered home intervention with subsequent reassessment for resolution versus persistent BCRL. High risk factors of chemotherapy regimen, BMI, radiation, number of nodes removed, number of positive nodes, and time to abnormal BIS were analyzed. Patient groups were compared using t-tests or Wilcoxon rank sum tests for continuous variables and chi-square or Fisher's Exact tests for categorical variables. All analyses were conducted using R (version 4.2.1), and $p<0.05$ was used to define statistical significance.

Results: The mean follow-up was 55 months with 65 patients (44%) having an abnormal BIS. Of these, 54 (82%) resolved with home intervention. The persistent lymphedema rate was 8%. Average time to first abnormal BIS was 9 months. Thirty-four patients (52%) were identified at Stage 0, and 25 patients (38%) at Stage I. The remaining 7 patients (10%) were Stage II or III. None of the Stage 0 patients had persistent BCRL. BCRL only persisted in 5 (25%) of Stage I patients. Six (100%) of the Stage II patients and 1 (100%) of the Stage III patients had persistent BCRL. Abnormal BIS was not associated with BMI, radiation, chemotherapy, number of positive nodes, or percentage of positive nodes ($p=0.6$, 0.2, 0.9, 0.6, and 0.8 respectively). However, persistent BCRL did correlate with BMI, adjuvant taxane chemotherapy, number of positive nodes, percent positive nodes, stage of lymphedema at diagnosis, and recurring abnormal BIS measurements ($p=0.095$, 0.076, <0.001, <0.001, <0.001, 0.002 respectively). The correlation for taxane chemotherapy and radiation therapy can be seen in the Table.

Conclusions: Utilizing BIS to identify patients with subclinical BCRL decreases the risk of progressing to persistent BCRL. When abnormal BIS is identified at subclinical and early stages, at-home interventions are effective in lowering their risk for persistent BCRL by returning them to normal. Risk factors for persistent BCRL stem from multidisciplinary breast cancer treatment, not surgery alone. Clinicians should be aware of patients at higher risk for persistent BCRL based on multidisciplinary treatment modalities and monitor them with routine surveillance starting at 9 months post-operatively to identify an opportunity for early intervention.

Table. Taxane chemotherapy and radiation effects on BIS and persistent lymphedema

	No Taxane Chemo (n =28)[1]	Taxane Chemo (n =120)[1]	p-value[2]
Any abnormal BIS episodes			0.9
No	16 (57%)	67 (56%)	
Yes	12 (43%)	53 (44%)	
# of abnormal BIS episodes, all patients			>0.9
Mean (SD)	0.71 (1.05)	0.68 (0.91)	
# of abnormal BIS episodes, among those who had episodes			0.9
Mean (SD)	1.67 (0.98)	1.55 (0.72)	
Persistent Lymphedema			0.4
Yes	1 (8.3%)	11 (20%)	
No	11 (92%)	43 (80%)	
Time to abnormal BIS			0.9
Mean (SD)	10 (6)	12 (11)	
# Positive Nodes			0.3
Mean (SD)	2.4 (3.8)	3.4 (5.4)	
% Positive Nodes			0.3
Mean (SD)	13 (0.18)	21 (0.26)	

	No Radiation (n=35)[1]	Radiation (n=113)[1]	p-value[2]
Any abnormal BIS episodes			0.2
No	23 (66%)	60 (53%)	
Yes	12 (34%)	53 (47%)	
# of abnormal BIS episodes, all patients			0.3
Mean (SD)	0.66 (1.11)	0.70 (0.88)	
# of abnormal BIS episodes, among those who had episodes			0.2
Mean (SD)	1.92 (1.08)	1.49 (0.67)	
Persistent Lymphedema			0.4
Yes	1 (8.3%)	11 (20%)	
No	11 (92%)	43 (80%)	
Time to abnormal BIS			>0.9
Mean (SD)	14 (14)	11 (9)	
# Positive Nodes			0.008
Mean (SD)	1.8 (2.5)	4.5 (10.4)	
% Positive Nodes			0.018
Mean (SD)	11 (0.14)	26 (0.47)	

[1]n (%)

[2]Fisher's exact test (when cell sizes <5) and Pearson's Chi-squared test for categorical variables; Wilcoxon rank sum test for continuous variables

1388301 - Does Routine SOZO Bioimpedance Spectroscopy Improve Survivorship in a Community-based Breast Cancer Program?

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Background/Objective: Lymphedema is recognized as a complication that significantly increases morbidity following breast surgery. Treatments and prophylactic interventions have remained areas of active investigation even despite changes in axillary management. The SOZO monitoring device uses bioimpedance spectroscopy (BIS) in the limb to identify extracellular fluid in the pre-clinical phase. A change in BIS of 6.5 units has been associated with subclinical lymphedema (SCL). In late 2020, as part of our survivorship program, we instituted the wide use of SOZO monitoring collecting a pre-surgical baseline as well as surveillance measurements ideally at 3-month intervals following surgery.

Methods: A total of 950 patients were reviewed who underwent SOZO measurements. Patients with BIS at least 6.5 above baseline (or over 6.5 in the absence of baseline) were further evaluated and stratified according to surgical intervention, axillary management, and pathology. Physical therapy (PT) provided additional information regarding referrals.

Results: Of 950 patients evaluated with SOZO, 30 patients (3.2%) were identified with elevated BIS measurement ≥6.5. Of the 30 patients, 2 patients were discarded due to previous surgery or absence of post-surgical data, leaving 28 patients for further evaluation. Eight (28.6%) patients underwent ALND, while 20 (71.4%) had SLN biopsy alone. Nine patients (32.1%) had positive LNs. Five (17.9%) patients had neoadjuvant chemotherapy, and 1 (3.6%) had adjuvant chemotherapy. Sixteen patients (57.1%) had radiation treatment. Six (21.4%) patients were referred for cording. Three (7.1%) were referred for lymphedema or extremity swelling, and 1 (3.6%) was referred for breast edema. Four (14.3%) were referred for joint stiffness, some of which was present prior to surgery. One patient was referred immediately post-operatively for prophylactic exercises following ALND. Thirteen patients (46.4%) had isolated BIS changes without physical exam abnormalities and were referred for SCL therapy. Overall, in 950 patients screened, only these 13 patients (1.4%) were referred for early lymphedema-targeted PT based exclusively on SOZO. They continue to be monitored for development of clinical lymphedema.

Conclusions: In the current era of de-escalating surgical and axillary management, the number of patients progressing to lymphedema is low. The implementation of a broad, active surveillance program to identify early-stage lymphedema in all patients resulted in identifying very few patients, less than 1.5%. We therefore have changed our monitoring for early lymphedema to the high risk population only.

1388371 - Primary Lymphatic Reconstruction (PRL) in Prevention of Breast Cancer-related Lymphoedema (BCRL) Using a Novel Triple-mapping Technique

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Background/Objective: Efficacy of a novel triple-mapping technique in primary lymphatic reconstruction for prevention of upper-limb lymphoedema in breast cancer patients undergoing axillary lymph node dissection.

Methods: Eligible patients were identified at tumor board and consented prior to surgery by both the breast and microsurgical teams. Pre-operative bioimpedance (L-DEX) and arm volume measurements were calculated using 5cm increment arm circumferences in a formula for frustum (truncated cone). Lymphoedema was defined as an L-DEX increase of ≥6.5 or a relative arm volume increase (RAVI) >10% or persistent subjective symptoms of lymphoedema and confirmed on ICG lymphangiography. Patients were triple-mapped; forward-mapping was performed with a paramagnetic tracer (Magtrace®) and dual-reverse mapped with blue dye and indocyanine green to facilitate identification of the ARM lymphatics. PRL was undertaken as a modification of the technique described by Boccardo, et al.

Results: Fifty patients underwent PRL by 2 breast surgeons and 6 microsurgeons from July 2018 to November 2022. The average BMI was 26.5 (range 19.2-44.1). A total of 96% of patients had chemotherapy reflecting the high-risk cohort, of which 54% had neoadjuvant chemotherapy and 46% adjuvant chemotherapy. Except for patients with low lymph node burden of disease, the majority received locoregional radiotherapy, including the supraclavicular fossa and internal mammary chain. The majority of patients (41/50; 82%) underwent mastectomy and immediate breast reconstruction, 31/40; 76% of had free flap with DIEP. An average of 4.7 lymphatics (range 1-7) were identified, and an average 1.7 LVAs (range 1-3) were performed. There were no reported technical failures (where either a suitable recipient vein or ARM lymphatic was identified). With an average follow-up of 16.4 months (range 1-51), there are no reported cases of lymphoedema, of which 20 patients had more than 18 months of follow-up.

Conclusions: We report the first experience of primary lymphatic reconstruction utilising a novel triple-mapping technique; our results further improve on those previously reported and demonstrate the reproducibility of the technique in prevention of BCRL.

1339198 - A Comparison of Utilization of Treatment Modalities Between Breast Cancer-related Lymphedema and Other Cancers in a Large Population

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Background/Objective: Breast cancer treatment (BCRL) is the most common cause of oncologic-related lymphedema (LED). There is a scarcity of literature on the trends in treatment of LED, and we aim to describe the state of the current non-surgical treatment of BCRL in the largest sample size of its kind.
Methods: The IBM MarketScan Commercial and Medicare Databases were examined from April 2013 to March 2019 for patients with a new diagnosis of LED (index date), which yielded 85,601 patients. The etiology of LED was determined based on diagnosis codes (ICD-9/ICD-10) recorded prior to the index date, while LED treatment modalities were identified based on procedure codes (HCPCS) recorded on or after the index date. BCRL was compared to 2 other cancers that are associated with LED: gynecologic (GYN) cancers (cervical, ovarian, and uterine) and melanoma (MEL).

Results: For the 85,000+ patients, BCRL was the most common cause of LED [n=17,954, 21%]. Nearly 90% of BCRL patients received some form of specific treatment for LED, compared to a lower percentage for GYN (79.5%) and MEL (81.3%). Manual lymphatic drainage (MLD) and PT/OT were the most frequently used treatment modalities for BCRL at 75.3% and 83.3%, respectively. These modalities were employed less often for GYN [MLD 65.0% and PT/OT 73.0%] with comparable proportions for MEL. Additionally, when BCRL patients were prescribed MLD, they had more treatment encounters (11.6) compared to GYN (9.3) and MEL (9.2). Pneumatic compression devices (PCDs) were prescribed for a smaller segment of LED patients [BCRL 11.4%, GYN 20.1%, and MEL 13.8%], and although still utilized less for other etiologies, advanced PCDs were prescribed 2 to 3 times more often in BCRL than simple pneumatic compression devices. LED treatment was initiated after diagnosis of LED in a shorter period of time for BCRL (47 days) than for GYN (77 days) or MEL (68 days).

Conclusions: Once the diagnosis of LED is established, the preponderance of BCRL patients undergo prompt treatment for LED, usually with conservative modalities such as PT or MLD. Despite the colloquial idea that BCRL is undertreated and ignored, our data show a high rate of attempted treatment among BCRL patients, and a greater percentage of BCRL patients receiving treatment compared to other causes of LED. Overall, these data are encouraging for breast surgeons.

1363254 - Lymphedema Surveillance and Prevention in Women with Breast Cancer: Identifying and Eradicating Barriers to Entry

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Background/Objective: Axillary lymph node staging remains critical for guiding treatment decisions and predicting prognosis in breast cancer. Lymphedema is a significant complication of axillary staging procedures. In 2016, we instituted a lymphedema program to assess whether early detection and management of lymphedema improves outcomes. We hypothesized that decision to enroll would be multifactorial and based on patient characteristics, as well as geographic constraints.
Methods: All women with newly diagnosed invasive breast cancer seen in our multi-disciplinary clinic having axillary surgery at our institution between 2016-2021 were eligible to enroll. Women were ineligible if axillary surgery occurred prior to the first clinic visit; men were excluded. Pathologic, treatment, and demographic data, including geographic features, were retrospectively abstracted and compared among those who did and did not enroll. Univariable and multivariable logistic regression were performed to identify factors that predicted enrollment.

Results: Of 324 women invited to participate, 159 (49.1%) enrolled, and 165 (50.9%) did not. Of those who didn't enroll, 138 (83.4%) were eligible to participate. On univariable analysis, later study year and Asian race were associated with enrolling. Being widowed, having Medicaid insurance, living 26 to 100 miles from or having a drive time of 36 to 225 minutes to our institution, living in a county immediately adjacent to (contiguous) or further removed (not contiguous) from the home institution county, or living in an area of deprivation with a low score (11-40) significantly decreased study enrollment (Table). On multivariable analysis, later year of study (2019, p=0.04; 2020-21, p=0.01) and Asian race (p=0.01) continued to significantly predict enrollment, while Medicaid insurance (p=0.046) and living in contiguous (p=0.001) or not contiguous (p=0.01) counties remained predictive of low enrollment.

Conclusions: In our lymphedema program, both demographic and geographic factors influenced enrollment patterns. Widowed patients and those with Medicaid insurance, possibly due to poorer support networks and more financial insecurity, were unlikely to enroll. Women living in the same county as the home institution, <25 miles away, and those with drive times <35 minutes were most likely to enroll, suggesting that proximity to the home institution remains critical. This highlights potential areas of policy change, including identifying ways to support those with more limited means. It will also help identify where to establish, or partner with existing, physical therapy sites that have appropriate technologies available, which will hopefully assist in overcoming barriers to enrollment.

Table. Univariable analysis

Variable		OR (CI)	P value
Year consented	2016-17	Ref	
	2018	1.39(0.76-2.58)	0.29
	2019	2.13(1.19-3.84)	0.01
	2020-21	4.29(1.62-12.82)	0.003
Race	Asian	3.68(1.62-9.5)	0.001
	Other	0.63(0.23-1.66)	0.35
	White	Ref	
Marital status	Divorced	0.77(0.35-1.72)	0.53
	Married	Ref	
	Single	1.45(0.79-2.70)	0.23
	Widowed	0.22(0.03-0.92)	0.04
Insurance	Medicaid	0.24(0.05-0.81)	0.02
	Medicare	0.77(0.45-1.34)	0.36
	Other	1.02(0.37-2.97)	0.96
	Private	Ref	
County	Contiguous	0.38(0.21-0.68)	0.001
	Home	Ref	
	Not Contiguous	0.37(0.19-0.71)	0.003
	Other state	1.2(0.47-3.34)	0.7
Driving distance (miles)	0-25	Ref	
	26-100	0.44(0.25-0.78)	0.005
	>100	0.84(0.43-1.64)	0.6
Driving time (minutes)	0-35	Ref	
	36-225	0.49(0.29-0.83)	0.007
	>225	1.09(0.47-2.64)	0.84
Area deprivation index	1-10	Ref	
	11-40	0.61(0.38-0.99)	0.045
	>40	0.83(0.33-2.11)	0.69

1388098 - Autologous Breast Reconstruction Is Associated with Post-mastectomy Chest Wall Lymphedema

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Background/Objective: Chest wall lymphedema after mastectomy is an under-recognized and under-reported problem that can impair health-related quality of life. Often patients complain of chest wall tightness, swelling, and pain when lymphedema is present, and physical exam findings sometimes can be subtle. While there have been a few methods of chest wall lymphedema detection reported in the literature, most clinicians do not regularly evaluate for it or recognize it when it occurs. The aim of this study was to determine the incidence of chest wall lymphedema after mastectomy with or without reconstruction.

Methods: Using a prospectively maintained database, we identified patients who underwent mastectomy with or without reconstruction for cancer management or risk reduction between January 2019 and Oct 2021. Patients with distant metastases at diagnosis were excluded. Retrospective chart review was performed to obtain oncologic, radiologic, and clinical characteristics. Chest wall lymphedema was determined by signs of mastectomy site soft tissue swelling on clinical examination or identified by imaging. Chi-square and Fisher's exact tests were used for statistical analysis.

Results: One hundred sixty-five patients were identified who underwent mastectomies during the study period. Sixteen patients (9.7%) were found to have chest wall lymphedema. Out of these 16 patients, 13

patients (81.3%) had chest wall lymphedema alone, while 3 patients (18.7%) had concurrent chest wall and upper extremity lymphedema. The majority of patients who experienced chest wall lymphedema were overweight or obese (n=12, 75%; p=.11). While clinical exam was the main method of chest wall lymphedema detection (n=9, 56.2%), breast MRI alone detected chest wall edema in 7 cases (43.8%). Chest wall lymphedema was associated with skin-sparing mastectomy and deep inferior epigastric artery perforator (DIEP) flap reconstruction (n=15, 93.8%; p=.02). Chest wall lymphedema was observed in only 1 patient (6.2%) with implant-based reconstruction alone, and it was not seen in any of the patients who had mastectomy without reconstruction. There was no association observed between chest wall lymphedema and age, post-operative cellulitis, presence of upper extremity lymphedema, tissue expander or implant loss, receipt of post-mastectomy radiation, pre- or sub-pectoral tissue expander or implant placement, breast cancer recurrence, or history of prior lumpectomy with whole-breast radiation.

Conclusions: Post-mastectomy chest wall lymphedema is often clinically under-assessed and can contribute to post-mastectomy pain. Chest wall lymphedema is associated with receipt of autologous reconstruction, specifically DIEP flap reconstruction in our population. Future prospective studies should be directed to fully define chest wall lymphedema symptomatology and imaging assessment in patients who undergo autologous reconstruction, as recognition of this clinical entity provides an opportunity for earlier symptom management.

Male Breast Cancer

1388285 - Trends in Surgical Treatment for Male Breast Cancer Using the National Surgical Quality Improvement Program (NSQIP) Database

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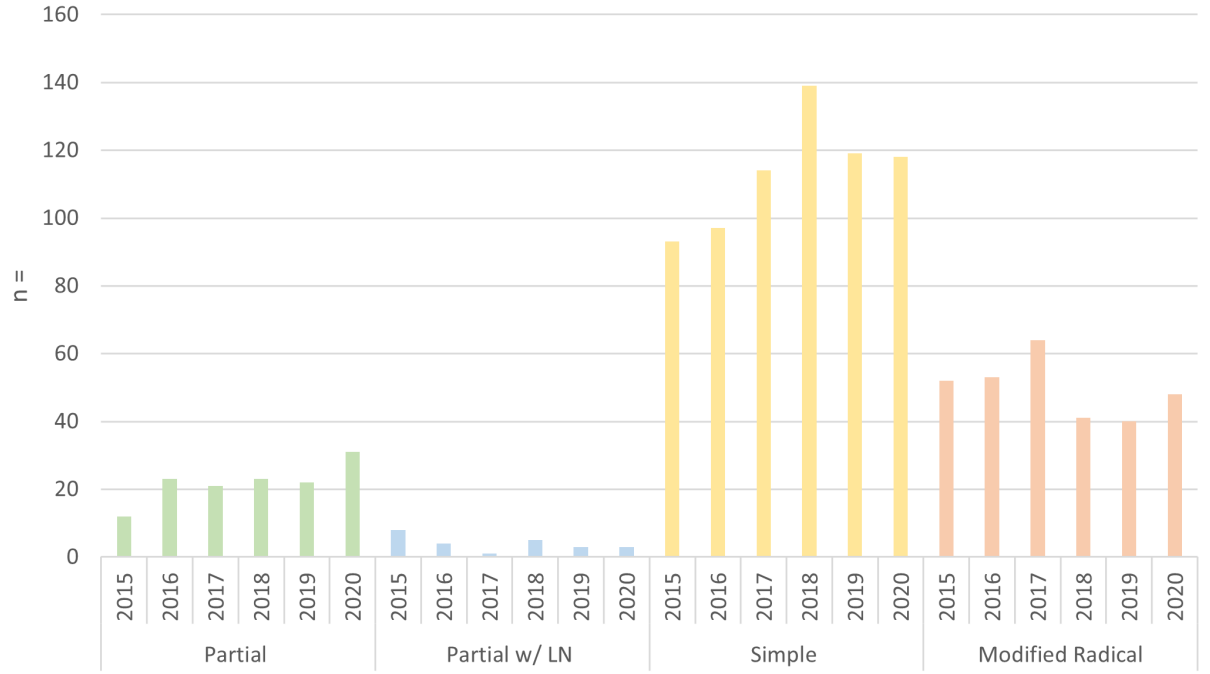
Background/Objective: In male breast cancer patients, de-escalation of breast cancer treatment with breast conservation or fewer axillary surgeries has not been well documented despite rapid uptake of these treatment guidelines in female patients. We aimed to assess if national trends reflect the updated guidelines and whether there has been a de-escalation of breast and axillary management in men.

Methods: Using the American College of Surgeons National Surgical Quality Improvement Program (NSQIP), male patients with diagnoses of breast cancer undergoing a primary surgical procedure of partial mastectomy (PM), partial with lymphadenectomy (PM-AX), simple (TM), or modified radical mastectomy (MRM) were selected from 2015 to 2020 for retrospective cohort analysis. Chi-squared were performed to assess trends in recent years.

Results: Of the 1,134 men diagnosed with breast cancer, 154 (13.6%) had in situ disease while 980 (86.4%) had invasive. The patients underwent PM (n=132, 11.6%), PM-AX (n=24, 2.2%), TM (n=680, 60%), or MRM (n=298, 26.3%). The median age was 66 years old. Most patients were Non-Hispanic White (n=779, 69%), with 14% Black (n=155), 9% unknown (n=104), 3% Asian (n=35), and 3% Hispanic White (n=39). There was a dependent relationship between year and type of surgery on chi-squared analysis (p=0.016). 2020 had higher percentage (15%, n=31) of partial mastectomy compared to earlier years (2015: 7.3%, n=12). There does not appear to be a linear trend for rates of TM or MRM from 2015 to 2020. There was a dependent relationship for invasive disease between type of surgery and year (p=0.011). More partial mastectomies were done for invasive cancer, 14.46% (n=24) in 2020 compared to 4.79% (n=7) in 2015. However, there does not appear to be any statistical change in surgical management of breast cancer patients in recent years on analysis. Most male breast cancer patients still undergo total mastectomy and there does not appear to be a decrease in axillary dissection in male patients.

Conclusions: Although there is a suggestion that more male patients underwent partial mastectomy and more were performed for invasive cancer in 2020 compared to earlier years, statistically, there is no linear trend in this most contemporary NSQIP data. Most male patients were treated for invasive disease. Axillary management in these patients has not decreased despite studies showing efficacy and safety from an oncologic perspective. Further studies may be needed to determine the lack of de-escalation in axillary management in male breast cancer patients if the trend continues.

Figure. Male breast cancer surgery over time



Margins

1387026 - Comparison of Surgical Outcomes Between Wire Localization vs Wireless Radiofrequency Identification Hologic LOCalizer Technique for Breast-conserving Surgeries: A Retrospective Cohort Analysis

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Background/Objective: More than one-third of breast cancer lesions are non-palpable and require localization techniques for surgical excision. Although wire localization (WL) has been the standard method for localization of non-palpable breast lesions, the radiofrequency identification (RFID) Hologic LOCalizer (HL) technique has become an alternative option given its scheduling flexibility and decreased risk for displacement and discomfort after placement. Given that one of the most important predictors of local regional recurrence after breast-conserving surgery is margins status, our primary interest was to investigate if there was a difference of margin positivity status for patients that underwent breast-conserving surgery with either wire localization vs the wireless RFID Hologic LOCalizer.

Methods: A retrospective cohort analysis of women with non-palpable breast lesions eligible for breast-conserving surgery that underwent wire localization or wireless RFID localization using the HL tag between January 2019 to December 2021 at a single institution was examined. All women over the age of 18 with non-palpable breast lesions eligible for breast-conserving surgery were included in the study. Women that underwent both localization techniques (secondary to migration from one of the localization techniques) were excluded from the study. Primary endpoints were rates of margin positivity and re-excision.

Results: A total of 287 women underwent breast-conserving surgery, with 92 women in the WL group and 195 women in the wireless RFID HL group. Mean age was 66.6 years in the WL group and 67.3 years in the HL group. The localization of the breast lesions was either conducted under ultrasound or mammography. The Table includes the mean pre-operative lesion size: 1.71cm among the WL group and 1.56cm among the HL group. DCIS lesions comprised 21.7% (20/92) lesions in the WL group vs 21.5% (42/195) in the HL group. Re-excision rates were also significantly lower in the HL group, with 10.76% (21/195) than the WL group with 16.30% (15/92). The margin positivity rate was 27.1% (25/92) in the WL group vs 23.0% (45/195) in the HL group. There were no incidences where the RFID tag could not be detected intraoperatively because of interference from electrocautery noise. The wires and RFID tags were successfully retrieved with the tissue specimen in all cases.

Conclusions: In our single institution with a single breast surgical oncologist, the use of the wireless RFID HL technique for breast-conserving surgery was associated with a significantly decreased re-excision rate of 10.8% vs 16.3% within the wire localization group, making HL a comparable technique to WL. Other studies have reported similar, but higher, re-excision rates between 15.1%-29.2% for the HL technique. There was also a decrease in the margin positivity among patients that underwent HL than the WL technique, although many of these margins did not have require re-excision especially since many of the margins were anterior (skin) or posterior (pectoralis muscle). Despite this being a

retrospective review with limitations, our institution will continue the use of the HL for breast-conserving surgery.

Table. Results from the retrospective review between the wire localization group (WL) and the wireless RFID Hologic LOCalizer localization group (HL)

	Wire localization group (WL)	Wireless RFID Hologic LOCalizer group (HL)
Total number of patients	92	195
Mean age of patients (years)	66.6	67.3
Mean preoperative tumor size (cm)	1.71	1.56
Number of DCIS lesions	21.7% (20/92)	21.5% (42/195)
Re-excision rate	16.3% (15/92)	10.8% (21/195)
Margin positivity	27.2% (25/92)	23.1% (45/195)

1387514 - Routine vs. Selective Shave Margins: A Comparison

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Background/Objective: The goal of breast-conserving surgery (BCS) is to obtain adequate margins while preserving an acceptable cosmetic outcome. Lumpectomy cavity margin shaving has been proposed as a method to minimize positive margin rates (PM) in invasive cancer (IC) and ductal carcinoma in situ (DCIS) and close margin rates in pure DCIS (CM-DCIS, tumor ≤ 2 mm from margin), however, data on the efficacy of this technique is inconsistent. Moreover, margin shaving may negatively impact cosmetic outcome due to larger resected specimen volumes. In our institution, some surgeons routinely shave margins (RSM) while others selectively shave margins at surgeon discretion (SSM), allowing us to compare the techniques within a single institution.

Methods: We retrospectively reviewed patients from the Christiana Care Health System (CCHS) tumor registry treated with BCS for Stage 0-II breast cancer in 2021. Patients undergoing large oncoplastic reductions were excluded. Patients were stratified by whether they had RSM vs. no shave or SSM (NS/SSM) during BCS. Frequency comparison analysis of the PM between RSM and NS/SSM groups was done using Pearson Chi-square analysis or Fisher exact test. Approximate lumpectomy-to-tumor size (LTTS) was defined as largest diameter of the primary lumpectomy specimen (not including shaved margins) divided by largest diameter of the tumor. The median LTTS was compared between groups using Mann-Whitney U test. A p-value of ≤ 0.05 was significant. The statistical analysis was performed using SAS 9.4 software.

Results: 259 patients were included (108 RSM and 151 NS/SSM). The overall PM/CM-DCIS in our study was 21.2%. The combined PM/CM-DCIS for RSM and NS/SSM were 11.1% and 28.5%, respectively (OR 0.31; 95% CI 0.16 - 0.63; $p < 0.01$). In the IC group, the PM was 11.5% in the RSM and 29.5 % in the NS/SSM group (OR 0.31; 95% CI 0.14 - 0.66; $p < 0.01$). In patients with pure DCIS, the PM/CM-DCIS was

8.3 % in the RSM group and 26.9% in the NS/SSM group (OR 0.26; 95% CI 0.01 - 2.2; p = 0.26). LTTS median in the RSM and NS/SSM groups were 6.40 (range 258.92) and 5.82 (range 127.82), respectively (p = 0.56).

Conclusions: Our results showed that RSM was statistically superior to NS/SSM in minimizing PM/CM-DCIS overall and in the IC group, but the difference did not reach statistical significance in the pure DCIS group. This may be due to the smaller number of pure DCIS cases in our sample, the wider optimal margin for DCIS, or the multifocal/branching nature of DCIS. Our study found similar LTTS between the RSM and NS/SSM. Measurements of the margin shavings were not routinely reported by pathology, but with shaves taken from all margins, we infer that the RSM group had larger final LTTS compared to the NS/SSM group. We conclude that RSM yields a lower positive margin rate in invasive carcinoma, however it is likely that the total amount of tissue excised is larger compared to NS/SSM, potentially impacting cosmetic outcome while sparing re-excision in less than 20% of patients.

1387702 - Does Nipple-ward-positive Margin Contribute to a Higher Rate of Re-excision Procedures After Breast-Conserving Surgery?

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Background/Objective: An important aspect of breast conservation surgery (BCS) is complete excision of the tumor with negative resected margins to ensure lower recurrence rates. Positive margins on lumpectomy specimens are associated with a twofold increased risk of local breast tumor recurrence. Historically, 20-40% of patients undergoing BCS have positive margins on pathology, necessitating re-excision. Conversely, re-excision has the potential to increase patient anxiety, adversely affect cosmesis and delay initiation of adjuvant therapy. Theoretically, ductal cancers tend to develop in the terminal ducts and migrate toward the nipple. Prior literature has demonstrated various techniques and modalities for assessing margin status To reduce re-excision rates. However, there is a paucity of literature analyzing the role of nipple-ward positive margins contributing to re-excision rates. Therefore, the primary aim of the study was to investigate whether nipple-ward positive margins resulted in a higher rate of re-excisions in our patient population.

Methods: A retrospective chart review was performed on patients who had re-excision surgery between November 2017 and September 2022. Age, BMI, ethnicity, cancer-stage, surgical procedure, and radiological and histopathological reports were all recorded. Tumor location was determined using mammography, ultrasound, or MRI, which is typically reported as clockwise axis. Furthermore, pathological report from the initial BCS was examined to identify positive margins. Radiologic and pathologic reports were used to correlate whether the margin was in nipple-ward direction. Additionally, positive margins were assigned numbers for stratification: 0=Single margin non-nipple-ward, 1=Single margin nipple-ward, 2=Multiple margins (less than 4) with at least 1 margin being nipple-ward, and 3=Multiple margin (4 or more) non-nipple-ward. To determine if positive nipple-ward margin contributed to re-excision rate, we used a cut-off of more than 25% positive margin necessary to demonstrate correlation.

Results: A total of 98 patients' data were evaluated whose mean age and BMI were 61.4+12.4 years and 29.9+6.6 kg/m2, respectively. Patients belonging to ethnic minority groups accounted for 81.6%. On pathology, 47.9% of the patients were diagnosed with in situ carcinoma, whereas 52% had invasive carcinoma. Furthermore, after being diagnosed with positive margins, 73(74.5%) and 25(25.5%) patients underwent lumpectomy and mastectomy, respectively. In terms of margin pathology, 58(59.1%), 5(5.1%), and 35(35.7%) patients were diagnosed as DCIS, invasive carcinoma, and mixed pathology, respectively. Overall, 38.8%(n=38) of the positive margins were nipple-ward, with 71%(n=27) reporting DCIS. According to stratification, 43(43.8%) cases were single-margin positive, 20(46.5%) of which were nipple-ward. Moreover, the remaining 55(56.1%) patients had multiple positive margins, with 18(32.7%) cases being in the nipple-ward direction.

Conclusions: Nipple-ward positive margins significantly contribute to a higher re-excision rate. Of the patients undergoing re-excision surgery, 38.8% had positive nipple-ward margins. In our study, nearly 50% of the cases with a single positive margin were in the nipple-ward direction. Prior studies have highlighted that taking an additional shave during initial lumpectomy decreases re-excision rates. However, shaving in the nipple-ward direction can further reduce re-excision rates. Nonetheless, future studies with prospectively collected data defining the nipple-ward margin on excision can better delineate if taking an extra shave margin can decrease re-excision rates.

Table. Patient and nipple-ward margin characteristics

Total Patients	98
Age, y, mean (SD)	61.4 (12.4)
Race/ethnicity	
White	18 (18.3%)
Black	34 (34.7%)
Hispanic	39 (39.8%)
Asian/ Pacific Islander	7 (7.1%)
BMI, mean (SD)	29.9 (6.6)
Laterality	
Left	40 (40.8%)
Right	58 (59.2%)
Procedure following positive margins	
Lumpectomy	73 (74.5%)
Mastectomy	25 (25.5%)
Pathology	
In situ Carcinoma	47 (47.9%)
Invasive Carcinoma	51 (52%)
Stage	
0	41 (41.8%)
1	40 (40.8%)
2	13 (13.3%)
3	4 (4%)
4	0
Margin pathology	24.6% (35)
Ductal Carcinoma in Situ (DCIS)	58 (59.2%)
Invasive Ductal Carcinoma (IDC)	5 (5.1%)
Mixed (IDC+DCIS)	35 (35.7%)
Margin Stratification	
0 = Single Margin Positive Non-Nipple-ward	23 (23.4%)
1 = Single Margin Positive Nipple-ward	20 (20.4%)
2 = Multiple Margin Positive Nipple-ward*	18 (18.4%)
3 = Multiple Margin Positive Non-Nipple-ward**	37 (37.7%)
Total Single Margin Positive	**43 (43.8%)**
Total Multiple Margin Positive	**55 (56.2%)**
Neoadjuvant therapy	14 (14.3%)
Nipple-ward Positive Margin (Total)	38 (38.8%)
Single Margin Positive Nipple-ward (Out of Total Single Margin)	20 (46.5%)
Multiple Margin Positive Nipple-ward (Out of Total Multiple Margin)	18 (32.7%)

* Multiple margins positive less than 4 with at least 1 margin in the nipple-ward direction.

**Multiple margins positive 4 or more.

1387673 - 5-ALA-induced Fluorescence for Tumor Visualization in Breast-conserving Surgery: Part 2 of the "GLOW" Study

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Background/Objective: Breast-conserving Surgery (BCS) risks positive margins, resulting in a high burden of reoperative intervention (~20% in UK /21% USA). Fluorescence Guided Surgery (FGS) has the potential to provide real-time intraoperative visual cues for tumor visualization, enhance surgical precision and reduce positive margin rates. 5-Aminolevulinic acid, the precursor to Protoporphyrin IX (PpIX), accumulates in breast cancer cells due to enzymatic derangements in the heme pathway and fluoresces in the visible spectrum. We have developed a dual color and monochrome camera system tailored to PpIX's fluorescence. The difference in fluorescence between tumor and normal tissue in women undergoing BCS was assessed for diagnostic accuracy.

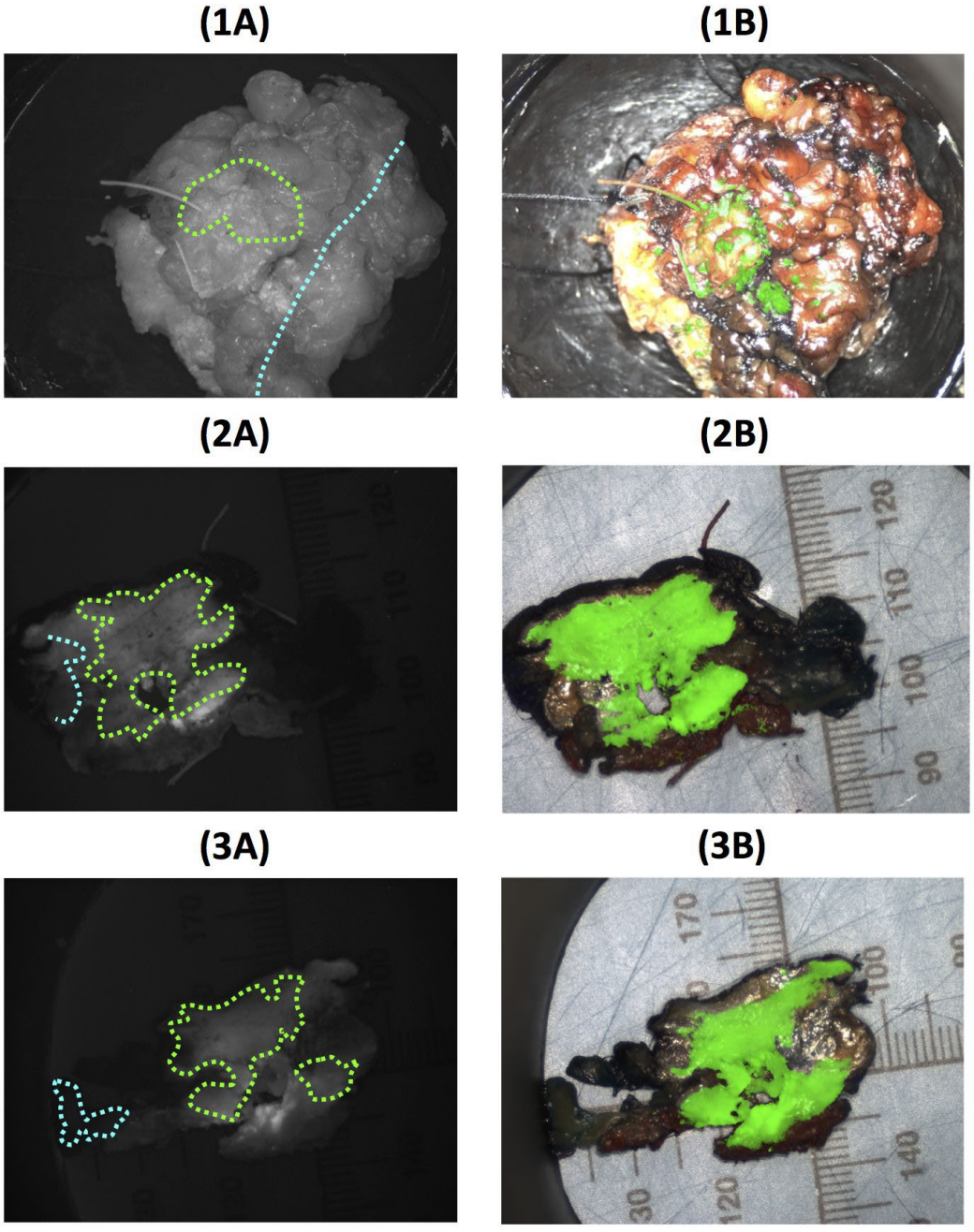
Methods: 30 patients were recruited to a single-center, prospective, feasibility study after UK Research Ethics Committee (19/LO/0927) approval. 20mg/kg of ALA was administered 2-4 hours pre-operatively. Using 2 different fluorescence filter modes (1 including and 1 excluding the excitation of the PpIX Soret band), images were acquired of the tumor in-situ, cavity, tumor ex-vivo, and during serial sectioning in histopathology. Surgeons were blinded to intraoperative images. Recorded outcomes included patient demographics and clinicopathological data. The images were marked using histopathology and processed to extract tumor-to-background ratio (TBR=(mean tumor pixel intensity)/(mean healthy pixel intensity)) and sensitivity/specificity to tumor with the use of the Receiver Operating Characteristic (ROC) curves in a 5-fold cross-validation.

Results: 30 women [median (range) age= 61 years (38-79), median (range) body mass index= 25kg/m2 (19.1-42.0)] were enrolled. 23 had Invasive Ductal Carcinoma (IDC), 12 of which had concurrent Ductal Carcinoma in Situ (DCIS), 4 Invasive Lobular Cancer (ILC) (2 with in-situ component ISLN), 1 DCIS and ISLN, 1 intrapapillary cancer, and 1 was metastatic. 4 were triple-negative (following NACT), 2 were triple positive, 3 were ER negative, and the remainder were ER+ and HER 2-. 11 had positive primary specimen radial margins (prior to cavity shaves). TBR reached a value of 3.4 ± 1.8 in the histopathology sections and 1.8 ± 0.7 in the ex-vivo samples. No statistical significance was found in the TBR values between the 2 different fluorescence filter modes, the NACT and the tumor cases, as well as depth of signal (i.e., same for under 2mm as for 3.5mm). The 5-fold cross validation resulted in a sensitivity/specificity of 0.72 ± 0.3/0.76 ± 0.4 in the histopathology sections, and 0.60 ± 0.4/ 0.81 ± 0.2 in the ex-vivo data.

Conclusions: ALA administration during BCS can distinguish tumor from normal tissue. The TBR of both the tumor (3.4 ± 1.8) and post NACT fibrosis (2.9 ± 1) were both above the recommended in-vivo threshold (>1.5), thus clinically significant in enabling excision of the tumor in its entirety in both scenarios. However, our current analysis indicates that for ex-vivo analysis the fluorescence signal is not

sensitive to the depth of the tumor. Future work will combine NIR camera system with a multispectral camera towards improving diagnostic accuracy.

FIGURE. Infrared images with corresponding color overlay of tumor ex-vivo and during histopathology cut-up



1364643 - Spare the Nipple: A Systematic Review of Tumor Nipple Distance and Oncologic Outcomes in Nipple-sparing Mastectomy

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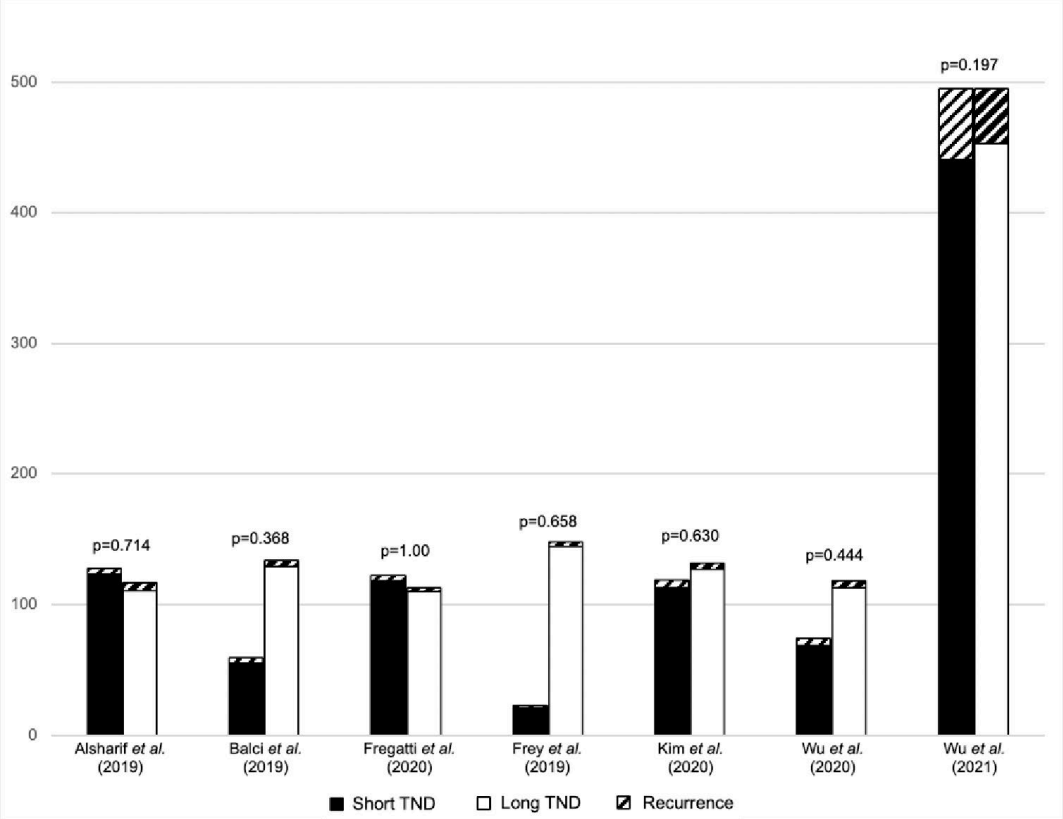
Background/Objective: Current NCCN guidelines recommend against performing nipple-sparing mastectomy (NSM) in breast cancers < 2 cm from the nipple, though nipple preservation in these patients has not been associated with increased risk of local recurrence. We conducted a systematic review of existing literature to determine the oncologic safety of NSM for breast cancers < 2 cm from the nipple.

Methods: We included studies of invasive or in situ breast cancer < 2 cm from the nipple-areolar complex (NAC) undergoing NSM which reported locoregional recurrence (LRR) rates. LRR rates were stratified by tumor-nipple distance (TND) and culminated across studies. Cohort study quality was assessed using Newcastle-Ottawa Criteria. Meta-analysis was not possible due to heterogeneity in reporting survival outcomes.

Results: We identified 7 retrospective cohort studies with 2295 patients and 18 case series with 3507 patients. Direct tumor involvement of NAC was considered an absolute contraindication to NSM in all studies. Among cohort studies, 1028 patients had TND < 2 cm. Median follow-up was 31-112 months (range 14-204 months). No cohort study identified TND < 2 cm as a significant risk factor for LRR. Among case series, 275 patients had TND < 2 cm. Combined LRR in case series was 2.6%, similar to rates reported for skin-sparing mastectomy.

Conclusions: Contrary to current guidelines, our systematic review did not identify TND < 2 cm as a significant risk factor for LRR. Our results suggest that the only contraindication to NSM is direct tumor involvement of NAC. Given the improved quality of life associated with NSM compared to skin-sparing mastectomy, we suggest NSM with immediate reconstruction as the procedure of choice in appropriately selected patients.

FIGURE. Proportion of locoregional recurrence rates in short vs. long TND cohorts among retrospective cohort studies, based on TND cut-off of 1 or 2 cm



1388112 - Multi-investigator Pilot Study of Post-lumpectomy Radio-frequency Ablation for Margin Extension and Local Control in Mastectomy Model

Tyler Wanke[1], Alyssa Bailey[2], Thomas Kurth[2], Robert Rioux[3], Luis Blanco, Jr.[4], Kevin Bethke[4], Swati Kulkarni[5]

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Background/Objective: Radio-frequency ablation (RfA) of post-lumpectomy surgical site has been used to extend the surgical margin and is a promising approach to reduce the need for re-operations and help provide local control without radiation therapy in many Breast Conservation Surgery (BCS) patients. The SIRA™ device (Innoblative Designs Inc., Chicago, IL) is a first-in-class Saline-coupled Intra-cavitary RfA device specifically designed to fit the post-lumpectomy breast cavity to deliver ancillary uniform ablation. In this study, we aimed to evaluate the SIRA device's ablation performance in breasts of patients undergoing prophylactic mastectomy (PM). The PM model allows for analysis of the device ablation in freshly excised ex vivo tissue to provide nearly identical electrical conductivity, thermal

conductive, and mechanical stress-strain properties as in vivo breast tissue. The device settings (i.e., power and duration) were previously optimized within this same model by 1 surgeon to target a ~1cm ablation depth, where residual cancer cells are most likely to be located. The study was designed to evaluate the repeatability and uniformity of the optimized settings across different breast densities and multiple surgeons.

Methods: Immediately following PM, simulated lumpectomies 3-4cm in diameter were removed from the breast specimen. The SIRA device was then inserted and secured in place within the cavity by a suture. The ablation was then performed using the optimized ablation dose (80W for 22min) with simultaneous administration of saline. Following each ablation,18 representative tissue blocks were taken around each ablation cavity, the tissue was fixed, HandE slides were made, and the resulting ablation zones were analyzed histologically by a board-certified pathologist. Ablation depth was analyzed by surgeon, by margin, and also by breast density scores (BI-RADS) in 2 groups (Fatty / Scattered Fibroglandular vs. Heterogeneously / Extremely Dense). Fixation-induced shrinkage of each sample was measured and used to correct the final depth of ablation.

Results: In the 22 procedures performed, the average age was 47 years (range 25-69 years). Fifteen patients had Heterogeneous or Extremely Dense breasts and 7 patients had Fatty or Scattered Fibroglandular breasts. A mean ablation depth across all margins of 1.0cm (SD = 0.2cm) was achieved with uniformity across each margin (Figure 1). No difference in ablation depths was observed between surgeons (p=0.76, 17 procedures performed by surgeon 1 and 5 procedures performed by surgeon 2). No correlation was seen between the ablation depth and BI-RADS score (p=0.68).

Conclusions: The results of this study support reliability of the SIRA device to create consistent and effective uniform ablations to targeted depth of 1cm around a lumpectomy cavity in fresh human breasts. This study specifically shows device ablation reliability across multiple surgeons with differing techniques. It also shows consistency in ablation depth across differing breast densities with limited settings. Ultimately, these data support the feasibility of the SIRA device to provide an additional zone of ablative treatment around the surgical site to assist in controlled margin extension and local control, which may reduce the need for re-operations and for adjunctive radiation in select BCS patients.

FIGURE. SIRA device, methodology, and ablation depth by margin

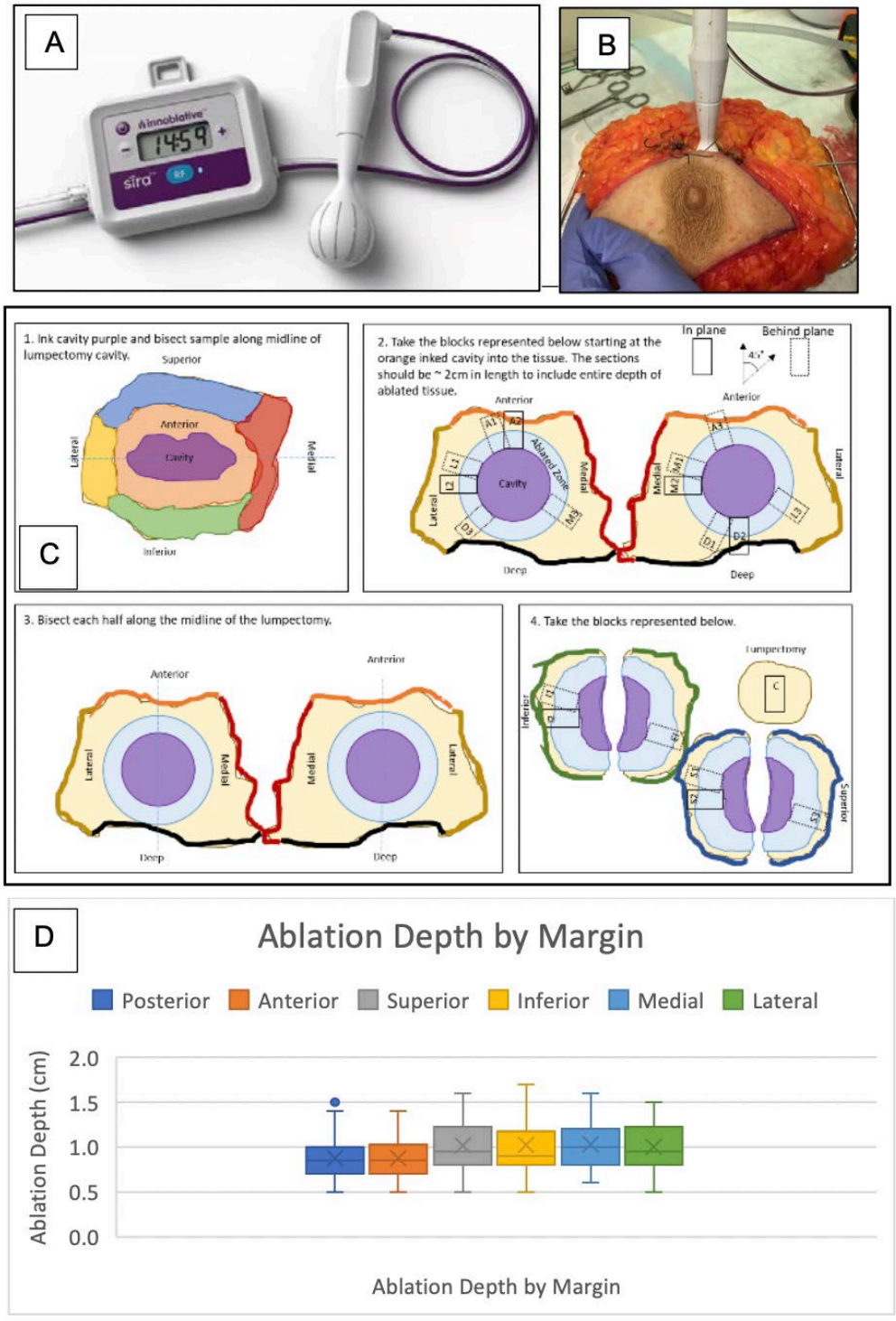

Figure 1. (A) SIRA RFA Electrosurgical Device, (B) device in place in PM, (C) histology sampling methodology, (D) histogram of mean ablation depth across all post-lumpectomy margins.

NAC

1385902 - Rates of Pathologic Complete Response and Overall Survival in Patients with Inflammatory Breast Cancer: National Cancer Database Study

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Background/Objective: Inflammatory breast cancer (IBC) has a poor prognosis despite multimodal treatment with neoadjuvant chemotherapy (NAC), modified radical mastectomy, and chest wall and regional nodal irradiation. Due to improved systemic therapies, survival has improved for contemporary IBC cohorts. IBC patients have traditionally had a survival 1/3rd that of their Stage III matched cohorts. We sought to investigate whether IBC patients who achieve pathologic complete response (pCR) have similar overall survival (OS) to non-IBC patients who also achieve pCR.

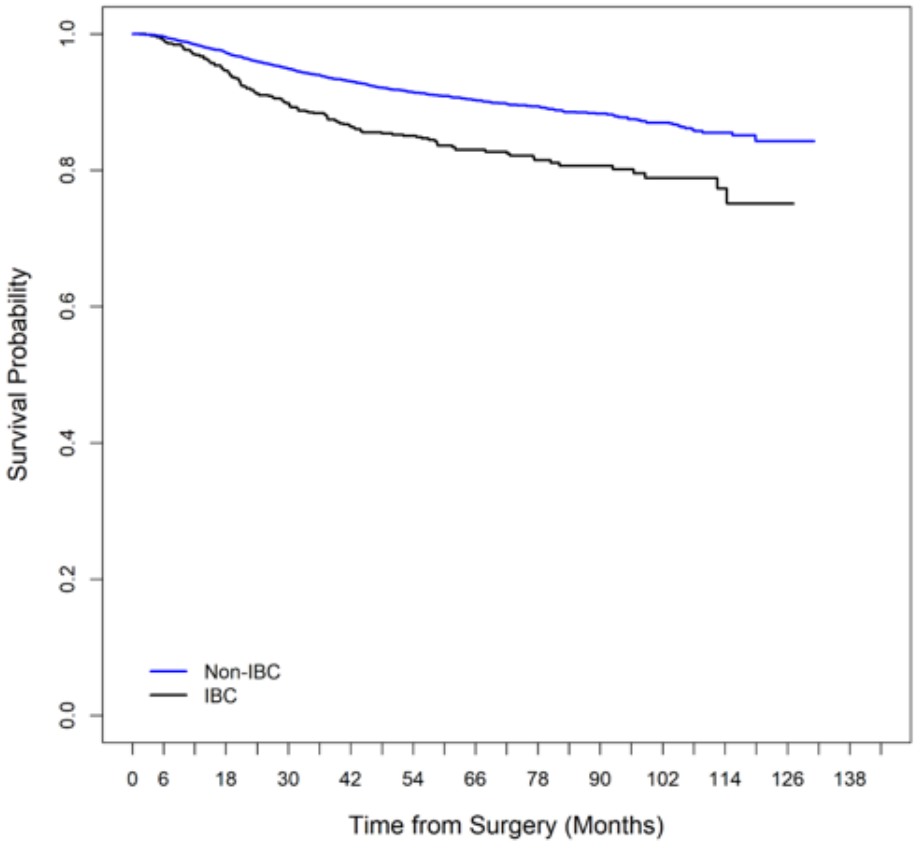
Methods: Adult patients (age 18-75) diagnosed 2010-2018 with clinical prognostic Stage III (AJCC 8th edition) unilateral invasive breast cancer who underwent NAC followed by surgery were selected from the National Cancer Database (NCDB). IBC was defined as cT4d disease, non-IBC was defined as cT4a-c. Pathologic complete response was defined as no residual invasive cancer in the breast or lymph nodes (ypT0/is pN0), regardless of initial cT and cN stage. Biologic subtype was defined as hormone receptor (HR)+/HER2-, HR+/HER2+, HR-/HER2+, and HR-/HER2- (triple-negative breast cancer, TNBC). Differences were tested using chi-square or Fisher's exact tests, and t-tests for categorical and continuous variables, respectively. Unadjusted OS from surgery was estimated with the Kaplan-Meier method, and log-rank tests were used to compare groups. Cox proportional hazards models were used to estimate the association of response group with OS after adjustment for covariates.

Results: The study included 38,390 patients; 12.0% IBC (N=4,600) and 88.0% non-IBC (N=33,790). The median follow-up from surgery was 59.6 months. pCR rates were lower for IBC compared to non-IBC (20.7% vs. 23.3%, p< 0.001), with lower pCR rates for HR+/HER2- (5.7% vs. 11.4%, p< 0.001) and TNBC (18.3% vs. 25.9%, p< 0.001) subtypes. However, pCR rates were similar for all HER2+ disease: HR+ (31.3% IBC vs. 31% non-IBC, p=0.85), and HR- (47.1% vs. 46.7%, p=0.84). For patients with IBC achieving pCR, the unadjusted 5y mortality rate was 16.4% (95% CI 13.9-19.1%), and for those with non-IBC achieving pCR, it was 9.1% (95% CI 8.4-9.8%, log-rank p< 0.001) (Figure). When divided based on biologic subtype, IBC patients had worse unadjusted OS compared to non-IBC for all subtypes (HR+/HER2-: IBC 5y mortality rate 18.2% vs. non-IBC 7.8%; HR+/HER2+: 14.2% vs. 8.3%; HR-/HER2+: 13.3% vs. 8%; TNBC: 23.1% vs. 10.2%). Among all patients achieving pCR, IBC remained associated with worse OS compared to non-IBC (HR=1.48, 95% CI 1.19-1.85, p< 0.001) after adjustment for available covariates.

Conclusions: We compared outcomes between patients with IBC and non-IBC in NCDB and found a lower pCR rate in IBC patients. Among those who achieved pCR, IBC patients had worse OS compared to non-IBC patients, even after adjustment for covariates including biologic subtype. These results suggest

that despite more effective systemic therapies, achieving a pCR for patients with IBC may not carry the same favorable prognostic impact in this unique patient population, supporting a different and more aggressive biology for IBC, even if responsive to systemic treatment.

FIGURE. Unadjusted overall survival from surgery by response group among those who achieved pathologic complete response



Study Group	Total	Deaths (%)	OS from Surgery Rate (95% CI)			Log-Rank P-Value
			1-Year	3-Year	5-Year	
Non-IBC	7870	689 (8.8%)	0.985 (0.982-0.987)	0.940 (0.934-0.945)	0.909 (0.902-0.916)	<0.001
IBC	951	150 (15.8%)	0.970 (0.957-0.979)	0.884 (0.861-0.903)	0.836 (0.809-0.861)	
Total	8821	839 (9.5%)				

Abbreviations: OS=overall survival, CI=confidence interval, IBC=inflammatory breast cancer.

1387316 - Upfront Surgery versus Neoadjuvant Chemotherapy in cT1N0 HER2+ Breast Cancer

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Background/Objective: For patients with cT1N0 HER2 + breast cancer, it is unclear whether patients who receive neoadjuvant chemotherapy (NACT) have better outcomes compared with those who proceed with upfront surgery followed by adjuvant chemotherapy (ACT). The aim of our study is to evaluate whether overall survival (OS) of early clinically node-negative HER2+ breast cancer is improved by NACT compared to ACT using the National Cancer Database (NCDB).

Methods: A retrospective review of women diagnosed with (cT1, cN0, cM0) invasive HER2+ breast cancer (ER-/PR-/HER2+, ER+/PR-/HER2+, ER-/PR+/HER2+, ER+/PR+/HER2+) between 2004-2016 was conducted. Patients with unknown clinical stage or pathologic stage, metastatic disease and no survival data were excluded. Patients were categorized into 5 subgroups based on pathologic staging compared with clinical staging and pathologic response after NACT: (1) NACT with pathologic complete response(pCR)(ypT0-is,ypN0), (2) NACT with residue disease (RD) (ypT1,ypN0), (3) NACT with progressive disease(PD) (>ypT1N0);(4) ACT with unchanged stage (pT1N0), and (5) ACT with pathologic upstage (>pT1N0). Survival curves were generated with Kaplan-Meier methods and compared using log-rank test. Primary outcome was 5-year overall survival (OS).

Results: 25,647 patients met inclusion criteria: 23,273 (90.7%) patients had upfront surgery followed by ACT, and 2,374(9.3%) patients had NACT, of whom 43.2% had pCR . After a median follow-up of 62.3 months, no significant survival difference was found in patients with upfront surgery followed by ACT compared with those who received NACT (5-year OS 94.2% vs. 92.9%, p=0.14). When stratifying by tumor size, patients with tumor size less than 1cm who underwent upfront surgery followed by ACT had significantly better survival compared with NACT (5-year OS 95.1% vs 89.2% (p=0.004)). No significant survival difference was found between ACT and NACT in patients with tumor 1-2cm (5-year OS: 93.8% vs 93.3%, (p=0.21). In analysis based on final pathologic findings at surgery, 70.6% of patients who underwent upfront surgery followed by ACT didn't have a change from clinical to pathologic stage, whereas 29.4% had pathologic upstage. 43.5% of patients who underwent NACT had RD, and 13.2% had PD. Both ACT without stage upgrade and NACT with pCR had superior outcomes among all subgroups, and no significant difference was found between them(5-year OS: 95.4% vs. 95.7% p=0.22 respectively). ACT with pathologic upstage had similar survival compared with NACT with RD (5-year OS: 91.6%, vs. 92.1 %, p=0.12), and NACT with PD had the worse survival with 5-year OS 86.4%.

Conclusions: Patients with cT1a-b N0 HER2+ tumors undergoing surgery followed by ACT demonstrated superior survival when compared to those undergoing NACT. Survival was similar among all T1cN0 Her2+ patients receiving ACT or NACT. Consideration of surgery first is reasonable in T1N0 HER2+ patients.

Figure. Overall survival comparison of NACT and upfront surgery followed by ACT

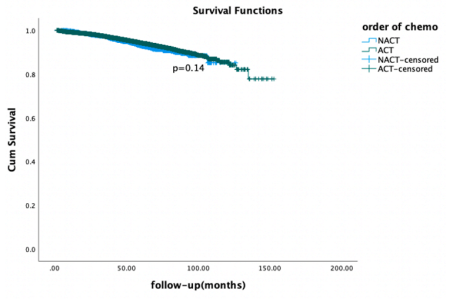

Fig 1. OS of NACT compared with upfront surgery followed by ACT

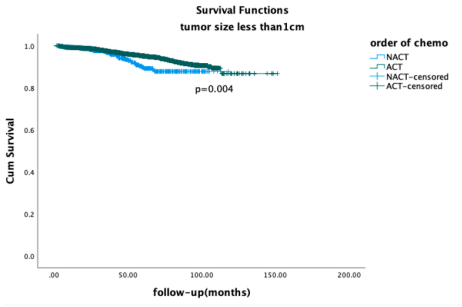

Fig 2a. OS of NACT compared with upfront surgery followed by ACT in tumor less than 1cm

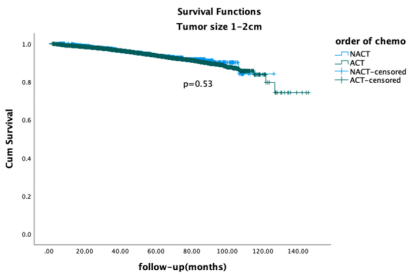

Fig 2b. OS of NACT compared with upfront surgery followed by ACT in tumor 1-2cm

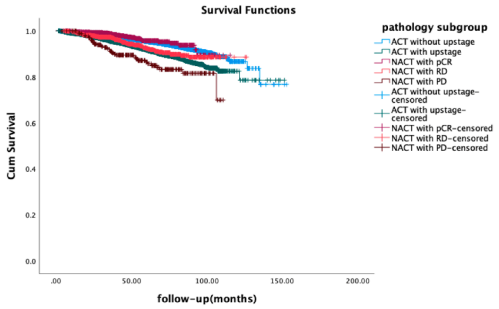

Fig 3. OS comparison of pathologic subgroups (NACT with pCR vs ACT without upstage, p=0.22)

1387153 - Neoadjuvant Chemotherapy and Surgical Decision-making in Locally Advanced Breast Cancer

Cory Nonnemacher, Anthony Scott, Paul Dale
Navicent Health, Mercer University School of Medicine, Macon, GA

Background/Objective: Neoadjuvant Chemotherapy (NAC) in the treatment of breast cancer has evolved and become more prevalent with a wide range of indications. Initial indications for NACT included non-resectability and locally advanced cancer with the goal of converted patients to being operative candidates. This evolved into the expanded role of downstaging tumors so they would be amenable to breast-conserving therapy (BCT). We look to examine the patients who underwent NAC and assess what surgical plan the patient chose.

Methods: We analyzed patients across a 4-year period from 2017-2021 who were treated surgically for breast cancer at our facility. We excluded any male breast cancers and those of whom we did not have operative data. We used a retrospective chart review to identify patients who underwent NAC and those who did not. We then looked at what surgical procedure each patient underwent after their initial therapy. We identified tumor factors including triple-negative state, tumor size on imaging, pathologic tumor size and the presence of bilateral disease and compared among the different treatment groups.

Results: We identified 885 patients who underwent surgery for breast cancer from 2017 through 2021. 187 (21.1%) of these patients underwent NAC. Those that underwent NAC underwent bilateral

mastectomy at a rate of 41.7% and only underwent BCT at a rate of 31%, as compared to 16.2% and 65.9% respectively. When comparing patients who underwent BCT versus non-BCT after NAC, the average age was 58.7 versus 53 years old, which was statistically significant. Patients that elected for non-BCT had larger tumors based on pre-NAC imaging of 44.4 mm versus 34.6, which was also statistically significant. Despite this, there was no significant difference in pathologic tumor size, HER2neu status, or triple-negative tumors between BCT and non-BCT patients.

Conclusions: NAC in breast cancer can often downgrade tumors to be amenable to BCT. We found that patients who underwent NAC elected for BL mastectomy nearly twice as often as those who did not despite overall similar tumor characteristics. We believe this reflects patient fatigue from being in the medical system. BCT comes with the recommendation of post-operative radiation therapy, further extending the course of treatment. We believe that patients therefore opt for BL mastectomy after NAC to complete their treatment. We believe this reflects the need for more robust pre-therapy multidisciplinary conversations with patients to counsel on overall recommendations and treatment options which may help limit the treatment and cost burden of cancer care on these patients.

Table. Neoadjuvant vs non-neoadjuvant

	Non-neoadjuvant	*Neoadjuvant*	*p*
N	698	187	
Age	62.8	54.8	< 0.05
Caucasian	416 (59.6%)	84 (44.9%)	
Minority	282 (40.4%)	103 (55.1%)	
Lumpectomy	460 (65.9%)	58 (31.0 %)	< 0.05
Mastectomy	125 (17.9%)	51 (27.3%)	< 0.05
BL Mastectomy	113 (16.2%)	78 (41.7%)	< 0.05
BL disease present	11 (1.58%)	5 (2.67%)	0.415

1387868 - Neoadjuvant Chemotherapy for Breast Cancer: Population-level Trends Over Time by Receptor Subtype

Julie Hallet[1], Natalie Coburn[1], Frances Wright[1], Lena Nguyen[2], Sonal Gandhi[1], Katarzyna Jerzak[1], Andrea Eisen[1], Nicole Look Hong[1], Amanda Roberts[1]

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Background/Objective: Neoadjuvant chemotherapy (NAC) is the standard of care for non-operable, locally advanced breast cancers. More recently, NAC use for triple-negative (TN) and HER2-positive (HER2+) breast cancer has been supported by international guidelines to decrease extent of surgery, provide prognostic information, and allow for response-driven adjuvant therapies. Multidisciplinary care for patients with TN and HER2+ cancers, including consultation with a medical oncologist prior to first treatment, is also supported by treatment guidelines. Previous studies in Ontario have demonstrated NAC rates of 20.1% (HER2+) and 18.7% (TN) between 2012 and 2016. Therefore, we sought to update

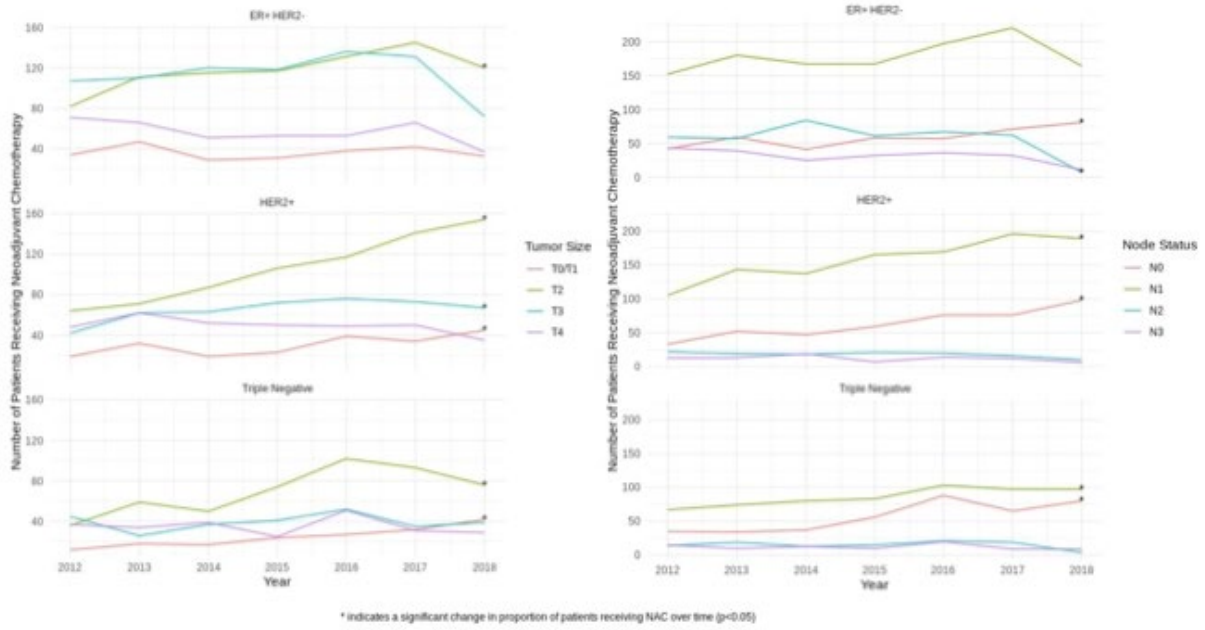
this data by describing recent trends of NAC use and medical oncology consultation over time by receptor, tumor, and nodal status.

Methods: A retrospective population-based cohort study of women with Stage I-III breast cancer (2012-2019) in Ontario (population 14.6 million) was completed using linked administrative datasets. The outcomes were NAC as first treatment and medical oncology consultation prior to first treatment. All patients underwent surgery after NAC or as first treatment. Temporal trends in NAC use and medical oncology consultation were evaluated using Cochran-Armitage tests. Multivariable regression assessed the association between NAC use and year of diagnosis while adjusting for age, rurality, deprivation quintile, comorbidity, previous cancer diagnosis, cancer stage, receptor subtype and receipt of consultation at a regional cancer center. The same analysis was completed for the association between referral to medical oncology and year of diagnosis.

Results: Of 48,719 patients included, 10.75% (5,237) underwent NAC as first treatment. By receptor sub-type, 21.8 % TN, 23.8% HER2+ and 6.4% ER+HER2- patients underwent NAC. Between 2012 – 2019, NAC use significantly increased across all receptors groups for patients with node-negative (HER2+ 6.7% to 16.9%, TN 7.2% to 16.4%, ER+HER2- 1.4% to 2.1%,) and T2 tumors (HER2+ 15.2% to 33.7%, TN 9.5% to 24.0%,ER+HER2- 5.5% to 6.8%). Patients with TN and HER2+ breast cancers demonstrated an increase in NAC use over time for ≤ T1 (TN 4.7% to 14.7%, HER2+ 5.0% to 10.6%) and N1 tumors (TN 32.8% to 51.6%, HER2+ 33.3% to 51.9%) (Figure 1). Across all receptor groups, medical oncology consultations significantly increased for patients with N0 (HER2+ 10.7% to 22.6%, TN 11.3% to 23.1%, ER+HER2- 7.4% to 8.4%) and N1 (HER2+ 36.4% to 57.1%, TN 38.7% to 58.0%, ER+HER2-19.0% to 21.0%) disease but remained stable over time for patients with N2 and N3 disease. Overall, 30.7% of node-positive patients (N1-N3) underwent a medical oncology consultation prior to treatment.

Conclusions: NAC use increased over time but still only a minority of TN and HER2+patients received NAC. This finding may be associated with the low rate of NAC eligible patients (i.e., N1) who were referred for upfront medical oncology consultation. This lack of multidisciplinary assessment within breast cancer care is concerning, although other factors should be evaluated. Further work to evaluate variation in NAC use and referral to medical oncology across institutions and providers is necessary.

Figure. Trends over time for neoadjuvant chemotherapy use by tumor size and nodal status



1387818 - The Impact of Neoadjuvant Chemotherapy on Hospital Length of Stay and Readmission Rates for Bilateral Mastectomies with Immediate Breast Reconstruction

Amanda Ruffino[1], Joshua Madera[1], Makayla Dearborn[1], Emma Dahmus[2], Jacqueline Oxenberg[3]

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Background/Objective: Bilateral mastectomies with immediate breast reconstruction are more frequently becoming safe, outpatient surgical options for women. While the use of neoadjuvant chemotherapy (NAC) may extend hospital length of stay (LOS), it has not been studied on a larger, national level. Our study aims to examine the impact NAC has on LOS and readmission rates for patients undergoing bilateral mastectomies with immediate reconstruction.

Methods: The National Cancer Database (NCD) was retrospectively reviewed for patients who underwent bilateral simple total mastectomies (BSM) or bilateral modified radical mastectomies (BMRM) with immediate breast reconstruction between 2006 and 2019. Patients were stratified based on demographic information and univariate analyses were performed for comparison. Multivariate logistic regression was used to identify potential factors impacting LOS and readmission. Poisson regression was used to test the effect of NAC on LOS.

Results: A total of 67,351 patients were included, 11,314 underwent NAC, and 56,037 did not. The average age of diagnosis for patients who underwent BSM was 50.3 years, with patients receiving NAC being significantly younger, $p < 0.0001$. Similarly, the average age of diagnosis for patients who

underwent BMRM was 49.1 years, with patients receiving NAC being significantly younger, $p < 0.0001$. Additional patient characteristics can be seen in table 1. LOS was longer in patients who underwent BSM without NAC vs. with NAC (LOS = 1.8 vs. 1.5 days, $p < 0.0001$) but not significantly different in patients who underwent BMRM (LOS = 1.9 days vs. 2.0 days, $p > 0.05$). Multivariate analysis of all patients showed NAC significantly decreased LOS -0.125 (CI: -0.141, -0.109, $p < 0.0001$). However, a multivariate analysis also showed that readmission rates at 30 days were significantly higher in patients who received NAC, regardless of the surgical approach used ($p < 0.0001$ for all patients; $p< 0.004$ for BSM; $p< 0.001$ for BMRM).

Conclusions: While the use of NAC may be associated with decreased LOS, readmission rates were higher after bilateral mastectomies with immediate reconstruction with the use of NAC. While this may be secondary to possible increased complications after NAC, further studies are warranted to elucidate the details of this relationship and determine patients appropriate for expedited discharge.

Table. Patient characteristics

	Bilateral Simple Mastectomies				Bilateral Modified Radical Mastectomies			
	Neoadjuvant Therapy							
	Yes (N=8225)	No (N=48564)	Total (N=56789)	P-value	Yes (N=3089)	No (N=7473)	Total (N=10562)	P-value
Race, n (%)				<.0001				<.0001
White	6819 (82.9%)	43234 (89.0%)	50053 (88.1%)		2556 (82.7%)	6611 (88.5%)	9167 (86.8%)	
Black	890 (10.8%)	3009 (6.2%)	3899 (6.9%)		359 (11.6%)	544 (7.3%)	903 (8.5%)	
Other/Unknown	516 (6.3%)	2321 (4.8%)	2837 (5.0%)		174 (5.6%)	318 (4.3%)	492 (4.7%)	
Charlson-Deyo Score*, n (%)				<.001				0.3368
0	7440 (90.5%)	43142 (88.8%)	50582 (89.1%)		2770 (89.7%)	6615 (88.5%)	9385 (88.9%)	
1	644 (7.8%)	4616 (9.5%)	5258 (9.3%)		272 (8.8%)	744 (10.0%)	1016 (9.6%)	
2	110 (1.3%)	636 (1.3%)	746 (1.3%)		39 (1.3%)	93 (1.2%)	132 (1.2%)	
3	31 (0.4%)	172 (0.4%)	203 (0.4%)		8 (0.3%)	21 (0.3%)	29 (0.3%)	
Insurance Status, n (%)				<.001				<.0001
Not Insured	142 (1.7%)	442 (0.9%)	584 (1.0%)		68 (2.2%)	82 (1.1%)	150 (1.4%)	
Private	6690 (81.3%)	39252 (80.8%)	45942 (80.9%)		2485 (80.4%)	6051 (81.0%)	8536 (80.8%)	
Medicaid	719 (8.7%)	2104 (4.3%)	2823 (5.0%)		266 (8.6%)	389 (5.2%)	655 (6.2%)	
Medicare	478 (5.8%)	5611 (11.6%)	6089 (10.7%)		193 (6.2%)	782 (10.5%)	975 (9.2%)	
Other Government	122 (1.5%)	623 (1.3%)	745 (1.3%)		50 (1.6%)	74 (1.0%)	124 (1.2%)	
Unknown Insurance	74 (0.9%)	532 (1.1%)	606 (1.1%)		27 (0.9%)	95 (1.3%)	122 (1.2%)	
Facility Type, n (%)				<.001				<.0001
Academic/Research Program	1837 (22.3%)	13340 (27.5%)	15177 (26.7%)		627 (20.3%)	1547 (20.7%)	2174 (20.6%)	
Community Cancer Program	190 (2.3%)	1247 (2.6%)	1437 (2.5)		70 (2.3%)	230 (3.1%)	300 (2.8%)	
Comprehensive Community Cancer Program	2238 (27.2%)	17444 (35.9%)	19682 (34.7%)		928 (30.0%)	3013 (40.3%)	3941 (37.3%)	
Integrated Network Program	1569 (19.1%)	10921 (22.5%)	12490 (22.0%)		650 (21.0%)	1594 (21.3%)	2244 (21.2%)	
Unspecified Facility Type	2391 (29.1%)	5612 (11.6%)	8003 (14.1%)		814 (26.4%)	1089 (14.6%)	1903 (18.0%)	

*Charlson-Deyo Score is a comorbidity index that assigns a score to various chronic medical conditions and uses the sum to predict long-term mortality.

1388272 - The Efficacy of Neoadjuvant Endocrine Therapy in Node-positive HR+, HER2- Breast Cancer Compared to Neoadjuvant Chemotherapy: A Systematic Review and Meta-Analysis

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Background/Objective: Neoadjuvant therapy (NT) is a therapeutic approach to downstage the axilla and avoid a complete axillary lymph node dissection (ALND). Cytotoxic chemotherapy is the most common NT used with the lowest pathologic complete response (PCR) in hormone receptor-positive (HR+), and HER2-negative breast cancers. The role of neoadjuvant endocrine therapy (NET) in the management of axilla was evaluated in this meta-analysis.

Methods: This study was performed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The databases, including SCOPUS, EMBASE, PUBMED, and the Web of Science were queried between 2010 to August 2022. "Locally advanced breast cancer", "node-positive", “hormone receptor-positive ", HER2-negative”, and “neoadjuvant endocrine therapy” were the search keywords. 6 studies out of 13 studies reviewed compared NET and neoadjuvant chemotherapy (NAC). Two main endpoints were assessed: 1. Nodal PCR, 2. The rate of complete axillary lymph node dissection (ALND) omission.

Results: A total of 126,040 patients were assessed. Patients were deemed node-positive if presenting with palpable lymphadenopathy confirmed by imaging or positive axillary biopsy. 5,063 node-positive HR+, HER2-, with a median age range of 42 to 74 years old, received NET. 56.3% of this population were invasive ductal carcinomas (IDC). The duration of NET ranged from 16 to 34 weeks. The follow-up period in different studies ranged from 29.7 to 60 months. 10.2% of the 5,063 NET patients achieved a nodal PCR as vs 16.5% of the 20,798 NAC patients. (P< 0.001) Among studies separately reporting ALND rates, 22.9% of 1,553 receiving NET avoided ALND as vs 18.7% of the 1,692 receiving NAC. In studies directly comparing ALND- sparing between the two groups, NET was more successful (28% vs 18.8%, P< 0.001) but not be explained by the PCR rate; overall, 61.2% of the NET patients who did not undergo ALND had a PCR as vs 74.1% in the NAC group. 9.6% of the patients who did not have PCR and did not undergo ALND, were found to have isolated tumor cells or microscopic nodal disease and 29.2% were not defined or were pN1. Published NCDB data between 2010- 2016 found that in patients having a PCR, 43.8% of the NAC patients and 54.7% of the NET patients did not undergo ALND. Among the 5 studies reporting the OS and DFS, and 3 reporting the rate of ALND, none reported survival differences between NAC and NET.

Conclusions: In HR+, HER2- patients, PCR rates in the NET setting are confirmed to be lower than after NAC. However, heterogeneous patterns of care and PCR rates make determination of the need for ALND in the NET setting unclear at this time. Additional data evaluating survival differences after PCR from NET vs NAC are required.

Table. Comparing NAC and NET according to axillary surgery in cN1 patients after neoadjuvant systemic therapy

	NET				NAC			
	SLNB alone	SLNB followed by ALND	ALND	Total NET	SLNB alone	SLNB followed by ALND	ALND	Total NAC
	118 (20.5%) PCR:51(43.2%) Non-PCR:67(56.8%)	122	334	574	1026 (16.3%) PCR:615(59.9%) Non-PCR:411(40.1%)	1465	3773	6264
	4 (10.2%) PCR:1(25%) yPN1mi:3(75%)	26	9	39	-	-	-	-
	2 (8.7%) PCR:1 Non-PCR:1	11	10	23	-	-	-	-
	121 (17.9%) PCR:74 yPN0[i+]:7 yPN1mi:24 Non-PCR:16	172	382	675	-	-	-	-
	***24 (28.9%) PCR:4 Non-PCR:20	-	59	83	***38 (43.6%) PCR:12 Non-PCR:26	-	49	87
	87 (54.7%) PCR:87	-	72	159	628 (43.8%) PCR:628	-	804	1432
	356 (22.9%) PCR:218 (61.2%) yPN0[i+]:7(2.0%) yPN1mi:27(7.6%) Non-PCR:104(29.2%)	331	866	1553	1692 (18.7%) PCR:1255(74.1%) Non-PCR:437(25.8%)	7026	14020	25887
es	229 (28%) PCR:142(62.1%) Non-PCR:87(38.0%)	122	465	816	1692 (18.7%) PCR:1255(74.1%) Non-PCR:437(25.8%)	7026	14020	25887

ercentage between SLNB by NET & NAC
w 0.05 are considered statistically significant
ı residual nodal disease received axillary sampling which is defined as the removal of less than 10 LNs located near the SLN

1388226 - Expanded Indications for Neoadjuvant Therapy in Early-stage Breast Cancer During the COVID-19 Pandemic

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Background/Objective: In response to challenges to hospital capacity posed by the COVID-19 pandemic, the Pandemic Breast Cancer Consortium (PBCC) published recommendations for triage of breast cancer patients in 2020. Recommendations included: (1) clinical Stage T1N0, ER+/PR+/HER2- patients can receive neoadjuvant endocrine therapy (NET), (2) some clinical T2 or N1, ER+/PR+/HER2- patients can receive NET, and (3) triple-negative and HER2+ patients can receive neoadjuvant chemotherapy (NACT). We evaluated national patterns of neoadjuvant treatment according to triage guidelines.

Methods: Data were obtained from the National Cancer Database 2020 breast cancer participant user file. Patients with clinical Stage 0 or 4 disease, or unknown time from diagnosis to therapy were excluded. Only patients that were treated with surgery (either upfront or after neoadjuvant therapy) were included. The proportions of patients treated according to PBCC triage guidelines were calculated in 2020 and compared to similar cohorts in 2019. Cohorts from 2018 were included as an additional control to evaluate for secular trends in neoadjuvant therapy not related to the pandemic. Patient and hospital factors were evaluated for association with treatment by triage recommendations using logistic regression.

Results: Among patients who were clinical Stage T1N0 ER+/PR+/HER2-, those treated in 2020 were more likely to receive NET compared to 2019 (OR 3.08, 95%CI [2.93-3.24]). Among patients with T2N0 or T1N1 disease, NET was more common in 2020 (OR 1.76, [1.65-1.88]). NACT was more common in 2020 compared to 2019 among triple-negative breast cancer patients (OR 1.15 [1.11-1.20]) and HER2+ patients (OR 1.15, [1.10-1.19]). Increasing NACT trends were seen in Stage I and 2, but not Stage III patients (Table). Academic facility (OR 1.49 [1.41-1.58]), Northeast (OR 1.20 [1.11-1.30]) or Pacific (OR 1.25 [1.14-1.37]) region, Black (OR 1.23 [1.12-1.34]) or Asian (OR 1.22 [1.09-1.37]) race, and more comorbidities (OR 1.27 [1.09-1.48]) were associated with NET use for early-stage ER+/PR+/HER2- patients. Among triple-negative or HER2+ patients, academic facility (OR 1.12 [1.06-1.19]), younger age (OR 1.57 [1.45-1.69] for age< 50), and fewer comorbidities (OR 1.49 [1.26-1.77]) were associated with NACT use, while Northeast (OR 0.71 [0.66-0.77]), Pacific (OR 0.87 [0.80-0.96]), and South (OR 0.88 [0.82-0.94]) regions had less NACT use.

Conclusions: During the COVID-19 pandemic, expanded utilization of neoadjuvant therapy was observed in surgical breast cancer patients eligible for PBCC triage recommendations. While increasing use of NACT was observed prior to the pandemic and continued in 2020, the use of NET for early-stage disease was stable pre-pandemic and increased 3-fold in 2020. Although causality cannot be assumed, the demographic and geographic variation in implementation of triage guidelines suggests that COVID-19 burden played a role in treatment decisions. Health care system limitations during the pandemic led to expanded adoption of neoadjuvant therapy in early breast cancer, in the absence of level 1 evidence supporting this practice. Long term outcomes for patients treated according to PBCC triage guidelines should be closely monitored.

FIGURE. Proportion of patients treated according to COVID-19 pandemic triage guidelines in 2020 compared to previous years

	2018	2019	2020	Chi-square test *p*
Neoadjuvant endocrine therapy for T1N0, ER+/PR+/HER2-				
All T1N0	1,816	2,132	5,352	p<0.01
(N=237,288)	2.3%	2.6%	7.5%	
Neoadjuvant endocrine therapy for T2/N1, ER+/PR+/HER2-				
All T2 or N1	1,507	1,577	2,344	p<0.01
(N=68,830)	6.7%	6.7%	11.2%	
T2N0 only	1,236	1,292	2,009	p<0.01
(N=59,149)	6.4%	6.4%	11.1%	
T1N1 only	271	285	335	p<0.01
(N=9,681)	8.4%	8.5%	11.6%	
Neoadjuvant chemotherapy for triple negative breast cancer				
All TNBC	8,752	9,863	9,363	p<0.01
(N=60,513)	43.2%	47.1%	50.6%	
Stage 1	1,348	1,853	1,823	p<0.01
(N=22,672)	17.8%	23.2%	26.6%	
Stage 2	3,636	4,022	3,777	p<0.01
(N=18,571)	58.1%	62.8%	67.0%	
Stage 3	3,341	3,612	3,430	p=0.4
(N=13,655)	77.4%	77.3%	76.3%	
Neoadjuvant chemotherapy for HER2+ breast cancer				
All HER2+	10,464	10,816	10,305	p<0.01
(N=69,820)	42.7%	45.9%	49.4%	
Stage 1	4,051	4,523	4,387	p<0.01
(N=39,407)	29.6%	33.6%	37.0%	
Stage 2	4,048	4,111	3,899	p<0.01
(N=17,246)	67.1%	72.0%	73.8%	
Stage 3	1,894	1,807	1,696	p=0.2
(N=6,980)	79.8%	77.9%	77.7%	

Reported *N* includes all patients in that cohort across 2018-2020. Column percentages are reported, i.e. proportion of patients treated with neoadjuvant therapy among all patients in that cohort for that year.

1388093 - Surgical Outcomes in Patients Receiving Pembrolizumab Containing Neoadjuvant Systemic Therapy Regimens for Triple-negative Breast Cancer

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Background/Objective: Triple-negative breast cancer patients (TNBC) are known to have a worse prognosis compared with clinical stage-matched hormone receptor-positive disease. Recently, studies such as iSPY2 and KEYNOTE 522 have demonstrated that the addition of pembrolizumab to standard platinum-based neoadjuvant chemotherapy (NAC) regimens for TNBC increased pathologic complete response (pCR) and event-free survival rates. Notably, these trials also revealed higher rates of serious treatment-related adverse events with pembrolizumab-NAC. Additionally, an increased prevalence of immune-related side effects and endocrinopathies, including thyroid disorders and adrenal insufficiency, have been noted with use of pembrolizumab. Given the severity of adverse events associated with incorporation of pembrolizumab in Stage I-III TNBC treatment regimens, we aimed to investigate surgical outcomes and peri-operative implications of this therapy at our center.

Methods: A query was performed of the electronic medical record identifying patients with clinical Stage I-III TNBC treated with neoadjuvant pembrolizumab plus anthracycline-cyclophosphamide/carboplatin-paclitaxel, followed by surgery at our institution from January 2018-October 2022. Variables related to patient demographics and the peri-operative period were examined. Type of surgery and receipt of reconstruction were also recorded, as well as changes made from the original to final operative plan. Descriptive statistics were utilized. We also sought to evaluate pathologic response after systemic therapy. Overall pCR was defined as resolution of invasive and in-situ disease in the breast and lymph nodes. Axillary pCR was defined as clinically node-positive disease with no residual nodal metastasis on surgical pathology.

Results: Of 87 patients treated with pembrolizumab and NAC, the overall pCR and axillary pCR rates in this population were 73.2% and 84.1% respectively; with 43 (49.4%) presenting with clinically node-positive disease. There were 21 (24.1%) patients who experienced post-operative complications. Surgical delays not attributed to delays in the delivery of NAC occurred in 8 (19%) patients. There were 4 (4.6%) patients unable to complete NAC treatment and they were taken to surgery earlier than anticipated due NAC side effects. Furthermore, 8 (9.2%) of patients were on steroids at the time of surgery, and 6 (6.9%) experienced a change in final surgical plan due to adverse effects from the systemic therapy, including less extensive reconstruction or axillary surgery. We did not see an association with patient factors such as obesity, diabetes, immune disorders, type of surgery, or receipt of reconstruction.

Conclusions: We found that a significant portion of patients who received NAC with pembrolizumab for Stage I-III TNBC were unable to complete their NAC course, required exogenous steroids, experienced delays in surgical care, alterations in their surgical plan, and post-operative complications. The overall observed pCR rate after NAC was extremely high at 73.2%, with 84.1% of those with clinically node-positive disease achieving an axillary pCR. This underscores the importance of this regimen with respect to oncologic benefit. However, there are significant implications for the perioperative management and

surgical treatment of TNBC due to side effects from the systemic therapy. Strategies to pre-operatively monitor and optimize peri-operative risk in this patient population should be considered.

Table. Demographics and outcomes

Variable	(n) Total 87 patients	%
Age (years)		
≤40	20	22.7
41-60	41	46.6
≥61	27	30.7
BMI		
<25	25	28.4
25-30	29	33.0
>30	34	38.6
Hypertension		
Yes	35	40.2
No	52	59.8
Diabetes		
Yes	13	14.9
No	74	85.1
Thyroid dysfunction		
Yes	16	18.4
No	71	81.6
Pre-existing autoimmune dysfunction		
Yes	5	5.8
No	82	94.3
Tobacco use		
Yes	3	3.5
No	84	96.6
Clinical T category		
0	2	2.3
1	11	12.6
2	52	59.8
3	19	21.8
4	3	3.5
Clinical N category		
0	44	50.6
1	26	29.9
2	8	9.2
3	9	10.3
Breast surgery type		
Mastectomy	51	58.6
Lumpectomy	35	40.2
None	1	1.2
Axillary surgery		
Sentinel node biopsy	44	50.6
Targeted axillary dissection	15	17.2
Axillary dissection	28	32.2
Change in surgical plan		
Yes	6	6.9
No	81	93.1
Surgical delay		
Yes	42	48.3
No	45	51.7
Reason for surgical delay		
Chemo delay	34	81.0
Other	8	19.0
Post-operative complications		
Yes	21	24.1
No	66	75.9
Steroid use at time of surgery		
Yes	8	9.2
No	79	90.8
Overall pathologic complete response		
Yes	30	73.2
No	11	27.8
Axillary pathologic complete response		
Yes	37	84.1
No	7	15.9

NSM

1387846 - Outcomes of Nipple Preservation in Patients with Breast Cancer Undergoing Nipple-sparing Mastectomy with Atypia or Lobular Carcinoma In Situ on Nipple Biopsy

Srivarshini Mohan[1], Christina Weed[2], Ton Wang[2], Joshua Tseng[2], Theodore Hu[3], Jaswinder Jutla[2], Marissa Boyle[2], Farin Amersi[2], Armando Giuliano[2], Alice Chung[2]

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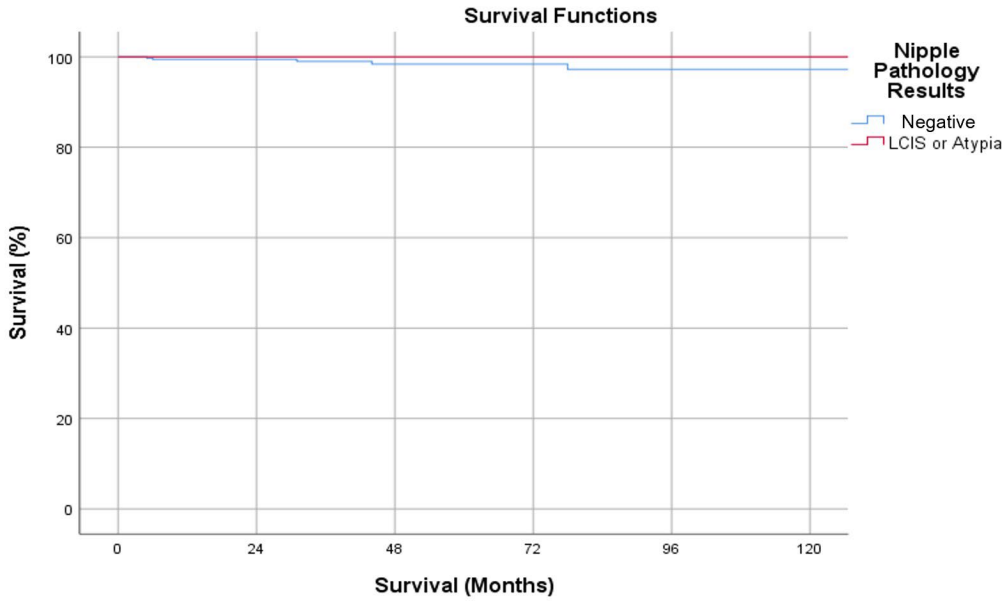
Background/Objective: Nipple-sparing mastectomy (NSM) is frequently offered to patients with breast cancer with comparable oncologic outcomes to traditional mastectomy. However, little is known about the risk of locoregional recurrence (LRR) associated with the presence of atypia or lobular carcinoma in situ (LCIS) in the nipple-areolar complex (NAC) margin. We investigated the outcomes of NAC preservation in patients with breast cancer identified to have atypia or LCIS in the nipple biopsy after NSM.

Methods: A prospectively maintained database identified 511 patients with ductal carcinoma in situ (DCIS) and/or invasive cancer who underwent NSM between 2007-2021 at an academic tertiary institution. Patient demographics, disease characteristics, operative variables, pathology, therapy modalities, and recurrence rates were assessed. Univariate and multivariate analysis was performed to compare factors associated with NAC margin pathology and locoregional recurrence. Kaplan-Meier was used to evaluate overall survival.

Results: 894 NSMs were performed on 511 patients. LRR was 5% (n=26). Nipple margin pathology was available for 460 patients. Patients who had nipple margin biopsy showing invasive cancer (N=53, 11.5%) or DCIS (N=22, 4.8%) had subsequent excision of the NAC and were excluded. Atypia/LCIS was identified with preservation of the NAC in 19 (4.9%) NAC margin specimens: 4 (21.1%) had ADH, 6 (31.6%) had ALH, and 4 (21.1%) flat epithelial atypia, and 5 (26.3%) had LCIS. Compared to those who had negative NAC margins, patients who had atypia/LCIS at their NAC margins had higher rates of prior chest radiation (15.8% vs 3.5%, p=0.037). There were no significant differences between the groups with regards to rates of comorbidities or multifocal disease, T stage, nodal status, biomarker status, or adjuvant therapies received. Three (15.8%) patients with atypia/LCIS in the nipple margin received post-mastectomy radiation therapy. At a median follow-up of 33 months (interquartile range, 17-58.25 months), there was no difference in LRR for patients with atypia/LCIS on NAC margin compared to those with negative NAC margins (10.5% versus 5.1%, p=0.275). Among patients with atypia/LCIS at their NAC margin, 1 had a subareolar recurrence; the remaining were located in the chest wall. None of the patients with a negative NAC biopsy had a subareolar recurrence. All patients with atypia or LCIS at their NAC margin were alive at the end of the study period with an overall survival of 100%.

Conclusions: NAC margin atypia/LCIS is uncommon and subareolar recurrence is rare. Preservation of the NAC in patients with atypia or LCIS in the nipple margin may be a safe option in patients with breast cancer undergoing NSM.

FIGURE. Kaplan-Meier curve for survival of patients with nipple LCIS or atypia compared to those with negative nipple pathology



1387775 - Positive Nipple Margins and Oncologic Outcomes Of Nipple-sparing Mastectomy in a Large Community-based Hospital System

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Background/Objective: The American Society of Breast Surgeons recommends sending separate nipple margins when performing nipple-sparing mastectomy (NSM). While the definition of a positive nipple margin remains vague, it's typically understood as any tumor within this margin. We evaluated how positive nipple margins were defined and treated, and examined oncologic outcomes in NSM patients at a large, community-based hospital system.

Methods: A retrospective chart review was performed of breast cancer patients undergoing NSM in our hospital system from 2010 to 2021. Patient and tumor characteristics, treatment, and outcomes information were collected, and descriptive analysis performed.

Results: A total of 619 patients were included, comprising 1086 NSM (637 therapeutic, 449 prophylactic). Invasive ductal cancer (IDC) and ductal carcinoma in situ (DCIS) accounted for 80.2% of diagnoses. Median invasive tumor size was 1.5cm (0.09 -13cm) and median follow-up was 30 months (0-128 months). Fourteen therapeutic NSM had tumor within the nipple margin, 12 with tumor in the separate nipple margin and 2 at the distinctly marked nipple margin when a separate margin was not taken. Of the separate nipple margins containing tumor, 9 were classified positive using the definition, "any tumor within the separate nipple margin," and underwent nipple-areolar complex (NAC) excision, with 4 having residual disease (3 DCIS, 1 IDC). Two nipple margins containing tumor were classified

negative when positive was defined as “any tumor on ink,” and observed. Four recurrences were observed overall but none in patients with tumor in the nipple margin who did not undergo NAC excision.

Conclusions: Our results suggest positive nipple margins warranting NAC excision could be interpreted as “any tumor on ink.” Overall, NSM can be safely performed with low rates of positive nipple margins and recurrences in high-volume, community hospitals.

1388161 - Extreme Nipple-sparing Mastectomy: Feasibility of Nipple Preservation and Immediate Reconstruction in Breasts >600 Grams

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Background/Objective: Nipple-sparing mastectomy has been shown to improve quality of life, improve patient satisfaction with aesthetic outcomes, and decrease body image disturbance. With careful tissue handling and preservation of perfusion to mastectomy skin flaps, an increasing number of oncologic patients are now being offered nipple-sparing mastectomy (NSM). Despite data supporting the oncologic safety of NSM in appropriate candidates, concerns still remain about the feasibility of NSM with immediate reconstruction in patients with large-volume breasts due to longer length of skin flaps and possible blood supply issues. Limited data exists on complication rates in NSM in large-volume breasts, or extreme nipple-sparing mastectomy (NSM). Our aim was to evaluate the early complication rate of NSM with immediate reconstruction in large-volume breasts.

Methods: After IRB approval, patients treated with prophylactic or therapeutic NSM from January 2020 to June 2022 at our health network were identified who underwent NSM and immediate reconstruction with 6 different plastic surgeons and 7 breast surgeons. Patients undergoing NSM and reconstruction, including tissue expander, direct to implant, or DIEP were included in the study. Major and minor complications were evaluated for each patient, including seroma, hematoma, wound dehiscence, wound infection, skin necrosis, nipple necrosis, partial flap necrosis, total flap necrosis, capsular contracture, implant displacement, implant extrusion, implant rupture, fat necrosis, and cellulitis. Major complications were those requiring return to OR. If a patient had both a minor and major complication, they were included in the major complication group only.

Results: 34 patients out of a total of 150 NSM patients had breast weights over 600 grams. 7 patients were bilateral for a total of 49 breasts with breast-volume over 600 g, ranging from 603 g to 1658 g. There was no significant difference in age, race, menopausal status, cancer stage, prior radiation, neoadjuvant chemotherapy, diabetic status, tobacco use, or reconstruction type between patients who had extreme and average breast-volume NSM. The patients with higher breast weight did also have

significantly higher mean BMI (31.1 vs 25.5, $p < 0.05$). The mean implant size for extreme NSM was 416 ml, and the mean implant size for non-extreme NSM was 250 ml, with statistically significant difference ($p = 0.01$). At a mean follow-up of 5.5 months, slightly higher percentage of major and minor complications in the extreme NSM group was not found to be statistically significant ($p = 0.14$), as noted in Table 1. Only 2 patients in the extreme NSM group lost their nipples due to necrosis.

Conclusions: Nipple-sparing mastectomy with immediate reconstruction was successful for the majority of patients with large volume breasts. Rate of nipple loss was acceptably low (2 of 49 breasts). There were no significant differences in major or minor early complication rates between extreme and non-extreme NSM. Women with breast volumes larger than 600 grams can be safely offered NSM with appropriate coordination between the breast surgeon and plastic surgeon.

Table. Major and minor complications in patients with extreme and non-extreme NSM

	Extreme NSM - No (116) n (%)	Extreme NSM - Yes (34) n (%)	p-value
Complications			0.1421
Total Patients with Major Complications (n = 28)	19 (16.4%)	9 (26.5%)	
Total Patients with Minor Complications (n = 15)	10 (8.6%)	5 (14.7%)	
Total Patients with No Complications (n = 107)	87 (75.0%)	20 (58.9%)	

1388185 - Clinical Breast Exam Is Adequate Surveillance Following Nipple-sparing Mastectomy for Breast Cancer

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Background/Objective: Optimal post-operative surveillance following nipple-sparing mastectomy (NSM) when performed for cancer has not been defined. The aim of this study is to characterize surveillance strategies following nipple-sparing mastectomy and identify opportunities for standardization.

Methods: A prospectively maintained database identified 511 patients with in-situ and invasive cancer who underwent NSM between 2007-2021 at an academic tertiary institution. Clinical data on post-operative breast surveillance was collected including frequency of clinical breast exams (CBE), imaging,

biopsies, and recurrence data. The cohort was categorized into 2 groups: those who had post NSM imaging surveillance and those who had CBE alone. The groups were compared with respect to tumor characteristics and recurrence using univariate and multivariate analyses. Kaplan-Meier was used to evaluate overall survival.

Results: 894 NSMs were performed on 511 patients. Median age was 47 [range, 21-79] years. 331 (64.74%) patients had invasive ductal carcinoma (IDC) of various subtypes, 39 (7.6%) had invasive lobular carcinoma (ILC), and 124 (24.3%) had ductal carcinoma in situ (DCIS). 16 (3.1%) patients had bilateral disease and 176 (34.3%) had multifocal or multicentric disease. Post-operatively, 265 (51.2%) patients were followed with CBE alone; 134(26.2%) had surveillance MRIs performed during the study period to evaluate for residual breast tissue and/or to rule out locoregional recurrence (LRR) despite normal CBE. There was no difference in pre-operative T stage between patients who had MRI vs CBE follow-up (p=.47) and no difference in pre-operative clinical nodal status or pathological nodal status between the 2 groups (p=.39 and .74, respectively). At a median follow-up of 33 months (interquartile range, 17-58.25), 26 patients (5.1%) developed LRR and 28 (5.4%) patients developed distant recurrence. 20 (76.9%) of the LRR were an in-breast recurrence and 6 (23.1%) were axillary recurrences. 15 (57.7%) LRR were detected in the CBE group and 11 (42.3%) were detected in the MRI group (p=.33). Overall survival for the entire cohort was 99%. There was no difference in OS among those who had CBE alone versus post-NSM MRI (p=.46). Among patients who had MRI, there was a higher rate of biopsies compared to those who had CBE alone (15.8% vs 7.8%, p =.01). The positive predictive value (PPV) of biopsy obtained following abnormality detected on CBE was 0.77 (95% CI: 0.623, 0.977) and the PPV of biopsy obtained following MRI-detected abnormality was 0.54 (95% CI: 0.342, 0.738).

Conclusions: CBE alone is adequate to detect LRR following NSM and has a higher PPV than MRI. Use of routine screening MRI following NSM results in higher rate of biopsy and no difference in overall survival.

Table. Characteristics and surveillance strategies of patients undergoing nipple-sparing mastectomy

	Surveillance Strategy		
	Annual CBE *n(%)*	Annual CBE + MRI *n(%)*	*p*-values
Demographics			
Number of patients	265	134	
Median Age (years)	47	46	
BRCA1 or 2	26 (9.8)	14 (10.4)	0.84
Preoperative cN+	33 (14.7)	12 (9)	0.38
Preoperative cT2-4	89 (33.6)	40 (30.0)	0.45
Pathology			
DCIS	53 (20)	39 (29.1)	**0.04**
IDC	185 (69.8)	85 (63.4)	0.19
ILC	21 (7.9)	10 (7.5)	0.87
Other/Unknown	4 (1.5)	2 (1.5)	0.99
Multifocal/-centric	98 (37)	37(27.6)	**0.001**
Bilateral	5 (1.8)	5 (3.7)	0.37
pN+	73 (27.5)	27 (20.1)	0.11
Adjuvant Treatments			
pMRT	62 (23.4)	21 (15.7)	0.07
Endocrine therapy	153 (57.7)	79 (59)	0.82
Chemotherapy	90 (34)	35 (26.1)	0.11

Abbreviations: CBE, clinical breast exam; MRI, magnetic resonance image; cN+, clinically node positive; pN+, pathologic node positive; pMRT, post-mastectomy radiation

Oncoplastics

1387616 - Incidental Contralateral Malignancy in Patients Undergoing Oncoplastic Breast-conserving Surgery with Symmetry Procedure

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Background/Objective: The incidence of occult breast cancer in average-risk patients undergoing reduction mammoplasty and those undergoing prophylactic mastectomy ranges from less than 1% to up to 5%, respectively. The incidental diagnosis of contralateral malignancy in patients with known unilateral breast cancer undergoing an oncoplastic partial mastectomy and simultaneous symmetry procedures is not well described. Incidental cancer identified on final pathology poses significant challenges due to ambiguous location and margins, which mandates subsequent mastectomy for adequate oncologic treatment. We aimed to determine the incidence of contralateral occult breast cancer in patients undergoing oncoplastic breast-conserving surgery (OBCS) with concurrent symmetry procedure on the contralateral breast.

Methods: We reviewed a single institution, prospectively maintained database of patients with unilateral breast cancer undergoing OBCS. Patients with known bilateral breast cancer, undergoing excisional biopsy on the contralateral breast or those undergoing standard breast-conserving surgery were excluded. Patient clinical demographics, pathologic features of the primary tumor, incidence of occult malignancy, second tumor characteristics, and subsequent adjuvant treatment of the occult cancer were evaluated. Per institutional standards, routine orientation by the operating surgeon with intraoperative margin inking was performed for all breast specimens.

Results: Between March 2018 and July 2022, 383 patients underwent OBCS for unilateral breast cancer. A total of 314 (82%) had pre-operative breast MRI to rule out additional disease. There were 289 patients (75.4%) who underwent a contralateral procedure, and 100 patients yielded contralateral breast tissue specimens. Fifteen patients who underwent a planned contralateral excisional biopsy with their symmetry procedure were excluded. Patient demographics and tumor characteristics of the remaining 85 patients are described in Table 1. The majority of these patients (92%) underwent pre-operative breast MRI. All 85 patients had a mammoplasty as their symmetry procedure. Four patients (4.7%) had occult malignancies identified in the contralateral breast pathology. Three were diagnosed with ductal carcinoma in situ (DCIS) ranging in size from 4mm to multifocal disease with the largest focus measuring 10mm, and 1 patient diagnosed with invasive lobular carcinoma (ILC) measuring 3.2mm. Three patients had undergone pre-operative MRI which showed no suspicious findings. Based on the oriented specimen, clear margins were obtained in 2 patients, while 1 patient with DCIS required re-excision to obtain clear margins followed by adjuvant whole-breast radiation therapy. The patient with ILC underwent re-excision for positive margin, axillary staging, and intraoperative radiation. No patients required mastectomy for treatment of the contralateral occult breast cancer.

Conclusions: The incidence of contralateral occult malignancy in symmetry procedures for patients undergoing OBCS is higher than the reported incidence in patients undergoing cosmetic reduction

mammoplasty and rivals the reported incidence for prophylactic mastectomy. In our study, patients who elected to have OCBS as the surgical management of their malignancy were not precluded from having breast-conserving surgery upon incidental identification of contralateral malignancy. The higher incidence of occult breast cancer in this population warrants the routine orientation of all specimens. Accurate assessment of margins and tumor location affords patients with incidental early-stage cancer the option of breast preservation.

Table. Clinicopathological features of patients undergoing OBCS with contralateral symmetry procedure

Characteristics	N (%)
Age (years, median (IQR))	61 (19)
Germline mutations *(BRCA1/2)*	
Yes	2 (2)
No	48 (56)
Testing not performed	35 (41)
Preoperative MRI	
Yes	78 (92)
No	7 (8)
Index cancer histology	
DCIS	18 (21)
IDC	45 (53)
ILC	10 (12)
Other	12 (14)
Index cancer receptor status	
ER positive	77 (91)
PR positive	69 (81)
HER2 positive	8 (9)
Index cancer subtype	
HR positive/HER2 negative	77 (91)
HR any / HER2 positive	8 (9)
TNBC	0 (0)
Index tumor size	
T1	53 (62)
T2	23 (27)
T3	9 (11)
Index breast surgery	
Mammoplasty	75 (88)
Mastopexy	5 (6)
Neoareolar reduction with nipple reconstruction	5 (6)
Adjuvant radiation after index breast surgery	
External beam	37 (44)
Intra-operative	29 (34)
No radiation	17 (20)
Both intraoperative and external	2 (2)

Abbreviations: IQR, interquartile range; DCIS, ductal carcinoma in situ; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; ER, estrogen receptor; PR, progesterone receptor; HER2, Human Epidermal Growth Factor Receptor 2; HR, hormone receptor; TNBC, triple-negative breast cancer

1388212 - Utility of Novel Educational Training Tool in Oncoplastic Surgery

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Background/Objective: Oncoplastic surgical training can be challenging, particularly as many techniques are not incorporated into traditional surgical training programs. Independent courses have been available domestically and internationally since 2004. These educational programs address oncoplastic principles, the importance of the multidisciplinary approach to patient assessment, as well as specific training in various surgical techniques. Many of these courses incorporate a hands-on laboratory component which is essential to learning and adopting new surgical techniques. Of particular importance is the understanding of symmetry and avoiding post-operative surgical deformities that can prove difficult to repair following surgery and radiation therapy. Comprehensive surgical assessment, planning and a thorough understanding of the patients' desires as well as the approach for achieving symmetry are of paramount importance. The current study examines the utility of a novel surgical training tool for hands-on training that can be used for educational programs taught remotely or in person thereby including faculty from around the world.

Methods: In this study, a total of 95 participants from 14 U.S. states and 9 countries completed an oncoplastic workshop consisting of online and in-person attendants. The training tool (The Symmetrist™) was used along with didactic lectures and consisted of a 2-3 hour experience. Each participant used the Symmetrist to complete a sculpture representative of the breast while learning about techniques to avoid deformities and methods for surgical planning. Participants then completed an evaluation rating the utility and effectiveness of the training tool for oncoplastic surgical training.

Results: 90% of participants rated the training experience format as being conducive to learning, and the unique tool as being excellent and relevant to their educational needs. 80% reported they believed this training would result in an improvement of their competence and surgical performance, while 70% felt that it improved their communication skills and would have a positive impact on patient outcomes.

Conclusions: The vast majority of surgeon participants (90%) rated this training tool as excellent with 80% indicating that it would improve their competence and surgical performance. A majority of the surgeons reported that it would help to improve their communication skills, as well as patient outcomes. This hands-on training tool should be considered for training residents and fellows as well as surgeons in practice. It can be used as an adjunct to online training programs leveraging a global array of highly experienced faculty in a very cost-effective and efficient manner.

1388274 - Accuracy and Feasibility of Intraoperative Augmented Reality in Breast Cancer Surgery - A Systematic Review

Prerna Khanna[1], Michael Boland[2], Dimitri Amiras[2], Meera Joshi[2], Daniel Leff[2]

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Background/Objective: Augmented reality (AR) is being used with increasing frequency in breast surgery. AR devices can project a 3D reconstruction of the breast and its vasculature into the operative field to aid surgical planning. However, AR remains early in its development, with many studies focusing on accuracy and feasibility of device use. Our aim was to review current literature on the technical accuracy and feasibility of AR use in breast surgery, with a view to explore its clinical promise and identify specific areas for advancement.

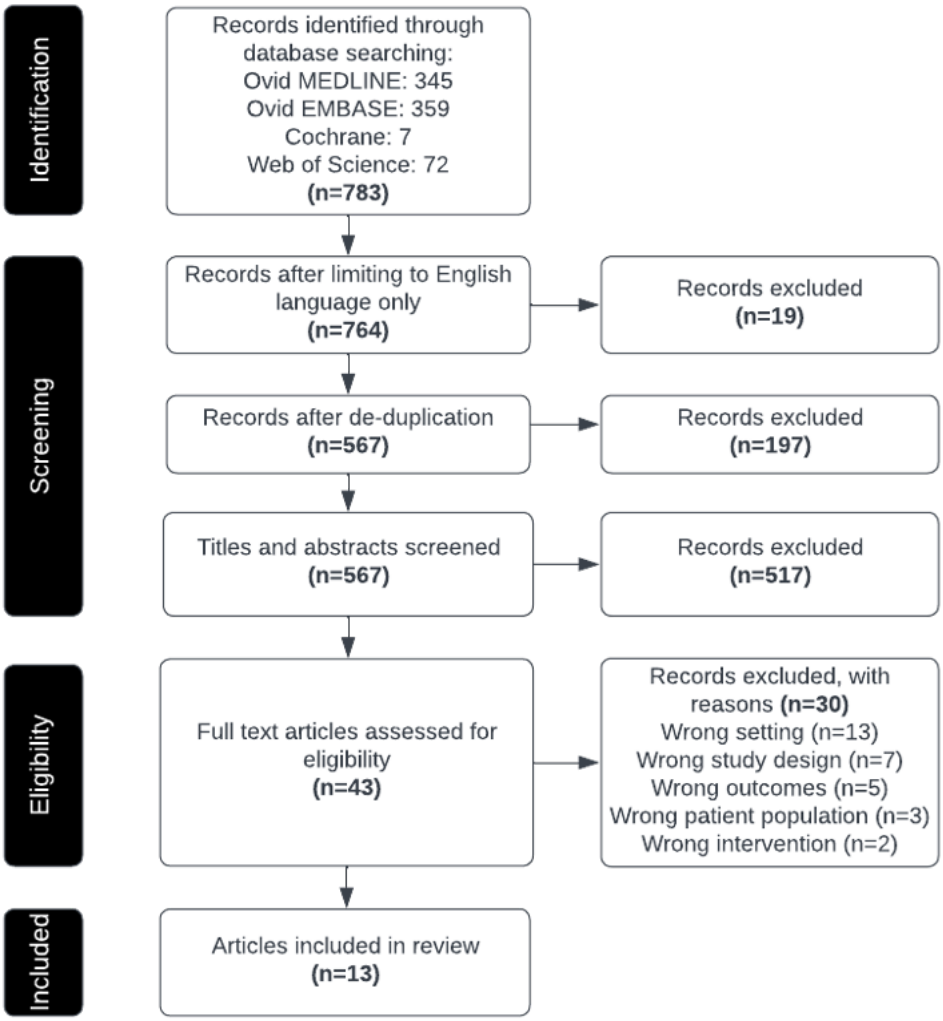
Methods: The study was performed in accordance with PRISMA guidelines. A systematic literature search of MEDLINE, EMBASE, Cochrane, and Web of Science databases was conducted to identify studies that involved intraoperative or simulated intraoperative use of AR in breast surgery. Primary outcomes were technical accuracy and feasibility. Technical accuracy was defined as accuracy of tumor and/or vessel location by AR, in comparison to imaging or intraoperative findings. Feasibility was defined as the functional ability of the AR device in the operative setting by assessing 2 domains – procedural efficiency and marker/fiducial registration. Study quality was also evaluated using the ROBINS-I and case series (Murad et al) quality assessment tools.

Results: Following screening of 567 studies, 13 articles were included in the review. Of the 13, 7 evaluated AR accuracy, including 1 that assessed registration accuracy. Definitions of acceptable accuracy distances, between vessel locations found on AR versus on imaging, varied between studies, with 1 study defining 'accurate' as ≤ 10mm. All 7 studies identified their respective AR devices to be clinically 'accurate.' 1 AR device was found to be more accurate at vessel location than standard imaging techniques. 6 articles evaluated feasibility of AR device use, of which 3 evaluated the Microsoft HoloLens. 1 study found that AR use reduced operative time thereby improving efficiency. 6 studies used novel surface marker/fiducial registration techniques. Registration methods were clinically promising; however several studies identified their complexity as a limiting factor to implementation. All studies identified areas for technological development, to improve user responsiveness and experience. Of the 13 studies evaluated, 5 measured as low-risk on ROBINS-I or had a score of at least 5/8 on the case series tool. The review was limited by heterogeneity in methodology, small sample sizes, and subjective definitions of 'accuracy' and 'feasibility' described in the studies.

Conclusions: This study demonstrates an overall benefit and clinical promise for the use of AR in breast surgery. AR devices appear accurate at vessel/tumor identification when compared to intraoperative measurements and standard imaging modalities, but agreed accuracy thresholds are required for larger scale studies. AR use in breast surgery also appears feasible and has the potential to improve efficiency, but device registration using fiducial markers and improved user experience remain complex challenges. The review demonstrates significant heterogeneity between studies with regard to outcomes making definitive conclusions difficult to formulate. Future studies should investigate AR use in a larger breast

cancer patient population, with measurement of accuracy and effect on clinical outcomes using standardized definitions.

Figure. PRISMA Flow Diagram for systematic review. Screening process is identified, and records included and excluded are quantified.



1388292 - Augmented Reality for Pre-operative Planning for Breast Oncoplastic Surgery

Prerna Khanna[1], Michael Boland[2], Dimitri Amiras[2], Meera Joshi[2], Daniel Leff[2]

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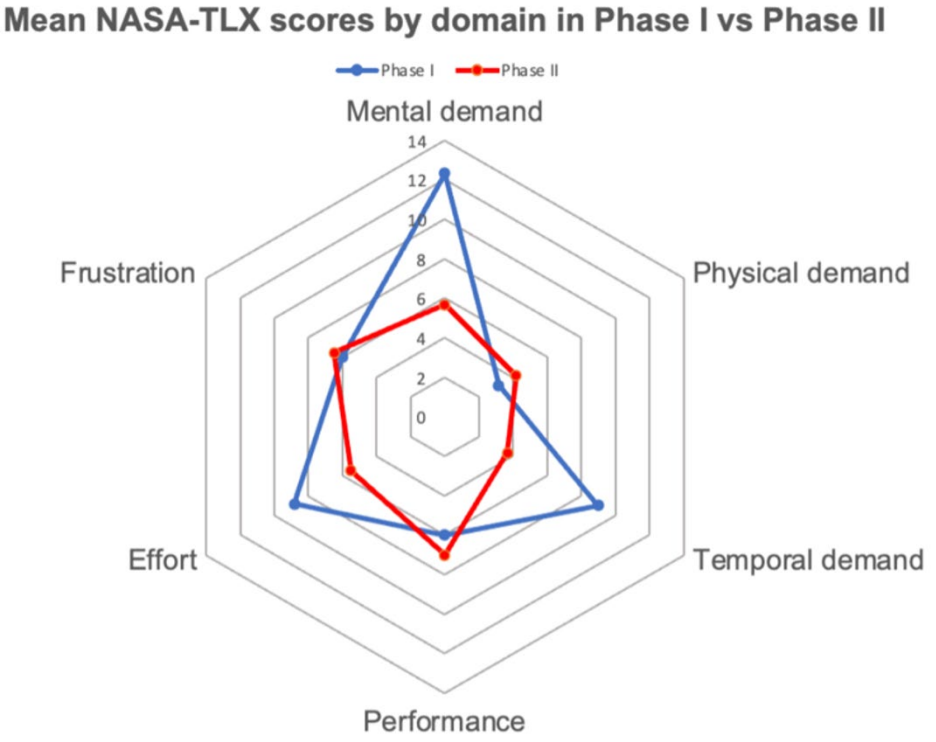
Background/Objective: Augmented reality head mounted display (ARHMD) devices such as the Microsoft HoloLens may improve planning and execution of breast oncoplastic surgical procedures. For example, for local flaps such as lateral intercostal artery perforator flaps (LICAP) and free flaps such as Deep Inferior Epigastric Artery (DIEP) flaps, ARHMD allows 3D visualization of chest wall vascular anatomy during pre-operative planning of reconstruction. Whilst accuracy of ARHMD has been studied, few studies have evaluated operator experience. This study aims to determine the effect, on surgical workload, of adding ARHMD during the pre-operative planning phase of breast reconstructive procedures.

Methods: Six Computerized Tomographic Angiography (CTA) scans of retrospective breast oncoplastic surgery cases were segmented and uploaded onto an ARHMD by a consultant radiologist. Six breast and plastic surgeons were invited to simulate pre-operative planning of 3 of these procedures each, with the help of CTA imaging. The task of pre-operative planning was evaluated for workload on 2 separate occasions using a validated National Aeronautics and Space Administration Task Load Index (NASA-TLX) survey. On the first occasion, the surgeons were provided CTA scans. On the second occasion, ARHMD was used in addition to standard CTA assessment. A qualitative questionnaire based on a framework for innovative surgical device implementation (COHESIVE-COS) was used to record user experience.

Results: ARHMD introduction led to a decrease in 'overall workload' scores on a composite NASA-TLX index (45.33 vs 32.50; p=0.125). A statistically significant decrease in mean mental demand scores on the NASA-TLX was seen with ARHMD use (12.33 vs 5.67; p = 0.009). Mean temporal demand (9.00 vs 3.67; p = 0.059), and mental effort (8.83 vs 5.50; p = 0.177) scores also decreased. Mean physical demand (3.17 vs 4.17; p = 0.377), performance (6.00 vs 7.00; p = 0.687), and frustration (6.00 vs 6.50; p = 0.846) scores increased with ARHMD. Qualitative analysis using the COHESIVE-COS revealed diverse responses to user experience outcomes. All users agreed ARHMD use would be beneficial, however 2 were hesitant about its application. Five major themes were noted to be common among participants. Positive themes included (i) ability to view anatomy in a 3-dimensional plane and (ii) ergonomic benefit. Negative themes included (i) steep learning curve, (ii) surgery-specific limitations, and (iii) technological limitations. Participants identified the need for further technological and surgery-specific developments of the device prior to clinical application. These included improved responsiveness, better resolution, and automatic overlay of holograms onto the patient anatomy.

Conclusions: ARHMD is associated with a reduction in overall and mental workload, partially due to its ability to translate 2D anatomy into the 3D environment for the surgeon. ARHMD resulted in reduced time pressure and lower effort during pre-operative planning. Frustration was identified among some participants, partially due to a learning curve and technological limitations. ARHMD development should focus on shortening the learning curve and reducing physical demand and frustration through improved user experience and automatic anatomical registration. Future studies should explore ARHMD in the intraoperative setting, to determine its effect on clinical outcomes.

Figure. Radar plot of mean NASA-TLX domain subscores on a scale of 0-20. From Phase I (CTA alone) to Phase II (CTA and ARHMD), overall domain decreases (mental demand, temporal demand, and effort) were greater than domain increases (physical demand, performance, and frustration). Phase I and Phase II mean domain values are demonstrated in blue and red respectively.



1388303 - A Pilot Program to Teach General Surgery Residents Oncoplastic Principles Using Simulation

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Background/Objective: Simulation is used in surgical training to allow learners to practice complex techniques in a safe setting with increasing responsibility as skill mastery progresses. Many general surgery residents do not have exposure to oncoplastic surgery, even though oncoplastic techniques have been shown to improve patient satisfaction with their cosmetic result after breast surgery. The primary aim of this pilot study was to observe the effects of teaching general surgery residents basic oncoplastic techniques using a simulation breast model. The focus was on awareness of oncoplastic procedures as an option for all breast cancer patients.

Methods: General surgery residents completed a pre-training survey consisting of 3 questions: (1) Do you understand the role of oncoplastics in breast surgery? (2) Do you feel comfortable advocating for oncoplastic techniques for your patients? (3) Does oncoplastic surgery improve your patients'

outcomes?. Answers were on a 1 to 5 scale, 5 being the highest score. An oncoplastic breast surgeon then led them through a didactic and hands-on training with a breast simulator (Mastotrainer). The simulation session focused on aesthetic scar placement and tissue advancement flap closure. The residents then completed a post-training survey consisting of the same questions. Surveys were gathered in a prospective fashion and reviewed retrospectively.

Results: Seven junior-level general surgery residents from a single institution completed the pilot. 6 residents completed the pre-training survey and 4 residents completed both the pre- and post-training surveys. All of the participants that completed a post-training survey responded that they were more comfortable with oncoplastic principles (score of 5) after the program.

Conclusions: This is a pilot study focusing on general surgery residents' subjective understanding of Level I oncoplastic procedures before and after a didactic lecture and oncoplastic technique simulation surgery on a Mastotrainer. The goal of this training is to improve understanding of oncoplastic techniques and the benefit they have for patients. There is minimal data regarding use of simulation in breast cancer surgery, and specifically oncoplastic surgery. Simulation training for oncoplastic procedures could be a future option to provide access to surgeons for learning basic oncoplastics.

Table. Oncoplastic breast surgery survey results

Resident	Pretest Q1	Posttest Q1	Pretest Q2	Posttest Q2	Pretest Q3	Posttest Q3
A	3	5	3	5	4	5
B	3	5	4	5	4	5
C	4		2		5	
D	3	5	4	5	4	5
E	4		5		5	
F		4		4		5
G	3	5	3	5	5	5

1388310 - The Goldilocks: Not Your Average Mastectomy

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Background/Objective: The Goldilocks mastectomy is as a type of skin-sparing mastectomy involving a Wise-pattern skin excision that utilizes mastectomy flap tissue for immediate reconstruction of the breast mound. This technique is traditionally described for patients who have redundant tissue who are poor candidates for post-mastectomy reconstruction. In this case series, we have expanded the role of the Goldilocks mastectomy with the creation of an inferior dermal pedicle to provide prosthesis coverage, to create a better breast pocket for reconstruction, and to maintain the nipple-areolar

complex in patients who would otherwise not be candidates for nipple-sparing procedures. The aim of this study is to present our modifications of this technique and to review the outcomes.

Methods: A retrospective review of all patients undergoing Goldilocks mastectomy from April 2022 to October, 2022 was performed. Patients included in our study were women aged 18 years and older with a diagnosis of breast cancer or with a genetic predisposition to breast cancer (i.e., BRCA gene) who underwent Goldilocks mastectomy. Data collected included patient demographics (age, BMI, smoking, diabetes, hypertension), degree of breast ptosis, oncologic data (type of breast cancer, stage, receptor status, adjuvant chemotherapy or radiation), type of genetic predisposition to breast cancer, type of breast reconstruction procedure, oncologic outcomes (positive margins, re-excision, recurrence), and reconstructive complications (seroma, hematoma, infection, tissue expander failure, minor mastectomy flap necrosis, major mastectomy flap necrosis, nipple necrosis).

Results: A total of 10 patients (18 breasts) were included in this study. Average age at time of surgery was 49.3 years (35-64 years) and average BMI was 28.8 kg/cm 2 (22.3-33.7 kg/cm 2). Half the patients (50%) had autologous reconstruction after mastectomy, and 50% underwent staged breast implant placement. Patient characteristics, outcomes and complications are summarized in Table 1. There were 40% of patients that had a diagnosis of invasive breast cancer. There were no cases of positive margins or re-excision. Of the 5 patients who underwent a nipple-sparing Goldilocks mastectomy (9 breasts), there were no cases of nipple necrosis; however, in 1 case there was superficial epidermolysis that resolved with local wound care. There was 1 case with major mastectomy flap necrosis requiring operative debridement. In 1 case there was an issue accessing the tissue expander port, requiring tissue expander replacement.

Conclusions: The Goldilocks mastectomy using an inferior dermal pedicle is a safe technique that provides an optimal mastectomy pocket for breast reconstruction, uses autologous tissue for prosthesis coverage, and allows the potential for nipple-sparing mastectomy in patients with significant ptosis who would otherwise not be candidates for a nipple-sparing procedure.

Table. Patient characteristics and outcomes

Patient Characteristics and Outcomes	N (%)
Demographics	**n =10**
Age (mean ± SD)	49.3 ± 8.9
BMI (mean ± SD)	28.8 ± 3.8
Smoking history	5 (50)
Diabetes	0 (0)
Hypertension	2 (20)
Ptosis Grade	
Pseudoptosis	1 (10)
1	0 (0)
2	6 (60)
3	1 (10)
Indication for Surgery	
BRCA mutation	2 (20)
Ductal carcinoma in-situ	3 (30)
Invasive breast cancer	4 (40)
*Other	1 (10)
Oncologic Data	**n = 4**
Type of breast cancer	
Invasive Ductal Carcinoma	2 (50)
Invasive Lobular Carcinoma	1 (25)
Invasive Ductal and Metaplastic Breast Carcinoma	1 (25)
Receptor Status	
ER-/PR-/HER2-	1 (25)
ER+/PR+/HER2-	2 (50)
ER+/PR+/HER2-	1 (25)
Stage	
T1cN1a	1 (25)
T2N0(i+)	1 (25)
T2, N1mi, M0	2 (50)
Adjuvant Chemotherapy	2 (50)
Adjuvant Radiation Therapy	0 (0)
Oncologic Outcomes	
Positive margins	0 (0)
Re-excision	0 (0)
Recurrence	0 (0)
Reconstructive Complications	**n =10**
Seroma	1 (10)
Hematoma	0 (0)
Infection	0 (0)
Tissue expander failure	1 (10)
Minor mastectomy flap necrosis	0 (0)
Major mastectomy flap necrosis	1 (10)
Nipple necrosis	0 (0)

*Other included capsular contracture of breast implants following nipple-sparing mastectom

1366124 - Complications After Oncoplastic Breast Reduction and Impact on Time to Adjuvant Therapy

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Anne Arundel Medical Center, Annapolis, MD

Background/Objective: Lumpectomy with oncoplastic breast reduction/lift (L-OBR) offers improved cosmetic results and concurrent treatment of macromastia, but may increase complications and delay adjuvant therapy compared to lumpectomy alone. This study aimed to determine 1) the complication rate, 2) risk factors for complications, and 3) association of complications with delay to adjuvant treatment (chemotherapy or radiation) after L-OBR at our institution.

Methods: This was a single institution, retrospective study of patients with breast cancer who underwent L-OBR from 2006 to 2021. Complications were ascertained by electronic medical record review. Nearly all cases had a contralateral symmetry procedure; complications for both breasts were included, and analyses were performed on a per-patient basis. A major complication was defined as unexpected readmission, need for IV antibiotics, and/or return to the operating room with general anesthesia. Mann-Whitney tests were used to compare median weeks to radiation, for those with versus without complications.

Results: 282 patients were included. The major complication rate was 3.9% (n=11/282; 7 had re-operation under general anesthesia) and overall complication rate was 31.2% (n=88/282). 33% of patients had BMI > 35, 11% were diabetic, 20% had hypertension, 7% were current cigarette smokers, 17% received neoadjuvant chemotherapy, and 30% had a sternal notch-to-nipple distance >28.5 cm. The most common complication was incisional dehiscence requiring serial debridement or dressing changes (23.4%, n=66/282). BMI >35 (RR 20, p=0.003) and diabetes (RR 4.8, p=0.02) were significantly associated with having a major complication. Ten of the eleven patients with a major complication (91%) had BMI >35. HTN (p=0.007) and a longer notch-to-nipple distance (p< 0.001) were associated with incisional dehiscence. Of the 282 patients, 173 (61.3%) went on to receive adjuvant radiation and 77 (27.3%) received adjuvant chemotherapy as their next form of treatment. The occurrence of any complication was associated with a delay in time to radiation (median 7 versus 8 weeks, p< 0.001; see figure). The occurrence of a major complication was associated with a more meaningful delay to radiation (median 7 versus 15 weeks, p=0.002; see figure). Occurrence of any complication, or a major complication, was not associated with longer time to chemotherapy.

Conclusions: The overall complication rate of 31.2% after L-OBR falls within the range of 11-33% reported in the literature. There was a significant and clinically meaningful delay to radiation in patients with major complications, although no delay to chemotherapy was evident. Diabetes, BMI > 35, hypertension, and longer notch-to-nipple distance were risk factors for complications. Patients with BMI > 35 and diabetes should be counseled that they are at increased risk for major complications after L-OBR, which could delay adjuvant radiation and compromise oncologic outcomes. This is particularly important for patients with aggressive tumors, or patients with small tumors in which OBR is considered due to macromastia but is not medically necessary for breast conservation. Identifying patients at high risk for wound complications after L-OBR may allow for appropriate selective addition of closed incision

negative pressure dressing or use of low energy dissection devices, which were not routinely used in the time period studied.

Figure. Box and whisker plots, showing time from surgery to radiation, by complication type. Center line shows the median weeks to radiation; gray box shows interquartile range (center 50% of patients).

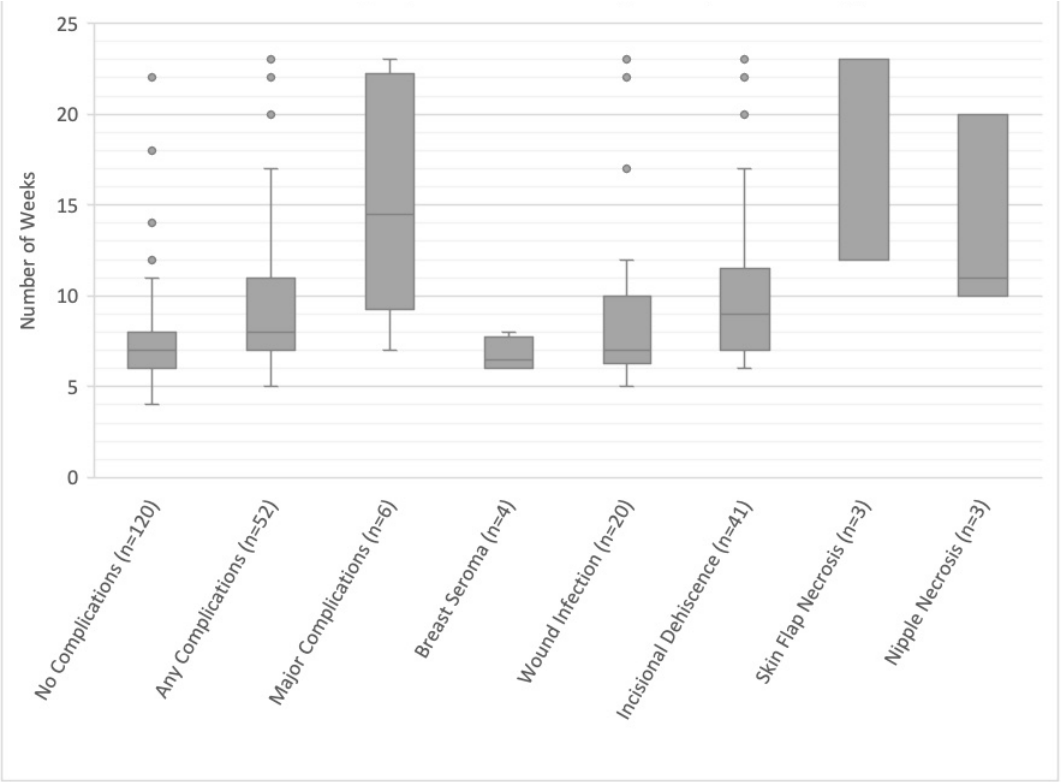

Figure. Box and whisker plots, showing time from surgery to radiation, by complication type. Center line shows the median weeks to radiation; gray box shows interquartile range (center 50% of patients).

1368454 - Pre-operative Three-dimensional Simulation of Appearance After Breast-conserving Treatment Does Not Over-inflate Expectations at 1 Year

Amy Godden[1], Aikaterini Micha[1], Peter Barry[2], Katherine Krupa[3], Anna Kirby[1], Jennifer Rusby[4]

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Background/Objective: Simulation of aesthetic outcome of Breast-conserving Treatment (BCT) using 3-dimensional surface imaging (3D-SI) better prepares women for their aesthetic outcome compared to viewing 2D photographs or a discussion with their surgeon. What remains unknown is 1) whether women's memory of this information matches their perception of reality 1 year on i.e., was it a fair representation? and 2) the effect of preparation method on longer term quality of life.

Methods: With IRB approval, an RCT was conducted, powered to identify differences in a women's preparedness for aesthetic outcome after surgery between 3 arms: 3D-simulation, viewing post-operative 2D photographs of other women (matched for age, BMI, breast volume and tumour location), and standard care (verbal description from the surgeon). Randomisation was stratified for BMI (>30) and intent to undergo Axillary Lymph Node Dissection (both factors previously demonstrated to impact upon patient reported satisfaction with breasts) and operation type. One year following BCT, participants completed the BCT BREAST-Q and a Visual Analogue Scale (VAS) for the question "How well do you think the information about how your breasts are likely to look after surgery reflects how they actually look today?." The Kruskal-Wallis test was used to assess significance of between-group differences at a 5% significance level.

Results: From 2017 to 2019, 117 women were recruited and completed the primary endpoint. 106 remained eligible for follow-up at 1 year and 104 at 2 years. 78(74%) women attended for 1 year study follow-up. A standardised (non-bespoke) simulation representing an average aesthetic outcome from BCT built from the patient's own pre-operative 3D-SI did not affect patient perception of outcome compared with standard verbal description or viewing 2D photographs, with no between group significant difference in VAS (p=0.40) (Table 1). Median (IQR) "satisfaction with breasts" and "psychosocial wellbeing" Q-scores were 74(59-95) and 79(61-94) respectively at 1 year follow-up. Analysis of between-group differences in Q-score for both scales showed that results were best in the simulation group (median 77 and 82), but the difference did not reach statistical significance (p= 0.70, p=0.81 respectively) (Table 1).

Conclusions: The simulation model used in the RCT proved helpful in the pre-operative setting, with women feeling significantly more confident going into surgery. The secondary outcomes reported here demonstrated that 3D simulation using a basic non-bespoke method improved medium-term quality of life parameters but not to a statistically significant extent (with 26% lost to follow-up). The Q-scores in all groups within this RCT are at the upper end of the reported range, making demonstrating between-group differences more challenging. There is caution regarding the use of pre-operative simulation to aid decision-making for oncoplastic surgery due to concerns about repercussions if reality does not meet expectations. Reassuringly, recall of a non-bespoke simulation of BCT applied to the individuals' 3D-SI was not inferior to standard verbal description or viewing 2D photographs. This result brings confidence that even a basic simulation does not over-inflate expectations. Study completion at 5 years may provide clarity on the impact of 3D simulation on PROMs.

Table. VAS and Breast-Q by randomisation group at 1 year post BCT. BCT, breast-conserving treatment; VAS, visual analogue scale; IQR, interquartile range. Kruskal Wallis statistics. Maximum Q-score and VAS score is 100.

	Control	2D photographs	Simulation	
				P value
	Median (IQR)	Median (IQR)	Median (IQR)	
Satisfaction with breasts Q-score				
	67 (59-85)	74 (59-91)	77 (60-100)	*p=0.70*
n=78/106				
Psychosocial wellbeing Q-score				
	78 (63-92)	68 (59-100)	82 (68-96)	*p=0.81*
n=78/106				
Visual Analogue Scale (VAS) score				
	81 (66-94)	90 (70-95)	84 (78-100)	*p=0.40*
n=78/106				

1358211 - Tele-education of Oncoplastic Breast Skills Utilizing Simulation Tools and a Live Hands-on Course

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Background/Objective: Oncoplastic breast surgery courses have traditionally been held in-person and utilized cadavers, which present significant cost and travel-related limitations. Technology advances have supported tele-education development, and implementation was further hastened by the COVID-19 pandemic. We introduce tele-education of oncoplastic techniques using high-fidelity low-cost simulation materials and remote access to expert instructors.

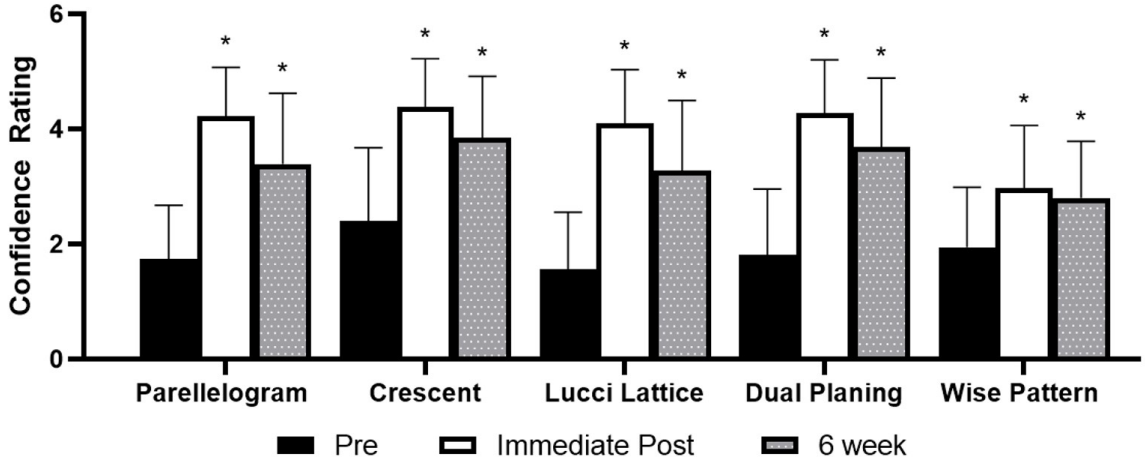
Methods: Breast surgical oncology fellows and practicing surgeons were invited to participate from August 2020 to January 2022. Oncoplastic techniques were taught using the American Society of Breast Surgeons curriculum. Learners received a kit of simulation tools, including surgical instruments and

breast models with realistic tissue planes, prior to the course. The 4-hour course included live demonstrations and personalized feedback on practiced skills from expert surgeons through video conference, with learner-instructor ratios of 4:1. Learner confidence was assessed prior to the course, immediately after, and 6 weeks following. Survey results were compared using analysis of variance with significance set at $p< 0.05$.

Results: One-hundred and twenty-three participants underwent the course and completed the pre-course survey; 114 (93%) and 66 (54%) completed the immediate post-course and 6-week follow-up, respectively. There was significant immediate improvement in confidence for the techniques of parallelogram and crescent mastopexy, Lucci lattice, dual planing, and Wise Pattern reduction mammoplasty. These effects were sustained at 6 weeks, with confidence ratings remaining significantly higher than before the course.

Conclusions: Oncoplastic techniques can be effectively taught and confidence largely sustained through tele-education and remote simulation. Utility of this teaching method extends beyond pandemic restrictions and may be useful for practicing general or rural surgeons.

Figure. Oncoplastic breast course participant confidence ratings. *Differed significantly from Pre-course rating with p<0.05



1387887 - Performance of Immediate Contralateral Symmetry Mastopexy/Mammoplasty with the Use of Oncoplastics: Do Patients Want It, and Are Delayed Revisions Required?

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Background/Objective: In the era of oncoplastic breast-conserving-surgery (OBCS), cosmetic outcomes and the desire for symmetry have become an important part of the surgical management of breast cancer. Timing of contralateral symmetry procedures remains a controversial topic. Simultaneous symmetry procedures in OBCS have not been routinely offered due to the perceived risk of delayed asymmetry because of surgical scarring and/or external beam radiation therapy (EBRT), increasing the risk of cosmetic revision after completion of treatment. This study evaluates the rate of revision after simultaneous symmetry procedures in patients undergoing OBCS.

Methods: We reviewed our institutional prospectively maintained breast cancer database identifying all breast cancer patients treated surgically since the introduction of oncoplastic surgery at our facility in 2018. Since starting oncoplastic surgery, our institution routinely offers simultaneous symmetry procedures when appropriate. Descriptive statistics were performed evaluating the use of oncoplastic surgical techniques, simultaneous symmetry procedure offerings, number of patients proceeding with symmetry procedures, perioperative complications, and the rate of revisions after completion of treatment.

Results: Between 2018 and 2022, 514 patients underwent surgical management of breast cancer. Partial mastectomies were performed in 468 patients, 369 (79%) underwent OBCS. Of the 319 patients who were offered simultaneous symmetry procedures, 287 (90%) had contralateral symmetry procedure at the time of their OBCS (Table 1). The re-excision rate of this cohort was 20% (59 patients). Of these 287 patients with simultaneous contralateral symmetry procedures, 160 (55.7%) underwent intraoperative radiation therapy (IORT) whilst 109 (37.9%) had adjuvant EBRT. In the remainder of the patients, adjuvant radiation therapy was not indicated or the patient declined. Three patients (1%) experienced complications involving the symmetry side. One patient with bilateral hematomas required evacuation in the operating room and 1 patient with bilateral superficial wound dehiscence and surgical site infection was managed with local wound care and oral antibiotics. One patient developed a delayed hematoma of the symmetry side which was treated with percutaneous aspiration in the clinic. Adjuvant therapies were not delayed in any patients due to complications involving the symmetry side and none of these patients requested cosmetic revisions. Only 3 patients (1%) desired surgical revisions due to asymmetry. Of these patients, 2 had previously required surgical re-excision for achievement of adequate margins and had subsequent EBRT.

Conclusions: The majority of women undergoing oncoplastic partial mastectomy proceeded with a simultaneous symmetry procedure when offered. Complications on the symmetry side are rare, and few patients desired delayed revision for symmetry.

Table. Patient clinical, tumor pathology, and treatment characteristics

Characteristics	N (%)
Age, years, median (IQR)	61 (16)
Histology	
IDC	208 (72.5)
DCIS	45 (15.7)
ILC	32 (11.1)
Other	2 (0.7)
Index tumor size	
<2cm	187 (65.1)
2-5cm	81 (28.2)
>5cm	19 (6.6)
Primary oncoplastic incision	
Mastopexy	160 (55.7)
Racquet mammoplasty	35 (12.2)
Reduction mammoplasty	85 (29.6)
Neoareolar reduction with nipple reconstruction	7 (2.4)
Symmetry oncoplastic incision	
Mastopexy	188 (65.5)
Reduction mammoplasty	84 (29.3)
Other	15 (5.2)
Radiation	
EBRT	109 (37.9)
IORT	160 (55.7)
Complications involving the symmetry side	3 (1)
Surgical re-excision for margins	59 (20)
Surgical revision for symmetry	3 (1)

Abbreviations: IQR, interquartile range; DCIS, ductal carcinoma in situ; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; EBRT, external beam radiation therapy; IORT, intraoperative radiation therapy

1387893 - Patient-reported Outcomes in Patients Undergoing Lumpectomy with and without Closure of Defect

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Background/Objective: A growing range of oncoplastic techniques including local tissue transfers and closure of lumpectomy defect (level 1 oncoplastic techniques) are employed in breast-conserving therapy. There are limited patient-reported outcome data on breast satisfaction in patients undergoing lumpectomy with and without closure of the defect by the breast surgeon. The aim of this study was to determine if closure of the partial mastectomy defect led to improved patient-reported satisfaction as compared to no closure of defect.

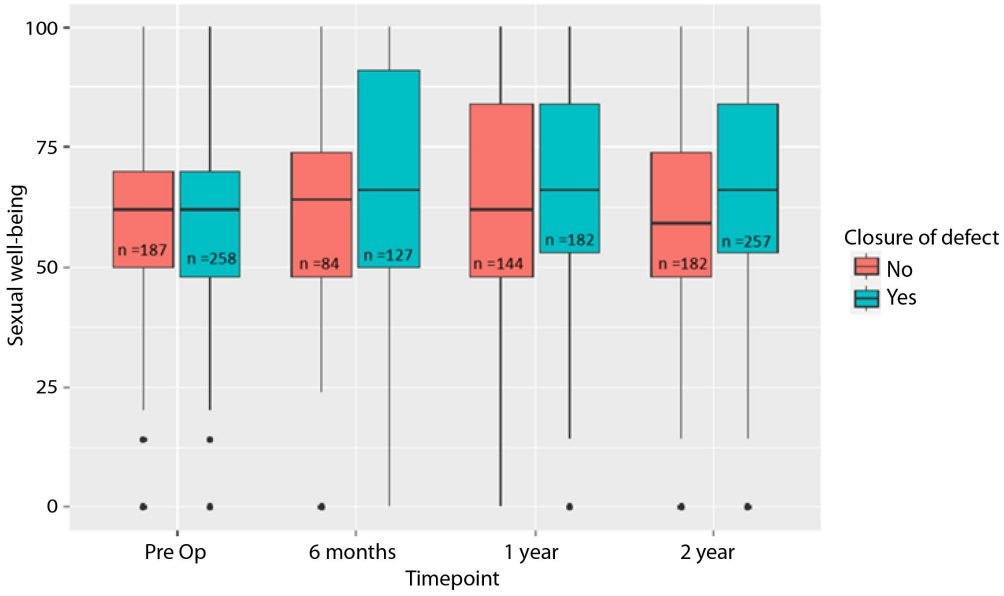
Methods: This is a single-institutional study of patients undergoing lumpectomy between 2018-2020 with or without closure of their lumpectomy defect. BREAST-Q, a validated breast surgery-specific

patient-reported outcome measure, was administered pre-operatively, and at 6 months, 1 year, and 2 years post-operatively. Satisfaction and quality-of-life domains were compared between those who had closure and did not have closure of their lumpectomy defect. The patient-reported outcomes were also compared to the surgeon's evaluation of the cosmetic result.

Results: The BREAST-Q was completed pre-operatively and at 2 years by 487 patients. In 206 (42.3%), the partial mastectomy defect was closed by glandular displacement, while 281 (57.7%) had no repair of defect. There were no differences in tumor stage, histology, or surgical specimen size between the groups. The median breast volume, as calculated from the mammogram, was smaller in patients undergoing closure of defect (826cm3 versus 895cm3, p=0.006). There were no statistically significant differences in satisfaction with breast (SABTR), physical well-being of the chest (PWB-CHEST), or psychosocial well-being (PSWB) scores between the 2 cohorts at any time point. Both had an increase in SABTR and PSWB scores from the pre-operative to 2-year post-operative time point. PWB-CHEST scores had an initial slight decline that recovered to baseline at the 2-year post-operative mark. There was no difference in sexual well-being (SWB) scores between the cohorts at the pre-operative time point, but at 2 years post-operatively, the closure of defect cohort had a statistically significant higher SWB score as compared to the no closure of defect cohort (66 versus 59, p=0.021)(Figure). Patients' self-reported scores positively correlated with physician-reported outcomes, with an increase in physician-documented "excellent" and "good" cosmesis in patients who self-reported scores above 75 for SABTR, and more patients evaluated to have "fair" and "poor" cosmesis in patients with lower SABTR scores.

Conclusions: Patients who undergo repair of the lumpectomy defect report better satisfaction in their SWB when compared to those in whom the defect was left open at 2 years. The improvement in SWB may reflect the patient's comfort with their appearance and ease in being a sexual partner. Closure of the defect did not lead to improvements in patient-reported SABTR, PWB-CHEST, and PSWB at any time point. Further research is needed to corroborate and understand the effect of level 1 oncoplastic techniques on patient-reported satisfaction scores.

FIGURE. Sexual well-being scores in no closure of defect and closure of defect cohorts



1388004 - Locoregional Recurrence and Cosmesis Following Simple Closure and Breast Oncoplasty: A Randomized Controlled Trial

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Background/Objective: There is no RCT till date comparing the incidence of LR following conventional BCS and OPBS (Oncoplastic Breast Surgery). Aim: Evaluation of incidence of LR and cosmesis following conventional BCS and OPBS

Methods: 94 consenting Women with breast tumors ≤ 4cm were randomised to BCS (group 1: 47 patients) or OPBS (group 2: 47 patients). Patients in group 1 underwent 'standard' wide local excision with 1 cm tumor free margin. Patients in group 2 underwent level 1 or level 2 oncoplasty . Cavity margins were marked with titanium clips to facilitate planning of radiotherapy. All patients were discharged on post-operative day 1 and were followed up as per standard protocol. At follow-up patients were assessed for surgical site infection, seroma etc. Patient evaluated cosmetic and aesthetic outcome herself, a female nurse and surgeon 3 and 6 months after surgery. Aesthetic score was assessed individually using the predetermined criteria viz. shape with brasserie, shape without brasserie, symmetry to the opposite breast, mobility, consistency, position of inframammary fold and NAC and overall appearance. All patients received whole-breast RT with boost to cavity site followed by systemic treatment. Statistical Analysis: Qualitative and quantitative data were expressed as frequency , mean +SD, and median (min-max). Categorical and continuous variables were compared among the groups by chi-square, Fischer exact test, independent t test or Wilcoxon rank sum test . P value < 0.05 was considered as significant.

Results: Tumor size ranged from 1-4 cm (mean: 2.9 cm; median 3 cm in group 1 and mean 3.14 cm; median 3 cm in group 2). Primary tumor was T1 in 17 (18 %) and T2 in 77 (82%). Node status was N0 in 79 (81%) patients and N1 in 15 (19%). 66 (69.6%) tumors were ER and PR +ve, 21 (22.3%) were triple-negative and 8 (8.5%) were HER2 neu positive. 91 (93.61%) were invasive carcinoma and 3 (6.39%) were DCIS. Seven patients (7.4%) received NACT. 79 (81.4%) underwent SLNB and rest underwent ALND. Patient and tumor characteristics were similar in both groups. Local Recurrence: At a mean follow-up of 60.02±8.82 (range 13-77) months, LR developed in 1 patient in group and 4 in group 2.. However, this difference was not statistically significant. Three (3.19%) of these patients (1 in group 1 and 2 in group 2) developed systemic metastasis and died. Patients' satisfaction with surgery and comfort with brassiere were significantly higher in OPBS group. (table1) However, there was no difference in sexual and social life among the 2 groups. Shape of the breast with and without brassiere, and over all appearance were rated to be significantly better in OPBS group..

Conclusions: Cosmetic satisfaction and aesthetic outcome were significantly better with OPBS. LRR following OPBS as compared to conventional BCS was similar suggesting that OPBS is safe and can be offered to all patients undergoing breast conservation. Larger trials with longer follow-up are needed to confirm this observation.

Table. Results of cosmesis and aesthetic assessment following OPBS and conventional BCS

		SIMPLE CLOSURE N=47 MEAN±SD MIN-MAX	ONCOPLASTY CLOSURE N=47 MEAN±SD MIN-MAX	P
Self assessment				
	Satisfaction after surgery	3.19±0.57 (2-4)	3.53±0.58 (2-4)	.004
	Comfort with brassiere	2.85±0.80 (1-4)	3.36±0.91 (1-4)	0.005
	Effect of surgery on social life	2.25±0.64 (1-3)	2.29±0.58 (1-3)	0.79
	Effect of surgery on sexual life	2.27±0.64 (1-3)	2.38±0.53 (2-4)	0.60
SURGEONS ASSESSMENT				
	Shape of breast with brassiere	3.51±0.58 (2-4)	3.78±0.41 (3-4)	0.01
	Shape of breast without brassiere	2.82±0.89 (1-4)	3.23±0.75 (1-4)	0.01
	Symmetry to opposite breast	3.04±0.77 (1-4)	3.27±0.71 (1-4)	0.1
	Mobility of breast	3.29±0.80 2-4	3.53±0.74 (2-4)	0.1
	Inframammary fold	2.63±0.48 (2-3)	2.74±0.48 (1-3)	0.2
	Consistency of breast	2.74±0.44 (2-3)	2.76±0.42 (2-3)	0.6
	Overall appearance f	3.04±0.75 (2-4)	3.48± (1-4)	0.001
Nurse's Assessment				
	Shape of breast with brassiere	3.48±0.58 (2-4)	3.78±0.41 (3-4)	0.007
	Shape of breast without brassiere	2.87±0.87 (2-4)	3.23±0.66 (1-4)	0.02
	Symmetry to opposite breast	3.06±0.79 (1-4)	3.31±0.72 (2-4)	0.11
	Mobility of breast	3.27±0.77 (2-4)	3.48±0.77 (2-4)	0.12
	Inframammary fold	2.63±0.56 (1-4)	2.76±0.51 (1-3)	0.13
	Consistency of breast	2.76±0.47 (2-4)	2.91±0.28 (2-3)	0.05
	Overall appearance	2.95±0.75 (1-4)	3.34±0.82 (1-4)	0.001

1387997 - The Impact of Body Mass Index on Oncoplastic Breast Surgery: A Multicenter Analysis

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Background/Objective: Obesity has nearly tripled in the last 50 years and is a known risk factor of breast cancer. During the last 3 decades, oncoplastic breast surgery has become an important choice in the surgical treatment of breast cancer, and allows an improved cosmesis and satisfaction with similar oncologic efficacy. An association exists between a higher body mass index (BMI) and wound complications for major operations but this has not been studied for oncoplastic surgery. Hence, our aim was to compare the complication rates among patients who underwent oncoplastic surgery stratified by BMI.

Methods: Patient data were analyzed from the National Surgical Quality Improvement Program database (NSQIP) for oncoplastic surgeries from 2005 to 2020. Current Procedural Terminology (CPT) codes were used to obtain the data from these patients. Patients were stratified according to WHO obesity classifications [Class 1 (BMI of 30 to < 35), 2 (BMI of 35 to < 40), and 3 (BMI of ≥40)]. Surgical complications were defined as returning to the operating room (OR) and bleeding. Wound complications were defined as superficial (SSI), deep organ/space infections, and wound dehiscence. Clinicopathological, surgical characteristics, and complications were compared according to BMI. Multivariate logistic regression adjusted for sociodemographic and clinical characteristics was performed to assess risk factors for overall complications, surgical complications, and wound complications.

Results: From a total of 6 887 patients who underwent oncoplastic surgery, 5 101 had oncoplastic level 1, 1 466 oncoplastic level 2, and 320 volume replacement. A total of 4 229 patients were non-obese, 1 380 had Class 1 obesity, 737 Class 2 obesity, and 541 Class 3 obesity. The frequency of diabetes mellitus, ASA classification, and protein malnutrition increased with the BMI ($p< 0.001$). Greater operative time was found according to higher BMI (86.7 vs. 74.7 vs. 100.6 vs. 99.6 min, $p< 0.001$). Moreover, univariate analysis showed that a greater BMI was associated with higher rates of superficial SSI (1.0% vs. 1.9% vs. 2.7% vs. 3.5%, $p< 0.001$), wound dehiscence (0.1% vs. 0.2% vs. 0.3% vs. 0.9%, $p=0.005$), and return to the OR (2.7% vs. 1.4% vs. 2.7% vs. 3.1%, $p=0.042$). No differences were found in deep SSI, organ/space SSI, pneumonia, reintubation, pulmonary embolism, deep vein thrombosis, urinary tract infection, stroke, bleeding, post-operative sepsis, length of stay, and readmission. Multivariate analysis adjusted for baseline characteristics showed that patients with obesity class 2 (OR=1.51, 95%CI: 1.03-2.23, $p=0.037$) and 3 (OR=1.87, 95%CI 1.24-2.83, $p=0.003$) had increased risk of overall complications compared to non-obese patients. Similarly, higher rates of wound complications were seen in both obesity class 2 (OR=2.79, 95%CI 1.64-4.77, $p< 0.001$) and class 3 (OR=3.34, 95%CI 1.87-5.95, $p< 0.001$) compared to non-obese patients.

Conclusions: Oncoplastic surgery is a safe procedure even in obese patients. However, a BMI ≥35 kg/m2 is associated with higher rate of overall and wound specific complications, which are mostly based on

superficial SSI and wound dehiscence. These risks should be part of the pre-operative discussion, especially when oncoplastic surgery is performed in Class 2 and 3 obesity patients.

Table. Multivariate analyses for overall complications, surgical complications, and wound complications

Characteristics	Overall complications			Surgical complications			Wound complications		
	OR	95%CI	P value	OR	95%CI	P value	OR	95%CI	P value
Age	0.63	0.99-1.02	0.63	**0.98**	**0.96-0.99**	**0.007**	1.00	0.99-1.02	0.63
BMI									
Non-obese	1.00			1.00			1.00		
Class 1	0.98	0.69-1.40	0.90	0.72	0.43-1.20	0.21	1.47	0.87-2.49	0.16
Class 2	**1.51**	**1.03-2.23**	**0.037**	1.08	0.62-1.90	0.79	**2.79**	**1.64-4.77**	**<0.001**
Class 3	**1.87**	**1.24-2.83**	**0.003**	1.05	0.55-1.98	0.89	**3.34**	**1.87-5.95**	**<0.001**
Years									
2005-2015	1.00			1.00			1.00		
2016-2020	**0.60**	**0.47-0.79**	**<0.001**	**1.57**	**1.26-1.96**	**<0.001**	**1.57**	**1.02-2.41**	**0.04**
Operative time (min)	**1.003**	**1.002-1.005**	**<0.001**	1.002	0.99-1.004	0.13	**1.003**	**1.001-1.006**	**0.002**

Other

1385486 - Does Superolateral Group Clearance During Axillary Lymph Node Dissection Add Therapeutic or Prognostic Advantage in Management of Breast Cancer?

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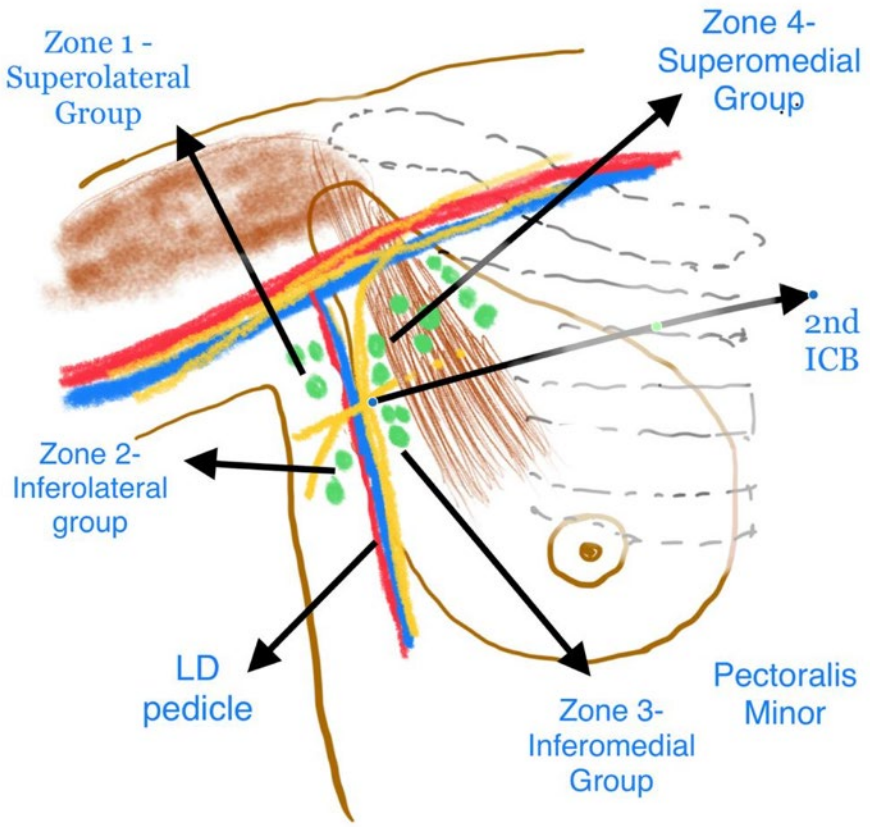
Background/Objective: Background Axillary lymph node dissection is the standard of care for high volume axillary disease. Arm lymphatics and breast lymphatics are indistinguishable and are sacrificed at non-targeted ALND. Preservation of arm lymphatics can lead to reduction of lymphedema. Axillary reverse mapping is used to navigate the arm lymphatics. Various studies including our experiences with ICG guided procedures suggest that the superolateral group of nodes are the arm draining nodes. Aims To evaluate the extent Of Metastasis In Superolateral Group(zone 1) Of Axillary Lymph Nodes in comparison to other groups of axilla in breast cancer.

Methods: Type of study: Observational longitudinal study(validation) Sample size :80 patients Period of Study :18 months (June 2020 to Feb 2022) Inclusion criteria :IDC both clinico-radiologically positive and negative axillary disease of all age group . Exclusion Criteria :MBC Axillary Nodal zonal divisions The thoracodorsal pedicle forms the horizontal line while the second intercostobrachial nerve forms the transverse line. This divides the axilla into 4 zones. The nodes are designated as zone 1 (superolateral), zone 2 (inferolateral), zone 3 (superomedial) and zone 4 (inferomedial) Procedure performed Standard ALND was performed in all patients. Superolateral group(zone 1) of lymph nodes and other group(zone 2,3,4) of lymph nodes of axilla were dissected out separately and sent for HPE separately.

Results: Out of 80 patients , 23 patients(28.75%) underwent neoadjuvant systemic therapy. The molecular subtypes were TNBC (40%),HER2 neu enriched (26%),Luminal A (28%) and Luminal B (6%) Across all spectrum (NST versus upfront surgery/ TNBC versus non-TNBC lesions) of patients the incidence of metastasis in superolateral nodes were 0(none). In 76 patients nodes were identified while in 4 only fibrofatty tissue was noted. In other zones of axillary nodes (2,3,4) number of patients with metastasis were 62 (77.5%) and 18 (22.5%) had non metastatic disease. Of the patients with metastasis the biological subtype distribution is TNBC (51.5%) and non-TNBC is 51.5 % and 48.5 %respectively.

Conclusions: Discussion • Zone 1 nodes are unaffected in BC irrespective of the biological subtype and axillary volume of the disease and NST usage. The validation study highlights a novel zonal concept of axilla. • It also introduces the concept of selective axillary dissection (like neck dissections). • This concept can be a successful model in reducing lymphedema in resource constraint infrastructures where SLNB, TAD is not feasible. • A clinical trial looking into reduction of DASH and acceptable axillary recurrence is needed to establish the technique as the standard of care Conclusion Superolateral lymph node dissection does not add to any therapeutic and prognostic value in the treatment of breast cancer

FIGURE. Axillary zonal divisions



1386459 - Treatment Trends for Stage 0 and I Breast Cancer from 2011 to 2020: A Retrospective Analysis Using the National Cancer Database

Anna Yumen, James Nicholas Conner, Kevin Choong, Julian Kim, Neelam Mulji
Prisma Health/University of South Carolina, Columbia, SC

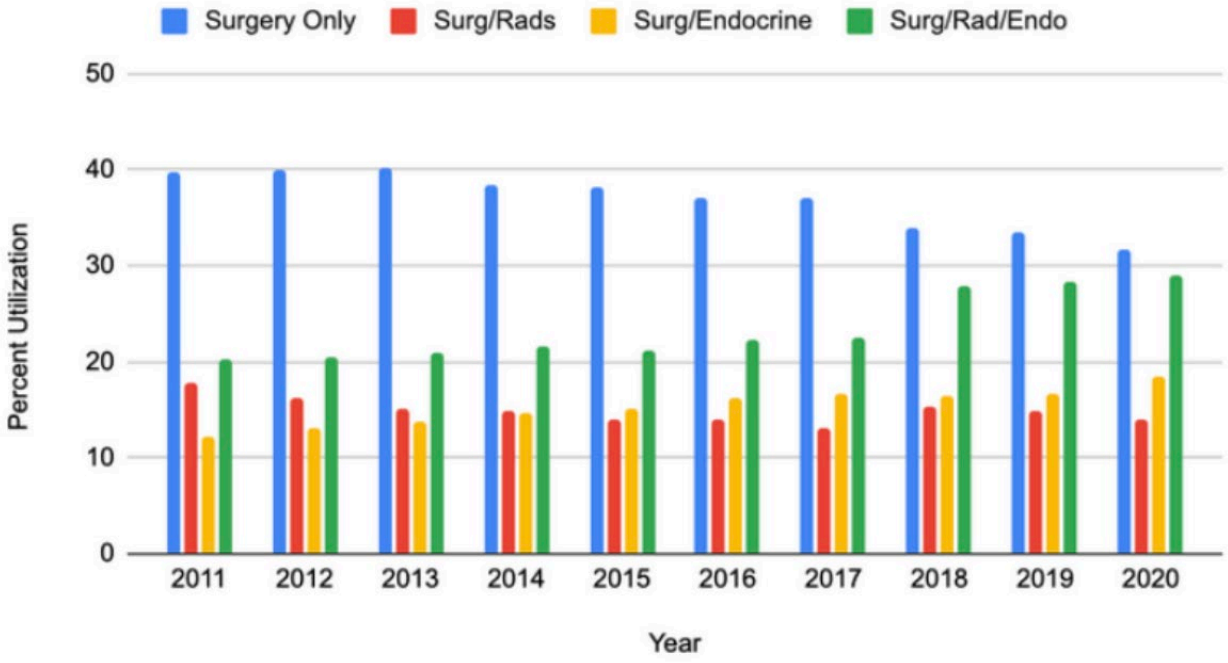
Background/Objective: The treatment of breast cancer has significantly evolved over time with the utilization of multidisciplinary treatment. The multimodal approach within breast cancer patients has improved survival and health outcomes. Through analysis of the National Cancer Database (NCDB), we sought to evaluate the treatment trends for Stage 0 and I breast cancer based on year, as well as demographic variables.

Methods: We queried the NCDB from 2011-2020, evaluating 1,548,130 patients diagnosed with Stage 0 (n = 440,841) and I (n=1,107,289) breast cancer. We then evaluated the treatment trends by year of surgery only (SO), surgery and radiation (SR), surgery and hormonal therapy (SH), and the combination of surgery, radiation, and hormonal therapy (SRH). Furthermore, we examined a subset of demographic factors for secondary analysis including: age, insurance status, race, distance from hospital, and comorbidity score and their relationship to treatment modality. Mann Kendall Trend (MKT) analysis and chi-squared tests were performed where appropriate.

Results: Overall from 2011 to 2020, the treatment trend of breast cancer showed decreased use of surgery only for Stage 0 (38.7% to 31.6% p< 0.00001, MKT p < 0.05, Fig 1) and Stage I (12.2% to 7.6% p< 0.00001, MKT p< 0.05). Management with multimodal (SRH) increased for Stage 0 (20.1% to 28.9% p < 0.00001, MKT p< 0.05) and Stage I (33.1% to 37.2% p < 0.00001, MKT p< 0.05). The use of SR for Stage I decreased from 2011 to 2020 (23% to 11% p < 0.00001). SH increased in Stage 0 from 2011 to 2020 (12.2% to 18.8% p< 0.00001, MKT p< 0.05). SH increased with increased age (>60) for Stage 0 and Stage I breast cancer (p< 0.00001). SRH decreased with increased age (>60) for Stage 0 and Stage I breast cancer (p< 0.00001). Increased distance (>25 miles) appeared to decrease the use of SRH with Stage 0 (p< 0.00001) and Stage I (p < 0.00001). For Stage 0 and Stage I breast cancers, there was increased use of SH with higher Charlson comorbidity scores (2/3+) compared to lower scores (0/1)(p< 0.00001). Race and insurance status did not have an impact on treatment of Stage 0 and I breast cancer.

Conclusions: The treatment trend for Stage 0 and Stage I breast cancer over the last decade has evolved, with overall increasing use of multimodal treatment (SRH) and decreasing use of SO modalities. Our review of the National Cancer Database showed statistically significant trends in overall management and for age, insurance, and comorbidity score factors for Stage 0 and I breast cancer.

Figure. Stage zero breast cancer treatment regimen by year



1386500 - Radiation Associated Angiosarcoma of the Breast: A Case Series from a Single Institution

Tucker Jennings[1], Jacob Oyeniyi[2], Joshua Dilworth[3], Muayad Almahariq[2], Nayana Dekhne[4]

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Background/Objective: Radiation associated angiosarcoma (RAAS) of the breast is a rare late complication of breast cancer treatment. While surgical clearance with wide margins (typically a mastectomy) is the primary treatment, the role of chemotherapy (CHT) and radiation therapy is unclear. We reviewed our institution's experience with RAAS, which involves a multi-modality treatment approach.

Methods: We identified 11 patients who received breast-conserving therapy, including whole-breast irradiation, at our institution from 1997-2018 and who subsequently developed non-metastatic angiosarcoma of the treated breast. We reviewed clinic-pathologic features and treatment details associated with each patient's primary breast cancer diagnosis and RAAS. Kaplan-Meier analyses were used to model clinical outcomes.

Results: Mean age at primary breast cancer diagnosis was 67 years. Median (range) latency period of RAAS was 84 months (24-168). Median follow-up time after RAAS diagnosis was 70 months. A mastectomy was performed in all cases of RAAS. CHT was offered to 6 patients (55%). One patient refused CHT, and 5 patients received CHT, 4 of whom (80%) received neoadjuvant CHT. Paclitaxel was used in all regimens and as a single agent in 3 patients (60%). All patients who received neoadjuvant CHT achieved primary closure at the time of mastectomy. RAAS clinical tumor size ranged from 1-10cm. One patient with close surgical margins received postmastectomy proton re-irradiation. There was 1 local recurrence of RAAS, which was treated with chest wall proton re-irradiation with concurrent hyperthermia. There were no regional recurrences, 1 distant failure, and no deaths. At 7 years, LRFS was 90%, DMFS was 91%, and DFS was 82%.

Conclusions: Our clinical outcomes compare favorably to previous reports. Our results support a potential role for neoadjuvant CHT, particularly for patients with large tumors, to down-stage the RAAS and allow for primary closure. The role of radiation therapy, which may be indicated in select patients, remains unclear.

1386340 - Development of a Community Outreach Program for Early Detection and Referral for Symptomatic Breasts in a Rural District of Pakistan

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Background/Objective: Mass screening reduces breast cancer-related morbidity and mortality. In low-resource countries, where screening mammography is infeasible and cancer is symptomatic at presentation, the World Health Organization (WHO) endorses clinical breast examination (CBE) for detection of symptomatic cases at the primary care level. Thus, we piloted a mass community outreach CBE-based screening and referral program for symptomatic breasts in a rural district of Pakistan, a low-resource country.

Methods: This quasi-experimental study was conducted in selected rural settings within the Dadu district of Sindh, Pakistan. Eight CHWs were educated regarding the basics of breast cancer and trained in clinical breast examination (CBE) by a fellowship-trained breast surgeon at a tertiary care hospital, with an opportunity to examine >20 symptomatic breasts. Their competence in detecting lumps > 2 cm was confirmed and improvement in knowledge was assessed via a pre- and post-test consisting of 15 questions scored on 20 points. The community outreach program consisted of door-to-door visits by the CHWs, where they performed a CBE on all consenting adult (≥ 18 years) women. The CHWs referred women with suspicious findings to an experienced gynecologist (part of the study team, also given additional training in CBE) at a nearby primary health care centre. The gynecologist repeated the CBE and obtained a comprehensive history from all referred patients. Patients were then referred by the gynecologist for diagnostic imaging as indicated.

Results: A total of 8757 women were screened by the 8 HCWs (1094.6 screenings/HCW) over 1 year (168.4 screenings/week). The HCWs identified and referred 20 patients with suspected breast lumps, only 10/20 (50%) of whom complied with their referral to the gynecologist. The gynecologist confirmed 9/10 patients as having a lump (90% concordance). All 10 of these patients were referred for imaging, with only 4/10 (40%) complying with the referral. These 4 patients had lumps classified as BI-RADS I (1/4) and BI-RADS III (3/4) lumps (Table). The HCWs' overall knowledge improved significantly after the educational intervention (median: 13.5 [12.25-14] vs. 15 [15-17]; p=0.011). Before the intervention, 4/8 (50%) HCWs believed that breast cancer could not occur in women who had given birth to and breast-fed a child, as compared to 0/8 HCWs after. Moreover, pre-intervention 2/8 HCWs did not consider dimpling of the skin overlying the breast to be a feature suggestive of malignancy, as compared to 0/8 HCWs post-intervention.

Conclusions: CHWs trained to perform a CBE and educated on the basics of breast cancer can play a vital preliminary role in mass community outreach detection and referral program for symptomatic breasts in rural, resource-constrained settings in Pakistan. Maintaining a low threshold for referral even when "unsure" seems important to help avoid missed abnormalities. Referral non-compliance due to a lack of disease-related awareness must be addressed via comprehensive patient education delivered by the CHWs at initial detection and referral.

FIGURE. Outcomes of community outreach screening and referral program

* Other findings include abnormal breast discharge, redness, skin changes (dimpling, ulceration, thickening), abnormal breast size/shape/symmetry, nipple retraction, crusting, or pain with any aforementioned symptoms	
Variable	**N = 8757 n/N (%)**
Total women referred by CHW with any positive finding	169/8757 (1.9%)
Reason for Referral	**N = 169**
Presence of lump on CBE	20/169 (11.8%)
Unsure about presence of lump on CBE	51/169 (30.2%)
Other findings *	98/169 (58.0%)
Referral non-compliance amongst women referred due to	
Presence of lump on CBE	10/20 (50%)
Low-probability/ "unsure" of lump on CBE	23/51 (45.1%)
Concordance of exam between HCWs and gynecologist on suspected lump	**N=10**
Lump confirmed and patient referred for diagnostic imaging	**9/10 (90%)**
No lump appreciated, but patient still referred for diagnostic imaging	**1/10 (10%)**
Outcomes of patients referred for imaging (ultrasound/mammography)	**N = 10**
BI-RADS III	**3/10 (30%)**
BI-RADS I	**1/10 (10%)**
Non-compliant with referral for imaging	**6/10 (60%)**
Outcomes of women referred with low-probability/ "unsure" of presence of lump	**N=28**
No lump on gynecologist's exam. No imaging deemed necessary	28/28 (100%)

1386190 - Interactive Multidisciplinary Pilot Workshop to Improve Medical Student Perception and Interest in Breast Surgical Oncology

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Background/Objective: Exposure to breast surgical oncology and the multidisciplinary management of patients with breast cancer is limited in medical school. The purpose of this study was to assess changes in student perceptions of breast surgical oncology following a 2-hour interactive multidisciplinary workshop demonstrating the scope of breast cancer care.

Methods: A multidisciplinary, hands-on workshop, composed of breast radiology (BR), breast surgical oncology (BSO) and breast plastic reconstructive surgery (B-PRS), was hosted for pre-clinical medical students at an academic medical center. Students were taught by faculty from the respective departments in an interactive, station-based event utilizing a soft-embalmed cadaver lab. BR presented students screening and diagnostic breast imaging followed by hands-on ultrasound-guided biopsy experience on phantom simulators and cadavers. BSO demonstrated lumpectomy, mastectomy, sentinel lymph node biopsy, and axillary lymph node dissection procedures. B-PRS demonstrated oncoplastic techniques and autologous flap reconstruction. Pre-and post- workshop surveys were distributed to

students assessing their opinions on surgery and BSO. Results were compared using Wilcoxon Signed Rank, Wilcoxon Rank Sum, and Fisher's Exact as appropriate.

Results: Twenty-four students attended the workshop. The majority, 75% (18/24), reported initial interest in surgery with 83% (20/24) having previous surgical exposure through shadowing and other medical school events. Students with 4 or more surgical experiences had greater confidence in their decision to pursue surgery ($p< 0.05$). There was a statistically significant increase in interest in BSO from 52% to 86% after completion of the workshop ($p=0.003$). The event improved understanding of the work and lifestyle in BSO for 79% (19/24) of participants. All students (100%) expressed interest to further explore BSO through shadowing. Students interested in pursuing surgery prior to the workshop were more confident in this decision after participation ($p< 0.05$). The most common attractors to pursuing a career in BSO were the impacts on patients' lives (N=23), intellectual stimulation (N=22), and earnings (N=20). The most reported deterrents of BSO were lack of personal time (N=18) and stress (N=15).

Conclusions: An interactive, hands-on anatomically based exposure to multidisciplinary breast care allows students an opportunity to see the complex scope of BSO and improves medical student perceptions of BSO as a career. Medical schools should consider incorporating similar medical student outreach events to encourage exploration of breast surgical oncology and other complex multidisciplinary focused surgical subspecialties.

1386114 - Oncotype DX in Invasive Lobular Carcinoma: Higher Recurrence Scores in Unexpected Places

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Background/Objective: The Oncotype DX recurrence score (RS), assessing the expression of 21 genes, has been increasingly used to predict adjuvant chemotherapy benefit in early-stage hormone receptor (HR) positive, HER2-negative patients. Invasive lobular carcinoma (ILC) is associated with characteristics of local and distant disease risk that are distinct from invasive ductal carcinoma (IDC), but published data on the performance of the Oncotype DX RS in patients with ILC are sparse.

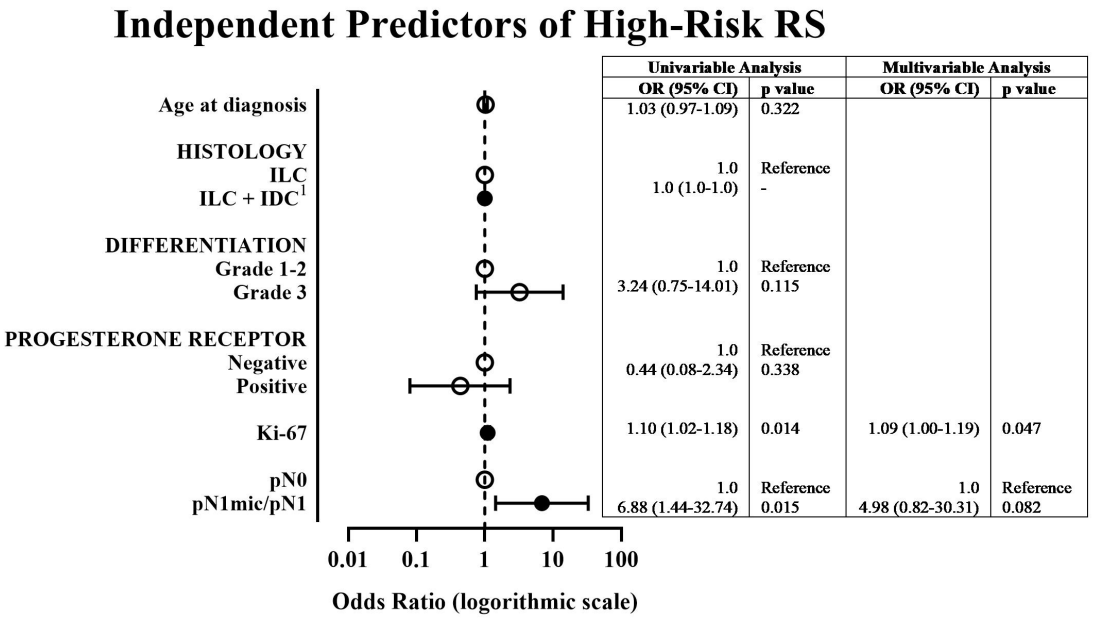
Methods: All female patients diagnosed with HR positive, HER2-negative ILC with Oncotype DX RS data from 1/2019-8/2022 at our academic tertiary center were included in this study. Clinicopathologic and treatment factors were correlated with frequency of high-risk RS (>25) via univariate and multivariate statistical comparisons.

Results: In total, 130 patients were included with a mean age of 61.6+12.2 years. The majority presented as cT1b (36%) or cT1c (19%), and none had evidence of clinical nodal or distant metastasis. Few underwent neoadjuvant therapy (7%) and a third underwent mastectomy (36%). On final pathology, mean tumor size was 1.9+1.2cm with 17 patients (13%) having grade 3 differentiation, and 23 patients (18%) having a component of IDC. All tumors were estrogen receptor-positive but 11% were progesterone receptor-negative. Mean Ki-67 was 10.8+7.6. Most patients were pathologically node-

negative (89%), with 5% and 3% of patients being pN1mic and pN1 respectively. Only 8% of patients had a high-risk RS (>25), with mean oncotype RS 16.6+6.9. Adjuvant radiation was given to 67% of patients and adjuvant chemotherapy recommended in 15% of patients. Oncotype DX RS were higher in older patients (>50 years old) compared to younger patients (16.9 vs 13.5, p=0.043), as well as in patients with pure ILC compared to those with an IDC histologic component (16.6 vs 12.9, p=0.016). None of the patients with an IDC component had a high-risk RS (>25) compared to 9% of patients with pure ILC (p=0.127). There was no difference in oncotype scores in patients based on pathologic nodal status (pN0 15.6 vs pN1mic/pN1 18.4, p=0.186) nor grade 3 differentiation (16.5 grade 3 vs 16.0 grade 1-2, p=0.749). Considering the aforementioned variables on multivariable analysis, Ki-67 was the only factor independently associated with high-risk Oncotype DX RS [1.1 (95% CI 1.0-1.2), p=0.047] (Figure 1).

Conclusions: Despite the frequent use of Oncotype DX in early-stage HR positive, HER2-negative ILC, very few patients have high-risk RS to suggest benefit from adjuvant chemotherapy. However, certain unexpected features conferred worse Oncotype DX RS – pure ILC histology vs combination ILC and IDC, as well as older age, pointing to the Oncotype DX potentially having different utility in ILC patients than the previously described IDC-prominent cohorts. Further investigation with outcomes correlation as well as in comparing difference in oncotype scores for ILC versus IDC patients are warranted.

Figure. Univariable analyses of factors associated with high-risk Oncotype DX recurrence score (RS >25) in patients with invasive lobular carcinoma (ILC). All variables included in multivariable analysis had p<0.1 on univariable logistic regression.



[1]No patients with ILC+IDC had a high-risk RS, predicts failure perfectly

1386879 - How Competitive Is the Breast Surgical Oncology Match Among Surgical Subspecialties?

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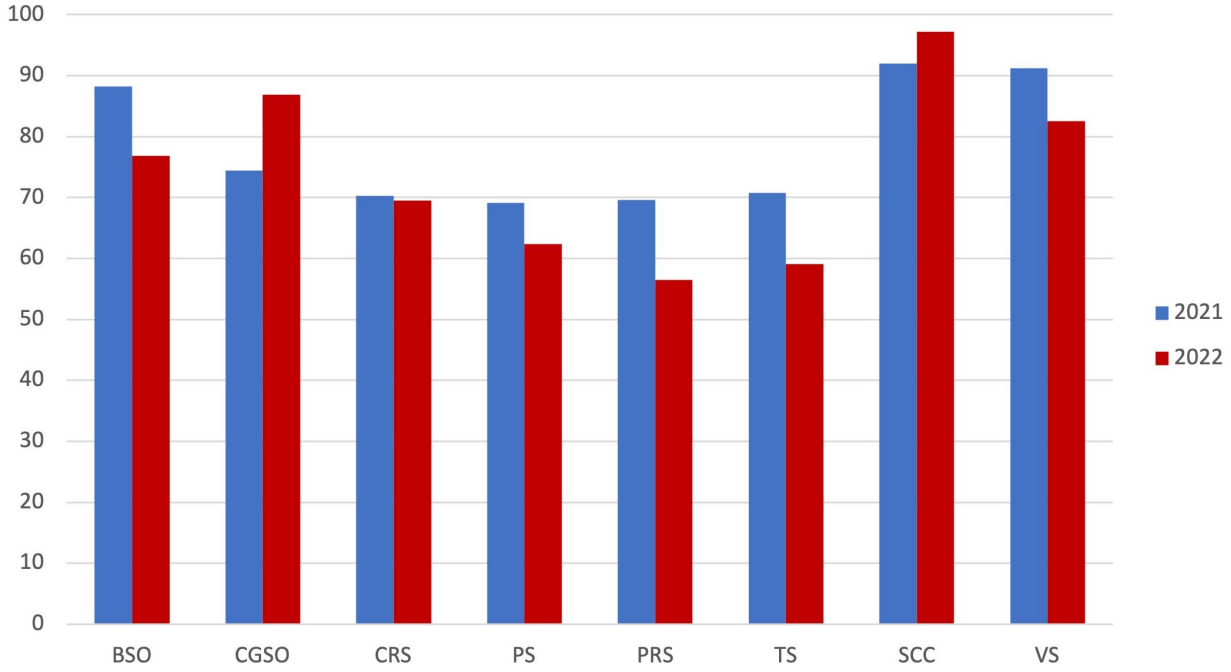
Background/Objective: Since the establishment of the first breast surgical oncology fellowship program in 2003, the field has grown. With the field of surgery becoming increasingly subspecialized, and more general surgery graduates than ever choosing to obtain additional post-residency training, we sought to evaluate the competitiveness of breast surgical oncology fellowship compared to other surgical subspecialty programs.

Methods: An analysis of the National Resident Matching Program Specialties Matching Service Results and Data, the Summary Results of the Society of Surgical Oncology Breast Surgical Oncology Match, and the San Francisco Match Independent Plastic and Reconstructive Surgery Match Data were performed. The numbers of available positions and programs, applicants, and match rates were evaluated from 2021-2022 for the available surgical subspecialties: breast surgical oncology (BSO), complex general surgical oncology (CGSO), colorectal surgery (CRS), pediatric surgery (PS), plastic and reconstructive surgery (PRS), thoracic surgery (TS), surgical critical care (SCC), and vascular surgery (VS).

Results: From 2021 to 2022, the match rate for BSO decreased from 88.2% to 76.8%. In the same period, the number of applicants increased from 85 to 108 (27%), and 2 new fellowship programs joined the match with 2 additional positions total (83 to 85). Across all specialties, BSO had the largest increase in number of applications (23). The top 3 specialties with the greatest decrease in match rate were plastic surgery (-13%), thoracic surgery (-12%), and BSO (-11%). The only specialties with an increase in match rate from 2021-2022 were CGSO (+12%) and SCC (+5%). The remainder of surgical fellowships saw a decrease in match rate over the same period. In 2022, the median number of applications among all specialties was 125.5 (IQR 82-154), an increase from 114 (IQR 86-146) in 2021. In 2022, the median match rate among all surgical subspecialties was 73.2% (IQR 60-85.7), compared to the median in 2021, which was 72.6% (IQR 70-90).

Conclusions: BSO appears to be gaining in popularity and competitiveness as the number of fellowship applicants increase and match rates continue to decline. Despite an overall increase in surgical subspecialty fellowship match rates from 2021-2022, BSO saw one of the greatest declines in match rate. As the demand for fellowship-trained breast surgical oncologists increases, as does the number of applicants seeking a fellowship position. Trainees interested in pursuing BSO should work to strengthen their applications in this increasingly competitive field.

Figure. Match rate trends among surgical subspecialties



1387681 - Mastectomy Pain Blocks…A Comparison of Pre-operative Pectoral Blocks versus Intraoperative Wound Blocks

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Background/Objective: Mastectomy perioperative pain management typically involves infiltration of local anesthetic into the surgical site to help block pain and decrease opioid consumption. Pain blocks can be performed either prior to the start of surgery or after completion of surgery prior to anesthesia emergence. This study compared perioperative opioid use in mastectomy patients who received either pre-operative ultrasound guided pectoral blocks versus intraoperative wound blocks.

Methods: A retrospective review was performed for patients who underwent mastectomy from September 2021 to September 2022 at a single institution. Patients either received an ultrasound guided pectoral I and II block (PECS) performed by anesthesia prior to surgery or an intraoperative wound field block (IWB) by the surgeon just prior to the completion of surgery. Both groups used liposomal bupivacaine 20mL mixed with varying amounts of bupivacaine HCL. Intraoperative opioid administration was determined by anesthesia. Post-operative pain scores and opioid use in the post anesthesia care unit (PACU) were recorded. Milligrams Morphine Equivalent (MME) was calculated for each patient and compared during surgery and in the recovery period. Length of PACU stay and pain scores were compared between groups. A logistic regression model evaluating opioid use in PACU was performed controlling for age, BMI, mastectomy type, reconstruction, and operative time.

Results: A total of 122 patients underwent mastectomy with a pain block during the study period with 69 patients receiving pre-operative pectoral blocks (PECS) and 53 patients receiving intraoperative wound blocks (IWB). Bilateral mastectomy was performed in 39% of the study group with 57% of the total cohort receiving immediate implant based reconstruction. Baseline patient demographics, tumor staging, and operative times were similar between groups. Unilateral mastectomy patients were more likely to receive PECS (p=0.004). During general anesthesia, both groups received a median of 30 MME which was not significantly different (p=0.501). There was no difference in PACU pain scores between the groups. Overall, 36% of the patients did not require any opioids in PACU. In those who did require opioids, the median MME for the PECS group was 4 versus 15 MME for the IWB group (p=0.057). A logistic regression analysis showed the PECS group had a 66% reduction in opioid use in PACU compared to the IWB group which was significant (OR = 0.34; 95% CI 0.13, 0.86; P=0.027). Patients in the PECS group spent median 107 minutes in PACU versus 165 minutes in the IWB group (p=0.012), however significantly more IWB patients were discharged home the same day (p=0.002) which may account for the longer PACU stay.

Conclusions: In patients undergoing mastectomy, pre-operative pectoral I and II blocks showed a significant reduction in opioid use in PACU when compared to intraoperative wound blocks. Larger scale prospective trials to confirm these results are recommended.

1387761 - Incidence of High Risk and Malignant Findings in Patients Undergoing Gender-affirming Mastectomy: Review of 418 Patients

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Background/Objective: Insurance coverage expansion for gender affirming surgeries has increased the number of patients seeking gender affirming mastectomies (GAM). As the number of individuals seeking GAM increases, more will reach the recommended age of breast cancer screening prior to undergoing surgery and the incidence of high risk and malignant findings on final pathology may increase. At this time, there are no standardized clinical guidelines regarding pre and post operative screening or clinical management for patients undergoing GAM who have findings on breast imaging or final pathology. Few studies have reported data on benign, atypical, and malignant findings on pathology following GAM, and most of these studies do not describe the clinical characteristics of their sample population. We report on the largest cohort of patients to date who underwent GAM as well as their clinical characteristics, pathological findings, and clinical management. Our aim with this pilot study is to identify the incidence of high risk and malignant lesions to further inform a multi-institutional study, which will define risk factors to facilitate national guidelines for this unique patient population.

Methods: This is a retrospective single institution cross sectional study. All medical records of patients who underwent GAM from July 2019 to September 2022 were reviewed and clinicopathologic data collected. A total of 457 patients underwent GAM surgery during the study period, 39 of these patients did not have final pathology and were excluded from the study. Descriptive statistics of demographics, clinical information and pathology information were performed.

Results: A total of 418 patients were included in final analysis. The median age of the study participants was 25 (IQR 22.0, 31.0), the majority (79.9%) of the study participants identified as female to male transgender (FTM), followed by non-binary (16.0%). Caucasians represented the majority of (81.8%) patients who underwent GAM followed by African Americans (9.7%). The remaining racial groups representing less than 9% of the entire study participants. Most of the study participants were either overweight or obese (65.4%). Eighty percent of patients were on testosterone prior to GAM surgery and the median duration of testosterone use prior to surgery was 21 months (IQR 12-36 months). There were a total of 3 (0.6%) high risk or malignant lesions found in specimens submitted for pathology review; 1 atypical lobular hyperplasia (ALH), 1 Paget's disease of the nipple and 1 case of ductal carcinoma in situ (Table 1). The patient with ALH underwent endocrine therapy. The patient with Paget's disease had his free nipple graft removed at a subsequent surgery as no disease was identified in the excised breast tissue. The patient with DCIS was advised to undergo additional surgery and endocrine therapy, however declined.

Conclusions: In the largest study to date of patients undergoing GAM, incidental high risk and malignant lesions remain rare in young FTM transgender and non-binary patients. Our aim is to develop a multi-institutional database to further refine risk factors in this population to develop conclusive national screening and management guidelines.

Table. Demographic and clinical characteristics of GAM patients

Demographic & Clinical variable	N (%)
Gender	
Female to Male	334 (79.9)
Non-Binary	67 (16.0)
Other	17 (4.1)
Race/Ethnicity	
White	345 (82.5)
Black	41 (9.8)
Latino/Latina	12 (2.9)
Asian	8 (1.9)
Native American/Alaskan/Other	12 (2.9)
BMI	
15-20	26 (6.2)
21-25	105 (25.1)
26-30	103 (24.6)
31-35	84 (20.1)
36-40	53 (12.7)
41-45	*22 (5.3)*
>45	11 (2.6)
Not specified	14 (3.3)
Testosterone use prior to surgery	
Yes	337 (80.6)
No	81 (19.4)
Duration of testosterone use in months, mean (IQR)	21.0 (12.0, 36.0)
Pathology	
Benign non-proliferative	
Fibrocystic changes	21 (5.0)
Fibroadenoma	8 (1.9)
Apocrine metaplasia	21 (5.0)
Proliferative disease without Atypia	
Usual ductal hyperplasia	13 (3.1)
Sclerosing adenosis	2 (0.5)
Columnar cell change	5 (1.2)
Intraductal papilloma	3 (0.7)
Proliferative disease with atypia	
Atypical lobular hyperplasia	1 (0.2)
Malignant lesions	
DCIS	1 (0.2)
Paget's Disease	*1 (0.2)*

1387748 - Evolution in the Management of Hematoma Following Core-needle Breast Biopsy

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Background/Objective: Percutaneous breast biopsy is standard of care for the diagnosis of breast lesions. Development of hematoma is a well described risk of percutaneous breast biopsy. While often incidentally noted on follow-up imaging or successfully treated with a short application of direct compression, a small number necessitate further management. Historically, those hematomas that fail conservative management have been treated through open surgical procedures. With the emergence of image guided therapies performed by interventional radiology (IR), our institution has developed a pathway of care for management of hematomas including percutaneous and surgical treatments. We sought to evaluate hematoma management over time at our institution.

Methods: This is a retrospective observational study looking at patients who underwent breast core needle biopsies at a single institution composed of 2 facilities between 2013 and 2022. We included all patients who required intervention beyond manual compression and/or those who returned to or contacted the facility for symptomatic evaluation concerning for hematoma. Demographics and details of intervention were collected from medical records.

Results: Of the 5820 patients who underwent percutaneous breast biopsy during the study period, 53 (0.9%) patients met our inclusion criteria (Table). Of those, 22/53 (42%) required intervention. Nine of 22 were treated with nonsurgical/non-IR methods including percutaneous evacuation of hematoma, injection of 1% lidocaine with epinephrine around a visible vessel, and admission for observation with compressive therapy. Two of these 9 patients required further surgical management for the breast tissue diagnosis and 1 of these procedures was delayed because of hematoma. Thirteen of 22 patients required surgical and/or IR interventions. Prior to 2017, all patients were treated surgically. Since the initiation of utilization of IR services by the breast imagers in 2017, all patients with hematomas requiring intervention were initially managed by IR with only 1 patient requiring surgical intervention due to inability of IR to obtain hemostasis. Ten of 13 patients managed via surgery or IR required further surgical management due to biopsy results and 4 of these 10 procedures were delayed because of hematoma.

Conclusions: Significant bleeding after core needle biopsy occurred in < 1% of patients at our institution. With the introduction of percutaneous methods and utilization of IR procedures, there has been a decline in open surgical management of hematomas that develop during percutaneous breast biopsy. However, non-surgical management may lead to a delay in definitive surgical therapy.

Table. Demographics and interventions for bleeding following percutaneous breast biopsy

	N (%)
Total Breast Biopsies	5,820
Bleeding Complication Meeting Criteria	53 (0.9)
Hematoma	47 (89)
Pseudoaneurysms	6 (11)
Clinically Significant Bleeding	53
Requiring Intervention	22 (42)
Not Requiring Intervention	31 (58)
Study Population Demographics	
Mean Age (years)	56.6 (32-79)[1]
Biopsy proven malignancy	13 (24.5)
Anticoagulation present	19 (35.8)
Vacuum assisted biopsy	48 (90.5)
Interventions	22
Surgery	5 (22.7)
IR	8 (36.4)
Gelfoam	2 (9.1)
Thrombin	5 (22.7)
Thrombin + Embolization	1 (4.5)
Other Intervention	9 (41)
Success of Intervention	
Surgery	5 (100)
IR	7 (87.5)
IR with subsequent surgery	1 (12.5)
Required Surgery After Core Biopsy	16 (30.2)
Not Requiring Intervention	6
Delay in surgery due to hematoma	0
Surgery	3 (5.7)*
Delay in surgery due to hematoma	0
IR	5 (9.4%)
Delay in surgery due to hematoma	3 (5.7%)
Other Intervention	2 (3.8%)
Delay in surgery due to hematoma	1 (1.9%)

[1]Age Ranges

*Includes the patient treated by IR with subsequent surgery

1387238 - Oncological Outcomes After Treatment for Breast Implant-associated Anaplastic Large Cell Lymphoma (BIA-ALCL)

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Background/Objective: Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) is an uncommon type of peripheral T-Cell, Non-Hodgkin lymphoma arising within the capsules of breast implants. As global experience in managing BIA-ALCL increases, clear communication of recurrence risk to patients remains challenging because of paucity of data on longer term follow-up. This has implications for decision-making about subsequent reconstructive procedures, for example, the re-insertion of smooth breast implants. The aim of this study was to benchmark the longer-term oncological outcomes of patients with BIA-ALCL after their multidisciplinary treatment at a tertiary referral unit.

Methods: Following Institutional Review Board (IRB) approval, a retrospective chart review of all patients treated for BIA-ALCL at our institution was performed. Patient demographics, clinic-pathological variables, treatment details and surveillance data were reviewed.

Results: Sixteen patients were treated for BIA-ALCL between 2015-2022 in our institution. The median age at diagnosis was 48 (IQR 39-53.5) years. Ten patients developed BIA-ALCL following cosmetic augmentation and 6 after breast reconstruction following mastectomy for cancer. All patients had a history of textured implant insertion. Median time from first implant surgery to diagnosis was 8.5 (IQR 7-11.5) years. Eleven women presented with effusion only, 2 with an effusion and mass and 2 with mass alone. One patient was found to have BIA-ALCL as an incidental finding on histological examination of the capsule specimen following implant exchange for Grade 3 capsular contracture. All 16 patients underwent en-bloc total capsulectomy with implant removal. The patient who was diagnosed incidentally had a total capsulectomy and implant exchange as the first procedure but went on to have her implants removed once the diagnosis of BIA-ALCL was made. One patient underwent neoadjuvant systemic therapy with CHOP (cyclophosphamide, doxorubicin, vincristine, prednisolone) and brentuximab due to extensive chest wall involvement and pleural effusion, and subsequent en-bloc capsulectomy with explantation, wide local excision of the remaining tumour residuum within the breast parenchyma and sentinel lymph node biopsy. One patient underwent adjuvant systemic therapy (CHOP) for extracapsular invasion. The majority of patients were diagnosed with T1 disease. The final staging is summarized in table 1. Surveillance consisted of a combination of mammograms, ultrasound scans, breast MRIs and PET/CT scans (2015-2021) and clinical follow-up without routine use of imaging following publication of the UK Guidelines in 2021 (2021-2022). At median follow-up of 46.5 (IQR 15.5-66.5) months there have been no episodes of local or systemic recurrence or death.

Conclusions: For the majority of patients with BIA-ALCL, surgical management is adequate and systemic therapies are not required, unless there is evidence of extensive loco-regional disease and/or metastatic spread. The long-term outcome of patients diagnosed with BIA-ALCL is favourable, especially in women

with early-stage disease, and in our series no patients have had local or systemic disease recurrence within a median follow-up of 46.5 months. This is reassuring for BIA-ALCL patients both in terms of communicating risk but also for considering breast reconstruction after BIA-ALCL treatment, further supporting existing recommendations suggesting consideration of reconstruction at least 6 months following multidisciplinary management of BIA-ALCL.

Table. Final staging of patients diagnosed with BIA ALCL (n=16)

TNM Staging:	
T1N0M0 (IA)	N= 10
T2N0M0 (IB)	N= 2
T3N0M0 (IC)	N= 2
T4N0M0 (IIA)	N= 2

1387544 - Risk Assessment of Breast Cancer Patients Aged 40-50

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Background/Objective: The timing of initiation of breast cancer screening is discrepant between multiple national societies, leading to conflicting guidelines and confusion among patients. The United States Preventative Services Taskforce (USPSTF) recommends initiation of screening at age 50 in average risk women, while the American Cancer Society (ACS) recommends screening begin at 45 years. Several other societies, including the American Society of Breast Surgeons (ASBrS) and the American College of Radiology (ACR) recommend initiation of screening at age 40 in average risk women. We aimed to evaluate the risk profiles of women diagnosed with breast cancer between ages 40 to 50 to assess whether their calculated risk should have placed them in a high-risk group with earlier recommended screening.

Methods: A retrospective review was conducted of all patients between 40 and 50 years of age who presented with a new diagnosis of breast cancer at our institution from 2017 to 2021. Demographic and risk metrics were collected and patients' risk of breast cancer was retrospectively assessed using the Breast Cancer Risk Assessment Tool (Gail Model) and the Breast Cancer Risk Consortium Risk Calculator (BCSC). Results from the risk models were compared to 5-year and lifetime cancer risk for patients with the same age and race in the general population. Data analysis was conducted in SAS 9.4 using paired t-tests.

Results: Two hundred eight patients were captured who underwent analysis with the Gail Model. Average age was 44 years old; the majority of patients were white (64.4%), followed by 27.9% African-American, 4.8% Asian, and 2.9% Hispanic. Average 5-year risk of developing breast cancer in our population was significantly higher compared to the general population (0.99% vs 0.87%, p=0.02) according to the Gail Model. Lifetime risk, however, was not significantly higher in this population compared to the general population (11.2% vs 10.8%, p=0.35). Only 6 patients had a predicted lifetime risk greater than 20%. Risk was also assessed using the BCSC model on 190 patients following exclusion for history of breast augmentation. Five-year risk in our population was not significantly different from the general population (0.83% vs 0.87%, p=0.11). We found that there was a significant difference in the 5-year risk determined by the Gail Model compared to the BCSC with Gail predicting higher risk (0.99% vs 0.83%, p< 0.001).

Conclusions: Nearly all patients in our cohort did not have a calculated lifetime risk greater than 20% at the time of their diagnosis and therefore would not be recommended for additional or earlier screening per the American Cancer Society guidelines. We found that patients' 5-year risk of cancer was lower when predicted by the BCSC compared to the Gail Model, which has been shown to underestimate risk for several groups in the past. However, 5-year risk according to the Gail Model was elevated in our young population and may be helpful in predicting their risk. Further studies are needed for clarification. In summary, until improved methods of evaluation of breast cancer risk in this age group are identified, women should begin screening at the age of 40.

1387605 - Does Axillary Dissection Help Guide Systemic Therapy in Invasive Lobular Carcinoma of the Breast: Factors Associated with Use of Adjuvant Chemotherapy

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Background/Objective: Determining whether to recommend adjuvant chemotherapy in patients with invasive lobular carcinoma (ILC) can be challenging. While some studies have shown decreased chemotherapy efficacy in ILC, these tumors often present at more advanced stages. Historically, axillary dissection was used to help make adjuvant chemotherapy recommendations. Recent studies have shown a dramatic reduction in the use of axillary dissection for nodal staging, given prospective trials allowing for de-escalation of axillary surgery. Lack of nodal staging information could influence practice patterns regarding chemotherapy. We sought to evaluate factors associated with type of axillary surgery and receipt of adjuvant chemotherapy.

Methods: We analyzed a prospectively maintained institutional database of women with Stage I-III hormone receptor-positive, HER2-negative ILC. We hypothesized that undergoing axillary dissection would be associated with increased use of adjuvant chemotherapy, even when adjusting for stage and era of diagnosis (1990-2000, 2000-2010, 2010-2020, 2020-2022).

Results: Of the 742 women who were diagnosed between 1992-2022, 217 (32%) were pre-menopausal and 455 (68%) were post-menopausal. Chemotherapy was used in 242 (32.6%), more commonly in pre-menopausal women (46% of pre-menopausal and 28% of post-menopausal). In most, chemotherapy was given in the adjuvant setting (65%). Axillary lymph node dissection (ALND) was performed in 161 (24%) cases and sentinel lymph node biopsy (SLNB) alone in 459 (69%). Pre-menopausal women were significantly more likely to undergo ALND compared to post-menopausal women (33% vs 20%, p< 0.001). The mean number of nodes removed at SLNB was 3 (SD= 2.5), and 15.2 (SD =9) at ALND. In a logistic regression analysis predicting type of axillary surgery adjusting for confounding variables i.e., menopausal status, size of tumor, number of positive nodes, tumor grade, presence of lymphovascular invasion (LVI), and era of diagnosis, we found that larger tumors (per 1 cm, OR= 1.1, 95% CI= 1.01-1.22, p= 0.029), and more positive nodes (per 1 node, OR= 2.45, 95% CI= 1.95-3.07, p< 0.001) were associated with higher odds of undergoing ALND when compared to SLNB. In contrast, post-menopausal status (OR= 0.53, 95% CI= 0.3-0.92, p= 0.025), and diagnosis in more recent years (p< 0.001) were independently associated with lower odds of ALND. In a similar multivariable model predicting the use of adjuvant chemotherapy, we found no association between type of axillary surgery or era of diagnosis and the use of adjuvant chemotherapy (Table 1). Instead, larger tumor size, greater number of positive nodes, higher grade, and LVI were independently associated with higher odds of receiving adjuvant chemotherapy. In contrast, being post-menopausal was associated with significantly lower odds of receiving adjuvant chemotherapy compared to being pre-menopausal (p=0.006).

Conclusions: Although axillary staging was historically performed in part to guide adjuvant therapy decisions, we found other factors being used to guide adjuvant chemotherapy decision-making. Despite lower rates of axillary dissection over time, SLNB alone appears to yield sufficient nodes for adequate nodal staging. Whether the factors which we identified are optimal to select those who benefit from chemotherapy requires further investigation, particularly given mixed findings in the literature on chemotherapy benefit in those with ILC.

Table. Factors associated with use of adjuvant chemotherapy for patients with Stage I-III hormone receptor-positive, HER2-negative ILC

Characteristic	OR	95% CI	p value*
ALND vs SLNB	0.99	0.51-1.92	0.511
Postmenopausal vs premenopausal	**0.53**	**0.34-0.84**	**0.006**
Tumor size (per 1 cm)	**1.10**	**1.02-1.19**	**0.014**
Positive nodes (per node)	**1.24**	**1.11-1.37**	**0.000**
Grade 2 vs 1	1.52	0.89-2.62	0.128
Grade 3 vs 1	**5.36**	**1.90-15.12**	**0.002**
LVI present vs absent	**2.54**	**1.07-6.02**	**0.035**
2001-2010 Vs 1990-2000	0.80	0.25-2.54	0.703
2011-2020 Vs 1990-2000	0.46	0.14-1.49	0.196
2021-current Vs 1990-2000	0.34	0.10-1.20	0.095

* Logistic regression analysis

1387803 - Flat Aesthetic Mastectomy Closure with the Angel Wings Technique to Address Lateral Adiposity: Outcome Analysis

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Background/Objective: As mastectomy rates have changed over the years, there is a growing interest in patients who desire mastectomy without reconstruction ("going flat"). Oncologic mastectomy in the setting of obesity, however, poses challenges in achieving a flat closure that include the lateral redundant fold or "dog ear." The Angel Wings (AW) incision is a feasible and effective technique for addressing this lateral adiposity resulting in an aesthetic flat closure. In the current study, we aim to prove the safety of using this technique by evaluating incidence of arm lymphedema in patients who had mastectomy with and without the AW closure.

Methods: A retrospective chart review was performed of patients who underwent mastectomy with and without the AW technique from May 2014 to October 2022. Patients with a history of breast reconstruction (immediate or delayed), partial mastectomy alone, and male patients were excluded. The presence of post-operative lymphedema as documented in the surgical clinic assessments was evaluated. Patient variables including BMI, the extent of axillary surgery and axillary radiation were also noted.

Results: A total of 390 patients met the inclusion criteria with the median follow-up of 27 months. Of those, 173(44.4%) had flat aesthetic mastectomy with AW and 217(55.6%) had flat aesthetic mastectomy without AW. The average age was 61 and the average BMI was 32. Eight patients underwent prophylactic mastectomy and 10 had no axillary lymphadenectomy. Otherwise, 380(97.4%) underwent axillary surgery, with 226(57.9%) undergoing sentinel node biopsy and 154(39.5%) having axillary node dissection. Post-mastectomy radiation therapy (PMRT) was performed in 138/390(35.4%) patients. The overall lymphedema rate was 50/390(12.8%), with 7.2% of those having a BMI ≥30, and 6.9% undergoing AW vs 5.9% non-AW. Lymphedema was seen in 3.5% of sentinel lymph node biopsies and 27.3% of axillary lymph node dissections (ALND). Lymphedema occurred in 25.4% of those undergoing PMRT and 31.5% of those undergoing both ALND and PMRT. The AW group was noted to have a higher BMI with 124/173(72%) having a BMI ≥30, compared to 86/217(40%) in the non-AW group.

Conclusions: In conclusion, the AW technique is a safe and effective method for addressing the lateral adiposity and achieving an aesthetic flat closure. Our study demonstrates the lymphedema rates for AW were comparable when considering known risk factors such obesity, PMRT and extent of axillary surgery. As we strive to provide our patients with improved surgical techniques for oncologic resection, we submit that this technique is a viable and safe option for achieving the goals of cosmesis with oncologic safety.

Table. Patient variables

	N=390		Lymphedema N=50	
	AW 173	Non-AW 217	AW 27	Non-AW 23
BMI <25	16	60	3	3
BMI 25-29.9	33	71	5	11
BMI ≥30	124	86	19	9
No ax surg	6	4	0	0
SLNB	91	135	4	4
ALND	76	78	23	19
PMRT	60	78	21	14
No PMRT	113	139	6	9
PMRT+ALND	50	58	20	14

1387865 - Clinicopathologic Features, Treatment, and Three-year Survival Outcome of Breast Cancers with Neuroendocrine Features

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Background/Objective: Breast cancers with neuroendocrine features (BCN) are rare diagnosis without standardized treatment due to limited literature. World Health Organization (WHO) classification in 2019 defined neuroendocrine neoplasms of the breast as tumors with >90% of cells showing neuroendocrine differentiation, including neuroendocrine tumor (low-grade) and neuroendocrine carcinoma (high-grade). Thus, BCN survival information is unclear with updated classification. Also, there is mixed data on BCN due to various diagnosis/treatment protocols and resource access at different institutions. In this study, we characterized clinicopathologic features of BCN and evaluated treatments and survival outcome at a single institution.

Methods: We conducted a retrospective study of all women who had breast cancer with any neuroendocrine features from March 2006 to August 2022. Patients whose BCN was not breast primary, and whose BCN was not confirmed on secondary pathological review were excluded. Clinicopathologic features and treatment were analyzed using multinomial tests. Survival outcomes were evaluated with Kaplan Meier curves on the R software.

Results: We reviewed 33 patients with BCN, of which 31 patients remained after exclusion, and 25 patients had follow-up information. The average follow-up was 28 months. The average age of diagnosis

was 66 years old, with BCN equally detected by routine screening or self-breast exam (n=14 vs 14). BCN was more likely to present as a mass than asymmetry or calcification on imaging (n=15 vs 7 vs 2, p=0.001), and the average tumor size was 2.6 cm. More patients had pathologic T1 tumor than T2, T3, or Tis (n=12 vs 5 vs 2 vs 2, p=0.01), and more had pathologic N0 disease than N1, N2, or N3 (n=12 vs 3 vs 1 vs 1, p=0.002). BCN presented with more multifocal disease (n=17 vs 6, p=0.035), more moderately differentiated tumor (p< 0.0001), and lack of lymphovascular invasion (n=22 vs 3, p=0.0002), but no difference in Ki-67 levels >15 (n=16 vs 7, p=0.09). BCN hosted more invasive ductal carcinoma than invasive lobular or other histology (n=19 vs 2 vs 4, p=0.0001), and no differences in neuroendocrine tumor/features/differentiation/small cell carcinoma (p=0.09). They were more likely to be ER positive (p< 0.0001), PR positive (p< 0.0001), and HER2-negative (p< 0.0001). Despite more multifocal disease, patients were equally able to receive lumpectomy over mastectomy (n=12 vs 9, p=0.66). Most patients had sentinel lymph node biopsy over no axillary surgery or axillary lymph node dissection (n=14 vs 4 vs 2, p=0.0004). There were no differences in whether patients received chemotherapy, type of chemotherapy, or in neoadjuvant/adjuvant setting. Due to more hormonal receptor positivity, more patients received endocrine therapy (p=0.0007). There were no differences in whether patients received radiation therapy, or in radiation treatments (whole-breast vs partial breast vs post mastectomy/regional nodal irradiation, p=0.96). Patients had a good 3-year overall survival rate of 92% (p< 0.0001) and disease-free survival rate of 90% (p< 0.0001).

Conclusions: Our single institution study provided standardized treatment to patients with BCN, and our study shows good overall survival and disease-free survival rate for BCN under the updated WHO classifications.

Table. Clinicopathologic features and treatment of NET breast cancer

Age (mean)	66 years old (32 – 85 years old)	
Method of detection		$p = 0.003$
Screen detected	14 (47%)	
Self breast exam	14 (47%)	
Other	2 (6%)	
Imaging finding		$p = 0.001$
Mass	15 (58%)	
Asymmetry	7 (27%)	
Calcification	2 (7.5%)	
Other	2 (7.5%)	
Size	2.6 cm (0.7 cm – 6.0 cm)	
Pathologic tumor staging		$p = 0.011$
Tis	2 (9.5%)	
T1	12 (57%)	
T2	5 (24%)	
T3	2 (9.5%)	
Pathologic nodal staging		$p = 0.002$
NX	4 (19%)	
N0	12 (57%)	
N1	3 (14%)	
N2	1 (5%)	
N3	1 (5%)	
Core biopsy pathology		$p = 0.09$
Small cell carcinoma	3 (10%)	
Carcinoma with neuroendocrine features	11 (35%)	
Carcinoma with neuroendocrine differentiation	5 (16%)	
Neuroendocrine tumor	3 (10%)	
No neuroendocrine features/differentiation	9 (29%)	
Surgical pathology		$p = 0.61$
NET on core biopsy but no NET on surgical pathology	5 (24%)	
No NET on core biopsy but NET on surgical pathology	9 (43%)	
NET on core biopsy and surgical pathology	7 (33%)	
Tumor focality		$p = 0.035$
Multifocal	17 (74%)	
Unifocal	6 (26%)	
Histology		$p = 0.0001$
Invasive ductal carcinoma	19 (76%)	
Invasive lobular carcinoma	2 (8%)	
Other	4 (16%)	
Tumor grade		$p < 0.0001$
Grade 1	0 (0%)	
Grade 2	22 (71%)	
Grade 3	9 (29%)	
Lymphovascular invasion		$p = 0.0002$
Present	3 (12%)	
Absent	22 (88%)	
Estrogen receptor status		$p < 0.0001$
ER positive	27 (87%)	
ER negative	4 (13%)	
Progesterone receptor status		$p < 0.0001$
PR positive	27 (87%)	
PR negative	4 (13%)	
HER2 receptor status		$p < 0.0001$
HER2 positive	0 (0%)	
HER2 negative	29 (100%)	
Ki-67 levels		$p = 0.09$
Ki-67 >15	16 (70%)	
Ki-67 ≤ 15	7 (30%)	
Breast surgery		$p = 0.66$
Lumpectomy	12 (57%)	
Mastectomy	9 (43%)	
Axillary surgery		$p = 0.0004$
SLNB	14 (67%)	
ALND	2 (9%)	
SLNB, then ALND	1 (5%)	
No axillary surgery	4 (19%)	
Average number of SLN obtained	2.25	
Chemotherapy		$p = 0.08$
Received chemotherapy	6 (29%)	
Did not receive chemotherapy	15 (71%)	
Chemotherapy regimen		$p = 0.22$
Regimen similar to conventional breast cancer	5 (83%)	
Regimen similar to non-breast NET	1 (17%)	
Timing of chemotherapy		$p = 1.00$
Neoadjuvant chemotherapy	3 (50%)	
Adjuvant chemotherapy	3 (50%)	
Endocrine therapy		$p = 0.0007$
Received endocrine therapy	17 (89%)	
Did not receive endocrine therapy	2 (11%)	
Endocrine therapy drug		$p = 0.07$
Tamoxifen	2 (12%)	
Aromatase inhibitor	15 (88%)	
Radiation therapy		$p = 0.17$
Received radiation therapy	13 (68%)	
Did not receive radiation therapy	6 (32%)	
Radiation regimen		$p = 0.96$
Whole breast irradiation	3	
Accelerated partial breast irradiation	1	
Intraoperative radiation	2	
Post-mastectomy radiation	2	
Regional nodal irradiation	3	

1387867 - Improving Identification and Resection of Abnormal Axillary Lymph Nodes with Pre-operative Tattooing

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Background/Objective: Sentinel lymph node biopsy (SLNB) is the current standard of care in clinically node-negative patients. Compared to cases with surgery first, SLNB following neoadjuvant chemotherapy has a higher false-negative rate which can be reduced using dual tracers, retrieval of biopsied or clipped nodes, and resection of at least 3 SLN. In up to 23% of patients, however, discordance between the biopsied node and the SLN makes pre-operative localization of biopsied nodes imperative. One technique is to tattoo suspicious nodes with a black carbon dye. This study evaluated the rate of identification of the tattooed and/or clipped nodes, and their concordance with the sentinel lymph nodes.

Methods: Breast patients with suspicious axillary lymph nodes identified on ultrasound at our institution from March 2021 to October 2022 underwent biopsy and clip placement as part of an ongoing study. SPOT TM suspension (0.3-0.6 ml) was injected into 1 or 2 axillary lymph nodes either at the time of biopsy, shortly after, or following completion of pre-operative treatment. At surgery, identification of the tattooed lymph nodes and the presence of the biopsied clip was documented and concordance between the sentinel and tattooed lymph node was established. A review of the electronic medical records provided information on demographic data, histology, and surgical findings. (See Table 1.)

Results: Forty-three patients underwent tattooing of the biopsied axillary lymph nodes. Thirty-two (74.4%) had pre-operative treatment and eleven (25.6%) had surgery first. Five patients were excluded from the analysis, as pre-operative therapy was not completed in 4, and surgery was not done in 1. At surgery, the tattooed lymph node was identified in 30/31 (96.8%) patients that had documented retrieval. Medical, surgical, and oncologic reasons precluded SLNB in 8 patients, and correlation with tattooed nodes was not documented in 7 cases. In 18/23 (78.3%) patients there was concordance between the tattooed node and the SLN. Clips were not placed in 3/38 surgical patients and radiographic confirmation of the clipped node was not documented in thirteen. Specimen radiographs of the tattooed lymph node confirmed the biopsy clip presence in 16/22 (72.7%) remaining patients. Biopsy changes in the tattooed lymph nodes were noted in 2/22 (9.1%), supporting the accuracy of the localization despite the absence of the clip. In 3 cases, the biopsy clip was found in adjacent tissue or nodes, and in 1, the clip was not found and was possibly extruded during treatment or misplaced at biopsy.

Conclusions: Our study confirms that in about 22% of patients, the previously biopsied and clipped node is not one of the SLN, supporting the need for pre-operative localization. Tattooing of the axillary lymph nodes is a low-cost, easily performed, and effective method that allows identification of marked lymph nodes in most cases. Technical accuracy is higher when the tattooing is performed at the time of biopsy prior to pre-operative treatment. Tattooing allows reliable retrieval of the biopsied lymph node that along with sentinel lymph node removal, improves the accuracy of SLNB.

Table. Improving identification and resection of abnormal axillary lymph nodes with pre-operative tattooing

TABLE 1: Patient Characteristics

N=43	N (%)
Race/Ethnicity	
White	38 (88.4%)
Hispanic/White	3 (7.0%)
Black	1 (2.3%)
Asian	1 (2.3%)
Age at diagnosis, Median (Range)	51 (31,85)
Histology at Diagnosis of New Breast Cancers (n=41)	
ER/PR +, HER2 +	7 (17.1%)
ER/PR +, HER2 -	21 (51.2%)
ER/PR -, HER2 +	1 (2.4%)
ER/PR -, HER2 -	10 (24.4%)
ER/PR +, HER2 - PLUS ER/PR -, HER2 +	1 (2.4%)
ER/PR +, HER2 - PLUS ER/PR -, HER2 -	1 (2.4%)
Non-breast cancer cases included in study (n=2)	
Node status at diagnosis of New Breast Cancers (n=41)	
Positive	28 (70.0%)
Negative	12 (30.0%)
Unknown (too deep for biopsy)	1
Preoperative treatment (n=43)	
Yes	32 (74.4%)
No	11 (25.6%)
Tattoo done before or after preoperative treatment (n =32)	
Before	12 (37.5%)
After	20 (62.5%)
Number of Radiologists	5
Number of Surgeons	7
Surgery (n=43)	
Yes	38 (88.4%)
No	5 (11.6%)
Tattooed node identified at surgery (n=38)	
Yes	30 (96.8%)
No	1 (3.2%)
Not reported	7
Tattooed node one of the sentinel lymph nodes (n=38)	
Yes	18 (78.3%)
No	5 (21.7%)
Not reported	7
Sentinel lymph nodes not done or unsuccessful	8
Tattooed node contained biopsy clip (n=38)	
Yes	16 (72.7%)
No	6 (27.3%)
Clip not placed	3
Not documented	13

1388389 - Incidence and Survival of Women with Incidental Breast Carcinoma Discovered During Bilateral Reduction Mammoplasty: 30-Year Population-based Study in Ontario, Canada

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Background/Objective: Women receiving reduction mammoplasty have a small risk of incidental breast cancer identified during reduction specimens. Data on the survival of these women are conflicting. We aim to determine the incidence and survival rates of women with incidental breast cancer identified during reduction mammoplasty between 2003 and 2019 in the province of Ontario, Canada.

Methods: Using population-based administrative health care databases at Institute of Clinical Evaluative Sciences (ICES) Ontario, we identified all women over 18 years of age who received bilateral reduction mammoplasty during the study period. We excluded women with prior breast cancer. Using the linked Ontario Cancer Registry, we identified all women who were found to have an occult breast cancer. We collected sociodemographic, clinicopathologic and treatment details. We compared overall survival between women with versus without incidental breast cancer using the Kaplan-Meier method. Survival curves were compared using the log-rank test. Using a multivariable Cox proportional hazards regression analysis, we determined the effect of patient and tumour factors on predicting overall survival in women with incidental breast cancer. Statistical analysis was performed using SAS® and P values < 0.05 were considered statistically significant.

Results: Among 62, 217 women receiving bilateral reduction mammoplasty, we identified 8,700 cases of incidental breast cancer (14%). By stage, there were 5524 Stage I (63%), 1948 Stage II (22%), 1046 Stage III (12%) and 142 Stage IV (2%). Only 10.6% of incidental breast cancers were found in women under the age of 40, the vast majority occurring between the ages of 40 to 60 (77%). Of the cases with receptor status available, 83% were hormone receptor(HR)-positive, HER2-negative, 12% were HR-positive, HER2-positive, and 5% were HR-negative. There was a significant difference in overall survival between women having versus not having incidental breast cancer (Figure, P < .0001). After 15 years, overall survival was 78% for women with breast cancer and 97% for women without breast cancer. In our Cox proportional hazards model, ages 55-64 (compared to 50-54), lowest neighborhood income quintile, and Stage IV disease predicted worse overall survival (P < 0.01).

Conclusions: We observed a small but higher than previously reported rate of incidental breast cancer discovered during bilateral reduction mammoplasty (14%), particularly between the ages of 40 to 60. Notably, these women have worse overall survival compared to women without occult breast cancer. Our data highlight the importance of informing women having reduction mammoplasty on the risk of incidental breast cancer and pre-operative screening for breast cancer, especially if over the age of 40.

1388307 - Industry Payments to ASBS Members

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Background/Objective: The Open Payments Program (OPP) was created to provide transparency in interactions between physicians and industry. OPP trends have not been evaluated for breast surgeons. Our aim in this study was to describe OPP trends among members of the American Society of Breast Surgeons (ASBrS).

Methods: A list of members from the ASBrS was compiled using the society website. Society members were queried by NPI number in the OPP database from 2015–2021. Of 1,832 ASBrS members, 80% were listed in the OPP database. Members without an available NPI number in the database were excluded from analysis. Linear Model ANOVA was used for quantitative analysis and chi square was used when appropriate for categorical variables.

Results: From 2015 to 2021, 871 female surgeons and 472 male surgeons in the ASBrS received a total of $13,056,173 in general payments. The median payment to a single surgeon was $1,215.39 over all years. The mean per female surgeon over the study period was $7494.16 vs. $13,705.09 per male surgeon (p= 0.009). The top 10th percentile of earners received 79.8% of the payments. Male surgeons were significantly more likely to be represented in the top 10th percentile of earners than female surgeons (p< 0.00001). The most common category for payments was food/beverage (78.6%) followed by travel/lodging (12.70%) and education (2.8%). The top 5 payers to breast surgeons during our study period were: Intuitive surgical (25.3% of all payments), Genentech Inc.(12.9%), Medtronic USA Inc.(9.6%), Focal Therapeutics Inc. (5.8%), Medtronic XOMed Inc. (3.9%). Regarding research payments, only 33 surgeons received $171,566 with a median payment of $919.76. Female surgeons received a mean of $4078.52 and male surgeons received $6921.98 (p=0.5).

Conclusions: Members of the ASBrS received a total of $13,227.739 in money from industry between 2015-2021 in general and research payments demonstrating that the industry relationship is substantial. The majority of these payments were given to a small portion of surgeons. Male surgeons were disproportionately represented in this top 10th percentile of earners, potentially contributing the income disparity between male and female surgeons in the United States.

1388209 - Metaplastic Breast Carcinoma: Evaluation of Triple-negative Metaplastic Breast Cancer and Non-triple-negative Metaplastic Breast Cancer in Terms of Clinico-pathologic Features, Treatment Modalities, and Clinical Outcomes

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Background/Objective: the aim of the current study was to evaluate the clinicopathologic characteristics, clinical outcomes, and prognostic factor between triple-negative metaplastic carcinoma (TNMC) and non-triple-negative metaplastic carcinoma (NTNMC).

Methods: After IRB approval we retrospectively analyzed MBC patients treated at Shaukat Khanum Hospital between 2000 and 2019. The clinicopathologic parameters evaluated in each tumor included: patient age at initial diagnosis; gender; laterality of the mass, tumor size, histologic grade; nodal status , ER, PR, HER2 , tumor stage, recurrence, metastasis along with treatment modalities and clinical outcomes.

Results: One ninety six patients were identified with the mean age of 45 and mean BMI was 29.28 123(62.2%) had TNMC and 73 (37.2%) had NTNMC. The 2 groups did not differ significantly by age, tumor size or nodal status. In patients with NTNMC, the positivity rates for estrogen receptor, progesterone receptor and HER2 were 30.6 % , 12.8 % and 13.8 % respectively . Nearly 2/3rd patients with MBC had N0 disease and 30.6% of the patients presented de novo metastatic. 44.6% of N0 patients had distant metastasis. 50% of patients with Stage IV, GIII (81.8%), T2 (59.1%) and N0 (63.6%) disease had early locoregional recurrence. The 3-year OS rates in patients with TNMC and NTNMC were 74 % and 79 % respectively. Stage I had 100% 3 years OS, whether Stage IV had worse prognosis. With respect to DFS, there was no statistically significant difference between patients with TNMC and those with NTNMC

Conclusions: Metaplastic breast cancer is a rare entity. Most of metaplastic breast cancer in our population was in T2 and N0 stage. In 22 patient's recurrence have been reported and 65 patients showed distant metastasis, Most of the patients had N0 disease with 1/3rd patients had de novo metastatic disease. No significant difference of DFS and OS was found between TNMBC and NTNMBC i.e. the results were comparable.

Table. Clinicopathological features of metaplastic breast cancer

Table 2 Clinicopathologic features of triple-negative metaplastic carcinoma (TNMC) and non-triple-negative metaplastic carcinoma (NTNMC).

Variable	NTNMBC	TNMBC	p-value
	n = 73 (37.2)	n = 123 (62.2)	
Age (years)			0.30
mean ± SD	43.89 ± 10.96	45.81 ± 12.33	
Body mass index			0.78
mean ± SD	29.10 ± 6.51	29.40 ± 7.40	
T stage (%)			0.42
T0	1 (1.4)	-	
T1	11 (15.1)	17 (13.8)	
T2	46 (63.0)	69 (56.1)	
T3	9 (12.3)	25 (20.3)	
T4	6 (8.2)	12 (9.8)	
N stage (%)			0.59
N0	50 (68.5)	77 (62.6)	
N1	18 (24.7)	29 (23.6)	
N2	3 (4.1)	11 (8.9)	
N3	2 (2.7)	6 (4.9)	
Stage			0.70
I	6 (8.2)	7 (5.7)	
II	38 (52.1)	62 (50.4)	
III	6 (8.2)	16 (13.0)	
IV	23 (31.5)	38 (30.9)	
DCIS (%)			0.80
Absent	65 (89.0)	112 (91.1)	
Present	8 (11.0)	11 (8.9)	
Grade (%)			0.11
1	1 (1.4)	-	
2	9 (12.3)	8 (6.5)	
3	63 (86.3)	115 (93.5)	
Recurrence			1.00
No	65 (89.0)	109 (88.6)	
Yes	8 (11.0)	14 (11.4)	
Metastatic status			0.80
No	48 (65.8)	83 (67.5)	
Distant	25 (34.2)	40 (32.5)	

1388219 - Incidence and Phenotype of Subsequent Breast Cancer Diagnoses in Patients with a History of Triple-negative Disease

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Background/Objective: Conventionally, patients diagnosed with triple-negative breast cancer (TNBC) are not given selective estrogen receptor modulators (SERMs) or aromatase inhibitors (AIs) for chemoprevention as there is thought to be no benefit in this population. We aim to evaluate the incidence and phenotypic distribution of subsequent breast cancer events in patients with a history of TNBC.

Methods: A retrospective cohort study was performed of all women diagnosed with TNBC at a single institution between 1/1998-12/2018. Subsequent breast cancers were defined as either ipsilateral or contralateral to the index disease, and patients with these events were identified from the overall population. Demographic and clinical features, including hormone receptor status of subsequent breast cancers were examined.

Results: A total of 604 patients were identified with a mean follow-up time of 4.9 years. 72 (11.9%) of these patients were diagnosed with a subsequent ipsilateral breast cancer within this time period with an incidence rate of 3.0 per 100-person years. Of the 72 cases of ipsilateral breast cancer, 13 (18%) displayed estrogen receptor (ER), progesterone receptor (PR) or HER2 positivity with 2 cases positive for

both ER and PR. Among patients with receptor data, 9 (12.9%, 95%CI=6.1 - 23%) were ER receptor-positive, 5 (7.1%, 95%CI=2.4 - 15.9%) were PR receptor-positive and 1 (1.5%, 95%CI=0 - 8.3%) was HER2-positive. There were 18 (3.0%) cases of subsequent contralateral primary breast cancers identified with an incidence rate of 0.72 per 100 person-years. Of these 18 cases, 17 were assessed for ER and PR status and 16 were assessed for HER2 status. Among those with receptor assessments, 11 (64.7%, 95% CI=38.3-85.8%) were ER positive, 8 (47.1%, 95% CI = 22.3% - 72.2%) were PR positive and 1 (6.3%, 95% CI = 0.2-30.2%) were HER2-positive. When combined, 24 cases (27%) of subsequent breast cancer events displayed hormone receptor positivity.

Conclusions: We observed 11.9% and 3% of patients with a history of TNBC experienced a subsequent ipsilateral or new primary contralateral breast cancer within our follow-up time, respectively. 24 (27%) of these cases displayed sensitivity to 1 or more hormone receptors. The distributions of ER and PR varied significantly between TNBC patients diagnosed with subsequent ipsilateral versus subsequent contralateral breast cancers. Further investigation is required to assess the possible utility of SERMs or AIs for chemoprevention in select patients with a history of TNBC.

1388234 - Identification of Nipple Biofluid Analytes by Desorption Electrospray Ionization (DESI) Mass Spectrometry and Its Interaction with the Nipple Fluid Microbiota

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Background/Objective: Methods for early breast cancer detection enable lesions to be treated at the earliest possible time-point, increasing survival and improving patient outcomes. Nipple biofluid produced by the lining of the nipple ductal epithelial cells contains proteins, lipids, carbohydrates and bacteria which may be potential biomarkers of early cancer detection. DESI is a novel analytical chemistry technique that separates the various components of fluids according to their mass-to-charge ratio and offers great potential for early detection. Nipple fluid has traditionally been considered a sterile biofluid and is relatively understudied. There has been no systematic evaluation of NAF using DESI and its microbiome and hence its diagnostic potential remains unknown. Therefore, a multi-omics approach to the interrogation of nipple biofluid was undertaken through DESI mass spectrometry and 16S rRNA gene analysis. Firstly, we assessed the lipidomic profile to determine whether it differs between a normal breast versus a breast with cancer. Secondly, we explored the nipple fluid microbiota, to evaluate whether it is unique to the nipple ductal system and whether it differs significantly between cancerous and normal breasts. Lastly, we aimed to establish whether there was a correlation between the lipidomic profile and the microbiome of nipple biofluid.

Methods: Manual compression of the breast was undertaken to collect nipple fluid samples alongside controls from the nipple skin, breast skin and arm skin using swabs. Nipple biofluid swabs underwent DESI analysis using a Waters Xevo mass spectrometer. Following this, DNA extraction from nipple fluid

samples was optimised and analysed by 16S rRNA gene sequencing. Quantitative PCR analysis was performed to determine assigned sequence variant (ASV) counts. Suport vector machine (SVM) modelling of ionic peaks to identify significant lipids were correlated with absolute abundance adjusted microbiome data.

Results: A total of 51 nipple fluid samples (mean age 52.8 (SD±11.87) years) yielded an identification accuracy of 91% for cancer swabs, 90% for benign swabs and 91% for normal (contralateral side) swabs, which was achieved with the PCA/LDA algorithm using a spectral database collected from various biofluid specimens. Validation of peaks using LC-MS confirmed the presence of biological material in the form of lipid peaks and interestingly, lipids predominantly found in bacterial species were present in samples. Moreover, a significant correlation was observed between mass spectral lipidomic data and absolute abundance adjusted 16S rRNA gene data. The highest correlation (R2 = 0.71) was demonstrated between peak 738.5629 m/z and ASV 78 (a Lactobacillus) with a p-value of 0.003.

Conclusions: This study demonstrates that tiny quantities of nipple biofluid can be successfully analysed for its molecular composition and can differentiate between disease states with a high accuracy. Certain lipids identified in patients with breast cancer are commonly found in breast tissue lipidomics and others point towards the presence of bacterial lipids within the ductal system. 16S rRNA gene results are promising for the presence of a nipple fluid microbiota, with subtle unique differences between fluid from cancer versus non-cancer breasts. Correlation analysis has started to delineate the extent of these differences and their potential link to the NAF lipidome.

1388343 - Utilization of Cancer Prehabilitation Resources for Newly Diagnosed Breast Cancer Patients: An Institutional Experience

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Background/Objective: Prehabilitation prior to cancer treatment has been associated with physical and psychological benefits, along with reductions in hospital length of stay and costs.1 Given that breast cancer is the most common malignancy in women, with high survival rates, interventions to improve function during treatment and in survivorship are important.2 Bioimpedance spectroscopy, used in our early lymphedema detection program, has been shown to decrease progression of lymphedema compared to tape measure (7.9% vs. 19.2%, p = 0.016.)3 In June 2020, our institution implemented a protocol for early referral to breast prehabilitation, at the time of diagnosis, to improve utilization of the program. The goals of this study were to assess the efficacy of the referral protocol and analyze patient perception of our institution's prehabilitation program.

Methods: A 15-question IRB approved survey was developed. 230 patients, who underwent operative management of newly diagnosed breast cancer at our institution, from June 2020 to June 2022 were identified and contacted by phone. If amenable to participation, verbal informed consent was obtained

and the survey was administered. Demographic data, clinical data and survey responses were recorded using Microsoft Forms and were transferred into an Excel sheet in a de-identified fashion. A binomial test was used to compare differences between proportions and p-value < 0.05 was considered statistically significant

Results: 126 of 230 patients responded to the survey. 56.3% (71/126) of patients recalled receiving the referral to prehabilitaton; 43.7% (55/126) did not. Of the 71 patients who reported receiving the referral, a statistically significant number, 93% (66/71) of patients elected to participate, as opposed to 7% (5/71) of patients who declined (p=< 0.0001). Four patients attended prehabilitation, despite not recalling receiving a referral. Reasons for declining participation included feeling that prehabilitation was not needed (3), caregiver burden (1), feeling overwhelmed with additional appointments (1) and intending to do physical therapy independently at home (1). Of those who attended prehabilitation, 58.6% (41/70) continued with post-operative therapy. 41.4% (29/70) of patients did not. The most commonly cited reasons included existing exercise routine (9) and transportation barriers (8). There was no difference in participation between patients who has mastectomy as opposed to breast conservation (p=0.496)

Conclusions: Patients receiving a prehabilitation referral at time of diagnosis are likely to participate, continue with post-operative therapy and are highly satisfied with their experience. Despite a standardized referral protocol, 43.7% of patients did not recall receiving a referral. This may represent recall bias and suggests that enhanced communication regarding prehabilitation may improve utilization at our institution. For those who declined participation, the most commonly stated reason was believing it to be unnecessary. Improved education regarding the benefits of prehabilitation may increase utilization at our institution.

1358619 - Drainless Mastectomy

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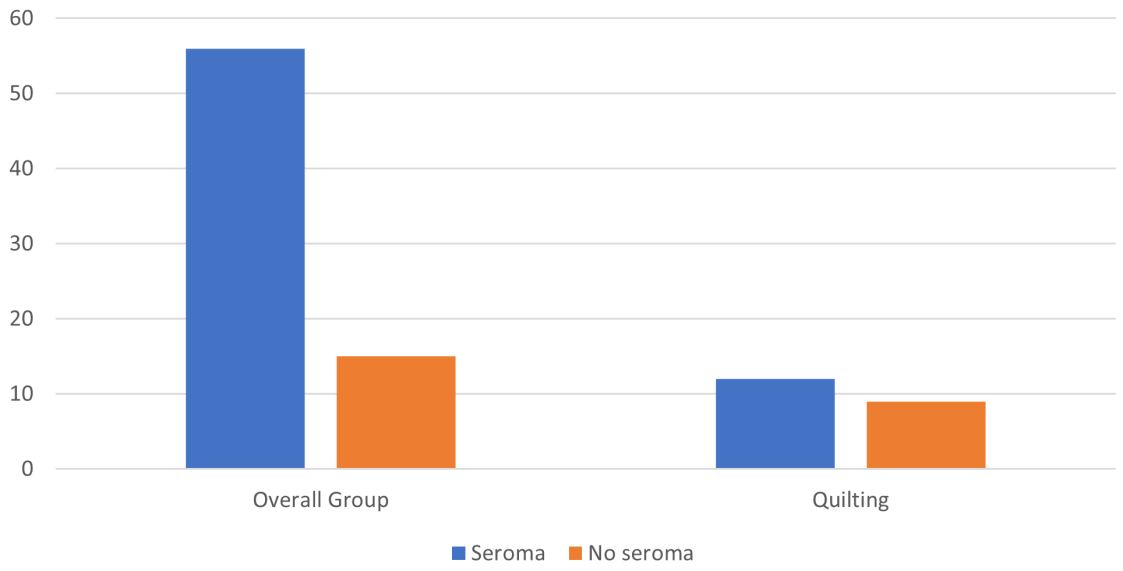
Background/Objective: For years, surgeons have placed suction drains in the mastectomy bed to reduce seroma formation. The presence and maintenance of a drainage catheter has negative aspects, including the need for the patient and family to maintain the catheter, possible infection, and recurrent seroma formation. Thus, we sought to implement a drainless mastectomy procedure in patients without concomitant immediate reconstruction.

Methods: Between 12/2017 and 9/2022 all patients undergoing simple mastectomy with or without axillary node surgery were treated as follows: fibrin glue was instilled under the mastectomy flaps prior to closure and no suction drains were used. Patients were wrapped with a breast binder and allowed to shower. In all cases, the procedure was outpatient and patients returned home the same day. Patients were scheduled for weekly post-operative appointments and if seroma was present, it was assessed for aspiration. If aspiration was performed, this was recorded. In May 2021, a quilting technique was added in hopes of decreasing seroma formation.

Results: During this time period, 46 patients underwent mastectomy; 25 were bilateral for a total of 71 breasts removed. In 29 cases a sentinel node biopsy was performed, and in 6 axillary dissection. 6 had been previously irradiated. Of 71 mastectomy sites, 56 (79%) developed post-operative seroma. Of the 56 seromas, 77% resolved within 3 aspirations. Of the 6 irradiated mastectomy beds, 2 required 3 aspirations, 1 required 2 aspirations, 1 had multiple aspirations eventually requiring a drain to be placed, and 2 developed wound dehiscence requiring wound care. Because of the high incidence of wound issues in irradiated patients, we discontinued the drainless technique in these patients. Of the 65 non-irradiated breasts, the most common number of aspirations was 1 or 2 followed by 3, and the others ranged from 1 to 8 aspirations. 63% of seromas resolved within 3 aspirations. There was no difference between those who underwent nodal surgery and those who did not. In the quilted group, there were 21 breasts removed in 13 patients. 12 (57%) developed seromas, including 58% of those who had nodal surgery vs. 56% of those who did not. 69% of the quilted group's seromas resolved within 3 aspirations. Overall, the patients were very receptive to the idea of drainless mastectomy as they could shower immediately, did not have to care for a drain, and felt the aspiration procedures were very tolerable. Only 2 patients expressed dissatisfaction and stated they would have preferred a suction drain.

Conclusions: While 79% of mastectomy sites formed seromas using drainless technique with fibrin glue, 63% of these resolved within 3 aspiration sessions. Half of patients with prior XRT failed this approach, whereupon it was abandoned for those with a history of radiation. The rate of seroma as well as the number of aspirations decreased to 57% after adding the quilting technique. In addition, patients showed overall satisfaction with this technique, and we recommend it be considered in mastectomy patients, with or without nodal surgery, particularly in cases where no prior radiation has been performed.

FIGURE. Seroma formation overall vs. quilting



1333805 - Utilizing ERAS for Mastectomy Procedures in the Outpatient Setting to Streamline Resources and Decrease Length of Stay

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John Muir Health, Walnut Creek, CA

Background/Objective: This quality improvement project aims to decrease the length of stay (LOS) for patients undergoing a mastectomy w/ or w/o reconstruction with a collaborative approach with breast and plastic surgeons, nurse practitioner (NP), and nurse navigator (NN). Historically, patients undergoing mastectomy surgeries at John Muir Health (JMH) required one-night admission for postoperative care, pain management, and education support. Patients having DIEP flaps required four-night stay, including one night in ICU. However, research studies show that implementing Enhanced Recover After Surgery (ERAS) pathways and patient education:

- Improves outcomes
- Improves patient satisfaction
- Reduces hospital stay

JMH surgeons, NP & NN aimed to utilize ERAS pathways and patient education for patients undergoing mastectomy w/ & w/o reconstruction to improve postoperative recovery, decrease LOS, patients' fears, and anxieties.

Methods: The multidisciplinary team implemented ERAS pathways to decrease LOS. The breast surgeon led project with support from the team in identifying, developing and implementing key ERAS protocols including post-operative pain management protocols and pre-operative patient education. Pre/Post-operative medications were:

- Gabapentin 300 mg
- Celecoxib 200 mg
- Tramadol 100 mg
- Acetaminophen 1000 mg

Intraoperative medications were:

- Ondansetron 5 mg
- Cefazolin 2 gm

In addition, expanders were placed pre-pectoral to help decrease pain.
Education materials were used to aid in pre-op teaching done by NN/NP in multiple languages. In addition, a 1:1 in-person or virtual education focusing on:

- ❖ preoperative and postoperative instructions
- ❖ patient care flow
- ❖ postoperative exercises
- ❖ care of the drain
- ❖ instructions when to contact the surgeon postoperatively

Baseline data showed LOS in 2020 for mastectomies w/ or w/o reconstruction was 32 hrs and DIEPS was 96 hrs. We started quality improvement project and ERAS implementation in 2021. Overall, 140 patients were seen and results showed:

Simple Mastectomy +/- Expanders (112):

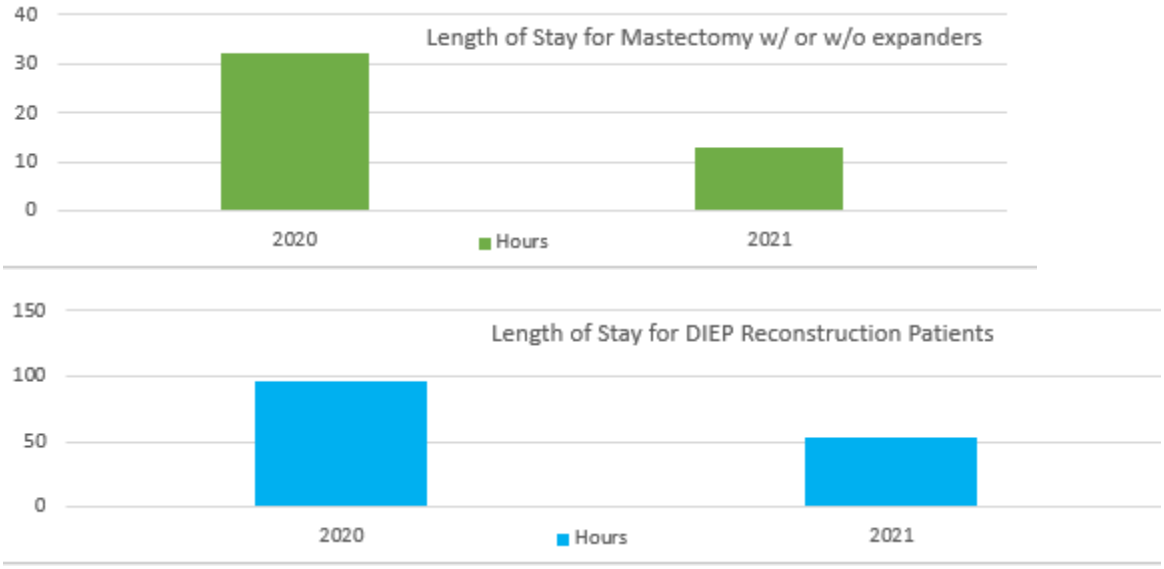
- 102/112 patients (91%) discharged same day
- Average LOS decreased to 13-hours
- 78 reconstruction/ 36 no reconstruction
- Complications were:

- Post-op Dizziness/Nausea – 5
- Co-morbidities – 4
- Post-op bleeding, but no return to OR – 1

- Return to ED – 1
- After discharged, hematoma evacuation - 2

Mastectomy w/ DIEP (28):

- Average LOS decreased to 54-hours
- Complications were:
  - DIEP failed, return to OR before dc – 4
  - Dizziness & nausea at POD 3 – 1
  - Difficulty breathing w/ 1 night in ICU – 1
  - Dehiscence – 2
- Over all, Reduction in patient's fears and distress
- No Readmissions
- In addition, <u>101 hospital beds were made available due to decreased length of stay</u>.



<u>Conclusion</u>: Creating this quality improvement program of providing the option of outpatient mastectomy surgeries has greatly benefitted our patients and our hospital bed and OR availability. It has improved communication and care coordination between patients, staff, and physicians. Due to the wide success, decreased need for hospital resources, and improved patient satisfaction, our facility will continue to provide the education program for mastectomy patients.

1363158 - Lactation Education for Surgeons: ASBrS Survey Demonstrates Strong Member Interest in Expanded Training

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Background/Objective: Breast surgeons are responsible for management of benign and malignant breast disease in breastfeeding patients; however, the extent to which surgeons undergo training to care for this specific patient population is unclear. We aimed to survey breast surgeons about their previous exposure to lactation education, identify specific topics in which they feel their knowledge could be improved, and explore the ways in which education could be most appropriately delivered.

Methods: Members of the American Society of Breast Surgeons (ASBrS) were administered an electronic survey via email from 10/27/2021 – 1/23/2022. Participation was voluntary and identifying information was not collected to ensure anonymity. The survey content included demographic information related to level of training and clinical practice, extent and type of lactation education, and desired topics and methods for further education. There was also an opportunity to provide comments. Descriptive statistics were used to analyze the data.

Results: In total, 2,785 surveys were sent, of which 87 (3.1%) were non-deliverable, 1,987 (71.3%) were opened, 631 (22.7%) were viewed in entirety, and 542 (19.5%) were completed. Most respondents completed training more than 10 years ago (61%, n=329), while 18% (n=95) completed 5-10 years ago, 18% (n=98) < 5 years ago, and 4% (n=20) were current residents/fellows. Eighty percent of respondents were women (n=436) and 53% completed a breast or complex general surgical oncology fellowship (n=264). Top 3 practice settings were hospital or health plan employed/community setting (39%, n=211), academic (33%, n=177), and private practice (26%, n=140). Nearly all respondents (99%, n=537) reported treating lactating patients with benign or malignant breast disease at least once or twice per year; 22% (n=119) reported treating at least 1 patient per month. However, most (78%, n=423) reported that their training in the management of lactating patients with breast disease was inadequate. The most frequently cited sources of lactation information were peer-to-peer informal knowledge sharing (50%, n=272) and personal experience with breastfeeding (44%, n=238). Nearly all respondents (99%) agreed that formal lactation education would be of benefit to breast surgeons. Recommendations for optimal timing of training included medical school (4%, n=20), residency (22%, n=120), fellowship (40%, n=216), clinical practice (7%, n=36), and all of the above (27%, n=145). The most frequently recommended educational formats included presentation at a national conference (60%, n=326), evidence-based management guidelines (58%, n=317), webinar (55%, n=296), and workshop/course (47%, n=252). Desired topics selected by respondents are delineated in Table 1. In addition, 160 respondents provided free text comments regarding lactation education for breast surgeons.

Conclusions: Breast surgeons self-report minimal training in the management of benign and malignant breast disease in lactating patients. Respondents near-universally desire formal lactation education, and most suggest it be a component of residency and/or fellowship training. To meet the needs of this unique patient population, recommendations include development of evidence-based management guidelines, webinars, and workshops/courses in the management of benign and malignant breast disease among lactating women.

Table. Distribution of responses to the question, "Which of the following topics should be included in lactation education for breast surgeons?" Multiple selections were permitted.

Response	N (%)
Management of patients with complications of lactation (e.g. mastitis, abscess, galactocele)	261 (48.2%)
Management of lactating patients with benign breast disease (e.g. fibroadenoma)	202 (37.3%)
Management of lactating patients with a new diagnosis of breast cancer	256 (47.2%)
Counseling patients with pregnancy associated breast cancer (PABC) who desire to breastfeed	250 (46.1%)
Counseling breast cancer survivors who desire to breastfeed	212 (39.1%)
Counseling patients who have undergone breast surgery in the past for benign disease (e.g. fibroadenoma) who desire to breastfeed	162 (29.9%)
Advising patients about breast cancer screening or diagnostic studies during lactation	218 (40.2%)
Advising pregnant or lactating patients in need of core needle biopsy or surgery	196 (36.2%)
All of the above	443 (81.7%)
Other	14 (2.6%)

1375480 - Identifying Differences in Incidence and Mortality Among Racial and Ethnic Groups Within an Academic Catchment Area

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Background/Objective: Breast cancer (BC) incidence and mortality have been found to vary with race/ethnicity and subtype, and given the mission of medical academic institutions to improve quality of care and reduce the cancer burden of the region it serves, it becomes imperative to better recognize the needs throughout its catchment area. In this study, we evaluated differences in BC incidence and mortality between a large California institutional catchment area and the U.S. population to approach an understanding of the BC disparities that exist.

Methods: We used 2015-2019 SEER-reported female invasive BC with a total 301,795 BC cases for the national-level data that we used as our control group. We obtained 2015-2019 invasive BC incidence and mortality rates (per 100,000 women) on the county-level from the California Cancer Registry with a total of 46,170 BC cases for an academic institutional Catchment Area that included 25 counties. BC subtypes were classified as IHC subgroups HR+HER2-, HR+HER2+, HR-HER2+, and HR-HER2-.

Results: Comparison between national and catchment area data as a whole revealed no statistical difference in BC incidence and mortality rates by race/ethnicity and IHC subtype. We then subdivided the catchment area data into its individual counties and compared this data against the national data. We found that BC incidence rates for select counties substantially differed from national incidence rates

while county-level mortality rates were generally similar to and slightly lower than national mortality. Specifically, Bay Area and surrounding counties demonstrated significant deviations in HR+HER2- BC incidence from national incidence rates. For HR+/HER2- BCs, NH Whites in Marin County demonstrated the largest elevation above the national rate, 174.1 Marin vs 137.7 national. In Solano County, NH Asian/Pacific Islanders also greatly exceeded the national incidence rate by 32.5 cases per 100,000 women. Among the HR+HER2+ group, San Benito County displayed the greatest difference in incidence rates with 33.1 (San Benito) vs. 19.2 (national) for NH Whites. Conversely, the mortality rates for nearly all 25 catchment area counties were lower across all BC subtypes and races/ethnicities with the exceptions of San Joaquin and San Mateo counties.

Conclusions: The expansive catchment areas of many academic institutions suggest that a diverse patient population will seek BC treatment; however, disparities among catchment area counties present barriers to access and availability of treatment regimens that the institution must address. The higher HR+HER2- BC incidence rates relative to national incidence for Marin, San Mateo, and Solano Counties mainly among NH Whites and NH Asian/Pacific Islanders were unexpected given their average high SES and proximity to academic BC centers. Likewise, the higher incidence of potentially more aggressive HR+HER2+ BC for NH Whites in San Benito County elicits the need for more targeted studies to understand potential sociodemographic contributors and propose potential changes to the distribution of resources for HER2-targeted therapies. The BC incidence rate differences between counties conclude that it is important for all research-conducting academic institutions to look more closely at individual regions within their catchment area to determine how to reallocate resources and identify disparities that contribute to local cancer burden.

Table. Incidence and mortality rates by race/ethnicity and region among national SEER and catchment area cohorts

Region	Race/Ethnicity	Age-Adjusted Incidence Rate per 100,000				Age-Adjusted Mortality Rate per 100,000			
		HR+HER2-	HR+HER2+	HR-HER2+	HR-HER2-	HR+HER2-	HR+HER2+	HR-HER2+	HR-HER2-
SEER National Data* (n =216,198,808)	All races/ethnicities	124.0	18.6	7.4	18.2	20.5	3.1	1.6	5.2
	Non-Hispanic White	137.7	19.2	6.9	17.2	22.2	3.2	1.5	4.9
	Non-Hispanic Black	108.0	19.3	9.6	34.0	26.3	4.6	2.9	11.4
	Non-Hispanic A/PI	91.1	15.6	6.7	12.4	14.2	2.4	1.5	4.1
	Hispanic	105.4	18.3	8.4	15.1	11.1	2.1	1.3	2.7
Academic Institution Catchment Area# (n = 25,541,900)	All races/ethnicities	124	18.2	7.3	16.4	8.5	1.5	1	3
	Non-Hispanic White	142.1	19.5	6.7	16.7	9.5	1.5	1	3
	Non-Hispanic Black	107	17.8	9.4	32.5	13.6	2.4	1.9	9
	Non-Hispanic A/PI	92.4	13.7	6.2	14.7	6.8	1.3	1	2.5
	Hispanic	106.3	19.2	8.5	12.3	5.6	1.4	0.9	1.7
Marin County# (n = 522,224)	All races/ethnicities	169.3	23.3	7.4	13.3	7.6	^	^	3
	Non-Hispanic White	174.1	24.4	7.6	13.2	8.3	^	^	^
	Non-Hispanic Black	129.6	^	^	^	^	^	^	^
	Non-Hispanic A/PI	126.7	^	^	^	^	^	^	^
	Hispanic	126.6	^	^	^	^	^	^	^
Solano County# (n = 845,516)	All races/ethnicities	125.7	19.1	7.5	20	8.4	^	^	3.4
	Non-Hispanic White	131	18.7	5.1	20.2	8.3	^	^	4
	Non-Hispanic Black	112	24.3	^	37.9	14.1	^	^	^
	Non-Hispanic A/PI	101.2	13.3	^	14.4	^	^	^	^
	Hispanic	137.9	22.2	13.4	12.9	7.8	^	^	^
San Benito# County (n = 107,944)	All races/ethnicities	107.7	20.3	^	^	^	^	^	^
	Non-Hispanic White	108.4	33.1	^	^	^	^	^	^
	Non-Hispanic Black	^	^	^	^	^	^	^	^
	Non-Hispanic A/PI	91.5	^	^	^	^	^	^	^
	Hispanic	^	^	^	^	^	^	^	^

^ Data not displayed due to fewer than 15 cases.
* From SEER17 invasive breast cancer data (2015 – 2019)
# From California Cancer Registry data

1379099 - Tumor Size and Histology Predict Mortality in Neuroendocrine Breast Carcinoma and Small Cell Breast Carcinoma

Mulin Xiong[1], Kelsey Mader[2], Mallory Vesling[2], Amy Kirby[1]

[1]Trinity Health, Pontiac, MI, [2]Ross University School of Medicine, Pontiac, MI

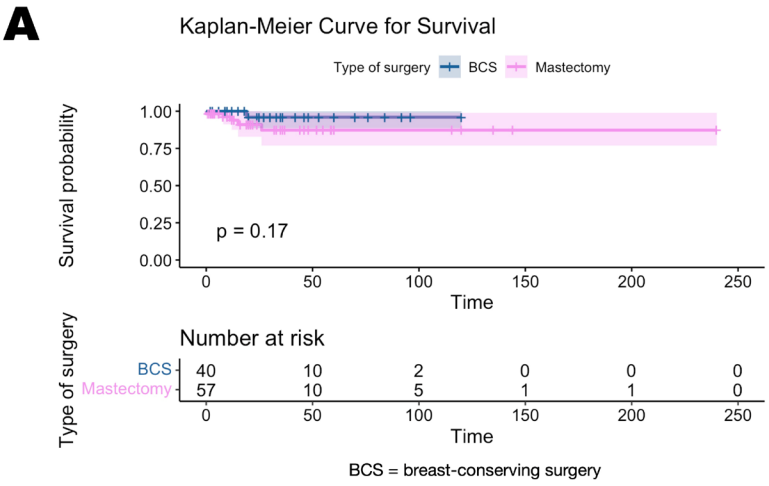
Background/Objective: Primary neuroendocrine breast carcinoma (NEBC) and its subtype, small cell breast carcinoma (SCBC), are rare entities, comprising < 1% of all breast neoplasms. As such, there is limited information available regarding diagnosis, management, and prognosis. While surgical intervention is a cornerstone to management, current literature lacks evidence to guide surgical practice. This study aims to better understand surgical outcomes and identify predictors of mortality by assessing reported patient cases.

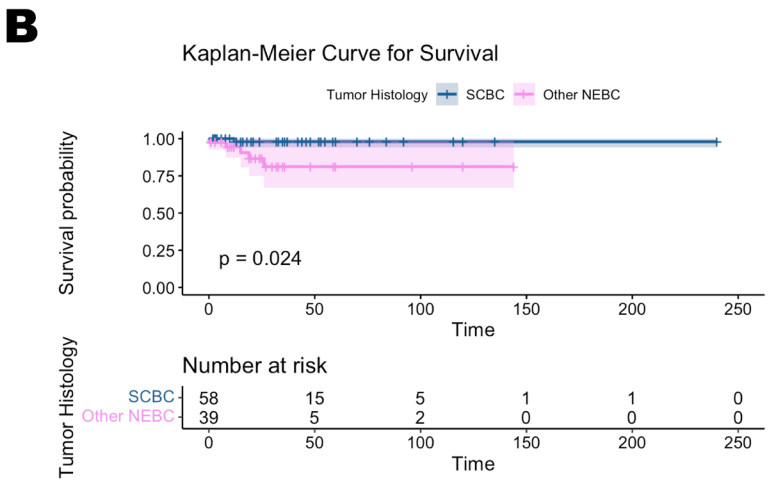
Methods: We performed a comprehensive literature search to identify cases of NEBC and SCBC from 1983-2022, compiling demographic, histologic, neuroendocrine marker, hormone marker, medical treatment, surgical treatment, and survival information. Cox proportional hazard regression analysis was used to measure the association between age, tumor size, histology (SCBC versus other NEBC), and type of breast surgery with mortality.

Results: We identified 168 cases of NEBC that met inclusion criteria. Of these, 64 (38%) were of SCBC histology. The median age of diagnosis was 55 years (range 22 to 88). The mean tumor size was 3 cm (range 0.1 to 15). Of the 151 patients that underwent surgical intervention, 60 (39.7%) underwent breast-conserving surgery while the remaining 91 (60.3%) underwent total, modified, or radical mastectomy. No statistically significant difference was found when comparing the breast-conserving surgery group and the mastectomy group ($p = 0.17$). There is a statistically significant increase in mortality in the other NEBC group compared to the SCBC group ($p = 0.024$). After adjusting for age and type of surgery, tumor size is positively associated with increased mortality ($p = 0.046$). However, when additionally adjusting for histology, no statistically significant association was found.

Conclusions: NEBC and SCBC present in a wide age range with variable tumor size. Breast-conserving surgery and mastectomy are both acceptable surgical approaches with no difference in overall mortality. Although larger tumors are predictive of higher mortality, this effect may be partly explained by histology type. SCBC tumors have better survival than other NEBC tumors. These results indicate tumor size and histology are important prognostic factors and can guide surgical management. Given the rarity of these neoplasms, standardized reporting across institutions will enable improved evidence-based surgical management.

Figure. Kaplan-Meier curves for survival comparing type of surgery and tumor histology





1380143 - Breast Symptom Prevalence in Pregnant Women Compared to Non-pregnant Women as an Initial Step in Exploring Delays in Diagnosis of Breast Cancer During Pregnancy

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Background/Objective: Early diagnosis of breast cancer (BC) is crucial, improving survival and prognosis. Pregnancy-associated breast cancer (PABC) is uncommon. It is often diagnosed when a woman complains of symptoms such as a breast mass, nipple discharge or skin changes. However, breast symptoms are common during pregnancy, and usually represent benign situations. This may explain part of the challenge and delayed diagnosis of PABC. There is a paucity of data regarding prevalence of breast symptoms during pregnancy. The objectives of this study were to prospectively compare breast symptoms between pregnant and non-pregnant young women, and to describe specific common symptoms in pregnant women as compared to non-pregnant women. The results may help determine the required testing process in pregnant women with breast symptoms to allow adequate medical care on the one hand, and effective use of medical resources on the other.

Methods: This prospective observational study included women 18-40 years old, who presented for routine obstetrics and gynecological visits unrelated to breast complaints. Data were collected through

self-filled questionnaires. We excluded women with breast cancer, carriers of pathogenic variants in BRCA1 and BRCA2 and first degree relatives with breast cancer. We obtained details on demographics and medical history and queried women about symptoms: breast pain, skin discoloration, breast congestion, breast lumps, and nipple discharge.

Results: We included 372 women of whom 253 were pregnant. Mean age was 30.4 and 26.9 years in the pregnant vs. non-pregnant groups (p=0.00). The groups were comparable for ethnic origin, comorbidities and past use of contraceptives. The prevalence of at least 1 symptom was significantly higher in pregnant women as compared to the non-pregnant group (26.9% vs 11.9%, p< 0.001). Breast pain and skin discoloration were significantly more common in pregnant women (14.5% and 7.2% vs. 6% and none, p=0.019, p=0.003, respectively) yet complaints of breast lump and nipple discharge were similarly prevalent in both groups (Table 1). Using multivariate analysis, the following were found to be associated with increased risk of at least 1 breast symptom: contraceptive use in the past (OR 3.84), pregnancy (OR 3.78), any comorbidity (OR 2.77) and family history of breast cancer (excluding first degree relatives) (OR 2.12).

Conclusions: Young women presenting to obstetric or gynecological care commonly have breast symptoms, and these symptoms are more common during pregnancy. However, prevalence of self-reported breast lumps or nipple discharge in pregnant women was comparable to non-pregnant women and cannot be attributed to pregnancy. These findings highlight the importance of thorough evaluation of such symptoms in pregnant women as is recommended in all women.

Table. Prevalence of breast symptoms

	Pregnant n (%)	Non pregnant n (%)	Total	p value
At least one symptom	68 (26.9)	14 (11.9%)	82 (22.1%)	**0.001**
Breast pain	36 (14.5)	7 (6)	43 (11.7)	**0.019**
Skin discoloration	18 (7.2)	0	18 (4.9)	**0.003**
Breast congestion	21 (8.5)	5 (4.3)	26 (7.1)	0.146
Breast lump	10 (4)	8 (6.8)	18 (4.9)	0.245
Nipple discharge	6 (2.4)	1 (0.8)	7 (1.9)	0.305
Breast lump OR Nipple discharge	16 (6.4)	9 (7.6)	25 (6.8)	0.655

1380398 - Supported Stratified Self-follow-up After Early Breast Cancer Treatment: A 3-year Experience from a Single Unit

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Background/Objective: The National Cancer Survivorship Initiative in the UK has championed prototyping of risk stratified pathways tailored for patients following treatment of early Breast cancer. According to this, supported self-management pathway with remote surveillance, guaranteed re-access would be offered as standard practice following completion of treatment for Breast cancer. The purpose of stratified follow-up is to improve the effectiveness of services. Routine follow-up is costly, time consuming with little evidence to suggest it identifies recurrence earlier. We describe the design and implementation of stratified follow-up at a single hospital.

Methods: The pathway was set up after discussions with the involved stakeholders such as – radiology, family practice, breast team, NHS management and administrative teams. At the end of treatment, patients were assessed for their suitability for stratified follow-up. Patients that were deemed suitable and willing, were given end of treatment documents which outlined the diagnosis, treatment, holistic needs assessment and a follow-up plan via face to face appointment or teleconsultation. Their family physician were also informed.. The information in the end of treatment document included the mammogram schedule over the next 5 years, length of adjuvant endocrine treatment and need for DEXA scans etc. Patients were also given written information about signs and symptoms that required

medical attention. Finally, they were given details to access the Breast unit helpline. A database was created for suitable patients with a designated data manager responsible for requesting and tracking mammograms. Patients on the stratified pathway had yearly mammograms, no routine clinical follow-up but open access to the breast unit via a helpline. A patient survey was carried out to assess the success of the pathway.

Results: A total of 97% (263/270) of patients were identified since 2019 who were suitable for stratified follow-up. 3% (8/263) of the suitable patients declined stratified follow-up. No patients were missed. A total of 94% of patients treated for Breast cancer were followed up using the stratified follow-up pathway over the last 3 years. 570 unnecessary routine appointments were avoided. The direct cost saving was £53,580 over 3 years. Cutting unnecessary routine appointments increased clinical capacity to see 15 extra patients every month and generate a further £50,760 in income over the same period, giving a total saving of £104,340. A patient survey was conducted in which 38 completed questionnaire was analysed. Patients felt they were able to manage their own health thus avoiding unnecessary hospital visits. 76.3% stated they received an end of treatment document. 80.5 % were confident in accessing care.

Conclusions: Our unit successfully designed and implemented a self-management pathway in patients with early Breast Cancer. This was possible because of involvement of all stakeholders in agreeing to the proposed pathway with excellent teamworking. The use of personalised end of treatment document enabled patients to be more informed and has shifted the focus from being dependent on health professionals to being self-reliant. Implementing a stratified follow-up has avoided unnecessary hospital visits and enabled significant cost saving.

1388005 - Evaluation of Oncologic Safety of Breast Conservation vs Mastectomy in Locally Advanced Breast Cancer: 8-Year Survival Outcome

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Background/Objective: Breast Conservation Surgery (BCS) is the accepted standard of treatment for early breast cancer, with evidence from randomized controlled and population-based studies. The oncological outcome of BCS in LABC is mainly available from retrospective series with a small sample size and a shorter follow-up duration.

Methods: A retrospective observational study of 411 non-metastatic LABC patients who received neoadjuvant chemotherapy (NACT) followed by surgery from 2011 to 2016. We retrieved the data from a prospectively maintained database and Electronic Medical Records. Survival data were analyzed by Kaplan Meier curves and Cox regression using SPSS 25 and STATA 14.

Results: 146/411 (35.5%) women had BCS with a margin positivity rate of 3.42%. With a median follow-up of 64 months (IQR 61, 66), the local relapse rate was 8.9% in BCS and 8.3% after mastectomy. The estimated 8-year LRFS, DFS and OS rates of BCS were 86.9%, 63.9% and 79.3%, and 86.1%, 46.3% and

49.7% in the mastectomy group. On univariate analysis, BCS showed superior survival outcomes compared to mastectomy [unadjusted HR (95% CI) for DFS: 0.70 (0.50 - 1), OS: 0.58 (0.36 - 0.93)]. After adjusting for age, cT stage, cN stage, PCR (ypT0/is, N0) and radiotherapy, BCS and mastectomy groups were found comparable in terms of LRFS [HR: 1.1, 0.53 -2.3], DFS [HR:0.80, 0.55 - 1.17] and OS [HR:0.69, 0.41 - 1.14].

Conclusions: BCS is technically feasible in LABC patients. LABC patients who respond well to NACT can be offered BCS without compromising survival outcomes.

1388012 - Mass Training of Outreach Healthcare Personnel for Detection of Symptomatic Breast Lumps Is Possible Through Master Trainers and Cascade Training

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Background/Objective: Most breast cancers in Pakistan are locally advanced at presentation. An awareness and clinical breast exam (CBE) training intervention among health care workers (HW) may help downstage breast cancer in resource-limited areas where mammography may not be feasible. However, mass training of HWs is challenging, especially for those living in remote regions. Thus, we piloted a CBE training program for HWs native to remote areas in Pakistan.

Methods: This pilot program conducted in Pakistan comprised of 2 phases: 1. Phase 1: Six HWs (3 physicians, 2 nurses, and 1 lady health worker [LHW]) were trained by fellowship-trained breast surgeons at a university hospital in Karachi, over 5 days. These trained HWs served as Master Trainers (MTs) in Phase 2. 2. Phase 2: Cascade training of fifteen HWs (5 physicians, 1 nurse, and 9 LHWs) was performed by MTs at 3-day health camps in Gilgit, Aliabad, and Gahkuch, each a remote area in Pakistan. The training program consisted of the following curricular components: • Knowledge and Awareness: Written material and a didactic lecture to increase knowledge/awareness and dispel myths about breast cancer • CBE Training: Demonstration and practice on a simulated breast model and subsequent hands-on training on consenting patients at the university hospital (Phase 1)/health camps (Phase 2). The goal was to enable trainees to identify breast abnormalities and detect breast lumps > 2 cm for referral. Pre-recorded videos covering the complete curriculum were used in Phase 2 to standardize training/instruction across both Phases. Effectiveness of the training program was assessed using: • Pre- and Post-Tests: A validated questionnaire assessing knowledge/awareness and self-reported confidence in performing CBE and detecting breast lumps > 2 cm. • Pre- and Post-DOPS (Direct Observation of Procedural Skills): Evaluated the ability to perform a systematic and complete CBE, including inspection, palpation, and lymph node (LN) examination, and time taken to perform CBE. Pre- and post-knowledge/awareness and CBE skill scores were compared using the Wilcoxon's signed rank test. Improvement of trainees' performance in Phase 1 and Phase 2 was compared using the Mann-Whitney U-test.

Results: For MTs (Phase 1), a significant improvement in knowledge/awareness and self-rated confidence in ability to detect breast lumps > 2 cm was observed. Improvement in all steps of CBE, except inspection, was seen. Time taken to perform a CBE decreased by the end of training. Cascade training (Phase 2) led to similar outcomes as Phase 1. However, contrary to Phase 1, time taken to perform a CBE increased by the end of training (Table). There was no significant difference in outcomes (knowledge/awareness, confidence, or CBE skills) of Phase 1 and Phase 2, thus confirming the effectiveness and feasibility of the cascade training model.

Conclusions: Mass training of outreach HWs in performing CBE, and improvement in knowledge/awareness about breast cancer, may be possible using a carefully structured 2-phase training model. Standardized pre-recorded instructions, and empowering local HWs as MTs, may facilitate cascade training in remote regions. Training large numbers of HWs in CBE may be an important step in downstaging symptomatic breast cancer in low-resource countries.

Table. Pre- and Post-comparisons of Healthcare Workers

* *All numbers are expressed as median [interquartile range]*				
Phase 1: Training of MT by Breast Surgeons				
Variable	**Pre-Score ***	**Post-Scores ***	**Difference ***	**P-Value**
Knowledge/Awareness (%)	65.4 [42.4-80.8]	92.3 [73.1-100]	+ 19.3 [13.4-40.4]	0.028
Confidence (%)	40 [35-65]	80 [80-80]	+ 40 [15-45]	0.039
CBE Skills (%)	62.4 [46.7-69.4]	89.3 [83.1-95]	+ 23.9 [18.6-45]	0.028
CBE Skill – Inspection (%)	62.5 [37.5-100]	97.2 [80.6-100]	+ 20.8 [0-50]	0.068
CBE Skill – LN Examination (%)	66.6 [49.2-70.8]	88.9 [80.6-95.8]	+ 20 [13.9-40.3]	0.028
CBE Skill – Palpation (%)	66.7 [66.7-66.7]	100 [100-100]	+ 33.3 [33.3-33.3]	0.014
Time Taken (seconds)	270 [180-300]	150 [150-180]	- 105 [22.5-150]	0.042
Phase 2: Training of other Healthcare Workers by MTs (Cascade Training)				
Variable	**Pre-Score ***	**Post-Scores ***	**Difference ***	**P-Value**
Knowledge/Awareness (%)	61.5 [53.8-69.2]	69.2 [53.8-84.6]	+ 7.7 [0-15.4]	0.005
Confidence (%)	60 [60-80]	100 [80-100]	+ 20 [20-20]	0.002
CBE Skills (%)	45.5 [27.2-63.6]	100 [90.0-100]	+ 46.2 [36.3-63.7]	0.001
CBE Skill – Inspection (%)	100 [50-100]	100 [100-100]	+ 0 [0-50]	0.160
CBE Skill – LN Examination (%)	16.7 [16.7-66.7]	100 [100-100]	+ 66.7 [16.7-83.3]	0.001
CBE Skill – Palpation (%)	50 [0-100]	100 [100-100]	+ 0 [0-100]	0.014
Time Taken (seconds)	120 [60-156]	190 [150-210]	+ 24 [0-120]	0.012
CBE: Clinical breast examination; *MT*: Master Trainers				

1388026 - Tissue Microarray Analysis of MET, EGFR, and HER3 in Primary Triple-negative Breast Cancer: A Potential Target for the Development of Immunotherapeutic Treatment Strategies

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[1]Moffitt Cancer Center, Tampa, FL, [2]University of South Florida School of Medicine, Tampa, FL

Background/Objective: Triple-negative breast cancer (TNBC) carries a worse prognosis with elevated risk of early recurrence and distant metastasis relative to other types of breast cancer. This has been attributed to the biological aggressiveness of TNBC and the lack of therapeutic targets. Here we sought to establish the prognostic implications of selected oncodriver expression by tissue microarray analysis (TMA) performed on TNBC surgical specimens to identify potential targets for immunotherapeutic treatment strategies.

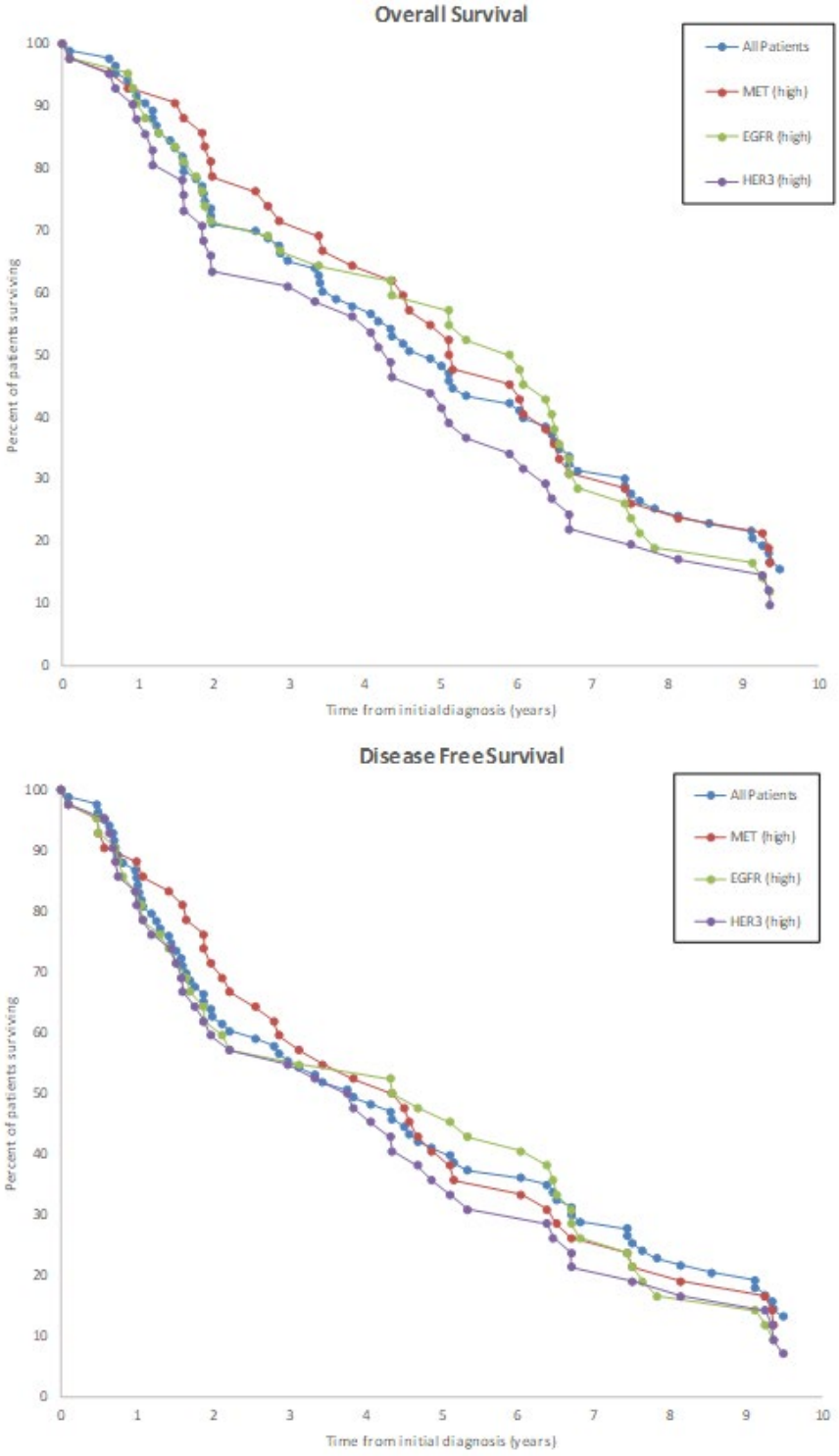
Methods: This is an IRB-approved, single institution, prospective cohort study of 90 patients with TNBC undergoing surgical management from January 2010-February 2019. TMA was performed on tissue blocks from surgical specimens. Patients were divided by chemotherapy received as either neoadjuvant or adjuvant therapy. TMA analysis targeted the expression of MET, EGFR, and HER3. The proportions of tumor infiltrating lymphocytes expressing CD4, CD8, CD20, CD45, CD56, and PD-1 were analyzed and correlated with pre- and post-chemotherapy responses. Retrospective chart review for clinical and pathologic data were completed for survival analysis.

Results: Of 90 total patients, 36 received neoadjuvant chemotherapy (40%), 44 received adjuvant chemotherapy (49%), and 10 refused chemotherapy (11%). Average patient age was 56 years old (range 29-87). On pathology, 3 patients were T0 (2%), 38 were T1 (42%), 33 were T2 (37%), and 16 were T3-T4 (18%); 58 patients had N0 disease (64%), 16 were N1 (18%), and 16 were N2-N3 (18%). Two patients had a low residual cancer burden (RCB-I, 6%), 16 had an RCB-II (44%) and 16 had an RCB-III (44%). Histology included 75 invasive ductal (83%), 12 metaplastic (13%), and 2 invasive lobular (4%) carcinomas. On TMA, 45.5% of cells expressed MET, 51% expressed EGFR, and 1.7% expressed HER3. HER3 expression was higher in patients treated with neoadjuvant chemotherapy (average 2.95% versus 0.79%, p=0.004). There was significantly higher expression of HER3 in node-positive disease (p=0.013) and MET expression in node-negative disease (p=0.004). There was no significant difference between pre- and post-chemotherapy samples regarding MET (p=0.097) and EGFR (p=0.754) expression. When considering histologic subtype, tumor grade, lymphovascular invasion, response to chemotherapy, recurrence, or death, there was no significant difference in the expression of MET, EGFR, or HER3. There was no significant impact on overall survival or disease-free survival for MET (HR 0.69, CI 0.26-1.78, p=0.437), EGFR (HR 1.39, CI 0.53-3.67, p=0.503), or HER3 (HR1.56, CI 0.60-4.06, p=0.362) regardless of pre- or post-chemotherapy status. There was a significant positive correlation between HER3 and CD4+ T cells (p=0.014), MET and CD8+ T cells (p=0.016) and CD56+ natural killer cells (p=0.026), and with EGFR and CD45+ activated lymphocytes. Chemotherapy treated tissue samples had a stronger correlation with infiltrating lymphocytes with similar statistical significance overall.

Conclusions: TNBC surgical specimens overexpress the oncodrivers MET and EGFR while HER3 is expressed in a smaller proportion of cells. HER3 appears to be altered by neoadjuvant chemotherapy

treatment. MET, EGFR, and HER3 demonstrated a significant positive correlation and strong immune response. Considering these factors, MET, EGFR, and HER3 remain viable options as potential therapeutic targets for human dendritic cell tumor vaccines.

Figure. Survival data for patients with TNBC and high levels of expression of MET, EGFR, and HER3



1387907 - Breast Cancer Survivorship in Louisiana – Identifying Causes of Mortality to Guide Risk Reduction

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Background/Objective: With modern breast cancer screening and treatment, most breast cancer patients have a very good prognosis and become breast cancer survivors who may ultimately die from a different disease process. Although Louisiana has one of the highest mortality rates from breast cancer in the US, it also has one of the highest rates of cardiovascular disease, as well as one of the shortest life-expectancies in the US. We sought to study the causes of mortality in breast cancer patients in Louisiana to guide survivorship plans for breast cancer patients based on their risks of mortality.

Methods: Our study is a retrospective data-base review. We identified women for our study from the population-based Louisiana Tumor Registry (LTR), including all patients diagnosed with breast cancer between 2009-2019. All records with a reported death were identified, as well as age, sex, and residence information at the time of cancer diagnosis, Charlson comorbidity index, and rural status. Subsets were then compared to determine differences in causes of mortality based on age groups, rural vs urban status, and stage of cancer at initial presentation. Additionally, LTR also calculated the great circle distance from the patient's residential address to their nearest utilized treatment facility, as well as their nearest utilized surgery, radiation therapy, and adjuvant therapy facility.

Results: In total, we identified 45,041 cases covering 42,676 unique female patients in LTR for the given time interval. As of December 15, 2021, 32,986 were still alive (77.3%), with 9,690 reported deaths (22.7%). The most common cause of death reported was breast cancer, with 4,071 deaths (9.5% overall, 42% of deaths), with cardiac disease being the second most common cause (991 deaths, 2.3% overall, 10% of deaths). The majority of patients were diagnosed as Stage I (54.7%), with Stage II, III, and IV being 32.5%, 11.5%, and 1.3% respectively. Although more patients were diagnosed at a later stage than the national average, mortality rates were higher in Louisiana across all stages, including breast-cancer specific mortality and all-cause mortality.

Conclusions: As expected, based on previous studies, Louisiana breast cancer patients face higher mortality rates than the national average. However, this is not limited to breast-cancer specific mortality. Many breast cancer patients also face a high risk of cardiac-related death, with a larger impact on early-stage cancer patients. Breast cancer survivors may benefit from additional health screening measures in survivorship programs to improve all-cause mortality in breast cancer patients.

1387959 - Surgical Oncology Breast Fellowship Websites: A Critical Analysis of Accessibility and Content

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Background/Objective: Residents applying for SSO-approved breast fellowships increasingly utilize the internet to manage their residency applications – a change that sets this generation of applicants apart from previous generations. This is true more than ever since the COVID-19 pandemic eliminated in person interviews and visits. Applicants rely on advice from colleagues, mentors and information gathered from the SSO website and the individual program websites. The purpose of this study is to evaluate surgical breast fellowship websites (SBFW) with respect to accessibility and content to determine if this information source is maximized for applicants.

Methods: Websites from all American 63 SSO-Approved Breast Surgical Oncology Fellowship Training Programs available for the 2023 match listed on the SSO website were included in the study. SBFW were evaluated by 2 current surgical residents interested in breast fellowship for comprehensiveness of content regarding resident education and recruitment.

Results: Of the 63 approved programs, 54 had fellowship specific websites (85.7%). As a whole, the only area where 100% of the programs reported information consistently was program contact information on the SSO-Website. In terms of resident recruitment, only 22.2% of SBFW had fellow selection process information, 20.6% had interview schedule information, and only 1.6% had interview day details. In terms of program description, 15.9% had a video description of the program, 50.8% listed the number of fellows, 79.4% had an overall rotation schedule, 41.3% had a description of expected skills and operative procedures that would be obtained, 3.2% had graduate operative case logs. In terms of education, 14.3% had a grand rounds schedule, 30.2% had a journal club schedule, and 11.1% had a morbidity and mortality conference schedule. In terms of research, 52.4% listed the regional national meetings attended, 68.3% listed research requirements, and 27.0% had research interests listed. In terms of fellow lifestyle, 12.7% listed annual salary, 15.9% listed health insurance information, 23.8% listed vacation policies, 9.5% listed family leave policies, 6.3% listed diversity/inclusivity information, 12.7% listed pictures or information on fellow social lives, 7.9% listed cost of living and/or housing information. No programs listed nursing mother considerations or work hours. In terms of alumni and current fellows and faculty, 20.6% listed past fellows, 23.8% listed current fellows, and 52.4% had a current faculty listing. Full results are reported in Table 1.

Conclusions: Surgical breast fellowship websites are often not readily accessible and do not provide basic information that allow residency applicants to use this recruitment tool effectively. SBFW may therefore be underutilized as an educational and recruitment tool. These findings have implications for applicants and breast fellowship programs, especially as the fellowship match process transition to an increasingly virtual and online experience. Programs may find it worth investing in SBFW for improved recruitment and matching of interested residents and programs.

Table. Full results

	SSO website		Program Website	
Category	N=	percent	N=	percent
Program description of any kind	63	100%	54	85.7%
Program contact information (name of program director & coordinator)	63	100%	52	82.5%
Program contact information (phone number)	57	90.5%	44	69.8%
Program contact information (email)	63	100%	50	79.4%
Link to program website	4	6.3%	N/A	N/A
Video description of program	0	0%	10	15.9%
Rotation schedule (overall year structure)	55	87.3%	50	79.4%
Operative case logs from graduates	1	1.6%	2	3.2%
Desc. Of surgical/procedural skills obtained during fellowship	26	41.3%	26	41.3
Call schedules	0	0%	2	3.2%
General surgery requirements	49	77.8%	38	60.3%
Didactics Description	49	77.8%	38	60.3%
Grand rounds schedule	9	14.3%	9	14.3%
Journal club schedule	20	31.7%	19	30.2%
M&M Schedule	3	4.8%	7	11.1%
Resident evaluation description	2	3.2%	4	6.3%
Regional/national meetings attended	42	66.7%	33	52.4%
Research requirements	50	79.4%	43	68.3%
Research interests listing	24	38.1%	17	27.0%
Past Research Citations	2	3.2%	9	14.3%
Up to date Research Citations	0	0%	0	0%
Faculty listing	8	12.7%	33	52.4%
Selection Process Info	10	15.9%	14	22.2%
Interview Schedule	4	6.3%	13	20.6%
Interview Day Details	0	0%	1	1.6%
List past fellows	0	0%	13	20.6%
List current fellows	0	0%	15	23.8%
Alumni Contact Info	1	1.6%	0	0%
Annual salary	2	3.2%	8	12.7%
Perks/educational stipend information	8	12.7%	13	20.6%
Health insurance information	1	1.6%	10	15.9%
Vacation policies	2	3.2%	15	23.8%
Family leave policies	0	0%	6	9.5%
Nursing mother considerations	0	0%	0	0%
Diversity/Inclusivity information	2	3.2%	4	6.3%
Patient population information	18	28.6%	13	20.6%
Work hours per week	0	0%	0	0%
Fellow Social Lives (pictures, activities, etc)	3	4.8%	8	12.7%
Cost of living/fellow housing information	9	0%	5	7.9%
Number of fellows	31	49.2%	32	50.8%
Password protected content (for current fellows)	0	0%	0	0%
Subjective: Based on the information on the website, do you feel the program meets the needs of the applicant?	N/A	N/A	R1 yes = 33 R2 yes = 53	61.1% 84.1%
Subjective: Do you feel the program website provided complete information for an interested applicant?	N/A	N/A	R2 yes = 12 R2 yes = 32	22.2% 50.8%

1387951 - Building Pathology Capacity in Sub-Saharan Africa to Improve Breast Cancer Diagnosis and Treatment: Training Laboratory Technicians in High-quality Manual Immunohistochemistry

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Background/Objective: Breast cancer mortality worldwide is highest in sub-Saharan Africa where an estimated one third of deaths over the next decade are preventable with improved diagnosis and treatment. To address the need for increased pathology capacity and a skilled workforce, we developed an educational program aimed at training pathology technicians in high-quality manual immunohistochemistry (IHC).

Methods: We mobilized faculty consisting of pathologists, an immunologist, a breast surgeon, laboratory technicians and a non-profit from Australia, Ethiopia, Germany, Kenya, South Africa, and USA. We conducted a baseline assessment across 11 countries about the available space, equipment, and human resources using 5-point Likert-scale questionnaires and free text. We launched a webinar (covering IHC theory, methods and troubleshooting); conducted knowledge assessments (pre and 35 days post-webinar using paired t-test); and invited participants to join an interactive digital mentorship platform (DMP) for posting discussions, sharing protocols, and networking. At 6 months, a pathologist presented the experience of implementing manual IHC in Hawassa, Ethiopia. Over 6 months, we tracked activity on the DMP, the number of times presentation recordings were viewed, and participant surveys on progress.

Results: A total of 263 participants from 11 countries attended the webinar. 95 participants from 9 countries responded to a survey: 62 histotechnicians, 11 pathologists, 4 pathology residents, 1 resident, and 17 “other” professionals. The majority (53.7%) reported their institutions do not perform IHC. Most institutions with IHC perform it manually. The most common assay was for breast cancer biomarkers: estrogen receptor (100%); progesterone (92.5%); and HER2neu (87.5%). The most common treatments frequently or always available for breast cancer were surgery (64.2%), chemotherapy (45.3%), endocrine therapy (34.8%), radiation (15%), and HER2neu directed therapy (< 14%). After the webinar, the mean knowledge assessment scores increased by 17.4% (from 41.8% pre to 59.2% post, p=< 0.0001). Self-reported confidence in topics increased by 11.3% (mean 3.36 pre-webinar to 3.74 post, p=0.1). 64 participants joined the DMP. Over 6 months, recordings were accessed 412 times. After the Hawassa pathologist’s presentation, membership in the DMP increased from 64 to172 and the recording was viewed 33 times in 30 days. Six months into our education program, 113 participants from 9 countries responded to surveys on progress. Of the 56 respondents who do not perform IHC, 64.3% (n=36) had begun discussions about starting it. Among 85 respondents, 43.5% reported moderate or significant positive practice changes such as improved antigen retrieval techniques, protocol development, and training others on optimization of preanalytical variables. Among 74 respondents who do perform IHC, 39 (52.7%) reported the quality of slides had moderately or significantly improved. (See Figure).

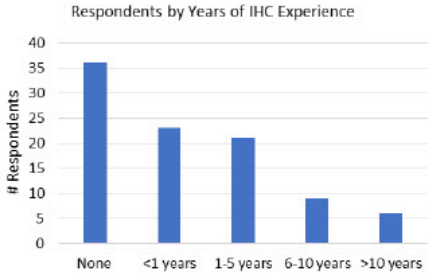
Conclusions: Our education intervention 1) reached hundreds of participants and provided a baseline assessment of pathology capacity in institutions in 9 sub-Saharan African countries; 2) created a novel mechanism to enable collaboration, resource sharing, and assessing progress with this cohort; and 3) improved practices and the preparation of slides for the majority performing manual IHC. Sustained engagement is needed for further building pathology capacity and tracking long-term impact on breast cancer treatment regionally.

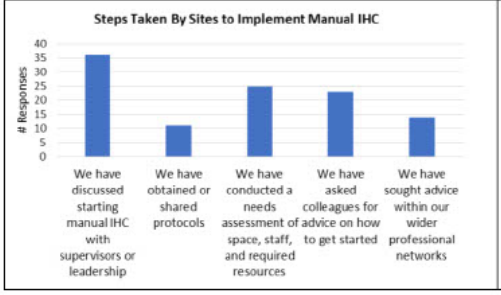
Figure.

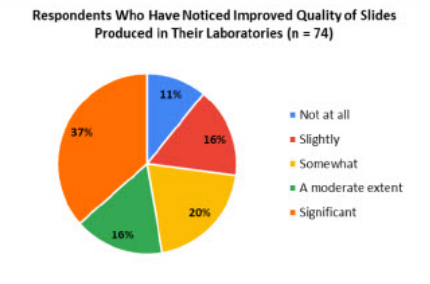
Milestone	Number of participants	Countries represented
Baseline Survey	95	Burundi (4), Cameroon (2) , Ethiopia (14), Gambia (1), Ghana (2), Kenya (7), Nigeria (56), Rwanda (5), and Zambia (4)
Webinar (lecture series)	266	Burundi (4), Cameroon (5), Ethiopia (32), Gambia (1), Ghana (4), Kenya (25), Nigeria (144), Rwanda (13), Senegal (1), and Zambia (19), non-African or unspecified country (18).
6 month Survey	113	Burundi (1), Cameroon (1), Ethiopia (34), Ghana (2), Kenya (6), Nigeria (56), Rwanda (4), Tanzania (1), and Zambia (8).

Baseline Survey of Available Treatment Options for Breast Cancer (n= 95 respondents)

	Never	Rarely	Sporadically	Frequently	Always	I do not know	
Surgery	7	6	13	30	31	8	95
Chemo-therapy	22	7	13	24	19	10	95
Tamoxifen	22	14	9	20	4	26	95
Radio therapy	39	14	7	14	6	15	95
Herceptin	31	11	13	11	2	27	95
Aromatase Inhibitors	33	11	8	7	2	34	95







1388197 - Surgical Approach in cT3 Breast Tumors – Is BCS a Reality?

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Background/Objective: Breast conservative surgery (BCS) with radiotherapy (RT) has proven to provide at least equivalent results to mastectomy in early breast cancer. Neoadjuvant treatments have allowed BCS in more advanced tumors, with literature reporting similar oncologic outcomes. We aimed to characterize real life practice of BCS in cT3 tumors, and its oncologic outcomes.

Methods: Retrospective analysis of all patients with cT3, non-metastatic, breast cancer, treated at a single oncology center, between 2018-2021. All BCS were performed with intraoperative margin analysis. Primary outcome was rate of BCS and secondary outcome was locoregional recurrence rate, overall and disease-free survival.

Results: From a total of 2716 patients, 133 patients were treated for non-metastatic cT3 tumors in the 4-year period. Of these, 27 (20,3%) patients had BCS. Median age was 52 years [Inter-quartile range (IQR) 47-64]. Neoadjuvant chemotherapy was used in 117 (88.0%) patients. Positive margins after BCS were found in 3 patients, who were subsequently submitted to mastectomy. Median follow-up time was 25 months [IQR 15-40]. Locoregional recurrences were found in 5 (3.8%) patients, all cases after mastectomy. Distant recurrences were found in 12 (9%) patients, 3 cases after BCS and 6 cases after mastectomy. No differences were found in overall survival and disease-free survival according to breast surgery performed.

Conclusions: BCS is performed in our center in 20.3% of cT3 tumors, with similar short-come oncologic outcomes to mastectomy.

Patient Education

1386726 - The Usability of MedEd: A Novel Patient Engagement Technology

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Background/Objective: Online patient portals have given patients increased access to their own medical records. While this increases patient autonomy, it also presents challenges as patients now receive complex medical reports without interpretation from their health care provider. MedEd is a novel patient engagement technology (PET) web browser extension which provides definitions of complex medical terminology to aid in patient comprehension of breast pathology and radiology reports. The aim of this study was to evaluate the usability, acceptability, and appropriateness of the PET web browser extension.

Methods: Patients who underwent a normal screening mammogram at an academic medical center between February and May 2022 were invited to complete a validated health literacy questionnaire. Patients were also asked to indicate interest to participate in a 30-minute semi-structured interview during which they were asked to download the PET website browser extension and discuss their experience with the tool. Participants then completed a validated questionnaire assessing acceptability, appropriateness, and feasibility of the tool. Transcripts were de-identified, transcribed verbatim, and independently coded by 2 members of the research team to assess common themes.

Results: Of the 121 patients who received the initial survey invitation, 11 completed the semi-structured interview and the acceptability, appropriateness, and feasibility questionnaire. In the interviews, patients described overall satisfaction with the ease of installing and usability of the PET web browser extension. Every patient interviewed expressed a degree of excitement for future implementation of the tool. Patients suggested the website provide more instruction regarding the need to restart the web browser for the extension to work. Some expressed concern that people with less technological proficiency may find the tool difficult to download. Responses to the questionnaire demonstrated that the PET extension had a mean acceptability score of 4.48/5 (Standard deviation [SD] 0.95), mean appropriateness score of 4.66/5 (SD 0.83), and mean feasibility score of 4.48/5 (SD 1.04).

Conclusions: In this mixed methods study of a novel patient engagement technology, patients had a positive experience with downloading and using the web browser extension and rated its acceptability, appropriateness, and feasibility highly. Next steps include evaluating the efficacy of MedEd in improving comprehension of breast pathology and radiology reports and subsequently making it accessible to patients independently interpreting medical results.

1387850 - Evaluating the Accuracy, Quality, and Readability of Online Breast Cancer Information

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Background/Objective: Online sources of health information can be difficult for non-medical professionals to comprehend, lowering accessibility for many patients. Consequently, the NIH and AMA recommend that patient education materials are written at no greater than a 6th grade reading level. Additionally, health websites may lack quality or accuracy, leading to misinformation about health conditions. These characteristics are especially important when discussing malignant conditions such as breast cancer. The aim of this study was to assess the accuracy, quality, and readability of online breast cancer information through expert evaluation and validated tools.

Methods: An online search of 50 websites was performed in June 2022 on the most used online search engine (Google) using the following terms: “breast cancer”, “breast surgery”, “breast reconstructive surgery”, “breast chemotherapy”, and “breast radiation therapy.” The first 10 websites from each search term were included for evaluation and were then categorized by their affiliation (non-profit hospital, non-profit organization, commercial, government, and media). Accuracy was evaluated by a panel of 5 fellowship trained and board-certified breast cancer specialists: 3 breast surgical oncologists, 1 medical oncologist, and 1 radiation oncologist using a 5-point scale: 1 for < 25% accuracy, 2 for 26%-50% accuracy, 3 for 51%-75% accuracy, 4 for 76%-99% accuracy, and 5 for 100% accuracy. Quality was evaluated through the DISCERN questionnaire. This validated tool assesses the quality of written health information using the following rating scale: 63-75 excellent, 51-62 good, 39-50 fair, 27-38 poor, and 16-26 very poor. Readability was then measured by grade level using 9 validated standardized tests through Order Readability Studio Professional Edition software. ANOVA and pairwise comparison testing were performed to evaluate differences between websites.

Results: Website affiliations with the highest accuracy ratings were non-profit hospitals (mean accuracy score 4.07) and non-profit organizations (mean accuracy score 4.05), with the lowest accuracy information on commercial sites (mean accuracy score 3.5). However, no significant differences were seen when comparing accuracy by website affiliations ($p=0.08$) or search terms ($p=0.98$). The overall mean DISCERN score for website quality was 50.8, which corresponds to “Fair”/borderline “Good” quality. While quality did not differ significantly among website affiliations ($p=0.10$), the highest quality information was on non-profit academic hospital websites (DISCERN score 52.6), while the lowest quality information was on government websites (DISCERN score 45.2). The overall mean readability was at a 10th grade reading level, which significantly exceeds the recommended grade level by 4.4 levels ($p< 0.001$). Readability was significantly different by website affiliation ($p=0.049$). Significant differences were found when comparing commercial websites (mean 9th grade reading level) with non-profit hospital websites (11th grade reading level) ($p=0.036$).

Conclusions: In this evaluation of online breast cancer information, mean accuracy was 4.05, mean quality was “Fair,” and readability scores significantly exceed the recommended 6th grade reading level. Accuracy and quality of websites did not significantly differ by their affiliation. These findings

demonstrate opportunities to improve online patient materials by providing higher-quality information while ensuring appropriate readability to facilitate informed patient centered decision-making.

1383241 - What Are We Saying?: A Qualitative Analysis to Assess Breast Surgeon-spoken Plain Language

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Background/Objective: Good communication in health care encounters improves outcomes, including emotional health, symptom resolution, functional status, and pain control. Yet there is limited research on how to measure elements of good communication such as spoken plain language, which is the use of familiar, clear language. We conducted a qualitative framework analysis to describe key elements of spoken plain language when breast surgeons talk with patients to identify attributes of spoken plain language that are measurable and distinguish clinicians from one other. Results will inform how we can provide clinicians feedback about their use of plain language.

Methods: We conducted a secondary analysis of transcripts from recorded encounters between breast cancer surgeons and patients with early-stage breast cancer. Patients were meeting with surgeons to discuss surgery and treatment options related to their diagnosis. To identify key and measurable elements of spoken plain language, 2 coders used a qualitative framework analysis based on the US Federal Plain Language Guidelines. To develop themes, they used an inductive approach while examining (1) alignment with the Federal Guidelines and (2) code frequencies within and across transcripts.

Results: Across 74 patients, the average age was 59 (standard deviation 11.6), 36% had a high school degree or less, 52% had an annual household income of less than $50,000, 72% were White 20% and 20% were Black. About half (51%) had adequate health literacy as measured by the single-item health literacy screener. Surgeons (n=13) from 4 medical centers were mostly female (77%), had finished medical school an average of 24 years prior, and had been at their current facility for an average of 11 years. We identified 2 major themes pertaining to measurable features of spoken plain language that distinguish clinicians from each other. First, clinician propensity to use explained and unexplained medical terms (Table 1). For example, some clinicians introduced the term sentinel lymph node biopsy and explained it fully while others mentioned the term but offered no description of what it entails. Other common medical terms included mastectomy, lumpectomy, margins, biopsy, estrogen receptor, progesterone receptor, and others. Second was the degree to which clinicians divide important clinical explanations across speech turns (one unit of someone speaking) (Table 1). Clinicians tended to either use short turns with single topics per turn (e.g., a surgeon using 6 phrases and 78 words to only go over the 2 surgical options then stopping their turn) or long turns with multiple topics per turn (e.g., a

surgeon using 33 phrases and 555 words to go over surgery, radiation, and anti-hormone therapy then stopping their turn).

Conclusions: The US Federal Plain Language Guidelines provided an appropriate framework to characterize the elements of spoken plain language. The propensity to use medical terms with and without explanation and to parse encounters into shorter or longer turns distinguish between using and not using plain language and are measurable across encounters. These findings will support further research on how clinician spoken plain language can be routinely assessed and the results given back to clinicians.

Table. Major themes and example quotes

Theme	Example Quotes
Major theme 1: Clinician use of medical terms was common; however some successfully explained the terms and some did not.	
Use of medical terms when surgeons are introducing the type of cancer the patient has	Example of explaining medical terms: "*You have an invasive ductal carcinoma and it's moderately differentiated. What does all that mean? When you think about the breast, it's made up of milk glands … and milk ducts. ... That means your breast cancer started in one of these milk ducts and it grew and it grew and it grew and it broke out.*" Example of not explaining medical terms: "*That's what they biopsied. When the pathology came back, it came back as this, invasive mammary carcinoma, and these neuroendocrine features is just their description of what it looks like, but it is a type of breast cancer.*"
Major theme 2: Some surgeons regularly used spoken plain language, such as use of short sentences ("phrases"), short paragraphs ("chunks"), and one topic per turn while others did not.	
Use of short turns with one topic	"*The second thing, when we talk about what type of breast cancer you have is what grade it is, and really that's when they look at the cells under the microscope, how fast are the multiplying, how aggressive do they look. We grade them low, slow growing, not very aggressive, intermediate and high. You're just low.*" "*I'm going to go over with you the advantages and disadvantages to each of these. That advantages to doing a lumpectomy is that we get to save your breast and it's less surgery. I would just make a small incision in your breast. I go in and I can feel the tumor. I take the tumor out with some normal tissue all around it and we saw you up and you go home. It's a same day surgery*"
Use of long turns with more than one topic	"*Yes. Ultimately, I don't think there's anything else on the side I need, so I'm going to go back to my own form. Typically, we know from a lumpectomy there's radiation to talk about. Ultimately, we also want to talk about the treatment that gets into the rest of you because treatment in the breast and the lymph nodes doesn't kill anybody. It's cancer that spreads. That's what makes breast cancer potentially fatal. We want a treatment that gets into your blood stream anywhere these cancer cells might try to be. Because your tumor is hormone-driven, a medical oncologist, who will be another part of the team taking care of you. A medical oncologist is definitely going to recommend anti-hormone pills for you. This, ultimately, will become your maintenance therapy for at least five years. These are pills that shut down the estrogen effect in your body to help reduce the risk of a cancer spreading anywhere else, and it actually reduces your risk of a second breast cancer as well. Any risk of a second breast cancer is very low. That just helps keep it low. The one thing that everybody worries about the most, I know, is chemotherapy. Chemotherapy, at this point in time, I can't tell you if they would say yes or no. You've got some features that say yes, some features that say no. Right now, I've got that it's possible. Hormone-fed cancers don't necessarily need chemotherapy because you're eligible for the anti-hormone pills. Some women have faster growing tumors who get more benefit for chemo. If your lymph nodes are okay and everything is still a little bit gray, what the oncologist may do is send out a tumor we removed with a lumpectomy for something called Oncotype DX. This is additional testing done on the tumor to help get a sense of your benefit from chemo. If your benefit is low, everybody is comfortable with no chemo. If your benefit from chemo is high, they're going to recommend chemo. If it's in the middle, then it's a discussion of all the pros and the cons. At this point in time, chemo is definitely a possibility, but it's not a sure thing. If chemo were recommended, that would be the thing that happens after surgery followed by radiation.*"

1388160 - Patient Knowledge of Their Personal Breast Cancer Risk and Breast Density

Kyra Nicholson[1], Kristine Kuchta[2], Marie Fefferman[1], Morta Lapkus[1], Catherine Pesce[2], Katherine Kopkash[3], Elizabeth Poli[2], Thomas Smith[2], Katharine Yao[2]

[1]University of Chicago, Chicago, IL, [2]NorthShore University HealthSystem, Evanston, IL, [3]NorthShore University HealthSystem/University of Chicago Medicine, Evanston, IL

Background/Objective: In the United States, a woman's lifetime risk of developing breast cancer is roughly 12%. However, it is not clear if women know their risk of getting breast cancer. The purpose of this study was to assess women's perception of their breast cancer risk and attitudes toward breast cancer screening.

Methods: We distributed a survey via our patient portal to women undergoing screening mammograms between November 2020 and July 2021. The survey asked women about their attitude towards breast cancer screening using a validated questionnaire, understanding of their breast cancer risk, and knowledge of their breast density. The results were stratified by patient age, race, and ZIP code.

Results: Of approximately 18,000 patients, 9,547 (50.0%) responded. The patients had a mean age of 59 ±11 years. 7,007 (73.4%) of the respondents identified as Caucasian, 357 (3.7%) identified as African American, 513 (5.4%) identified as Asian/Pacific Islander, and 1,590 (16.7%) identified as other. Of the respondents, 9,104 (96.7%) felt that breast screening is important. 2,468 (25.8%) of respondents perceived their risk of breast cancer as higher than the average woman, 5,213 (54.6%) perceived their risk as the same as the average woman, and 1,866 (19.5%) perceived their risk as lower than the average woman. Perceived risk of breast cancer was significantly different by patient race but not by patient age. 185 (36.0%) of Asian/Pacific Islander patients assumed their risk of breast cancer to be lower than the average woman compared to 1,236 (17.6%) of Caucasians and 74 (20.7%) of African Americans ($p < 0.0001$). 3,331 (34.9%) respondents stated their estimated lifetime risk of breast cancer was < 15% (low), 782 (8.2%) of respondents estimated their lifetime risk to be 15-20% (moderate) and 5,434 (56.9%) of respondents estimated their risk to be > 20% (high). These results did not vary among different age groups. Nonetheless, 220 (42.9%) of Asian/Pacific Islander patients assumed their lifetime risk of breast cancer was < 15%, compared to 2,356 (33.6%) and 137 (38.4%) of Caucasian and African American patients, respectively ($p < 0.0001$). 5,327 (55.8%) patients did not know their breast density category while 294 patients (3.1%) identified their breast density category as predominantly fatty, 935 (9.8%) identified their reading as scattered densities throughout the breast, 1,256 (13.2%) identified their category as heterogeneously dense, and 1,735 (18.2%) identified their category as extremely dense. Of the patients that identified their breast density as extremely dense, 894 (51.5%) perceived their risk of breast cancer to be the same as the average woman and 128 (7.4%) perceived their risk of breast cancer to be higher than the average woman.

Conclusions: Many women overestimate their lifetime risk of developing breast cancer and do not know their breast density. These findings present an opportunity to create educational interventions to better inform patients about their breast cancer risk and breast density.

Phyllodes

1386321 - Influence of Margin Width and Histology on Recurrence in Phyllodes Tumors of the Breast

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Background/Objective: Phyllodes tumors of the breast are rare neoplasms with guidelines historically calling for surgical resection with wide margins to reduce risk of local recurrence (LR). Recent reports suggest wider margins may not be necessary, even in malignant phyllodes tumor. These reports however used only very narrow margin width thresholds in their analysis and did not consider whether wider margins would improve outcome. We hypothesized that wide margins (>1cm) remain important to optimize LR.

Methods: We conducted a retrospective review of patients treated at our institution from the years 2008 to 2015. Patients were included if they were over the age of 18, had pathology reviewed at MD Anderson Cancer Center, and had at least 1 year of follow-up data. Patient demographics, treatment variables, pathology and recurrence data were obtained from the electronic medical record. Margin width was classified as positive, close (< 10mm) and widely clear (≥10mm). The distributions of time to local recurrence and time to distant recurrence were estimated by the Kaplan-Meier method.

Results: Our study included 117 female patients with average age of 44 years. Average tumor size was 3.4 cm. Breast-conserving therapy was performed in 97 (83%) patients and final surgical pathology was distributed as follows: 55 (47%) benign phyllodes tumor, 29 (25%) borderline phyllodes tumor, and 33 (28%) malignant phyllodes tumor. Final margins were noted to be positive in 16 (14%) patients, close in 32 (27%) patients, widely free in 64 (55%) patients, and unknown in 5 (4%) patients. Eighteen patients (15%) received adjuvant radiation and 10 patients (9%) received adjuvant chemotherapy. In multivariate analysis, narrower margins and higher histologic grade were significantly associated with increased risk of LR. As compared to patients with resection margins >10mm, patients with a positive margin and those with close margins had higher risk of having LR (HR 10.57 [95%CI 2.48, 45.02] and HR 5.66 [95% CI 1.19, 26.99 respectively). Compared to the patients with benign tumor, patients with borderline or malignant tumor had higher risk of having local recurrence (HR 5.80 [95% CI 1.48, 22.70]). Among the 55 patients with benign phyllodes tumors, the 10-year LR free rate was 100%, 94% and 66% for widely negative, close and positive margin cases respectively and LR rate was not significantly different between widely negative and close margin groups (p=0.93). In contrast, for the cohort with borderline or malignant tumors, the 10-year LR free rate was 93% and 57% for widely negative and close margin cases respectively (p=0.02), with no significant difference in local control between close and positive margin groups (p=1.00). Margin status did not impact risk of distant recurrence.

Conclusions: Margin status remains important for optimizing local control. For benign tumors, a negative margin remains important to reduce LR, although the width of the margin appears to be less

relevant. However, in higher grade phyllodes tumors, wider margins remain critical as narrower margins were associated with LR rates comparable to those with positive margins.

1385563 - Fibroepithelial Lesions on Core Needle Biopsy: Predictors of Upgrade to Phyllodes Tumor

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Background/Objective: Fibroepithelial lesions (FEL) are a common finding on core needle biopsy of breast masses. These are a heterogeneous group of lesions, including fibroadenomas (FA) and phyllodes tumors (PT), categorized as benign, borderline, or malignant. Differentiating FA from PT on core needle biopsy (CNB) can be challenging and when CNB of the breast shows FEL, excision is often performed to rule out a PT. The reported upgrade rate of FEL identified on core needle biopsy to PT after excisional biopsy is reported widely to range from 19-63%, and upgrade to borderline or malignant PT is reported as 2-8% in previous studies. The aim of our current study is to assess the upgrade rate from FEL identified on core needle biopsy to PT on excisional biopsy and identify the predictors of this upgrade at our institution.

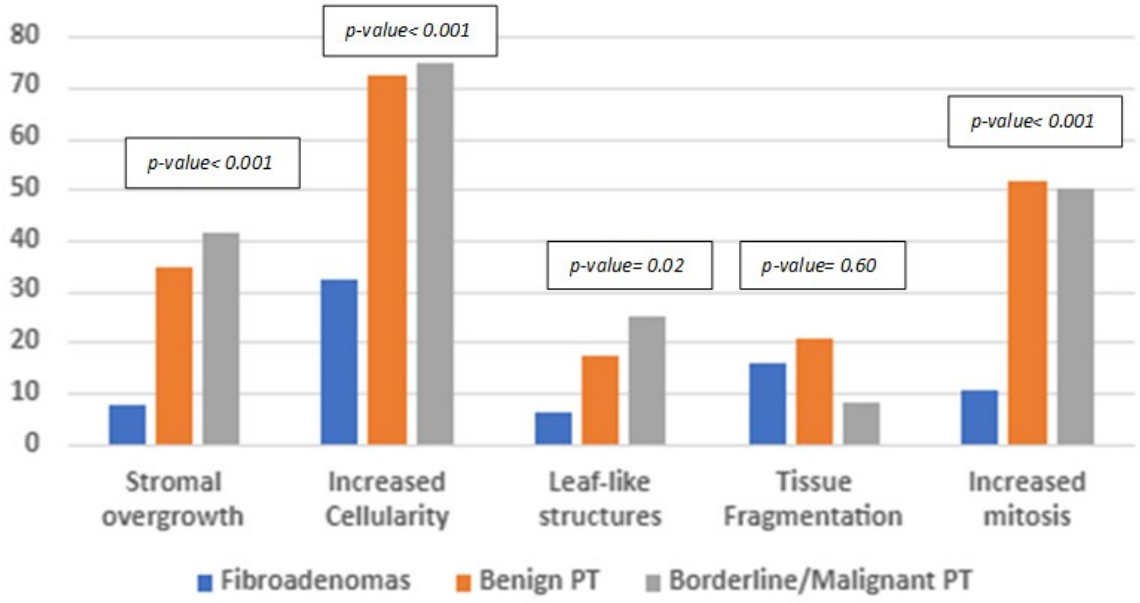
Methods: In this retrospective study, patients, aged 10 or older, who had a core needle biopsy consistent with FEL between 2012-2022, and subsequently underwent excisional biopsy were included. Based on the results of the excisional biopsy, patients were categorized into 3 groups; FA, benign PT, and borderline/malignant PT. Patients with a CNB consistent with FEL who did not undergo an excisional biopsy and patients with concurrent invasive or non-invasive breast cancer in the ipsilateral breast were excluded. Data regarding patient characteristics, ultrasound findings, and pathology of the CNB specimen were extracted and compared between the 3 groups. A total of 180 lesions, from 164 patients were included.

Results: Of the 180 lesions, 133 (74%) had an excisional biopsy consistent with FA, 29 (16%) benign PT, and 12 (7%) borderline/malignant PT (10 borderline, and 2 malignant). The overall upgrade rate to PT was 23% in this study. There were statistically significant differences between the 3 groups in terms of the presence of stromal overgrowth, increase or variation in stromal cellularity, leaf like structures, and increased mitosis at the time of core needle biopsy (figure 1). Also, the borderline/malignant PT lesions were more likely to appear heterogenous on US (42.8%), as compared to the FA (9.2%) and benign PT lesions (16%) with a p-value of 0.02. There were no statistically significance differences between the groups with regards to presence of tissue fragmentation (0.60), shape of the lesion on the ultrasound (0.47), and whether the margins were circumscribed on the ultrasound (0.74).

Conclusions: The overall upgrade rate from FEL to PT, at our institution is 23%. Consideration of factors such as stromal overgrowth, stromal cellularity, leaf-like structures, increased mitosis, and heterogenous

appearance on ultrasound may help predict the lesions that are less likely to have an upgrade on excisional biopsy. This may have clinical implication on the decision to surgically excise these lesions.

FIGURE. Comparison of the histologic characteristic of different FEL lesions on core needle biopsy



Quality Measures

1385695 - Breast-enhanced Recovery After Surgery Protocol Decreases Opioid and Anti-emetic Requirement and Hospital Length of Stay in Patients Undergoing Total Mastectomy without Reconstruction

Caleb King[1], Eleftherios Makris[2], Elizabeth Kairis[3], Nicole Zharichenko[4], Katie Meister[4], Stephen Esper[4], Jennifer Holder-Murray[4], Ronald Johnson[4], Jennifer Steiman[4], Kristin Lupinacci[4], Atilla Soran[4], Qurat ul Ain Sabih[4], Michael Cowher[4], Priscilla McAuliffe[4], Emilia Diego[4]

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Background/Objective: Enhanced recovery after surgery (ERAS) protocols have been used in several surgical specialties to improve patient outcomes, with a consensus from the ERAS Society in the utility of ERAS for patients undergoing breast reconstruction. However, an equivalent protocol for patients not having reconstruction does not exist. In 2018, an institution specific Breast-ERAS (BERAS) protocol was implemented with the goal of optimizing outcomes for patients undergoing a mastectomy without reconstruction (TM). The hypothesis of this study is that the BERAS protocol would result in a decrease in the in-hospital use of opioid pain medications, post-operative anti-emetic use and hospital length of stay (LOS) without affecting the 30-day readmission rate.

Methods: With Institutional Quality Review Committee approval, a single-institution retrospective review of consecutive patients undergoing a TM by 1 of 7 dedicated breast surgeons from January 2017-December 2022 was performed. Patient age, race, length of stay, 30-day readmission rate, post-operative anti-emetic use, intra-operative, post-operative and total opioid use during admission was collected and compared between the pre- BERAS and BERAS cohorts. This timeframe was chosen to capture at least 2 years of TM patients prior to BERAS implementation. Opioid use reporting was standardized using oral morphine milligram equivalents (OME). Statistical analysis was performed using GraphPad Prism software and a 2-tailed unpaired t-test was used to compare variables between the 2 groups, with significance set at $p< 0.05$.

Results: A total of 711 patients had a TM during this timeframe: 136 in the pre-BERAS and 575 in the BERAS cohort. Average patient age was 57 years in the BERAS cohort and 59 years in the pre-BERAS cohort. There was a statistically significant decrease in LOS (19.0hr vs 28.09h, $p< 0.0001$) in the BERAS group compared to the pre-BERAS group. Opioid use was significantly lower in the BERAS cohort intra-operatively (22.81 OME vs 28.76 OME, $p< 0.0001$), post-operatively (18.01 OME vs 62.95 OME, $p< 0.0001$), and in total opioid use during admission (40.82 OME vs 91.71 OME, $p< 0.0001$). While post-operative anti-emetic utilization was lower in the BERAS cohort (23% vs 30%), this was not statistically significant ($p=0.08$). There was no significant difference in re-admission rates between the 2 cohorts, 3% in the BERAS cohort and 5% in the pre-BERAS cohort ($p=0.30$). (Table 1)

Conclusions: Implementation of an institutional BERAS protocol for patients undergoing a TM can decrease LOS, opioid consumption and anti-emetic requirements without increasing 30-day readmission rates. Future work will include the impact of BERAS implementation on in-patient recorded pain-scores, and post-discharge anti-emetic use and opioid consumption.

Table. Comparison of the cohorts before and after breast-enhanced recovery after surgery (BERAS) implementation

Total Mastectomy without Reconstruction	BERAS N=575	Pre-BERAS N=136	p-value
Age (years)	56.9	59.3	0.18
Length of Stay (hours)	19.0	28.09	<0.0001
30-day readmission rates	3%	5%	0.30
Post-operative anti-emetic use	23%	30%	0.08
Intraoperative OME usage (mg)	22.81	28.76	<0.0001
Post-operative OME usage (mg)	18.01	62.95	<0.0001
Total OME usage (mg)	40.82	91.71	<0.0001

OME: Oral morphine milligram equivalent

1385696 - Variations in Use of Needle Biopsy for Breast Cancer Diagnosis and the Association with Guideline-concordant Care

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Background/Objective: Core needle biopsy (CNB) is the standard of care for the diagnosis of breast cancer by the National Comprehensive Cancer Network and is a well-established measure of quality surgical care by the Commission on Cancer (CoC). We used the National Cancer Database (NCDB) to examine the factors associated with needle biopsy and the relationship between receipt of needle biopsy and compliance with other indicators of quality. We hypothesized that patients who underwent diagnosis with needle biopsy were more likely to receive guideline concordant care than those who were diagnosed by other methods such as excisional biopsy.

Methods: Women with clinical T1-T3, nonmetastatic invasive breast cancer diagnosed between 2010 and 2018 were identified. Tumor registry codes were used to identify use of needle biopsy for diagnosis; method of diagnosis for those who did not undergo needle biopsy cannot be definitively elicited from the NCDB. Multivariable logistic regression was used to evaluate the association between patient,

hospital, and clinical tumor characteristics and concordance with use of needle biopsy in diagnosing the primary tumor. Hospital volume tertiles were created using distributional metrics of the number of breast cancer cases diagnosed annually at all institutions. Chi-squared tests were used to evaluate the association between diagnosis by needle biopsy and compliance with other CoC breast quality measures regarding guideline concordant receipt of timely radiation therapy, endocrine therapy and chemotherapy in appropriate patients.

Results: Of 581,959 patients, 550,904 (94.7%) were diagnosed by needle biopsy. The needle biopsy rate increased from 89% to 97% from 2010-2018. Higher hospital volume, more recent diagnosis year and higher T stage were associated with greater odds of receiving a needle biopsy on multivariable analysis. Patients who did not undergo needle biopsy were more likely to have positive surgical margins (6.4% vs. 3.6%, $p< 0.01$) and were less likely to undergo lymph node staging (84.5% vs 93.6%, $p< 0.01$) as part of their management. Receipt of needle biopsy was associated with higher compliance rates for all CoC breast quality measures: radiation following breast conservation: 94.0% vs. 87.9% ($p< 0.01$), post mastectomy radiation for patients with≥4 positive regional lymph nodes : 88.9% vs.80.5% ($p< 0.01$), endocrine therapy for Stage IB-III ER/PR+ surgically treated patients: 93.3% vs. 90.9% ($p< 0.01$) and combination chemotherapy or chemo-immunotherapy (if HER2+) for ER/PR- Stage IB-III surgically treated patients : 95.6% vs. 90.8% ($p< 0.01$).

Conclusions: Utilization of needle biopsy for the diagnosis of breast cancer is associated with higher rates of guideline concordant care for the treatment of breast cancer. Further research is needed to understand how the method of diagnosis impacts future management choices to inform quality improvement strategies

Table. Multivariable analysis of factors associated with needle biopsy (OR>1 means increase odds of needle biopsy)

			Odds of Needle Biopsy			
Covariate	Level	N	Odds Ratio	95% CI		P-value
Facility Type	Academic/Research Program	109583	1.12	1.06	1.19	**<.01**
	Comprehensive Community Cancer Program	209184	0.94	0.89	0.98	
	Integrated Network Cancer Program	91030	1.03	0.98	1.09	
	Community Cancer Program	41166	Ref	-	-	
Facility Location	Central	185916	1.15	1.12	1.19	**<.01**
	Mountain & Pacific	77243	1.35	1.29	1.41	
	New England & Atlantic	187804	Ref	-	-	
Hospital Volume for Diagnostic	26-50 cases diagnosed	97147	1.58	1.51	1.66	**<.01**
Year	>50 cases diagnosed	316498	2.21	2.11	2.31	
	1-25 cases diagnosed	37318	Ref	-	-	
Age	<50	72800	1.10	1.04	1.15	**<.01**
	50-60	127364	1.22	1.16	1.27	
	61-70	131025	1.22	1.18	1.26	
	>70	119774	Ref	-	-	
Race	Black	53180	0.99	0.94	1.03	0.50
	Other	21351	0.96	0.90	1.03	
	White	376432	Ref	-	-	
Ethnicity	Hispanic	24052	1.03	0.96	1.09	0.45
	Non-Hispanic	426911	Ref	-	-	
Primary Payor	Not insured	8380	0.97	0.88	1.07	**<.01**
	Private	226414	1.07	1.04	1.11	
	Public	216169	Ref	-	-	
Census Median Income	$38,000-$47,999	94802	1.11	1.06	1.17	**<.01**
Quartiles 2008-2012	$48,000-$62,999	122818	1.14	1.09	1.20	
	>=$63,000	166918	1.09	1.03	1.16	
	<$38,000	66425	Ref	-	-	
Percent No High School Degree	13.0-20.9%	105802	1.00	0.95	1.04	**<.01**
2008-2012	7.0-12.9%	149315	1.01	0.96	1.06	
	< 7.0%	130609	1.08	1.02	1.15	
	>=21%	65237	Ref	-	-	
Area	Non-Metro Bordering Metro	38929	1.05	1.00	1.10	0.13
	Non-Metro Not Bordering Metro	15665	1.05	0.97	1.12	
	Metro	396369	Ref	-	-	
Charlson-Deyo Score	1	62204	0.97	0.93	1.00	0.28
	2	13914	0.98	0.91	1.06	
	>=3	6471	0.95	0.85	1.07	
	0	368374	Ref	-	-	
Clinical T	2	122190	1.26	1.22	1.30	**<.01**
	3	21425	1.21	1.13	1.30	
	1	307348	Ref	-	-	
Clinical N	1	51501	1.37	1.30	1.44	**<.01**
	2	6484	1.01	0.91	1.13	
	3	3126	0.82	0.71	0.96	
	0	389852	Ref	-	-	
Year of Diagnosis	Units=1	448173	1.21	1.20	1.21	**<.01**

1386897 - Development of a Patient Readiness Screening Tool for Home Recovery After Mastectomy

Leah Kim[1], Holly Zurich[1], Eric Schneider[1], Pavan Anant[2], Melanie Lynch[1], Gregory Zanieski[1], Alyssa Gillego[1], Monica Valero[1], Ellie Proussaloglou[1], Mehra Golshan[1], Elizabeth Berger[1], Rachel Greenup[1], Tristen Park[1]

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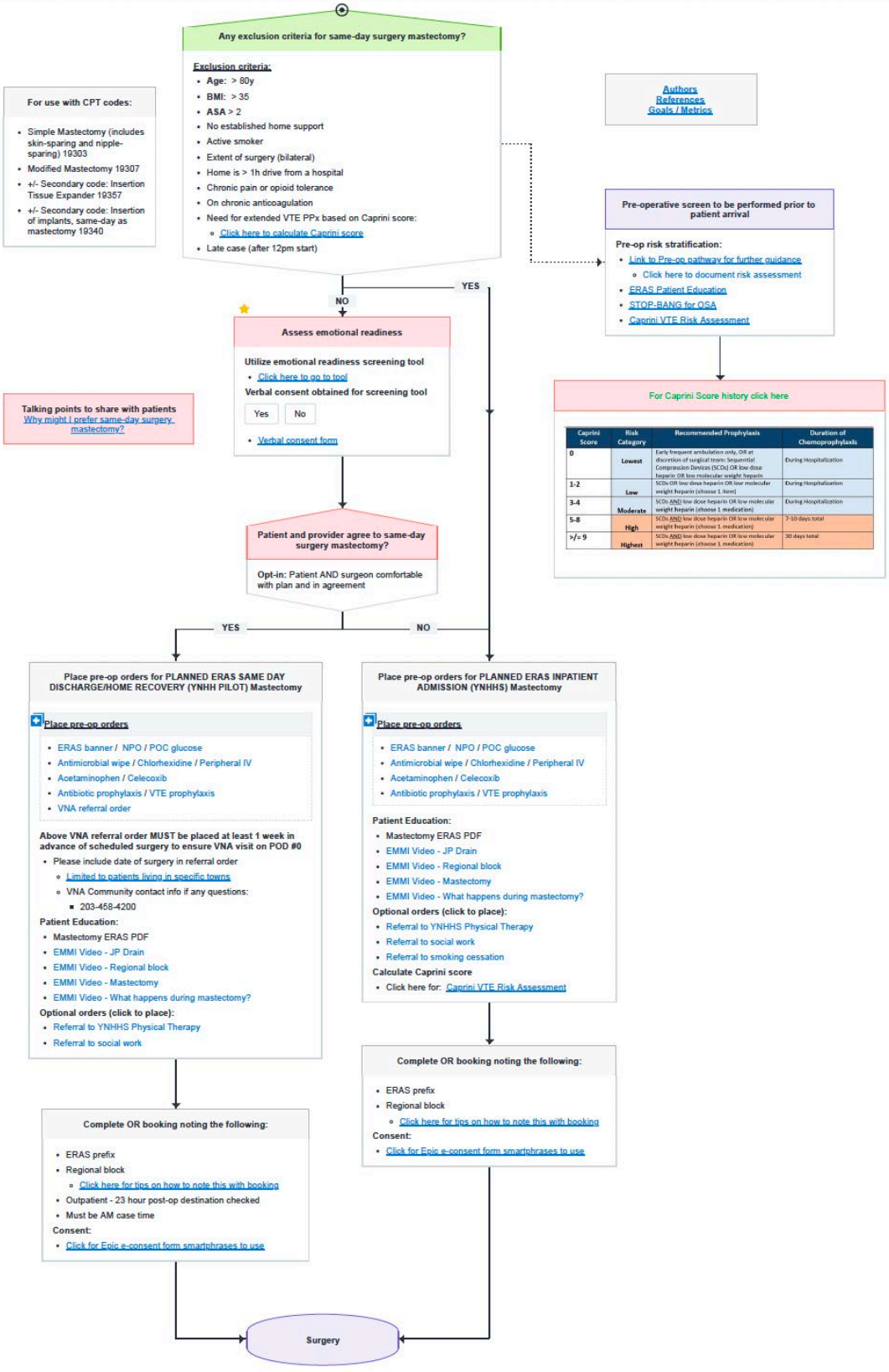
Background/Objective: Home recovery (i.e., same day discharge) after mastectomy may be a safe and patient-centered alternative to conventional overnight admission for appropriate individuals. Understanding the patient perspective around recovery at home remains unclear. We sought to determine the feasibility and acceptability of implementing a patient reported screening tool to evaluate psychosocial readiness for home recovery after mastectomy.

Methods: A literature review on "hospital discharge readiness" was performed and common themes were identified for assessing patient preparedness for discharge. A collaboration of multi-disciplinary stakeholders was assembled, including breast surgical oncologists, plastic surgeons, anesthesiologists, nursing staff, pharmacists, advanced practice providers, and advocates from our institution's Patient and the Family Advisory Council. A 10-item survey evaluating patient readiness was created. Oncology Patient Educational Specialists graded survey language to gather feedback and ensure health literacy at a 6th grade reading level. The survey was iteratively revised and pretested within interdisciplinary focus groups before being embedded into a Care Signature ERAS Home Recovery Mastectomy Pathway at a quaternary health system. A research protocol for implementation and administration of the survey was submitted for IRB review and granted exemption as part of clinical care.

Results: The literature review identified 4 thematic domains of patient readiness for home recovery. These included: (i) perceived ability; (ii) knowledge; (iii) expected home support; and (iv) psychosocial preparedness. Using these themes as a framework, a 10-item survey on a 10-point Likert scale was developed. Questions were assigned to each domain: perceived ability (3 questions), knowledge (3 questions), expected home support (2 questions), and emotional status (2 questions). Following iterative review, our novel screening tool was considered acceptable and feasible. Using the screening tool, patient recruitment will begin November 1st, 2022, at a quaternary care center and we anticipate enrolling at least N=50 patients by Spring 2023.

Conclusions: Development of a patient-reported readiness screening tool will help advance knowledge in an unexplored area for home recovery after mastectomy. Survey results will be analyzed in the context of clinical outcome metrics and health care resource utilization. Our goal is to develop a validated screening tool that could be used to provide support and interventions, where possible, to promote safe home recovery after mastectomy. Early development of a patient readiness screening tool can be further advanced and tailored to other patient populations.

Figure. Care signature ERAS home recovery mastectomy pathway



1388282 - Early Observations in the Use of Tranexamic Acid in Breast Surgery

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Background/Objective: Tranexamic acid has been demonstrated in trials and journals to reduce the risk of major bleeding complications and need for blood transfusion, while maintaining a low adverse event profile. In breast surgery there are potential benefits of decreased bleeding, reduced drainage, and earlier removal of surgical drains, leading to decreased morbidity.

Methods: In our academic community hospital, we initiated an IRB-approved quality improvement retrospective case review. We reviewed 21 patients who received tranexamic acid (TXA) versus 21 that did not. TXA was administered as either 1 gram IV or 1 gram topical. Patients with reconstruction were excluded. Primary endpoint was time to drain removal. Secondary endpoints included fluid collections, aspirations, and antibiotic requirements.

Results: 42 patients in this subset were treated surgically in 2021 and 2022. Of the 21 who received TXA, 13 (61.9%) underwent unilateral mastectomy and 8 (38.1%) underwent bilateral mastectomy. 11 (52.4%) had sentinel lymph node biopsy (SLNB) and 6 (28.6%) had axillary lymph node dissection (ALND). TXA was administered IV in 14 (66.7%) and topically in 7 (33.3%). Of the 21 patients treated surgically with a mastectomy who did not receive TXA, 17 (81.0%) underwent unilateral mastectomy and 4 (19.0 %) underwent bilateral. 13 (61.9%) had SLNB and 3 (14.3%) had ALND. The median post-operative day to drain pull was 7 in the TXA group and 11 in the non-TXA group. Threshold for drain removal < 30cc, at surgeon's discretion. During the peri-operative period, blood loss was minimal and none required transfusion. In the group who received TXA, 3 (14.3%) had seroma and 2 (9.5%) had hematoma collections. Of those, 2 required aspiration. In the non-TXA group, 2 (9.5%) had seroma collections and both were aspirated. None required antibiotics. No patients had adverse events related to TXA.

Conclusions: TXA use in breast surgery in this small cohort seems to be promising in reducing drainage output. The effects are faster drain removal with a decrease in the risk of infection. TXA is a cost-effective way to reduce drainage, which should decrease morbidity for post operative breast surgery patients. This cohort showed minimal seroma formation requiring aspiration and no serious adverse events. A prospective randomized controlled study is needed and we would welcome the participation of additional partner institutions.

Table. Characteristics and outcomes with and without TXA

	TXA	No TXA
Unilateral Mastectomy	13 (61.9%)	17 (81.0%)
Bilateral Mastectomy	8 (38.1%)	4 (19.0%)
SLNB	11 (52.4%)	13 (61.9%)
ALND	6 (28.6%)	3 (14.3%)
Post-Op Day Drain Pull	7	11
Seroma, Hematoma	3 (14.3%), 2 (9.52%)	2 (9.52%)
Aspiration	2	2
Antibiotic	None	None

1388328 - Quantifying Excessive Opioid Prescribing After Breast Cancer Surgery Using Opioid Prescribing Engagement Network (OPEN) Guidelines

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Background/Objective: The CDC estimates that opioid overdose deaths in the United States surpassed 100,000 (a 30% increase) with the COVID-19 pandemic in 2021. As a large proportion of the opioids involved in overdose are from physician prescriptions, limiting excess prescribing can change the course of the opioid epidemic and decrease unnecessary deaths. We sought to determine whether post-operative opioid prescribing patterns among breast surgeons align with procedure-specific national prescribing guidelines.

Methods: Non-metastatic breast cancer patients undergoing lumpectomy or mastectomy at a single institution between 4/2020 and 7/2021 were included in a retrospective cohort study. Surgical procedures were categorized to mirror procedure-specific Michigan Opioid Prescribing Engagement Network (OPEN) guideline recommendations. Opioids received were converted to oral morphine equivalents (OMEs) using the CDC dose conversion guidelines. Discharge overprescription was defined as a quantity of OMEs greater than the upper limit of the OME range recommended by OPEN (through conversion from 5mg oxycodone tabs). The percentage of patients overprescribed was categorized by procedure. In an effort to characterize provider decision-making, discharge OME amounts were compared to individualized inpatient opioid needs. Univariable analysis identified risk factors (increased age, tobacco use, and surgery duration) associated with high inpatient opioid need, and multivariable regression analysis accounting for significant covariates identified whether inpatient use of opioids predicted amount of opioids prescribed at discharge.

Results: 464 breast surgery patients met inclusion criteria. 280 patients underwent lumpectomy and 184 underwent mastectomy. Overall, 56% of patients were overprescribed according to OPEN recommendations. Specifically, 74% of patients undergoing lumpectomy alone, and 90% of patients undergoing lumpectomy with axillary surgery were overprescribed, whereas mastectomy patients were overprescribed less frequently (25% or less). Table 1 illustrates the mean differences between prescribed OMEs and recommended OMEs. The quantity of opioids prescribed at discharge did not correlate to inpatient opioid requirements after correcting for covariates ($r = 0.024$, $p = 0.604$).

Conclusions: Continued evaluation of current opioid prescribing patterns is the critical first step in limiting superfluous opioid prescription. Our findings demonstrate that opioid prescribing practices following breast cancer surgery still often exceed OPEN guidelines and are not reflective of individualized inpatient opioid requirements, and this is very common in patients undergoing ambulatory breast procedures. Future work will seek to improve adherence to procedure-specific guidelines and implement a tailored discharge prescription protocol to decrease the quantity of opioids available for diversion in our communities.

Table. Prescribed opioids compared to OPEN guidelines by procedure

Procedure	N (%)	Patients Overprescribed N (%)	OPEN Guideline Maximum (OMEs)	Mean Difference (Prescribed vs. Recommended OMEs)	p-value
Lumpectomy alone	57 (12)	42 (74)	37.5	+36.4	**<0.001**
Lumpectomy + Ax. Surgery	195 (42)	175 (90)	37.5	+50.3	**<0.001**
Lumpectomy + Bilateral Reconstruction	28 (6)	N/A	N/A	N/A	N/A
Unilateral Mastectomy +/- Ax. Surgery (no reconstruction)	53 (11)	4 (8)	150	+54.4	0.089
Unilateral Mastectomy +/- Ax. Surgery with Reconstruction	64 (14)	16 (25)	150	+62.2	**0.017**
Bilateral Mastectomy +/- Ax. Surgery (no reconstruction)	14 (3)	2 (14)	225*	+33.8	0.070
Bilateral Mastectomy +/- Ax. Surgery with Reconstruction	53 (11)	2 (4)	225*	+50.0	0.063

Ax. Surgery = Axillary Surgery, including sentinel lymph node biopsy and axillary dissection
Bold p-values indicate statistical significance
*OPEN recommendation for mastectomy with axillary dissection was used (max 225 OMEs) as the benchmark for patients undergoing bilateral mastectomy with and without reconstruction, since OPEN does not account for laterality nor reconstruction receipt

1383511 - Out-of-pocket Costs and Healthcare Utilization Related to Breast Cancer Surgery

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Background/Objective: Surgical decisions remain preference-sensitive for many women with early-stage breast cancer. We compared patient out-of-pocket (OOP) costs and health care utilization between breast conservation and mastectomy.

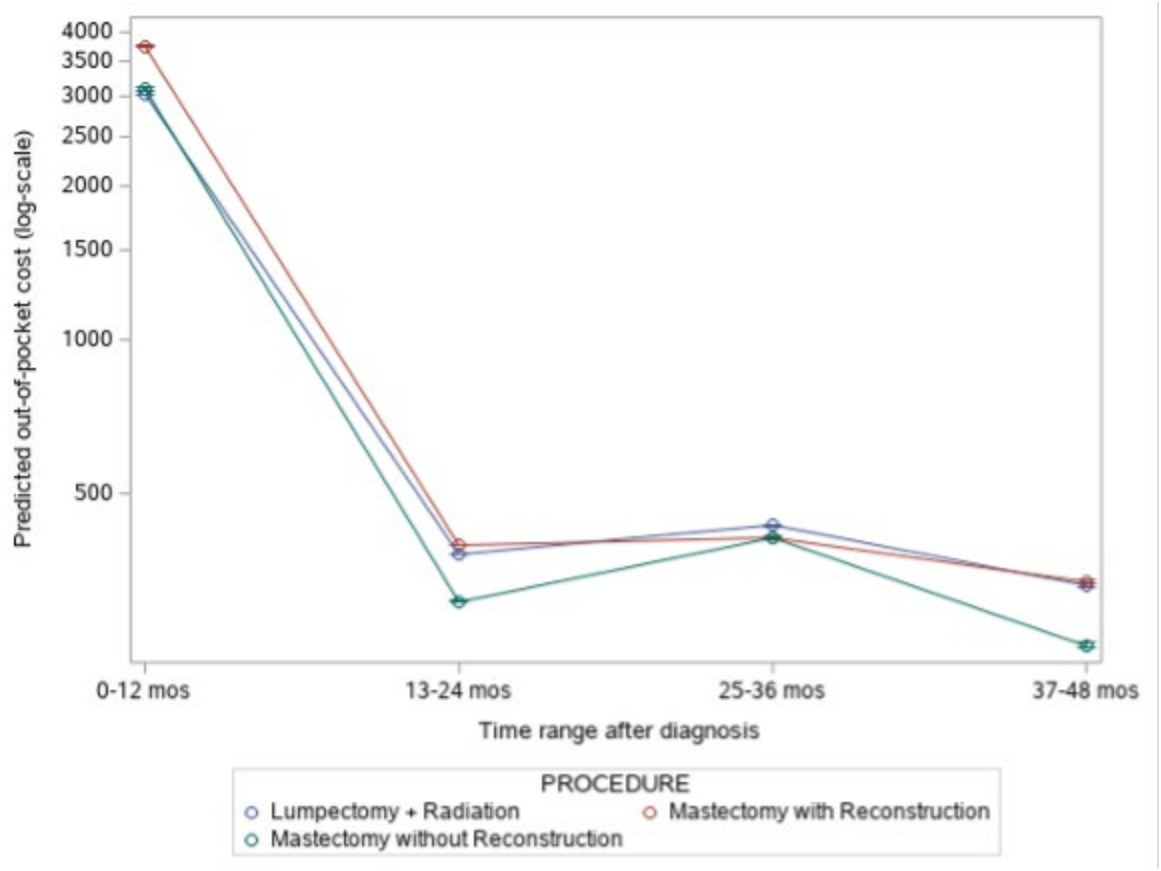
Methods: Women aged 18-64 who underwent up-front surgical management of early-stage breast cancer (January 2014-December 2017) were identified from the IBM MarketScan Commercial Claims Database. Women > 65 were excluded to eliminate Medicare-related capture bias. Enrollees had claims at least 1 year prior to and 1 year following diagnosis with at least 2 breast cancer-related claims within 30 days. Surgical treatment was identified by ICD-9/10 and CPT codes and included: a) lumpectomy with radiation; b) unilateral mastectomy +/- reconstruction; and, c) bilateral mastectomy +/- reconstruction. The Charlson Comorbidity Index score was used to assess patient comorbidities and health care utilization was measured by inpatient admissions, medicalized hospital days, and emergency care. Cumulative OOP payments (deductibles, copayments, and coinsurance) were assessed at 12-month

intervals for 4 years post-operatively and adjusted to 2017 USD$. Multivariable regressions were performed to identify factors associated with increased OOP cost.

Results: 22,819 unique female enrollees comprised the study cohort. Patients underwent lumpectomy with radiation (60%), unilateral mastectomy with (15%) and without (6%) reconstruction, and bilateral mastectomy with (17%) and without (2.6%) reconstruction. Women undergoing bilateral mastectomy with reconstruction were younger than other groups (median age 49 vs. 50-55, $p < 0.001$). The most common insurance plan type was Preferred Provider Organization (54.7%). In total, 1.24 million outpatient visits occurred within the first year, with a mean of 54 outpatient encounters per enrollee. In the first year after surgery, 27% of enrollees were admitted inpatient and 23% visited an emergency room. Health care utilization declined over time for patients regardless of surgery type with fewer inpatient, outpatient, and emergency room visits in years 2-4. Over the study period, median OOP costs for all patients were $5,669 (range $0 to $132,125). Cumulative costs were significantly higher in women < 45 ($p < 0.001$) and those with greater comorbidities ($p < 0.001$). In the first year, enrollees had median OOP costs of $3,661 (range $0-$119,311). OOP costs dropped dramatically over time, with median per-patient OOP cost of $486 between months 37-48 (range $0- $48,168). When comparing costs by surgical approach, median OOP costs remained higher for enrollees undergoing mastectomy with reconstruction throughout the study period. In the first 12 months, OOP payments for patients undergoing mastectomy with reconstruction were $4219, compared to $3,525 for mastectomy without reconstruction and $3,429 for lumpectomy + radiation. Logistic regression analysis demonstrated that cumulative OOP costs were 12% higher (8.9%-15.1%, $p< 0.001$) among enrollees that underwent mastectomy with reconstruction when compared to those treated with lumpectomy + radiation ($6,529 vs $5,333), translating into an estimated $8.6 million of cumulative additional OOP spending in those choosing mastectomy with reconstruction over 48 months after diagnosis.

Conclusions: Among commercially insured women with early-stage breast cancer, differences in out-of-pocket costs and health care utilization exist between equally effective surgical treatment options. Care coordination and cost communication may impact preference-sensitive treatment decisions and the risk of downstream cancer-related financial toxicity.

Figure. Adjusted out-of-pocket cost (log scale) by surgery type and time since surgery



1384374 - The Drain Game: Standardized Drain Instructions Improve Patient Memory While Maintaining Low Infection Rates

Kathleen Stutz[1], Maycee Gielow[2], Christina Lee[2], David Faddis[2]

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Background/Objective: Closed-suction surgical drains are common in breast surgery to reduce frequency of post-operative seroma, or hematoma. Studies have shown that early discharge after breast cancer surgery with a surgical drain in place is safe and does not increase wound complications. However, surgical site infection (SSI) rates in breast surgical literature are high, ranging from 1-38%, compared to only 1-5% for clean procedures. SSI following breast surgery can lead to prolonged hospitalization, readmission, reoperation, higher costs, negative psychologic and cosmetic outcomes, and delay in starting adjuvant therapies. When a patient leaves the hospital with a drain in place, the care of their drain is in their hands. To our knowledge, there is no published data about breast surgery patient education on and understanding of drain care after discharge from the hospital. This quality improvement project aimed to standardize and improve post-operative drain care instructions at our

institution, evaluate patient understanding and comfortability caring for their surgical drain, and decrease post-operative SSI rates.

Methods: For 6 months, breast surgery patients discharged with a drain were surveyed before hospital discharge and at their first post-operative visit. The survey measured patient understanding and comfortability caring for their drain and assessed drain cleanliness. Then, our institution implemented new, standardized drain care instructions. The old instructions encouraged patients to change their drain site dressings. The new instructions asked patients to leave their dressings in place unless visibly soiled. Post-intervention surveys were gathered for another 6 months. Breast surgery patients discharged with a drain were reviewed to assess understanding and identify drain related SSIs for 6 months before and after the new drain care instructions.

Results: At the first post-operative appointment, all patients reported that they understood their drain instructions (N=23 pre, 28 post). Patients reported mixed comfort levels when taking care of their drain, with minimal change in comfort after the intervention. Patients did, however, report better memory of drain instructions after the intervention (71.4% pre vs 91.3% post). After the intervention, more patients changed their dressings (9.5% pre vs 17.4% post) yet there was no change in reported redness (9.5% pre vs 9.1% post) and a decrease in reported drainage at the drain site (19% pre vs 13.6% post). After the intervention, fewer staff reported soiled dressings (16.7% pre vs 13.6% post). However, none of these changes were statistically significant. The overall rate of drain-related SSI was low, at 6.5% both 6 months before and after the intervention (N=46 pre, 31 post).

Conclusions: Surprisingly, patients changed their dressings more with the new instructions. It is possible patients were more aware of their drains after more specific instructions were provided. Our SSI rate was low and did not change over the 2 study periods, suggesting that changing dressings may not contribute to SSIs in this patient population. Patients had improved memory of their drain care instructions after the intervention, which may be due to having clearer instructions, reviewing instructions with the patient, and having patients practice caring for their drain in the hospital before discharge.

1337191 - Reducing Delays of Breast Cancer Care Using an Innovative Digital Health Platform

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Background/Objective: Background: For breast cancer patients, prolonged time from core needle biopsy to initiation of treatment is associated with a worse overall survival. This overall survival reduction disproportionately affects patients with Stage I and II breast cancer (hazard ratio: 1.09-1.16, $p < 0.001$), the subgroup of breast cancer patients for which a survival reduction would be least expected due to lower disease burden and least accepted due to the large number of patients affected and potential increased health care cost.

Methods: We conducted an IRB-approved quality improvement initiative among patients with Medicare Advantage at a health maintenance organization in Nevada to assess the ability of an innovative digital health platform to reduce the time interval between positive core needle biopsy to initiation of breast cancer treatment compared to a historical cohort of Medicare Advantage patients diagnosed and treated at the same facility over the preceding 6-month period. The study was restricted to women evaluated at a single contracted breast imaging center for inconclusive (Bi-RADS 0) and suspicious (BI-RADS 4 and 5) mammograms, ultrasound, and/or breast MRI. Time to treatment (TTT) calculations were limited to the subset of patients diagnosed with in situ and invasive breast cancer by core needle biopsy. The primary goal was to reduce the historical TTT by greater than 50%. A secondary goal was to reduce TTT to < 30 days, well below the interval where overall survival would be adversely affected.

Results: Between September 2021 and June 2022, 552 patients with BI-RADS 0, 4, and 5 breast imaging were enrolled in the quality improvement initiative and managed on the XpediteMD digital health platform. 444 patients were initially diagnosed as BI-RADS 0 of which 121 were reassigned as BI-RADS 4 (n=116) or BI-RADS 5 (n=5). 95 additional patients were initially classified as BI-RADS 4 and 13 additional patients were initially classified as BI-RADS 5. Among 232 ultimately classified as BI-RADS 4 or 5, 72 were found to have invasive or in situ breast cancer. Of these, 10 of which were excluded from the TTT analysis due to treatment delay caused by intercurrent illness (e.g., COVID-related hospitalization, cardiac disease, surgery for another condition) and 12 were excluded because which initially opted out of treatment. For the remaining 50 patients managed with XpediteMD, average TTT was 33 days compared to 74 days in the historical cohort, a statistically significant 55% reduction in TTT, exceeding the 50% TTT goal. Although the study did not meet the target goal of average TTT < 30 days, multiple potential process improvement were identified that, if implemented, would further reduce time to treatment.

Conclusions: This quality improvement initiative demonstrated the successful deployment of a novel digital health platform which achieved a 55% reduction in the time interval from a positive core needle biopsy to performance of breast cancer surgery or initiation of systemic therapy. By reducing TTT to 33 days, the initiative eliminated delays in initiation of cancer therapy that could have survival implications.

1388202 - Impact of COVID-19 on Breast Surgery

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Background/Objective: The Coronavirus Disease 2019 (COVID-19) pandemic both directly and indirectly threatened the health of thousands of cancer patients by disrupting their treatment schedules. Many hospitals during the pandemic were forced to delay elective surgeries to conserve resources and to limit the spread of the virus. It is estimated that nearly 38% of cancer surgeries are estimated to have been cancelled across the world during the 12-week peak of the pandemic. Patients frequently express concerns of even small delays in the treatment of breast cancer. Even pre-pandemic, time from breast cancer diagnosis to treatment initiation had increased by approximately 10 days in the last decade.

Delays in breast cancer treatment have been linked with increased mortality, such that each 60-day delay in surgery has been associated with a 26% increased risk of death.
Methods: A retrospective review was performed of patents who were diagnosed and treated for breast cancer between January 1, 2019, and December 31, 2020 (pre- and peri-pandemic) at a single institution. Timing to surgery (TTS) was calculated as the time interval between the initial clinical diagnosis and the surgical intervention of breast cancer patients. TTS was divided into 2 groups, less than 60 days, and greater than 60 days (delayed).

Results: A total of 678 patients were included in the study; 321 breast oncologic surgical interventions performed in 2019 and 357 performed in 2020. The average TTS in 2019 was 36.4 days, while the average TTS in 2020 was 46.9 days. There was a total of 106 (15.6%) patients who experienced delayed TTS during the time period analyzed. In the delayed group, the average TTS was 114.5 days in 2019 and 101.6 days in 2020. Of the peri-pandemic patients who were delayed, only 3 tested positive for COVID-19. Neoadjuvant endocrine therapy was initiated in 8/31 (25.8%) patients in 2019 and in 34/75 (45.3%) patients in 2020 who had greater than 60-day TTS. Of the patients in 2020 who had delayed TTS, and tested negative for COVID-19, 6/37 (16.2%) experienced clinical to pathologic upstaging.

Conclusions: Although the pandemic altered medical care in general, the number of breast oncologic surgical interventions did not vary significantly pre- versus peri-pandemic at this institution. The average TTS was longer during the pandemic, 46.9 days compared to 36.4 days; however, the majority of cases were less than 60-days to surgical intervention. COVID-19 infection positivity did not seem to contribute to delay in surgical intervention; however, 16.2% of patients who had greater than 60 days to surgical intervention did experience pathologic upstaging. Additionally, a shift in initial therapy toward the use of pre-operative hormone therapy was identified during the peri-pandemic period.

1387972 - Importance of Social Networks and Cancer Liaison Physicians in Implementation of Commission on Cancer's Synoptic Operative Report: An Organizational Theory in Implementation Science Analysis

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Background/Objective: The Commission on Cancer (CoC) introduced templated synoptic operative reports (SOR) in breast surgery as an accreditation standard to educate, integrate, document, and monitor adherence to the surgical standards. In the past, adoption of other CoC standards has been haphazard largely due to lack of explicit implementation strategies leaving hospitals to establish processes idiosyncratically. We sought to identify factors influencing SOR implementation with the long-term objective of improving adherence to surgical standards.

Methods: Guided by the Consolidated Framework for Implementation Research (CFIR), a comprehensive implementation determinants framework, we conducted in-depth semi-structured interviews from December 2021 – May 2022 with 31 health care professionals purposefully sampled from 4 CoC sites (Table 1). Additional participants from each of the sites were identified through snowball sampling. To analyze the data, we used template analysis, which involves identifying a priori themes based on CFIR domains and allowing additional themes to emerge. We leveraged implementation science's organizational theory domain called 'network perspectives' for further analysis. The 'network perspective' postulates that direct and indirect ties among individuals within organizations affect implementation of new standards. Social ties were mapped by characterizing the surgeon's relationship to a surgeon who was also a member of the Cancer Research Program or CoC's Cancer Liaison Physician (CLP) from the same health care system.

Results: Among 31 participants, there were 10 surgeons, 4 CLPs, 11 cancer program administrators, and 6 IT engineers (Table 1). Participants reported the CLP was the point person who received the updated Cancer Program emails from the CoC, which includes the new accreditation information. CLPs reported they in turn processed this to identify and designate key personnel to help implement the SOR . At the time of the interviews, CLPs did not intentionally disseminate SOR information to the surgeons even though the SORs were announced by the CoC at least a year prior. Surgeons who were not directly involved with the CoC reported lacking knowledge about the SOR. The surgeons who acknowledged they have known about SOR had close relationships with the CLP or the person who was involved with the CoC or American College of Surgeon's Cancer Research Program nationally.

Conclusions: CLPs are nominated as the physician quality leader of the hospital's cancer committee. Thus, CLPs are the central actors who receive the flow of information from the CoC. Organization theory suggests that leveraging social ties and secondary relationships with the CoC can help facilitate standard implementation. Engaging the participants in advance to allow for slow tempo of change also helps with uptake. Surgical standards adherence may be improved by leveraging CLPs' social ties to disseminate information from CoC to the surgeons.

Table. Characteristics of participating CoC-accredited hospitals

	A	B	C	D
Cancer Program Category	Comprehensive Community Cancer Program	NCI Designated Comprehensive Cancer Center	NCI Designated Comprehensive Cancer Center	Comprehensive Community Cancer Program
Location	East coast	Midwest	West coast	Midwest
Organizational Control	Non-profit	Non-profit	Non-profit	Non-profit
EMR Type	Athena, Cerner	EPIC	EPIC	EPIC
Employed breast surgeons (N)	2	8	3	0
Independent surgeon (N)†	0	0	0	5
Total Interview Participants (N)	9	12	6	4

†Breast surgeon not employed by cancer program

1387872 - Does Travel Distance Influence Length of Stay in Elective Breast Surgery?

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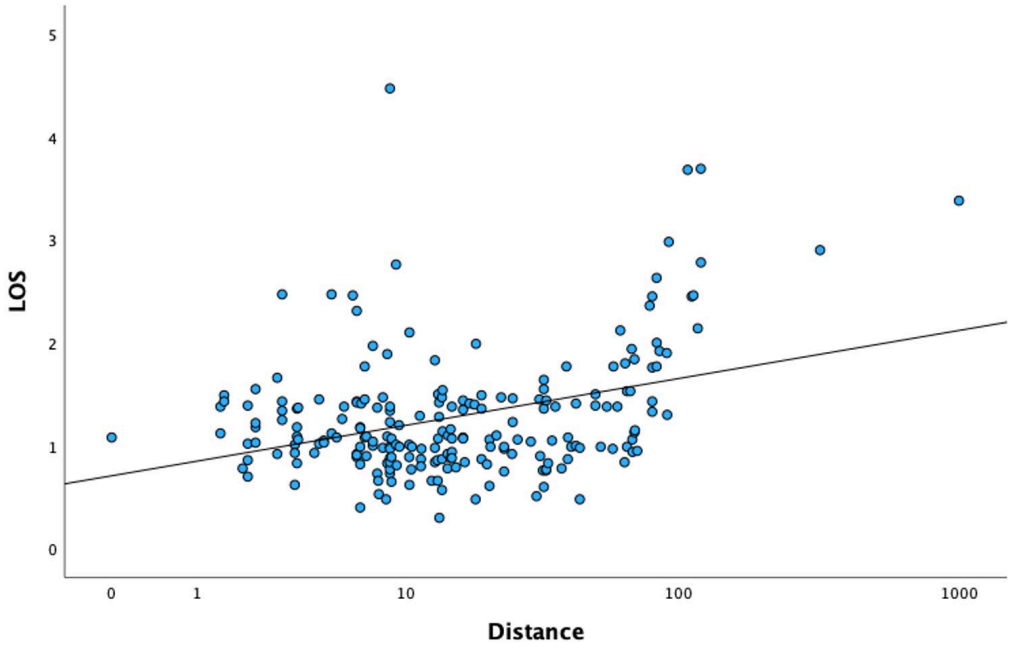
Background/Objective: Length of stay (LOS) following elective surgery is an important outcomes quality measure and there are increasing efforts in breast surgery programs to move towards same day surgery in appropriate cases. However, tertiary referral centers uniquely care for patients who may travel significant distances from home for surgical intervention. The objective of this study was to determine the effect of this travel distance on subsequent LOS for breast surgery patients.

Methods: With Institutional Quality Review Committee approval, a single-institution retrospective review of consecutive patients undergoing a mastectomy with or without breast reconstruction between 2017-2018 was performed. Demographics, surgical variables, and distance travelled were analyzed relative to LOS. Using IBM SPSS Statistics software version 29, continuous and categorical variables were compared using Wilcoxon rank-sum and Chi-square analyses. The LOS was log-transformed in general linear models to achieve normality.

Results: Of the 413 patients that underwent mastectomy, 99% were female with a mean ± standard deviation (SD) age of 55 ± 13 years. The mean ± interquartile range (IQR) distance travelled was 31 ± 27 miles (range: 0–992 miles). Of the 213 patients that underwent mastectomy without reconstruction the mean ± SD LOS was 1.25 ± 0.6 days (range: 0.2–4.2 days). Univariate analysis showed a significant increase in LOS with increased distance travelled ($p = 0.035$). Significant variables related to LOS were age ($p< 0.001$) and pre-operative American Society of Anesthesiologists (ASA) class ($p= 0.024$). The mean ± SD LOS of 151 patients that underwent mastectomy with implant reconstruction was 1.41 ± 0.5 days (range: 0.6–3.8 days) and 3.5 ± 0.9 days for 49 patients that underwent mastectomy with flap reconstruction. Univariate analysis did not show a significant increase in LOS with increased distance travelled, age, and pre-operative ASA class in either of these groups. The overall 30-day readmission rate for all patients was 5.2%. In a general linear model, for every 100 miles travelled there is an associated 2% increase in LOS ($p= 0.035$). When the distance travelled is increased by 500 miles LOS increases by 10% (Figure 1).

Conclusions: Increased travel distance from a patient's home to the hospital was independently associated with an increase in LOS for mastectomy patients. If LOS is a reportable quality measure in breast surgery, travel distance should be considered in risk adjustments..

Figure. Linear model of length of stay (LOS) by distance travelled



1387903 - Beyond CDC-defined Surgical Site Infection: Factors Associated with Antibiotic Prescription After Breast Surgery

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Background/Objective: Most studies exploring the prevalence and risk factors for surgical site infections (SSIs) use the Centers for Disease Control (CDC) reporting guidelines. Notably for CDC defined SSI after breast surgery, prescription of antibiotics for inflammation or cellulitis in the absence of fever is excluded. The aim of this study was to explore the prevalence of these excluded conditions after breast surgery and assess post-operative antibiotic treatment and outcomes in the absence of CDC defined SSI.

Methods: A single institution retrospective review of patients undergoing breast surgery from 01/2021-05/2021 was conducted. Solely reconstructive and cosmetic breast cases were excluded. Charts were reviewed for patient demographics, intra-operative details, post-operative CDC defined SSI, antibiotics prescribed during the peri-operative period, other wound related complications and reoperation. The primary outcome was antibiotic prescription in the post-operative period excluding routine prophylactic antibiotics. Data were analyzed to determine the rate antibiotic prescription in the absence of CDC defined SSI, with univariate analysis to identify factors associated with this outcome.

Results: A total of 754 breast surgical procedures were included. Of these 35% (n=266) were for benign breast disease and 65% (n=488) for malignant disease. Of the procedures performed for breast cancer, 48% included breast conservation without reconstruction, 3.5% breast conservation with oncoplastic

reduction, 15.4% simple mastectomy and 21.7% were mastectomy with reconstruction (tissue expander or direct to implant). The rate of CDC defined SSI in the overall cohort was 5.2% (n=39), with a majority of those in cases with tissue expander or implant-based reconstruction (49%, n=19) A total of 99 patients (13.2%) were prescribed antibiotics during outpatient follow-up: 25 (3.3%) had antibiotics prescribed at the time of CDC SSI diagnosis, 14 (1.9%) were diagnosed with a CDC SSI ≥ 1 day later, and 60 (8.0%) did not progress to meet CDC criteria for SSI. After excluding patients with a CDC defined SSI, patients who were prescribed outpatient antibiotics had a higher rate of diabetes (25% vs. 11%, p=0.004) compared to those not prescribed outpatient antibiotics, but no association with demographics such as age, body mass index, or current smoking. Patients prescribed antibiotics were more likely to have malignant disease (80% vs. 62%, p=0.005), a surgical drain (58% vs. 27%, p< 0.001), and to have been diagnosed with a post-operative hematoma (8.3% vs. 2.6%, p=0.03), seroma (21.7% vs. 8.2%, p=0.002) and cellulitis (11.7% vs. 0%, p< 0.001) compared to those not prescribed outpatient antibiotics. Re-operation for wound related concerns was higher among those prescribed outpatient antibiotics at 8.3% (5/60, for debridement of non-healing non-infected tissue) compared to 0.8% for those not prescribed outpatient antibiotics (5/655, for drainage of delayed hematomas/seromas).

Conclusions: Patients are being prescribed antibiotics after breast surgery based on clinical judgement for an indication other than CDC defined SSI. Post-operative wound morbidity including hematoma, seroma, and cellulitis could be contributing to these antibiotic prescriptions, with the possibility that providers are treating early SSIs prior to meeting CDC criteria. Conversely, these prescriptions could represent over-treatment in the absence of established infection. Future prospective studies are warranted.

Radiation

1386014 - DCLRE1C (Artemis) as a Potential Radiosensitivity Target in Triple-negative Breast Cancer

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Background/Objective: Breast cancer is the second leading cause of cancer-related deaths among females. The triple-negative (TNBC) subtype is associated with the worst clinical outcomes, due in part to the lack of biomarkers, limited availability of targeted therapies, and development of treatment resistance, including to radiotherapy. The mechanisms that govern development of radioresistance in TNBC are not fully understood, limiting the development of novel strategies or individualized treatments. Evidence suggests that dysregulation of various molecular pathways, such as cell death and DNA repair, could result in development of radioresistance.

Methods: We aimed to identify targets and pathways that confer radiosensitivity or radioresistance in TNBC using CRISPR-Cas9 genome-wide knock out screens (Moffat TKO V2 library; 90,000 single guide RNA, targeting ~18,053 protein coding genes) in MDA-MB-231 cells exposed to ionizing radiation (4Gy). Genomic DNA was isolated and sgRNA targeting sequencing was performed and analyzed by MAGeCK v0.5.7.

Results: Kyoto Encyclopedia of Genes and Genome (KEGG) pathway analysis on the 172 genes revealed enrichment of genes involved in non-homologous end joining (NHEJ) DNA repair, implicating their involvement in conferring radioresistance. One of the top hits in our screen was DNA cross-link repair 1 C, DCLRE1C, that encodes for Artemis endonuclease a key component of NHEJ DNA repair pathway. Analysis of The Cancer Genome Atlas (TCGA) database revealed that DCLRE1C was significantly upregulated in TNBC as compared to normal breast tissue. Furthermore, CRISPR-Cas9-mediated knockout of DCLRE1C in MDA-MB-231 cells confirmed that its loss-of function results in a significant decrease in colony forming ability, and this reduction was potentiated by ionizing radiation.

Conclusions: Taken together, our findings suggest that DCLRE1C loss-of-function sensitizes TNBC cells to ionizing radiation. Further investigation of the therapeutic potential of targeting DCLRE1C in TNBC to enhance radiotherapy efficacy is warranted.

1387595 - The Selection of Breast Cancer Patients for Intraoperative Radiation Therapy (IORT) Using American Society of Therapeutic Radiation Oncology (ASTRO) Category

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Background/Objective: IORT has many benefits compared to whole-breast radiation therapy (WBRT) including the convenience of giving a single dose of radiation therapy at the time of primary tumor excision, less expense, elimination of compliance issues, less exposure to the hospital environment, protection of the heart and lungs during treatment, and fewer side-effects. The lack of national acceptance stems from higher local recurrence rates compared to WBRT and low insurance reimbursement rates. In this study, we use 2017 ASTRO guidelines to select patients at a significantly lower risk of local recurrence to make IORT a viable treatment option.

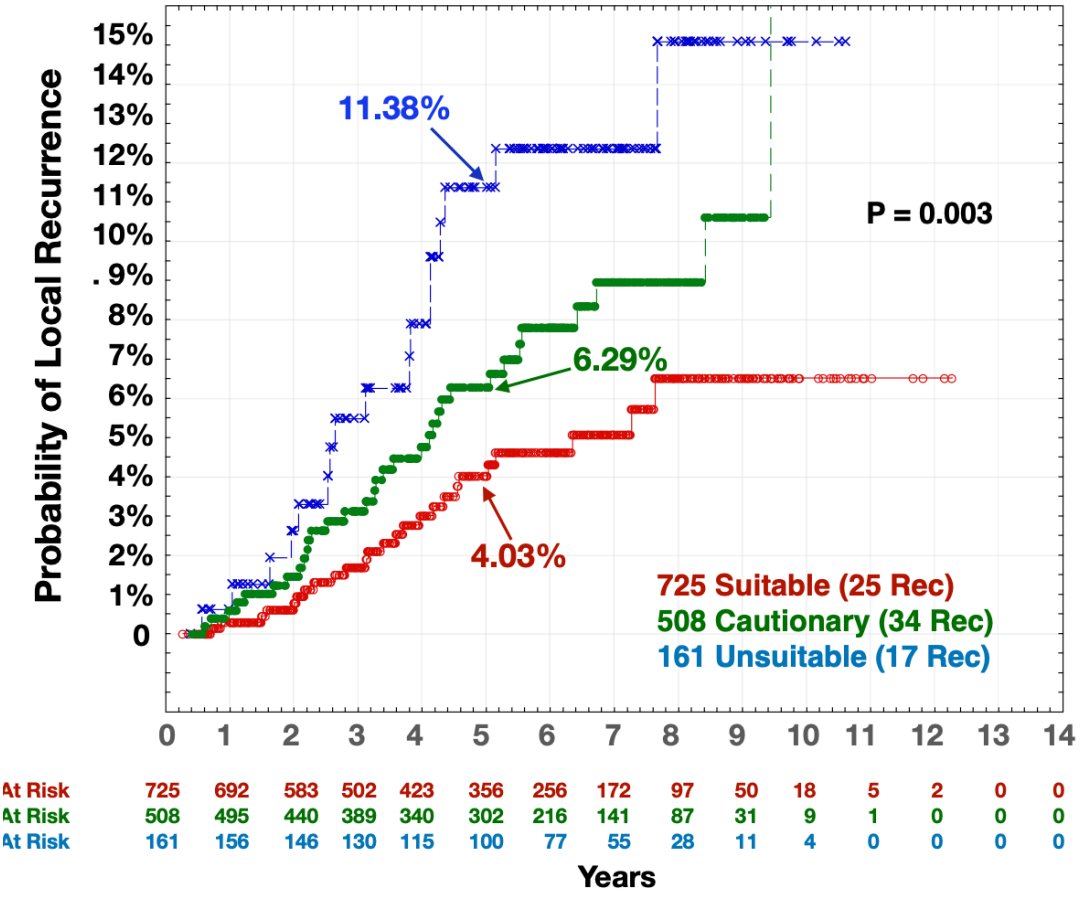
Methods: 1394 patients in our database received excision and IORT as their only form of local treatment for breast cancer. Patients who received any additional form of "risk-adapted" whole-breast treatment (WBRT or mastectomy) were not included since whole-breast treatment dramatically lowers the local recurrence rate, artificially improving the success rate of IORT. Once final histopathology was available, the patients were categorized into 3 ASTRO groups (suitable, cautionary, and unsuitable) using 2017 ASTRO criteria. ASTRO suitable patients were ≥ 50 years-old with tumor extent ≤ 20 mm, margins ≥ 2 mm, no lymphovascular invasion (LVI), node-negative or isolated tumor cells identified, no extensive intraductal component (EIC), unifocal, not invasive lobular carcinoma, not BRCA1/2 positive. If pure DCIS, grade 1 or 2, nonpalpable, tumor extent ≤ 25 mm and margins ≥ 3mm. Any ipsilateral breast tumor event was considered a local recurrence, regardless of location. Kaplan-Meier analysis was used to predict local recurrence rates. Curves were compared using the log rank test.

Results: With a median follow-up of 64 months, 1394 patients treated with excision and IORT alone were analyzed by ASTRO criteria. 725 suitable patients had 25 local recurrences, 508 cautionary patients had 34 local recurrences, and 161 unsuitable patients had 17 local recurrences. The figure shows the probability of local recurrence and the number of patients at risk for each category at yearly time points. The 5-year local recurrence probabilities are noted. ASTRO suitable patients recurred at a rate of 4.03% at 5-years. For ASTRO suitable patients who took post-operative endocrine therapy, the 5-year rate of recurrence dropped to 3.18%. The difference between suitable patients and both subgroups was statistically significant (overall p = 0.003).

Conclusions: ASTRO suitable patients treated with excision and IORT alone recur at a rate of 4.03% at 5-years. This is higher than patients who undergo WBRT but acceptable. In trade for the slightly higher local recurrence rate, all of their local treatment is completed at the time of their local excision. They do not have to return for a 4-6 week course of whole-breast radiation therapy during which time they would be exposed to a hospital environment. The heart and lungs are protected and IORT side-effects

are minimal. If they should develop a local recurrence or a new cancer at a later date, it can be excised and whole-breast irradiation given.

Figure. Probability of local recurrence by ASTRO category



1387246 - Low Ipsilateral Breast Tumor Recurrence Rates After Low-energy X-Ray Intraoperative Radiation Therapy in Patients with Low-risk Early-stage Breast Cancer

Natalie Johnson, Jessica Dzubnar, Nayana Vora, Laura Kruper, Scott Glaser, Lisa D Yee, Lorena Gonzalez, Yuman Fong, Terence Williams, Veronica Jones

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Background/Objective: Intraoperative radiation therapy (IORT) during partial mastectomy for breast cancer has potential advantages over external beam whole-breast irradiation (WBI), including precise delivery to the lumpectomy cavity, less damage to healthy tissues, patient convenience, and decreased cost. In 2 clinical trials, the risk of ipsilateral breast tumor recurrence (IBTR) was higher after IORT but varied depending on patient selection. Less is known about IORT using low-energy x-rays compared to electrons, especially regarding long-term IBTR rates and associated risk factors.

Methods: Patients who had partial mastectomy with IORT at a single institution from 4/2013 to 12/2021 were retrospectively reviewed. All patients had clinically and radiologically unifocal tumors ≤ 3cm and negative lymph nodes. Patients received a single dose of 20 Gy with 50 kV x-rays using the Xoft® Axxent system. Suitability categories and adequate margins (≥ 2mm for invasive, ≥ 3mm for DCIS) were defined according to ASTRO guidelines.

Results: All 230 patients were female, median age was 66 years (range 41-91 years), and 215 (93%) were postmenopausal. Overall, 28 (12%) patients had reexcision or mastectomy and 18 (8%) patients had adjuvant WBI. At a median follow-up of 4.5 years (range 0.8-9.6 years), 12 (5.2%) patients had IBTR. The IBTR rate was higher in patients who were younger than 55 (17% vs 4%, p=0.03), were premenopausal (20% vs 4%, p=0.03), had extensive intraductal component (19% vs 3%, p=0.03), and did not take hormonal therapy (12% vs 3%, p=0.04). The IBTR rate was 2.5% in patients who did not have any of these high-risk factors and increased with increasing number of high-risk factors (p< 0.0001) (Table 1). Among 18 patients with positive margins and 50 patients with inadequate margins, IBTR occurred in 5 (7.4%) patients, all of whom had undergone either reexcision without WBI or no reoperation and no WBI. Of 41 patients who had adequate margins but were “cautionary” for other reasons, none had reoperation or WBI. IBTR occurred in 3 (7.3%) of these patients, all of whom had extensive intraductal component or grade 3 ductal carcinoma in situ. There were no significant complications in patients who had WBI soon after IORT for poor prognostic features or long after IORT for IBTR.

Conclusions: The IBTR rate was similar to other studies on IORT and relatively few patients received adjuvant WBI. IORT should be approached with caution in young/premenopausal patients with extensive intraductal component who had higher rates of IBTR. Also, patients’ willingness to take hormonal therapy should be assessed when considering IORT. For patients who have margins that are negative but closer than recommended by ASTRO guidelines, WBI may be more essential than reexcision to decrease the risk of IBTR. WBI after IORT boost to the tumor bed was safe and effective. These findings support continued use of IORT in select patients with low-risk early-stage breast cancer with ongoing investigation to refine suitability criteria.

Table. Pathologic characteristics and outcomes related to ipsilateral breast tumor recurrence (IBTR) for all patients who received intraoperative radiation therapy (IORT)

		Median	*Range*
Ductal carcinoma in situ pathologic size (mm)		13	2 - 60
Invasive tumor pathologic size (mm)		12	1 - 48
		n	*%*
Histology	Ductal carcinoma in situ	41	18%
	Invasive ductal carcinoma	170	74%
	Invasive lobular carcinoma	19	8%
Tumor grade	1	71	31%
	2	123	53%
	3	36	16%
Biomarkers	ER positive HER2 negative	172	91%
	ER positive HER2 positive	8	4%
	ER negative HER2 positive	2	1%
	Triple negative	7	4%
Nodal involvement	Negative	169	92%
	Isolated tumor cells	7	4%
	Micrometastases	4	2%
	Macrometatases (pN1a)	4	2%
IBTR location	In IORT field	4	2%
	Same quadrant	3	1%
	Different quadrant	5	2%
IBTR management	Partial mastectomy + WBI	6	50%
	Mastectomy	5	42%
	Systemic therapy (metastatic)	1	8%
		IBTR rate	*p*
Number of high-risk factors (Age < 55, premenopausal, extensive intraductal component, no hormonal therapy)	0	4/159 2.5%	<0.0001
	1	3/52 5.8%	
	2	3/14 21.4%	
	≥ 3	2/5 40.0%	
ASTRO category	Suitable	4/114 3.5%	0.431
	Cautionary	7/89 7.9%	
	Unsuitable	1/27 3.7%	

1388261 - Outcomes of Intraoperative Radiation Therapy and Brachytherapy Compared with Whole-breast Irradiation

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Background/Objective: Adjuvant radiation therapy options following breast-conserving surgery (BCS) include whole-breast radiation (WBI) and partial breast irradiation (PBI). WBI may be delivered by 3-dimensional conformal radiation therapy (3DCRT), tangents, intensity modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT) while PBI may be delivered by these same techniques but also with brachytherapy or intra-operative radiation therapy (IORT). We hypothesize that the partial breast irradiation (PBI) techniques, IORT and brachytherapy, are associated with non-inferior local recurrence rates and lower toxicity rates compared with WBI in a federated network database.

Methods: The TriNetX network data from 55 health-care organizations across the USA was used to identify breast cancer patients who underwent BCS and received adjuvant radiation therapy during the years 2010 to 2022. Kaplan-Meier and Cox proportional hazards models were used to identify association between radiation type, local recurrence and overall survival (OS).

Results: A total of 31,496 patients were identified. 27,323 patients (86.75%) received WBI, 3436 (10.9%) received IMRT, 455 (1.4%) received IORT and 282 (0.9%) received brachytherapy. Compared to WBI, IORT was associated with increased local recurrence rates (LRFS 92.6% vs. 96.1%, $p< 0.00001$) but with improved 5-year overall survival rates (95.9% vs. 91.7%, $p=0.003$). Similarly, IORT was associated with higher local recurrence rates when compared with IMRT (LRFS 92.6% vs. 95.5%, $p=0.0005$). Among the PBI techniques, brachytherapy demonstrated the highest LRFS rate of 96.7% (IORT LRFS 92.6%, $p=0.02$) with similarly high 5-years OS rates (95.9% vs. 96.6%, $p=0.07$).

Conclusions: Brachytherapy is associated with low rates of local recurrence comparable to standard WBI coupled with improved OS rates compared with WBI. IORT is associated with similar excellent overall survival rates but with slightly increase local recurrence rates compared with the other radiation modalities.

1382951 - Evaluation of the Overlap Between Patients Eligible for NRG BR007 (DEBRA) Trial and Intraoperative Radiation Therapy (IORT) in Clinical Practice

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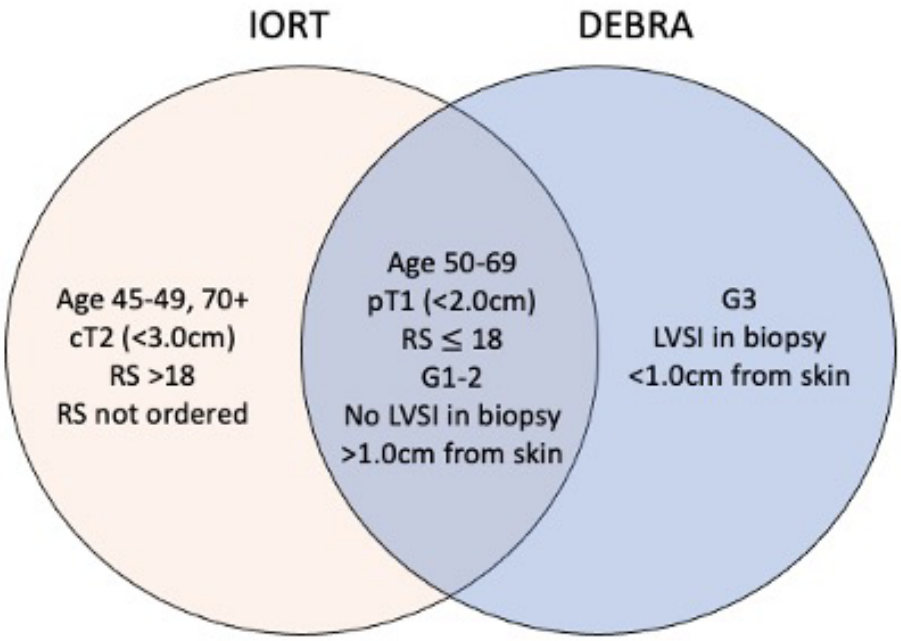
Background/Objective: Patients with early-stage invasive breast cancer undergoing lumpectomy may have multiple options for radiation as part of breast conservation, including potentially external beam radiation, intra-operative radiation therapy (IORT), NRG-BR007 (DEBRA) clinical trial participation, and omission of radiation therapy. Our goal was to evaluate the overlap between patients eligible for IORT and DEBRA trial in clinical practice to understand if these options compete or if they can coexist as part of a robust clinical program.

Methods: A single center, IRB-approved, retrospective review of patients treated with IORT from 1/2020-10/2022 was conducted. Clinicopathologic factors which determine eligibility for DEBRA trial were evaluated for the patients treated with IORT to identify overlap between the 2 populations (Figure 1). DEBRA trial ineligibility reasons were collected, as well as details on patients whose eligibility could not be confirmed such as Oncotype DX (recurrence score, RS) not ordered by medical oncology. Descriptive data are presented as total number, mean with standard deviation, and percentages.

Results: Among the 220 IORT patients reviewed, 85 did not meet age cutoffs for DEBRA with 6 being too young (< 50 years) and 79 being too old (≥70 years). Based on surgical pathology results, 20 patients did not meet pathologic tumor size requirements for DEBRA as their tumors were ≥2.0cm, and 21 patients had pathologic positive nodes despite being clinically node-negative. RS was obtained for 73/220 (33.2%) IORT patients with RS≤18 confirmed for 48/73 (65.7%). The other 147/220 (66.8%) of IORT patients did not have RS ordered by medical oncology, and therefore additional RS testing would be required to determine DEBRA trial eligibility. When combining the above factors and eliminating overlap, only 29/220 (13.2%) IORT patients were confirmed to meet eligibility criteria for DEBRA clinical trial.

Conclusions: While there are similarities between patients eligible for IORT and DEBRA, the overlap between these populations was of lesser magnitude than anticipated, with only 13% of IORT patients confirmed eligible for DEBRA trial. Multidisciplinary teams should be aware that a large percent of patients (66.8%) would require RS testing specifically to determine DEBRA trial eligibility when it would not otherwise be obtained by medical oncology for adjuvant systemic therapy decisions based on current NCCN guidelines. Centers can confidently offer both IORT and DEBRA, as the potential overlap between these 2 populations does not necessarily negatively impact successful enrollment in either option. Although our institution's IORT criteria and DEBRA trial eligibility are both directed at low-risk cohorts, these radiation approaches can successfully coexist in clinical practice and offering both provides patients more de-escalation opportunities.

Figure. IORT eligibility (pink) and DEBRA clinical trial eligibility (blue) with overlap in eligibility for both (purple) are demonstrated.



1384082 - The Relationship Between Radiation and Outcomes of Immediate Breast Reconstruction

Sarah Abouassali[1], Mallika Datta[2], Shreya Raman[3], Christian Blue[4], Paschalia Mountziaris[5], Dipankar Bandyopadhyay[5], Kandace McGuire[5], Xiaoyan Deng[5], Robert Marcaccini[6]

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Background/Objective: Post-Mastectomy Radiotherapy (PMRT) has become standard of care for patients with large tumors and nodal metastasis. However, local recurrence following breast-conserving therapy (including whole-breast irradiation) is also increasing in incidence due to increased survivorship. While PMRT and immediate breast reconstruction (IBR) has been well studied, the relationship between prior radiation therapy, PMRT and IBR outcomes has not been widely studied. In this study, we aim to assess factors that correlate with post-IBR complications in the face of radiation.

Methods: An IRB approved retrospective cohort review was completed using our tumor registry and electronic medical record chart review to identify female patients age ≥ 18 with and without history of radiation who underwent mastectomy with IBR. Operative (type of mastectomy, type of reconstruction), clinical, and pathological data were collected to analyze major and minor complications. Univariate and

multivariate logistic regression analyses were conducted to evaluate the relationship between receipt of radiation and major and minor complications after various forms of mastectomy and reconstruction with a p-value of 0.05 used to determine statistical significance. (SAS v 9.4).

Results: We identified 262 patients who underwent reconstruction from 2015 to 2019 with non-metastatic breast cancer of varying stages. There was no correlation between major or minor complications and a history of prior radiation. However, for patients with PMRT, univariate analysis demonstrated a higher incidence of “other” minor complications (OR 2.8, CI 1.27-6.28, p=0.01), such as erythema and edema. After multivariate analysis, it was determined that there is a higher incidence of implant exposure requiring reoperation (OR 5.7, CI 1.36-23.78, p=0.01) and “other'' minor complications (OR 3.1, CI 1.32-7.35, p< 0.001) in patients that have radiation after reconstruction. Neither history of radiation nor PMRT were associated with infection, skin necrosis, fat necrosis, capsular contracture, need for symmetry procedure, seroma, hematoma, implant rupture, bleeding, or pain (p>0.05).

Conclusions: Our study found no significant association between history of prior radiation and major or minor surgical complications after mastectomy and IBR. However, patients were at increased risk of developing minor complications requiring reoperation as a result of PMRT. These results suggest that we should discuss concerns regarding radiation with patients before their mastectomy and reconstruction and allay any fears regarding prior cancer therapy and effect on outcome. As length of survivorship from breast cancer continues to improve, further study is needed into the long term cosmetic and oncologic outcomes of radiation and IBR.

Reconstruction

1387383 - The Influence of Neoadjuvant Chemotherapy on Outcomes Following Immediate Breast Reconstruction with Latissimus Dorsi Flap and Silicone Implant

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Background/Objective: Neoadjuvant chemotherapy (NAC) is indicated in patients with locally advanced breast cancer, downstaging of large tumors, and early-stage aggressive breast cancer subtypes. NAC has been increasingly used over the past decade to improve local and distant disease control. Despite the benefits in terms of tumor downstaging, a significant number of patients who was exposed to NAC will still need to undergo mastectomy. Although NAC is considered safe for patients submitted to mastectomy and immediate breast reconstruction (MIBR) and some series previously described the surgical outcomes, the influence of NAC in MIBR with a latissimus dorsi myocutaneous flap and silicone implant (LDI) in terms of complications and outcomes have not been fully analyzed. Within this scenario, the present study has as primary objective to evaluate the safety of NAC in patients with breast cancer and undergoing surgical treatment with MIBR with LDI.

Methods: Retrospective observational clinical cohort performed by collecting data from 196 patients with breast cancer undergoing mastectomy and immediate breast reconstruction (198 MIBR - 2 bilateral) with LDI between August 1, 2010, and March 31, 2020. Patients were categorized as exposed (n=76) and not exposed to NAC (n=122). Clinical, surgical, oncological features and early complications, those that occurred in the first 3 months after surgery, were analyzed.

Results: Patients exposed to NAC were significantly younger (mean age 42.8 years vs. 46.8 years; p=0.007) and had more aggressive oncological features. The overall complication rate (major and minor) was 46.7% in non-NAC and 53.3% in NAC (p=0,650). The percentage of minor complications was 47,4% and of major complications was 7.1%. The number of comorbidities increased the chance to overall (OR 3.46; 95% CI: 1.38 – 8.66; p=0.008) and major (OR 3.35; 95% CI: 1.03 - 10.95; p=0.045) complications. Being overweight increased 2.04 times the chance of having dorsal seroma. Patients with diabetes mellitus, current smoking and previous breast radiotherapy exposure had an increased chance of mastectomy skin flap necrosis mastectomy (p< 0.05). In addition, patients undergoing prolonged surgeries (≥7 hours) had 5.15-fold greater chance to have this complication and those with hypertension had a 3.31-fold greater chance of having wound dehiscence. Patients exposed to NAC showed more than twice as many major complications when compared to those not exposed, however, perhaps due to the low frequency of these complications (n=14), there was no statistical significance (10.5% vs. 4.9% respectively, p=0.134).

Conclusions: The present cohort allowed us to suggest that NAC has not been shown to be a statistically significant risk factor for increased rates of early surgical complications and loss of MIBR with LDI. Still, the results suggest that patients with 2 or more comorbidities are related with a higher chance of overall and major complications.

Table. Risk factors related to complications

Characteristic		$OR_{adjusted}$ (CI95%)	p Value
Overall surgical complications			
Age (years)		0.99 (0.96-1.02)	0.552
Comorbidities (ref: <2 comorbidities)		3.46 (1.38-8.66)	**0.008**
NAC (ref: No)		1.15 (0.64-2.10)	0.638
Dorsal seroma			
Age (years)		1.01 (0.98-1.04)	0.476
BMI (kg/m²) (ref: Normal)			
	Overweight	2.04 (1.01-4.13)	**0.047**
	Obesity	2.14 (0.98-4.68)	**0.057**
QT neoadjuvante (ref: No)		1.39 (0.74-2.61)	0.300
Mastectomy skin flap necrosis			
Age (years)		1.02 (0.97-1.07)	0.443
Diabetes mellitus (ref: No)		4.59 (1.34-15.74)	**0.016**
Tobacco use *(ref: No)*		5.07 (1.44-17.86)	**0.012**
Previous radiotherapy *(ref: No)*		4.57 (1.21-17.29)	**0.025**
Operative duration *(ref: Normal <7h)*			
	Prolonged (≥7h)	5.15 (1.74-15.29)	**0.003**
NAC (ref: No)		0.79 (0.28-2.22)	0.659
Skin dehiscence			
Age (years)		0.97 (0.92-1.01)	0.113
Hypertesion (ref: No)		3.31 (1.21-9.05)	**0.020**
NAC (ref: No)		0.74 (0.32-1.70)	0.477
Major complication			
Comorbidities (ref: <2 comorbidities)		3.35 (1.03-10.95)	**0.045**
NAC (ref: No)		2.46 (0.80-7.53)	0.115

1387509 - Fat Grafting Before Delayed Prophylactic Mastectomy and Immediate Implant Reconstruction in High-risk Patients

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Background/Objective: Most patients undergoing prophylactic mastectomy (PM) request immediate implant-based breast reconstruction. Some patients, especially those with prior radiotherapy, are at increased risk of early complications and implant loss. We developed the technique of primary fat grafting (FG) weeks before prophylactic mastectomy to minimize early complications for selective high-risk patients. In this study, we evaluated our outcomes with this novel approach.

Methods: Between 2015 and 2022, we performed 38 cases of subcutaneous FG before PM and immediate implant reconstruction in 23 patients. Patients included for treatment had previous radiotherapy for breast cancer, ongoing tobacco use, or large ptosis. Immediate direct-to-implant reconstruction was performed in 36 cases. We performed total muscle coverage in 26 cases and partial muscular coverage with ADM in 12 cases.

Results: A single session of fat grafting, with a median injection volume of 250 ml (Range 80 - 550 ml), was performed. The median delay between FG and PM was 19 weeks (Range 7.6 – 111.5 weeks). The median implant volume was 400 CC (Range 240 – 500 ml). A minor early complication developed in 5 of 38 cases, with no early implant loss. At a median follow-up of 22 months, the authors found no cases of delayed implant loss.

Conclusions: Prophylactic mastectomies on high-risk patients carries a high-risk of complications including implant loss, reoperation rate, elevated costs, and patient dissatisfaction. We suggest initial fat grafting in high-risk patients. While larger studies are needed, our experience has demonstrated the safety of this technique, which may help significantly reduce the rate of implant loss in high-risk patients.

1388294 - Assessing the Patient-level Costs of Staged Versus Immediate Autologous Breast Reconstruction in Patients with Breast Cancer

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Background/Objective: Delayed autologous breast reconstruction (DBR) is performed in patients deemed unsuitable for immediate breast reconstruction (IBR) at the time of mastectomy. Previous studies have suggested a varied impact on oncological outcomes in patients undergoing DBR, with increased rates of patient satisfaction and quality of life in patients undergoing IBR in the absence of post-mastectomy radiotherapy. However, little is known about the financial and economic impact of performing autologous breast reconstruction at the time of mastectomy compared to when it is performed as a delayed procedure. The aim was to compare overall cost in patients undergoing DBR compared to IBR.

Methods: After institutional service evaluation approval (ID Service Evaluation Number: 648), a retrospective single centre evaluation of all patients undergoing DIEP flap autologous reconstruction (immediate and delayed) between January 2014- March 2020 was performed. Clinicopathological characteristics were recorded for all patients. Costing analysis was formulated using patient level information and costing system (PLICS) data. PLICS (CostMaster, 2021 Civica, London, UK) is a software package used to collate patient-level data on financial outcomes prospectively and systematically. Patients were excluded if complete financial data were not available. Costs were compared using standard statistical analysis including the unpaired t test. Multivariate logistic regression analysis was performed to assess the impact of other clinicopathological characteristics on total costs in both groups.

Results: Preliminary financial data were available for 111 patients, of which 10 underwent DBR(after previous mastectomy) and 101 underwent IBR(at the time of mastectomy). Timing of reconstruction (DBR vs IBR) significantly impacted costs with the crude combined cost of inpatient care for delayed autologous reconstruction (1st and 2nd procedures) being £24202 (Range: £16325-£34835) vs £19271(Range: £7966-£53200) in patients undergoing IBR (unpaired t-test; p=0.01). In those undergoing DBR, the median length of stay for the delayed procedure was 4 days (Range: 3-12 days) compared to 5 days (Range:3-10) in the IBR group (T Test; p>0.05). When comparing clinicopathological characteristics between those undergoing DBR and IBR, rates of obesity and diabetes were not different between groups (Chi-square Test; p>0.05). There was no difference in the number of further plastic/breast surgical procedures required between the DBR and IBR groups (Median no of further procedures: 0 (Range: 0-2) vs 1 (Range: 0-5); T Test; p=0.14). When comparing costs using multivariate logistic regression analysis, and accounting for other clinicopathological factors such as obesity, diabetes, tumour size and adjuvant therapies including chemotherapy and radiotherapy, a difference was

observed but this did not reach statistical significance (negative co-efficient; p=0.078). Radiotherapy significantly increased costs associated with IBR (p< 0.05).

Conclusions: Delayed DIEP reconstruction is associated with an increased financial and economic burden compared to those undergoing immediate reconstruction. The extent of this burden remains unclear and larger prospective studies are required to elucidate the exact effect of performing autologous reconstruction as a delayed procedure. Other clinical factors such as obesity, diabetes and the need for adjuvant therapies including chemotherapy and radiotherapy do not seem to differ significantly between groups, indicating that some patients undergoing a delayed reconstruction could be considered for immediate reconstruction.

1383082 - Upper Limb Recovery Following Mastectomy with and without Breast Reconstruction Measured Using Wearable Activity Monitors

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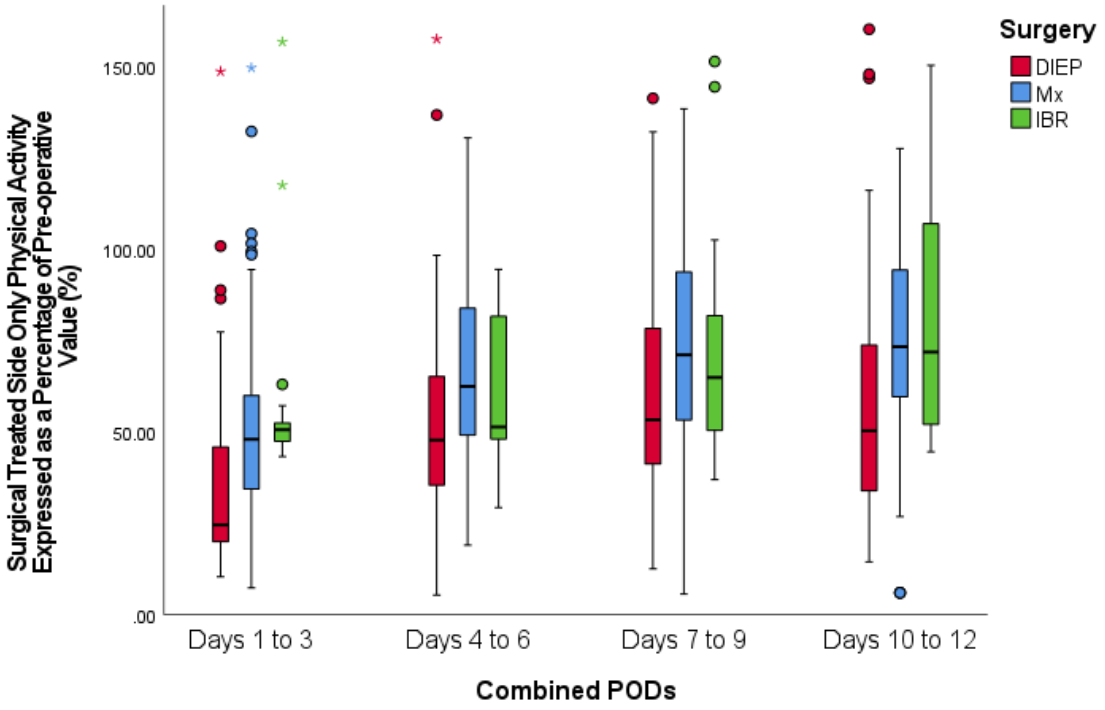
Background/Objective: The demand for reconstruction has increased due to the established functional, psychological, and social benefits for patients. Given long-term survivorship, physical morbidity associated with mastectomy and breast reconstruction needs to be established to assist patients and surgeons in making informed treatment decisions. Wearable activity monitors (WAMs) can reveal disparities in physical recovery across various reconstructions and provide further insight in an objective manner. While the physical recovery associated with the donor site may be well-known, the upper limb morbidity is less recognized. We hypothesized that the physical activity (PA) of patients who underwent Deep Inferior Epigastric Reconstruction (DIEP) would be slower than those receiving Implant-Breast Reconstruction (IBR) and a simple mastectomy (Mx).

Methods: A prospective, non-randomized, observational study was conducted from February 2020 to May 2022. Forty-nine consecutive patients undergoing breast/reconstructive surgery [i.e. Mx +/- sentinel lymph node biopsy (SLNB) or axillary lymph node dissection (ALND), DIEP +/- SLNB/ALND and IBR +/- SLNB/ALND], were identified from operating room schedules. There was no restriction placed on age. Patients who had a movement disorder/shoulder impairment, those using mobility aids, or those with inadequate comprehension were excluded. Recruited participants were invited to wear WAMs (AX3–triaxial accelerometer) on both wrists at least for 24 hours pre-operatively and up to 2 weeks post-operatively, and complete the Disability of Arm, Shoulder and Hand (DASH) and quality-of-life (EQ-5D-5L) questionnaires at pre, post-operative week 1 and 2. The Kruskal-Wallis test was used to assess differences in combined arm activity, surgically treated and control sides. Spearman’s correlation coefficient was determined between the PA data and the DASH/EQ-5D-5L.

Results: A significantly greater combined PA reduction was observed in DIEP compared to Mx and IBR patients across week 1 (Median: 40.1% vs 62.1% vs 61.8%, p< 0.001) and 2 (Median: 60.1% vs 77% vs 83.9%, p< 0.001) respectively. When comparing activities of the surgically treated side only across post-operative days (PODs) 1-3 (Median: 44.4% vs 47.9% vs 51.2%, p< 0.001), 4-6 (Median: 54% vs 62.4% vs 60.3%, p< 0.001), 7-9 (Median: 64.4% vs 66.2% vs 71.3%, p< 0.05) and 10-12 (Median: 23.6% vs 76.6% vs 80.7%, p< 0.05), the DIEP group was observed to have the most significant reductions in PA levels. The most significant difference in PA of the surgically treated side was observed on post-operative day 1 where the upper limb activity of DIEPs was approximately half that of Mx and IBRs (Median: 20.8% vs 38.4% vs 48.2%, p=0.003). There was a moderate negative correlation (R = -0.4, p=0.3) between PA levels at 1 week and their DASH scores at 18 months post-surgery.

Conclusions: DIEP reconstructions demonstrate significantly greater physical morbidity than IBR and Mx. This information may assist surgeons/patients have informed conversations about recovery expectations, determine the type of breast reconstruction, and direct resources such as early physiotherapy to those at risk of developing complications. The severity of the initial impairment may be correlated with the possibility of long-term persistent morbidity and may determine who is more susceptible to developing physical morbidity and more likely to benefit from physiotherapy.

FIGURE. Surgically treated side only expressed as percentage (%) of pre-operative level at different combined post-operative days (PODs) comparing deep inferior epigastric perforator (DIEP), mastectomy (Mx) and implant-based reconstruction (IBR)



1377158 - Crowdsourced Comparison of Aesthetic Outcomes of Traditional Transverse versus Skin-reducing Mastectomy Incision Patterns and Implant-based Breast Reconstruction

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Background/Objective: Skin-sparing mastectomy (SSM) remains the most commonly performed mastectomy technique with the goal of preserving native breast skin to be utilized for breast reconstruction. Incision patterns employed for SSM may be classified into the traditional transverse elliptical incision or skin reducing patterns. The transverse incision is centered around the nipple areolar complex (NAC) whereas skin reducing patterns employ vertical and/or low transverse incisions along the inframammary fold similar to those utilized in breast reduction/ mastopexy procedures. Advancements in both oncologic and reconstructive breast surgery have made post-operative cosmesis and patient satisfaction critical outcome measures. We aim to identify if there is preference among the public regarding aesthetic outcomes between the traditional transverse and skin reducing incision patterns following implant-based breast reconstruction (IBBR).

Methods: A review of patients who underwent SSM and IBBR was completed. Twelve patients were included, 6 with a transverse elliptical incision pattern and 6 with skin reducing mastectomy (SRM) patterns. The patients included were those of multiple oncologic breast surgeons and plastic surgeons. Patients were matched regarding to age, body mass index (BMI), pre-operative breast cup/ ptosis grade, comorbidities, American Society of Anesthesia (ASA) and chemotherapy/radiation status. Descriptive statistics were performed to characterize the patient sample. A survey of de-identified post-operative patient photos was created via RedCap to assess aesthetic outcomes in 7 breast-related categories: Symmetry, Volume, Projection, Shape, Skin Quality, Scar Pattern, and Overall Aesthetic Rating. In addition to the 7 outcome categories, survey respondents were categorized based on the presence or absence of health care work experience. The survey was distributed broadly via social media and the Amazon MTurk crowdsourcing platform. Once survey responses were recorded and analyzed, the sample was stratified by the incision pattern employed and respondent aesthetic evaluation was calculated for each of the selected covariates using logistic regression. Student's t-tests, Pearson chi-square tests, or Fisher exact tests were used to determine associations between dependent and independent variables. Wald test and the likelihood ratio test were used to test the significance of individual predictive variables, and the model $\chi 2$ statistic was applied to test the overall significance of the model. A p value of less than 0.05 was considered statistically significant.

Results: 1,192 survey responses were recorded and analyzed. Respondents tended to be female, less than 40 years of age, and similarly distributed in terms of those with health care experience and those without it. Respondents with or without health care experience could accurately identify the difference between scar patterns. In every breast-related category, the SRM was rated higher compared to the transverse pattern (Table 1). When comparing aesthetic preference of results between incision patterns with the NAC reconstructed, skin reducing incision patterns were preferred.

Conclusions: This study represents a crowdsourced survey of aesthetic results of patients following SSM with traditional transverse versus SRM patterns and IBBR. The skin reducing patterns were more aesthetically pleasing to the general public regardless of respondent age, gender, or health care

experience. In patients where skin reducing incision patterns are feasible, their use may improve patient satisfaction with their mastectomy/ reconstruction aesthetic outcome.

Table. Transverse versus skin-reducing mastectomy (SRM) incision patterns

	Transverse	SRM	p-value
Breast Volume Symmetry	2.50	2.91	<0.001
Overall Breast Symmetry	2.48	2.82	<0.001
Breast Projection	1.88	2.46	<0.001
Breast Cone Shape	1.73	2.38	<0.001
Skin Quality	1.86	2.16	<0.001
Overall Rating (1-10)	5.56	6.89	<0.001
Preference with NAC in Place	29.3%	44.2%	<0.001

1371952 – Patient-reported Outcomes Following Chest Wall Perforator Flap (CWPF) Reconstruction Following Breast-conserving Surgery and Reported Short-term Aesthetic Outcomes

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Background/Objective: Chest wall perforator flaps (CWPFs) are gaining popularity as a volume replacement technique after breast-conserving surgery (BCS). There is a relative paucity of data surrounding subjective patient reported outcomes (PROMs) and objective aesthetic outcomes following CWPF reconstruction. The primary aim of this study was to assess if CWPFs can provide comparable levels of subjective patient satisfaction as for standard BCS (wide local excision and volume displacement) and score similarly on panel assessments of 2D and 3D imaging. The secondary aim was to assess if patients having a lateral CWPF have a lower subjective assessment of back morbidity compared with latissimus dorsi (LD) flap reconstruction.

Methods: Data from a prospectively maintained database at a tertiary cancer centre was utilised to assess clinico-pathological features, complications and follow-up. Female patients undergoing BCS with CWPF reconstruction for invasive or in-situ breast carcinoma in the last 5 years were asked to complete an anonymised PROMs questionnaire based on applicable modules from the BREAST-Q. 2D and 3D imaging were used to provide an objective result of overall aesthetic outcome utilising the Harvard Cosmesis Score and the Delphi Score respectively. A univariate analysis was performed to assess correlation of variables which might predict outcome including patient, tumour and treatment-related factors.

Results: Local audit approval was gained. 89 patients with a median age of 55 years (IQR 34-63) underwent a single stage CWPF breast reconstruction in the last 5 years. 69 patients met the eligibility criteria. 37 patients responded to the questionnaire (response rate = 55.3%). A total of 21 patients

underwent 2D photography as part of the study and 14 patients attended for 3D imaging. The overall satisfaction based on the BREAST-Q 'satisfaction with breasts' had a mean score of 67.6, SD 18.8 (range = 39-100). The mean score for 'satisfaction with back' was 80.1, SD 19.9 (range = 40-100) with a mean score of 66.4, SD 20.1 (range = 39-100) for 'physical well-being of the shoulder/back'. The panel assessment on 2D imaging had a mean score 2.7, SD 0.9 (range = 1-4) and for 3D imaging a global outcome mean of 3.4, SD 1.1 (range = 1-5). Univariate analysis demonstrated no statistically significant predictive variables based on the assessed characteristics.

Conclusions: The overall patient satisfaction in patients having chest wall perforator flap for volume replacement is comparable to other reported studies utilising the BREAST-Q in breast conservation surgery. The physical well-being to the shoulder and back outcomes are more favourable than reported after LD flap reconstruction. This is the first study to utilise 3D imaging in this cohort of patients. Further work needs to be done to provide a validated outcome measure in patients undergoing CWPF to assess patient satisfaction and the optimal method to report aesthetic outcomes. The data here may serve as a benchmark for future studies.

Table. Results of the BREAST-Q

	Mean	SD (range)
Overall satisfaction with breast	67.6	18.8 (39-100)
Psycho-social well-being	72.4	19.5 (37-100)
Satisfaction with reconstruction	66.9	16.8 (37-100)
Physical well-being (chest)	68.1	21.2 (28-100)
Satisfaction with back	80.1	19.9 (40-100)
Physical well-being (shoulder/back)	66.4	20.1 (39-100)
Sexual well-being	46.2	24.3 (20-91)
Radiotherapy outcome	44.4	21.2 (33-78)
Satisfaction with information from surgeon	75.3	18.25 (25-100)

1363067 - Post-operative Complications After Mastectomy and Breast Reconstruction Impact on Quality of Life

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Background/Objective: Patients can experience emotional, physical, and social distress related to a new diagnosis of cancer. While surgery offers the expectation of long-term survival, post-operative complications can be devastating yet not entirely avoidable. Within the field of breast surgery, though the overall psychosocial benefits and body image gains of reconstruction after mastectomy are well-established, there is limited information on how subsequent complications affect patient quality of life (QOL).

Methods: Patients who underwent immediate post-mastectomy reconstruction between 2008-2020 were identified in a prospectively kept institutional database. QOL was assessed using the BREAST-Q and the Was It Worth It (WIWI) questionnaires. The results were compared between patients who had major complications, minor complications, and no complications. Major complications required return to the operating room or admission to the intensive care unit. Minor complications included aspirations for hematomas/ seromas, observation, and other noninvasive forms of management such as topical treatments. Responses were compared using one-way analysis of variance (ANOVA) and chi-square tests.

Results: Five-hundred and sixty-eight patients met inclusion criteria, and 244 patients responded (43% response rate). Most patients did not have any complications (N=128, 52%), 41 had minor complications (17%), and 75 had major complications (31%). There were no differences in demographics or in the distribution of index surgical characteristics. The most common operative complications were related to hematoma (n=13, 5%), wound break down (n=12, 5%), and infection (n=10, 4%). Those with minor complications were most likely to undergo planned revision surgeries (n=18, 65%), while those with major complications were most likely to undergo multiple unplanned revisions (n=58; 77%). Across all 3 groups, revision surgeries were most likely to occur on both breasts, followed by the cancer side, and lastly on the prophylactic side. There were no differences in any of the BREAST-Q wellbeing metrics based on degree of complication (Figure). Across all 3 groups, there were no difference in patients feeling that surgery was worthwhile (p=0.565), they would choose reconstruction again (p=0.565), and they would recommend it to a friend (p=0.6). Patients who did not have any complications had the most positive overall experience (p=0.048). Overall, at least 65% reported that their overall experience either met or exceeded expectations and 85% of patients had unchanged or improved overall QOL.

Conclusions: Existing literature shows that reconstruction after mastectomy can improve QOL and wellbeing. Our study demonstrates that these metrics are not negatively impacted by the presence of post-operative complications. Though patients who had no complications had an overall more positive experience, nearly two-thirds of all patients, no matter the degree of complication, stated that their overall experience either met or exceeded their expectations.

Figure. Wellbeing by complications. There were no statistically significant differences in any of the BREAST-Q wellbeing metrics when different complication severity groups were compared.

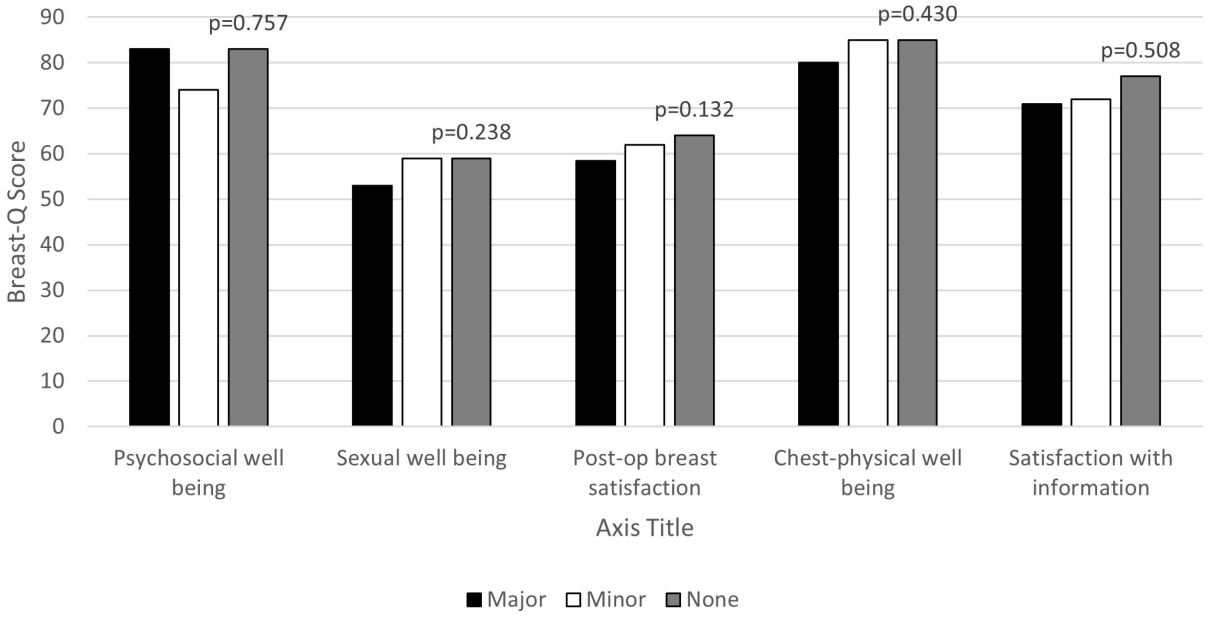

Figure. Post-operative complications after mastectomy and breast reconstruction impact on quality of life

1388033 - Population-level Breast Reconstruction for Immigrant and Long-term Resident Women Undergoing Breast Cancer Surgery

Olivia Lovrics[1], David Kirkwood[2], Christopher Coroneos,[1], Nicole Hodgson[1], Aristithes Doumouras[1], Jessica Bogach[1], Elena Parvez[1]

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Background/Objective: Immigrant women are susceptible to marginalization, secondary to greater social isolation, socioeconomic disadvantage, difficulty navigating the health care system, and can be subject to bias. Breast reconstruction surgery after mastectomy for breast cancer is generally associated with improved quality of life, and access to reconstruction is an important quality of care metric in breast cancer care. This study aims to demonstrate and characterize differences in breast reconstruction after mastectomy for breast cancer between immigrant women and Canadian long-term residents in Ontario, Canada.

Methods: A retrospective population-based cohort-study using linked provincial administrative databases was conducted including all patients with Stage I-III breast cancer diagnosed between 2010-2016. Immigration status was obtained from the federal Immigration Refugee and Citizenship Canada database. Variables including, age, stage, co-morbidity, socio-economic factors, cancer histology, and treatments were collected. Data on treatment facility including breast cancer volume and number of available plastic surgeons were collected. Proportion of immigrant and Canadian long-term resident

women undergoing breast reconstruction (immediate and delayed) were compared. Multivariable analysis was performed to adjust for patient, tumour, and treatment characteristics.

Results: 54,090 women with Stage I-III breast cancer were identified: 46,930 Canadian long-term residents and 7,160 immigrant women. Immigrant women were younger at diagnosis (median age 52 vs. 63 years, $p< 0.01$), and were more likely to have Stage III disease (16.8% vs. 13.9%, $p< 0.01$). Immigrant women were also more likely to be treated urban, high-volume breast surgery centers with availability of plastic surgeons. Of the cohort, 2,196 immigrant women (30.7%) and 13,656 (29.1%) Canadian-long-term residents underwent mastectomy. On univariate analysis, immigrant women were more likely to undergo breast reconstruction surgery when compared to Canadian long-term residents (21.4% vs. 18.9%. $p< 0.01$). They were significantly more likely to undergo immediate breast reconstruction (7.6% vs. 5.6%, $p< 0.01$), but not delayed reconstruction (13.9% vs. 13.3%, $p=0.42$). There was significant variation in uptake of breast reconstruction based on region of origin, with women from Latin America and the Caribbean most likely to undergo reconstruction (37.7%) and women from East Asia and the Pacific least likely (13.3%), though numbers within each subgroup were small. Length of time in Canada since immigration was not significantly associated with rates of reconstruction. Multivariable logistic regression demonstrated that immigrant women were less likely to undergo reconstruction when adjusting for baseline covariates [OR 0.59 (0.51-0.68)]. Covariates significant in the model included age, geographic location, neighbourhood ethnic diversity quintile, co-morbidity score, cancer stage, hormone receptor status, breast cancer surgery volume at treatment facility, number of plastic surgeons available, and receipt of post-mastectomy radiation.

Conclusions: While immigrant women were more likely to undergo breast reconstruction after mastectomy on univariate analysis, when adjusting for baseline covariates, the inverse relationship was found. What may be driving the inverse relationship is that immigrant women are more often treated at urban, high-volume centers with availability of plastic surgeons, and as a result undergo less reconstruction then would be expected when accounting for these factors. Further research is needed to elucidate the effect of patient, provider, and systemic contribution to our findings.

1388091 - Post-mastectomy Reconstruction Rates in the Asian-American Breast Cancer Population: Patterns and Disparities Among Aggregated and Disaggregated Ethnic Data in Queens

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Background/Objective: The Asian-American population is the most rapidly growing ethnic group in the United States. While breast cancer incidence has been increasing over recent years among Asian-Americans, data has shown these patients are less likely to undergo reconstruction after mastectomy compared to non-Asian women. Historically, data for Asian-American breast cancer patients has been reported in an aggregated form, potentially masking important heterogeneity within this population. We aim to identify patterns of post mastectomy reconstruction among the aggregated and disaggregated Asian American breast cancer population at our institution.

Methods: A single institution retrospective chart review was performed for patients in Queens, NY. All breast cancer patients who underwent mastectomy with or without reconstruction from 2017-2021 were identified. Breast reconstruction was defined as tissue expander, implant, or autologous ipsilateral breast reconstruction at time of mastectomy. Race/ethnicity and demographic variables were collected using self-reported data. Patients were divided into Non-Asian and Asian categories for initial analysis. The Asian category was subsequently subdivided into Chinese, Filipina, Korean, South Asian (including Indian, Pakistani), Southeast Asian (including Vietnamese, Thai, Malaysian) and Asian/Other when more specific ethnic data could not be identified. Demographic data and post-mastectomy reconstruction rates were examined between these groups.

Results: A total of 597 patients who underwent mastectomy with or without reconstruction were identified from 2017-2021 that met inclusion criteria. The median age at diagnosis was 60 years old and did not vary significantly between patient groups. Of these patients, 280 (46.9%) identified as Asian and the remaining 317 (53.1%) as non-Asian. In total, 266 (44.6%) patients underwent reconstruction after mastectomy. 50.5% of non-Asian patients underwent reconstruction compared with 37.9% of the aggregated Asian cohort ($p = 0.002$). When the Asian cohort was disaggregated, Chinese (n=147) and Asian/Other (n=12) patients had the highest rates of reconstruction among Asian ethnic subgroups, with 61 (41.5%) and 5 (41.7%) patients undergoing reconstruction, respectively. South Asian (n=20) and Filipina patients (n=22) had the lowest rates of reconstruction among the Asian ethnic subgroups with 6 (30.0%) and 6 (27.3%) patients undergoing reconstruction, respectively. While no significant difference was found when comparing Asian ethnic groups to each other, there was statistical significance when comparing Non-Asian and Filipina patient reconstruction rates ($p = 0.033$).

Conclusions: Rates of breast reconstruction for Asian Americans varies between ethnic subgroups. Filipina-American patients had lower rates of post-mastectomy reconstruction than other Asian-American patients, and this difference was statistically significant when compared to non-Asian patients. Further investigation is needed to better identify patterns of reconstruction among the disaggregated

Asian American population and appropriately allocate information and resources to address these disparities.

1388042 - Revision of Implant-based Breast Reconstruction from the Subpectoral to the Prepectoral Plane

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Background/Objective: Multiple studies have demonstrated the psychosocial, emotional, and functional benefits of breast reconstruction after mastectomy. Implant-based breast reconstruction with subpectoral plane placement of the implant has historically been preferred over prepectoral plane placement of the implant due to high rates of implant visibility, explantation, and infection. However, placement of an implant into the subpectoral position has its own set of undesirable outcomes including animation deformity, pain, capsular contracture, and displacement/malposition of the implant. As prepectoral reconstruction has become more common, some patients with unsatisfactory results have undergone revision from subpectoral to prepectoral implant reconstruction. The goal of this study was to evaluate the indications and outcomes for patients undergoing plane revision for implant-based breast reconstruction to determine which patients may benefit from plane revision surgery.

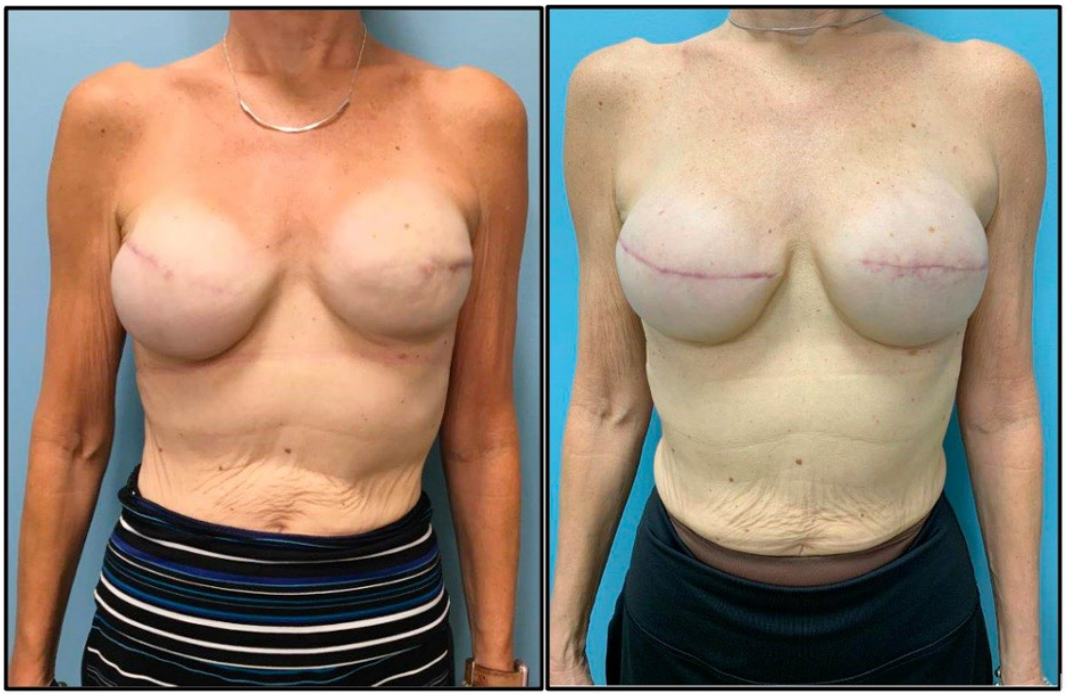
Methods: A single institution retrospective chart review was performed to identify patients with a history of subpectoral implant-based reconstruction after mastectomy, who underwent plane revision surgery (subpectoral to prepectoral) from October 1, 2015 through June 1, 2022. The patient's medical record was reviewed for demographics, indication for revision, co-morbidities, oncologic history, reconstruction history, and post-operative complications.

Results: A total of 28 patients (45 breasts) underwent surgery to revise the implant from the subpectoral to the prepectoral plane. Original indications for mastectomy surgery included malignancy lesion (71%) and prophylactic (29%). Average time from initial reconstruction to revision surgery was 8.3 years (range 0.5 to 26 years). Presenting symptoms for surgery included (with some patients endorsing more than 1 symptom): animation deformity (76%), pain (48%), asymmetry (38%), capsular contracture (31%), implant displacement (7%), poor cosmesis (3%), and implant rupture (3%). The majority of patients had silicone implants placed at revision, with an average increase in implant size by 28g. Most revisions were completed in 1 surgery (69%), whereas 31% of cases required placement of a tissue expander prior to the permanent implant. Overall post-operative complication rate was 16% (n=7), which included breast hematoma (n=4), incisional dehiscence (n=2), and mesh non-integration (n=2). One patient with bilateral breast hematomas was post-operatively diagnosed with von Willebrand Disease. Otherwise, all patients with complications were of average surgical risk: non-smokers, no history of diabetes, heart disease, or breast radiation, mean age 57.6 years (range 38-65 years), BMI 27 (SD=5.8). There were no reconstruction failures. The average follow-up time after plane revision surgery was 1.3 years (range 0.03 - 5.4 years). After revision of the implant plane into the prepectoral position, 82% of patients did not require any additional breast reconstruction surgeries. In the patients that

underwent additional breast revisions (18%, n=8), implant exchange (75%, n=6) was the most common surgery performed.

Conclusions: Revision for implant-based breast reconstruction from the subpectoral position to the prepectoral position can successfully be performed with a low complication profile. The majority of patients that undergo revision to address unwanted outcomes from subpectoral implant-based breast reconstruction did not require any additional surgeries after plane revision during the follow-up period.

FIGURE. Revision of implant-based breast reconstruction from the subpectoral (left) to the prepectoral (right) position: 54-year-old female was diagnosed with triple-negative breast cancer in 1995 and underwent bilateral total mastectomy with subpectoral implant placement. After implant exchange in 2018, patient was still dissatisfied experiencing bilateral breast pain, animation deformity, and asymmetry. She underwent plane revision in 2018 with symptom resolution.



SLN

1386243 - Surgeon Learning Curve When Transitioning from Blue Dye to IcG for Lymphatic Mapping in Breast Cancer: An Evaluation of Oncologic Yield and OR Time

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Background/Objective: We aimed to evaluate the surgeon learning curve, defined by oncologic yield and operative (OR) time, for indocyanine green (ICG) as an alternative to isosulfan blue (IB) for sentinel lymph node (SLN) mapping in breast cancer. We hypothesized that the oncologic yield is the same and operative times are shorter for IcG versus IB.

Methods: A single center, retrospective chart review was conducted to identify patients > 18 years of age with cN0 invasive breast cancer undergoing surgery first with SLN biopsy using IB or IcG. At our institution, IcG became standard in 10/2020, replacing IB for dual tracer mapping except in the case of an iodine allergy. Clinicopathologic factors and OR times were collected prior to IcG (before 10/2020), during IcG initial use (10/2020-11/2020), and after IcG implementation (after 12/2020). Analysis was performed for IB versus IcG (2 dye cohorts) and learning curve (3 time cohorts during IcG transition). Oncologic yield (number of SLN removed and number of SLN positive for carcinoma) was analyzed using the Wilcoxon rank sum test and adjusted gamma regression models. Clinicopathologic factors and OR times were compared using chi-squared, Wilcoxon rank sum, and Kruskal-Wallis rank sum tests.

Results: Of the 324 total patients, 94 had IB and 230 had IcG for SLN mapping with similar clinicopathologic factors between these dye cohorts. Overall oncologic yield did not differ between IB and IcG (SLN removed p=0.81; SLN positive p=0.35). Total operative time was longer for IcG versus IB on unadjusted analysis (118 versus 106 min, p=0.04); this association persisted after adjusting for individual surgeon, laterality of surgery, reconstruction, and oncologic yield (p< 0.001, mean ratio=1.18, 95% CI=1.09-1.28). During IcG transition, there was a brief observed learning curve in terms of increased OR time from incision to SLN removed (33 versus 49 versus 39 minutes, p=0.025). There was no observed learning curve for oncologic yield during IcG transition (SLN removed p=0.83; SLN positive p=0.43).

Conclusions: IcG has a favorable cost and safety profile versus IB but data on the learning curve when implementing in practice is lacking. Our results demonstrate that IcG does not change oncologic yield, including during the learning curve time. OR time is increased with IcG, during implementation, although the relative clinical significance is minimal. Our results support IcG as a safe alternative to IB and confirm surgeons in practice can transition from IB to IcG with confidence in the oncologic results during the learning curve time.

1386526 - The Importance of Minimal Cortex Thickness of the Lymph Node in Axillary Ultrasound for Early-stage Breast Cancer

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Background/Objective: Some ultrasonographic (US) features, such as cortical thickness greater than 2.5–3.0 mm, focal cortical lobulation, loss of the fatty hilum, a round shape, and abnormal cortical blood flow are indicative of a pathologic axillary lymph node. Patients with early-stage breast cancer (ESBC) who had normal lymph nodes on US are candidates for sentinel lymph node biopsy (SLNB). Lack of a commonly followed guideline for lymph node examination is the current problem for the US evaluation. Furthermore, it might be necessary to elaborate on some of the normal morphological characteristics for axillary lymph node involvement (ALNI) on US. The purpose of this study was to investigate any associations between sentinel lymph node involvement (SLNI) in ESBC and minimal cortical thickness (MCT) on pre-operative US.

Methods: Retrospective evaluations were performed on 445 women performed SLNB for ESBC . In the evaluation of the axillary region by US regarding the lymph nodes with normal or slightly thick cortex (< 3 mm), the ones without the loss of hilum were considered as cN0 and SLNB was performed to these patients. According to cortical thickness, patients in this research were divided into 2 groups: those with normal cortical thickness of ≤1.5 mm and those with MCT of 1.5–3 mm. These 2 groups' comparisons might provide some potential SLNI predictors.

Results: SLNI was present in 43.6% (n = 194) of all patients. On the axillary US, 105 of these patients (23.6%) showed lymph nodes with MCT. Patients with MCT had significantly higher SLNI than those without (n=126, 28.3%, n=68, 15.3%, respectively) (p< 0.001). Age, tumor size, breast density, quadrant of tumor location, microcalcification on mammography, multifocality/multicentricity, histological grade, in situ lesions accompanying invasive carcinoma, ER, PR, CERBB2, and lymphovascular invasion (LVI) were compared between patients with and without SLNI in MCT group . In MCT group, C-erb B2 positivity, LVI, microcalcification, and multifocality/multicentricity was significantly higher in the patients with SLNI compared to the patients without SLNI. (p=0.039, p< 0.001, p< 0.001and p=0.009, respectively). In MCT group, LVI and the presence of microcalcification were identified as independent predictors of SLNI on multivariant analysis (p< 0.001, 95%CI 0.004-0.139 and p< 0.001, 95%CI 0.001-0.073, respectively).

Conclusions: SLNB is the standard procedure for axillary staging in ESBC. Other noninvasive diagnostic techniques, such as US for axillary staging, have been considered in light of recent data that have started to discuss the necessity of SLNB in guiding the axillary management of breast cancer patients. Though previous research on breast cancer established cortical thickness evaluation of axillary lymph nodes on US to determine the pathological ones, the application of the criteria that were used to define them such as abnormal thickness cut off values and the significance of the association between thick cortex and other pathological morphological lymph node features, is unclear. This study showed a correlation between SLNI and minimum cortical thickness. This research may prove helpful for future prospective studies with larger case series to identify specific patient subgroups for SLNI prediction.

1384763 - Pre-operative Axillary Ultrasound in the Era of Z0011: A Model for Predicting High Axillary Disease Burden

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Background/Objective: Both the ACOSOG Z0011 and IBCSG 23-01 studies demonstrated that axillary lymph node dissection (ALND) has no prognostic benefit in clinically node-negative patients and low disease burden within the axilla on sentinel lymph node biopsy (SLNB). In our center, patients who are node-negative on physical examination but who have a radiologically detected biopsy positive lymph node have a high likelihood of proceeding directly to an ALND. Many of these patients are found to harbor low axillary nodal burden after ALND and would – in retrospect - have met Z0011 criteria. These patients could have undergone a SLNB avoiding the added morbidity of ALND. The aim of our study was to determine which cN0 patients with a positive lymph node biopsy could avoid a full axillary dissection or, better still, which patients with perceived low-volume axillary disease on imaging could avoid pre-operative lymph node biopsy all together.

Methods: Breast cancer patients undergoing ALND from 2010 – 2017 were identified using our Provincial Cancer Registry. Inclusion criteria were cN0 female patients over 18 years of age diagnosed with T1-3 breast cancer who had an axillary ultrasound with a positive lymph node biopsy performed pre-operatively followed by mastectomy or breast-conserving surgery with ALND. Univariate analysis and multi-variable logistic regression was performed to determine predictors of high axillary nodal burden (> 2 positive nodes).

Results: The Provincial Cancer Registry identified 2947 patients who had an ALND performed, 107 patients met our inclusion criteria. Of these patients, 42% would have met Z0011 criteria and could have avoided an ALND. Our predictive model found that axillary ultrasound findings are not effective at estimating a patient's risk of high axillary nodal burden. The presence of LVI was the only parameter found predictive of high axillary nodal burden.

Conclusions: Axillary lymph node dissections carry a significant risk of peri- and post-operative complications. Therefore, we suggest that cN0 patients with T1-T2 tumors who fit Z0011 criteria have axillary US-guided biopsy omitted to lower the percentage of unnecessary ALND. If an axillary ultrasound is performed and 1-2 borderline abnormal LNs identified, surgeons should consider several factors when considering which patients should have a radiological biopsy, which should have a SLNB and therefore which are appropriate for ALND-avoidance.

1371918 - Axillary Status After Neoadjuvant Systemic Therapy: How Many Nodes Can Be Sentinel?

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Background/Objective: Implementation of sentinel lymph node biopsy (SLNB) has been pivotal for de-escalation of the extent of surgery in the axilla. Trials investigating the application of SLNB in the setting of neoadjuvant systemic therapy (NST) have not proven this approach to accurately predict the status of axilla. Increasing the number of nodes is a common practice to increase the accuracy of SLNB. The purpose of this study is to investigate recent trends and factors that influence the number of sentinel lymph nodes (SLNs) removed post neoadjuvant chemotherapy.

Methods: The National Cancer Database (NCDB) was queried for breast cancer patients at least 18 years old treated with intent to cure from 2018-2019 who underwent sentinel lymph node biopsy (SLNB) without further axillary dissection at a Commission on Cancer (CoC)-accredited facility. The number of SLNs retrieved during SLNB was computed for patients receiving NST and those having surgery upfront. Descriptive statistics, odds ratios (OR), and 95% confidence interval (CI) were estimated for the following demographic and clinicopathologic variables: age, race/ethnicity, metro area, type of treatment facility, breast sub-type, clinical stage, type of breast surgery, and number of SLNs resected. Multivariable logistic regression was used to analyze the odds of having 3-8 SLNs resected.

Results: A total of 255,753 patients met inclusion criteria. Overall, the median (IQR) age was 63(53-70) years,76.1% patients were Non-Hispanic White, 66.7% were clinically Stage I, and 63.8% were ER+/PR+/HER2-, 39.8% were treated at a comprehensive community cancer program, and 65.9% underwent partial mastectomy. Overall, 25,748 patients had SLNB post NST and 230,005 had SLNB upfront. In the post NST group, 13,627 (52.9%) had 3-8 nodes resected compared to 89,809 (39.1%) in the upfront group [$p< 0.001$]. Multivariable binary logistic regression revealed the odds of 3-8 SLNs resected were 1.49 (95% CI: 1.45, 1.54) times greater in the NST group when adjusting for the following significant covariables: age, race/ethnicity, type of treatment facility, breast sub-type, and breast surgery (Table 1). In subsequent analysis of the NST group, the multivariable odds of 3-8 SLNs resected were 1.31 (95% CI: 1.23, 1.40) greater for clinical Stage II and 1.81 (95% CI 1.65, 1.98) greater for clinical Stage III.

Conclusions: SLNB following NST is a common practice despite negative large multi-institutional trials. Increasing the number of resected nodes is associated with NST, higher clinical stage and younger age at presentation.

Table. Simple and multivariable logistic regression odds ratio of retrieving 3-8 lymph nodes on SLNBx

	<3 SLNs N (%)	3-8 SLNs N (%)	Unadjusted OR (95% CI)	P value	Multivariable OR (95% CI) N= 245,689
SLNBx schedule					
Upfront Surgery (Ref)	**140,196 (92.0)**	**89,809 (86.8)**	**1.00**		1.00
Post-neoadjuvant systemic therapy	**12,121 (8.0)**	**13,627 (13.2)**	**1.76 (1.71, 1.80)**	**<0.001**	**1.49 (1.45, 1.54)**
Age					
18-39	4,311 (2.8)	4,995 (4.8)	1.84 (1.76, 1.92)		---
40-49	18,810 (13.4)	16,635 (16.1)	1.40 (1.37, 1.44)		**1.30 (1.27, 1.34)**
50-59	34,151 (22.4)	24,643 (23.8)	1.15 (1.12, 1.17)		**1.11 (1.08, 1.13)**
60-69 (Reference)	49,683 (32.6)	31,280 (30.2)	1.00		1.00
70-79	36,184 (23.8)	20,850 (20.2)	0.92 (0.90, 0.94)		**0.93 (0.91, 0.96)**
80+	9,178 (6.0)	5,033 (4.9)	0.87 (0.84, 0.90)	**<0.001**	**0.88 (0.85, 0.91)**
Race/Ethnicity					
Non-Hispanic White (Ref)	117,713 (77.5)	76,811 (74.5)	1.00		1.00
Non-Hispanic Black	14,363 (9.5)	12,039 (11.7)	1.28 (1.25, 1.32)		**1.21 (1.18, 1.24)**
Hispanic/Latinx	11,583 (7.6)	8,630 (8.4)	1.14 (1.11, 1.18)		**1.05 (1.02, 1.08)**
Non-Hispanic Asian/Pacific Islander	6,847 (4.5)	4,738 (4.6)	1.06 (1.02, 1.10)		0.97 (0.93, 1.01)
Other	1,370 (0.9)	912 (0.9)	1.02 (0.94, 1.10)		0.95 (0.87, 1.03)
			---	**<0.001**	
Facility type					
Comprehensive Community Cancer Program (Ref)	63,705 (43.0)	6,621 (6.7)	1.00		1.00
Academic/Research Program	41,919 (28.5)	38,168 (38.8)	1.22 (1.20, 1.25)		**1.18 (1.15, 1.20)**
Integrated Network Cancer Program	31,770 (21.5)	30,738 (31.2)	1.20 (1.18, 1.23)		**1.19 (1.16,1.21)**
Community Cancer Program	10,612 (7.2)	22,914 (23.3)	1.04 (1.01, 1.08)	**<0.001**	**1.05 (1.02, 1.09)**
Biological profile					
DCIS	13,074 (8.6)	6,928 (6.7)	0.80 (0.77, 0.82)		**0.69 (0.67, 0.72)**
ER+/PR+/HER2- (Ref)	98,051 (64.4)	65,197 (63.0)	1.00		1.00
HER2+	8,758 (5.8)	7,274 (7.0)	1.25 (1.21, 1.29)		**1.07 (1.03, 1.10)**
TNBC	13,033 (8.6)	11,428 (11.1)	1.32 (1.28 (1.35)	**<0.001**	**1.07 (1.04,1.11)**
Unknown	19,401 (12.7)	12,609 (12.2)	0.98 (0.95, 1.00)		0.93 (0.91, 0.96)
Type of breast surgery					
Partial mastectomy	103,961 (68.3)	64,587 (62.5)	1.00		1.00
Mastectomy	48,321 (31.7)	38,826 (37.5)	1.29 (1.27, 1.31)	**<0.001**	**1.24 (1.22, 1.27)**

1388007 - Validation of MSKCC Nomogram in Iranian Breast Cancer for Predicting Non-sentinel Lymph Node Metastases

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Background/Objective: Completion axillary lymph node dissection(ALND) remains the standard of care for patients with disease-positive sentinel lymph nodes (SLN). However, approximately 40% to70% will have no additional disease positive nodes(1). We do this study to assess whether the Memorial Sloan Kettering Cancer Center (MSKCC) nomogram for prediction of NSLN metastasis is useful in Iranian breast cancer population and whether the characteristics of the breast tumor and the sentinel lymph node (SLN) are able to predict the likelihood of non-sentinel lymph node (NSLN) metastasis.

Methods: We retrospectively reviewed 183 patients who underwent completion axillary lymph node dissection between 2011-2022. The MSKCC nomogram was applied to 183 patients with a positive SLN who subsequently had completion axillary lymph node dissection (ALND)

Results: Predictive accuracy was assessed by calculating the area under the receiver-operator characteristic (ROC) curve. Results The MSKCC nomogram achieved a ROC of 0.62 indicating a bad accuracy of the nomogram. In the following we designed a new nomogram contain: age ، lymphovascular invasion، focality، ER، PR، HERE2، Type of tumor، grade tumor، number of positive and negative sentinel lymph node، tumor size. AUC of the ROC curve was calculated to evaluate the efficacy of new nomogram. The AUC value of the ROC curve was found to be 0.71 for new nomogram

Conclusions: MSKCC nomogram did not provide a reliable predictive model in our study population. Our new nomogram provide an accurate prediction of the probability of NSLN-metastasis in our cohort of SLN-positive breast cancer patients.

1387990 - Real-world Data on Surgical Management of the Axilla in Early Breast Cancer: Oncology Center Experience in Eastern Province, Saudi Arabia

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Background/Objective: The American College of Surgeons Oncology Group Z0011 (ACOSOG Z0011) and the AMARO'S randomized clinical trials have shown that sentinel lymph node biopsy (SLNB) alone yielded survival outcomes that were non-inferior to axillary lymph node dissection (ALND) in women with early breast cancer and a limited sentinel node metastases undergoing breast-conserving surgery(BCS) and mastectomy, respectively. Randomized clinical trials are considered the gold standard in the research hierarchy yielding high-quality evidence. However, real-world data (RWD) reflecting health care delivery is becoming increasingly important. Here, we present a retrospective, single-surgeon, study including females with early breast cancer between December 2016 to December 2019, when those 2 trials were not yet adopted at our institute. The primary endpoint was to examine the real-world surgical management of the axilla in early breast cancer patients. And the secondary endpoint was to evaluate the treatment outcome after a median follow-up of 24 months. We also sought to determine the percentage of our patients who would have benefited from the application of AMARO'S/Z0011 during the study period.

Methods: Institutional databases were reviewed to identify patients with cT1-T2N0 breast cancer treated with BCS or mastectomy from December 2016 to December 2019. Patients who received neoadjuvant therapy were excluded. Descriptive and Statistical analysis was done to define the surgical practice and determine the complication and survival rates.

Results: 73 patients were eligible for the study. The median patient age was 51 years (range 81-28); 38 (52%) patients had T1 tumors whereas 35 (48%) had T2 tumors. Breast cancer subtypes included 63 (86%) HR+/HER2-, 9 (12.3%) HR-/HER2-, and 1 (1.4%) patient with HR+/HER2+ disease. Forty (55%) and 33 (45%) patients underwent BCS and mastectomy, respectively. All underwent SLNB and only 19 (26%)

patients proceeded to ALND. Out of those, 13 had 0-2 positive SLNB, 8 (62%) of which did not have additional positive nodes on ALND. Only 5 (9%) of the SLNB group received regional adjuvant radiation compared to 14 (74%) in the ALND group. The majority of patients (90%) in both groups received adjuvant systemic therapy. The overall survival (OS) was 98% in the SLNB group and 89% in the ALND group (P > 0.05). The disease-free survival (DFS) was 94% in both groups. Three local recurrences were observed in the SLNB group, 1 distant recurrence in the ALND group, and no nodal recurrence in any group. The prevalence of lymphedema in ALND group was 37% (42% with adjuvant radiation and 20% with ALND alone), and 0% in SLNB group (p=0.363).

Conclusions: In patients with early breast cancer, the nodal recurrence after SLNB alone is extremely low and the DFS and OS are comparable to those who receive ALND. About 62% of our patients could have benefited from the application of AMARO'S/Z0011 to avoid unnecessary ALND, and significantly reduce the rate of upper limb lymphedema. Our study adds value to health care decision-making, providing RWD evidence on the application of evidence-based treatment de-escalation, which plays an important role in improving the quality of health care provided.

1388041 - Impact of Delayed Sentinel Lymph Node Biopsy: A Single-institution Experience

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Background/Objective: Standard practice is to perform a sentinel lymph node biopsy at the time of mastectomy if the patient has DCIS or a suspicious lesion because a sentinel lymph node biopsy may not be feasible after mastectomy. DCIS can be upgraded on final pathology to invasive cancer in approximately 10-25% of patients, which could then implicate the need for sentinel lymph node biopsy. Superparamagnetic iron oxide (SPIO) is a new technique for marking sentinel lymph nodes that allows for delayed sentinel lymph node biopsy up to 30 days after surgery if pathology is upgraded. We detail our experience using SPIO lymphatic tracer at our institution.

Methods: A retrospective chart review was performed over 5 months. Indications for use, success rate, pathology results, and subsequent axillary surgery were detailed. A subcutaneous subareolar injection was performed in all patients using 2cc of SPIO (Magtrace). Lymphatic massage was performed for 5 minutes. The tracer signal was assessed before the incision and following the primary breast resection. Patients were counted as separate procedures if they received bilateral mastectomies with bilateral SPIO injections.

Results: During the 5-month period, 9 patients underwent SPIO injections for DCIS. Eleven additional patients underwent SPIO injection for 1 of 3 reasons: as a tracer for primary sentinel lymph node biopsy, for prophylactic mastectomy, or for mastectomy with unbiopsied breast findings. SPIO successfully marked the sentinel node(s) in 85% of cases. Two patients demonstrated an upgrade from DCIS to invasive carcinoma. A delayed sentinel lymph node biopsy was performed in 1 patient 3 weeks after the initial surgery. Three sentinel nodes were obtained, and there were no complications. One patient is

pending delayed sentinel lymph node biopsy. Three patients did not localize sentinel nodes using SPIO, namely, 1 male patient, 1 patient who underwent neoadjuvant chemotherapy, and 1 patient who previously had breast conservation therapy 18 years prior. Of note, SPIO did trace in the contralateral axilla of the patient who previously had breast conservation therapy. Due to benign imaging findings pre-operatively, the patient did not undergo sentinel lymph node biopsy at the time of mastectomy and her final pathology was benign. Upfront sentinel lymph node biopsy was avoided in 88.9% of patients with DCIS who underwent mastectomy with SPIO injection.

Conclusions: SPIO is a viable tool for providing delayed sentinel lymph node biopsy to patients undergoing mastectomy and can be used as an alternative tracer for upfront SLNB. We avoided upfront sentinel lymph node biopsy in 88.9% of our patients undergoing mastectomy for DCIS. This approach has implications for avoiding unnecessary surgery and decreasing morbidity to patients, including a decreased risk of lymphedema and lowering health care costs, particularly in patients who are undergoing mastectomy for DCIS.

Table. Summary of patients undergoing SPIO injection

	Patients (N=20)
Indications for SPIO	
DCIS undergoing mastectomy	9 (45%)
Upfront tracer for sentinel lymph node biopsy	3 (15%)
Mastectomy with un-biopsied breast imaging finding	4 (20%)
Prophylactic mastectomy with benign findings	4 (20%)
SPIO traced to lymph nodes	
Yes	17 (85%)
No	3 (15%)
SPIO for delayed sentinel lymph node biopsy for DCIS (N=9)	
Delayed sentinel lymph node biopsy	2 (22.2%)
Sentinel lymph node biopsy performed during primary surgery (insufficient SPIO localization)	1 (11.1%)
Avoided upfront sentinel lymph node biopsy (due to adequate SPIO localization)	8 (88.9%)

1388133 - Incidence of Pathologic Nodal Disease in Clinically Node-negative, Microinvasive, or T1a Breast Cancers

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Background/Objective: Axillary staging in early-staged breast cancer can impact adjuvant treatment options but is also associated with increased morbidity. The incidence of pathologic nodal positivity in patients with microinvasive or T1a disease by histologic subtype is not well characterized and thus, the value of sentinel node biopsy remains controversial in these patients. We sought to analyze patient demographics and tumor characteristics associated with pathologic nodal disease in patients with clinically node-negative (cN0), microinvasive and T1a breast cancers.

Methods: Women >18 years old with clinically node-negative (cN0) and pathologic microinvasive or T1a breast cancer who underwent upfront surgery were identified from the National Cancer Database (2004 – 2019). Pathologic nodal stage at time of surgery was the primary outcome of interest. Multivariable logistic modeling was used to assess predictors of pathologic nodal positivity (pN+) in patients with either microinvasive or T1a tumor based on clinicopathologic factors. A subgroup analysis of HER2+ patients was performed using post-2010 data.

Results: Overall, N= 215,140 women were included in the final analytic cohort; 195,055 (90.7%) had pN0 disease and 20,085 (9.3%) had pN+ disease. Rates of pN+ disease differed by race and ethnicity with 8.8% of Asian women, 11.0% of Black women, 11.4% of Latina women, 10.9% of Native American women, and 9.1% of White women were node-positive ($p< 0.01$). Age was also predictive of pN+ disease; 13.1% of patients < 50 years old were node-positive compared to 9.1% of pts 50-70 years old, and 7.3% of pts >70 years old ($p< 0.01$). Receptor status was also predictive of pN+ disease [8.9% HR+/HER2-, 8.9% triple positive, 7.6% TNBC, and 10.6% HR-/HER2+, $p< 0.01$], as was histology [9.3% ductal vs 11.5% lobular, $p< 0.01$). Multivariable analysis demonstrated that compared to White women, Asian women had lower odds [OR 0.86 (95% CI 0.79-0.93)] of pN+ disease. In contrast, Black [OR 1.19 (95% CI 1.13-1.25)] and Latina women [OR 1.15 (95 CI 1.08-1.23)] had higher odds of pN+ disease. Compared to women < 50 years old, women between 50-70 years old [OR 0.81 (95% CI 0.78-0.84)] and women >70 years old [OR 0.69 (95% CI 0.65-0.74)] had lower odds of nodal positivity. Compared to women with HR+ disease, women with TNBC [OR 0.81 (95% CI 0.76-0.88)] and triple positive breast cancer [OR 0.90 (95% CI 0.83-0.98)] had lower likelihoods of nodal disease, and there was no difference in likelihood for women with HER2+/HR- disease [OR 1.03 (0.93-1.14)]. Women with invasive lobular disease had a higher likelihood of pN+ disease compared to women with invasive ductal disease [OR 1.24 (1.18-1.31)]. Women with more comorbidities also had higher odds of node-positivity (Charlson-Deyo scores of 1 [OR 1.06 (95% CI 1.01-1.11)] and 2+ [OR 1.17 (95% CI 1.08-1.27)].

Conclusions: Over 90% of patients with clinically node-negative, microinvasive and T1a breast cancer remain pathologically node-negative following axillary staging. However, higher rates of nodal disease was found among patients with young age, Black/Latina race, lobular histology, and significant comorbidities. Consideration of axillary staging in these patients should be patient-centric and value-based.

SLN/NAC

1385490 - Evaluation of Indocyanine Green Injection for Sentinel Lymph Node Identification in Breast Cancer Patients with Lymphatic Disruption

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Background/Objective: Several tracers are currently used for sentinel lymph node (SLN) detection in breast cancer. Although radioisotope (RI) and Lymphazurin Blue (LB) have been reliable tracers, Indocyanine Green (ICG) is emerging as a potential alternative. Many patients have disruption of lymphatic pathways from prior surgery, neoadjuvant chemotherapy, large hematomas post-biopsy, or prior radiation, making dual tracing and optimizing tracer methods crucial. LB has limitations, including anaphylactic reactions, contraindication in pregnancy, and in patients undergoing axillary reverse mapping, thereby inhibiting its use the second tracer for breast injection. In this study, we assess the non-inferiority of ICG to LB as a tracer in patients who have disrupted lymphatic pathways.

Methods: Forty-four patients who underwent axillary surgery at our hospital from May to September 2022 were retrospectively analyzed. All patients were injected with 3 tracers, RI, LB, and ICG, prior to SLN biopsy. The patients were stratified based on disruption of lymphatic pathway (21 patients with and 23 patients without lymphatic disruption). The detection rate (DR) of lymph nodes (LN) and false-negative rate (FNR) of metastatic LN were compared among the overall cohort and between disruption groups. FNR is the tracer failure to identify a metastatic LN identified by either of the other 2 tracers.

Results: Overall, 155 SLNs were detected with 8% (13/155) having metastasis. 15.9% of patients had nodal metastasis. There was significant difference in DR between LB and RI, as well as between ICG and RI, but not between LB and ICG. There was no statistical difference between metastatic LN disease DR among the tracers. Within the disruption group, there were 79 SLNs detected. There was statistical difference in DR between LB and RI, but not between the LB and ICG tracers or ICG and RI tracers. There was no statistical difference between metastatic LN DRs among the 3 tracers. In the non-disruption group, there were 76 SLNs detected. There was statistical difference between DR between LB and RI, as well as between ICG and RI, but not between LB and ICG. There was no statistical difference between metastatic LN DRs among the 3 tracers.

Conclusions: ICG combined with RI is a reliable method for dual tracer sentinel lymph node detection in breast cancer patients who have lymphatic disruption, those who have contraindication to LB, or for patients in whom reverse axillary mapping is planned. Metastatic DR was statistically similar among the 3 tracers, although this may be due to low number of positive nodes in each group.

Table. Efficacy of tracer methods in detecting sentinel lymph nodes

Overall Cohort	DR (%)	FNR (%)	DR (%) Metastatic Nodes	Comparison DR of SLN with ICG (p-value)	Comparison DR of SLN with RI (p-value)
Lymphazurin Blue	74.2	15.4	84.6	0.2238	<0.0001
Indocyanine Green	80.0	30.8	69.2	-	0.0004
Radioactive Iodine	93.6	0.0	100.0	-	-

Disruption Subgroup	DR (%)	FNR (%)	DR (%) Metastatic Nodes	Comparison DR of SLN with ICG (p-value)	Comparison DR of SLN with RI (p-value)
Lymphazurin Blue	69.6	20.0	80.0	0.1433	0.0033
Indocyanine Green	80.0	20.0	80.0	-	0.1270
Radioactive Iodine	88.6	0.0	100.0	-	-

Non-Disruption Subgroup	DR (%)	FNR (%)	DR (%) Metastatic Nodes	Comparison DR of SLN with ICG (p-value)	Comparison DR of SLN with RI (p-value)
Lymphazurin Blue	79.0	12.5	87.5	0.8405	0.0001
Indocyanine Green	80.3	37.5	62.5	-	0.0002
Radioactive Iodine	98.7	0.0	100.0	-	-

DR=detection rate, FNR=false negative rate, ICG=Indocyanine Green, RI=Radioisotope

1385628 - Locoregional Treatment Improves Survival in De Novo Bone-only Metastatic Breast Cancer: Long-term Results of the Prospective, Multi-institutional Study - Protocol BOMET MF14-01

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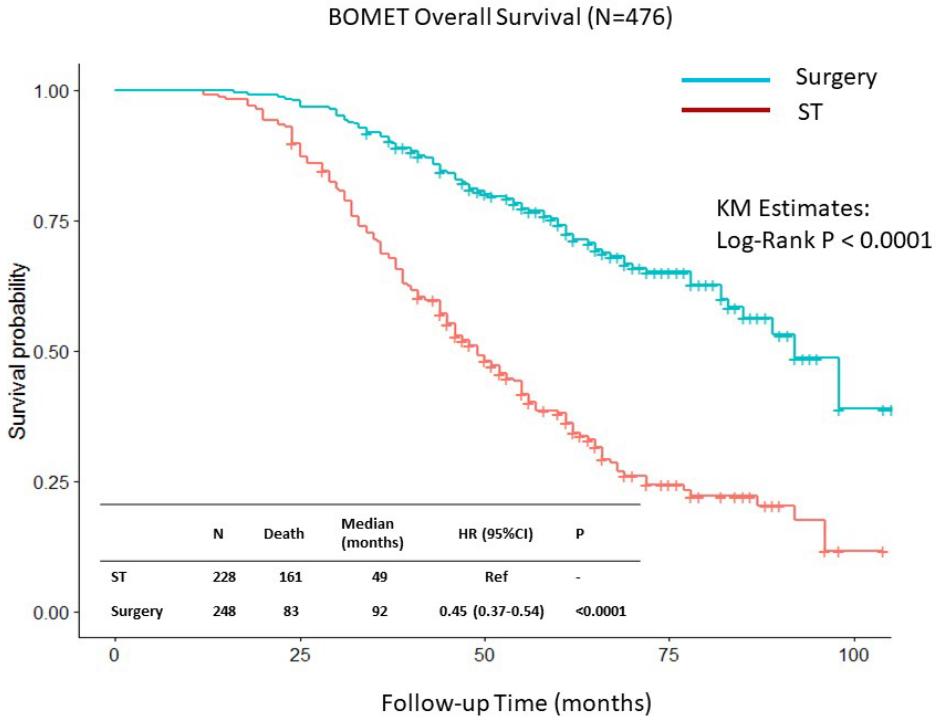
Background/Objective: Initial analysis of BOMET MF14-01 study showed that locoregional treatment (LRT) improved overall survival (OS) and decreased locoregional recurrence (LRR) at a median 3-year follow-up in de novo bone-only metastatic breast cancer (dn bone only MBC). The goal of this study is to compare the benefits of LRT to systemic therapy (ST) after a longer period of follow-up.

Methods: This is a prospective, multi-institutional registry study that was initiated in May 2014. Patients with de novo metastatic breast cancer (BC) with bone-only metastases were divided mainly into 2 groups: ST-group and LRT-group. Patients who underwent LRT were further evaluated in 2 subgroups: ST after LRT (LRT+ST group) and ST prior LRT (ST+LRT group).

Results: Median follow-up was 55 (39-70, 25-75%) months. Twenty-nine patients were lost during follow-up, and 476 women were included in this long-term analysis: 47.9% (n=228) and 52.1% (n=248) in the ST- and LRT-groups, respectively. In the ST+LRT group, 30.2% (n=75) of patients received ST before primary breast surgery, whereas 69.8% (n=173) of patients underwent breast surgery at the initial diagnosis followed by ST. Patients in the LRT group were significantly younger than the ST group (51.7±13.1 vs 54.4±13.9, p=0.03). In terms of tumor type, grade, tumor biology subtypes, hormonotherapy, and chemotherapy use, the groups were comparable (p>0.05). During the follow-up period, 161 (33.9%) and 83 (17.4%) patients died in the ST and LRT groups, respectively. Patients in the ST-group were more likely to have locoregional (locoregional progression; ST-group:16.7% vs LRT-group:7.3%, p=0.001) and systemic progression (systemic progression; ST-group:71% vs LRT-group:39%, p< 0.0001) compared to those in the LRT-group. In univariate analysis, the hazard of death was 55% lower in LRT-group than in ST-group (HR=0.45, 95% CI: 0.37-0.54, p< 0.0001). Similarly, multivariate Cox analysis showed that LRT (HR=0.46, 95% CI: 0.38-0.55, p< 0.0001) significantly decreased the hazard of death, whereas age older than >55 years (HR=1.41, 95% CI: 1.10-1.82, p=0.007), or presence of multiple bone metastases (HR=1.39, 95% CI: 1.07-1.82, p=0.015) significantly increased the hazard of death in all patients (p< 0.05). LRT was shown to have a survival benefit in all metastatic subgroups (solitary metastasis, oligometastases, multiple metastases), and survival was inversely correlated with the number of metastases as expected.

Conclusions: The long-term outcome analysis of this study suggests that LRT prolongs OS and decreases both locoregional and systemic progression in dn bone only MBC. We strongly recommend that all patients with dn bone only MBC be discussed in multidisciplinary tumor board meetings for the possibility of locoregional treatment.

Figure. Hazard of death was 55% lower in LRT-group than in ST-group (HR=0.45, 95% CI: 0.37-0.54, p<0.0001)



1388281 - Role of Axillary Lymph Node Dissection for Isolated Tumor Cells Following Neoadjuvant Chemotherapy

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Background/Objective: De-escalating axillary surgery in patients with minimal residual disease, specifically isolated tumor cells (ITC), after neoadjuvant chemotherapy (NACT) remains a subject of debate. The potential for lifelong complications, such as lymphedema, associated with an axillary lymph node dissection (ALND) may often outweigh the minimal contribution to oncologic management and outcome. We sought to evaluate if there is a subset of clinically node-positive patients who only have ITC after neoadjuvant chemotherapy who may be candidates for de-escalation of axillary surgery.

Methods: The National Cancer Database (NCDB) was used to perform a retrospective analysis of patients diagnosed with breast cancer from 2006 – 2018. Patients with cT1-T2 and cN1-N2 disease who received NACT were included. The primary outcomes were axillary surgical management trends and the rate of ITC only on final pathology following ALND. This study was deemed IRB-exempt.

Results: There were 42,776 patients who met our inclusion criteria. Of those, 38% underwent a SLNB, while 32% had only an ALND. Of the patients who had a SLNB, 44% had a subsequent ALND. Within our cohort, 384 patients had ITC alone on final surgical pathology. Of these patients, the mean age was 50 years old and 87% had a Stage cT2N1 tumor before treatment. Among patients with ITCs, 35.2 % (n= 135) had undergone SLNB alone, while 22.7 % (n = 87) had SLNB+ALND, and 40.1 % (n = 154) had ALND alone, Table 1. When comparing patients undergoing SLNB followed by ALND to patients with micrometastases or marometastases on ALND, patients with only ITCs were associated with higher grade, cT2cN1 disease, and HR+/HER2- receptor status (p-value < 0.05), Table 1.

Conclusions: A subset of patients (62.8%, n=241) was confirmed to have only ITCs following NACT and either ALND or SLNB followed by ALND. De-escalating axillary management may be a potentially viable option in carefully selected patients. We observed a practice pattern of omitting ALND in some patients with ITCs on SLNB following NACT. Further research, including the results of large randomized clinical trials, is needed to determine whether we can identify patients with minimal disease following NACT who can safely omit ALND.

Table. Axillary management and tumor characteristics in patients after NACT

Axillary management	ITCs n = 384		Micrometastasis n = 2,921		Macrometastasis n = 7,976		*p*-value
No procedures	8	2.1%	39	1 %	48	0.6 %	
SLNB alone	135	35.2%	554	19 %	912	11.4 %	
SLNB + ALND	87	22.7%	570	19.5%	2,206	27.7 %	
ALDN alone	154	40.1%	1,188	40.7%	4,810	60.3 %	
*Unknown**	76	16.5 %	2,030	46.3 %	4,219	34.6 %	
Grade**	**n = 87**		**n = 570**		**n = 2,206**		0.000
I	1	1.2%	27	4.74 %	133	6 %	
II	20	23%	187	32.81 %	831	37.7%	
III	58	66.7%	307	53.86 %	1,073	48.6%	
IV	0	0%	1	0.18 %	6	0.3%	
Unknown	8	9.2%	48	8.42 %	163	7.4%	
Clinical Stage – cT**	**n = 87**		**n = 570**		**n = 2,206**		0.006
cT1	20	23%	164	28.8%	553	25.1%	
cT2	67	77%	406	71.2%	1,653	75%	
Clinical Stage – cN**	**n = 87**		**n = 570**		**n = 2,206**		0.000
cN1	82	94.3%	543	95.2%	1,952	88.5 %	
cN2	5	5.8%	27	4.7%	254	11.5 %	
Tumor Size (mm ± SD)**	50	±149.5	58.3	± 169.6	43.6	± 117.17	
Biomarkers**	**n = 87**		**n = 570**		**n = 2,206**		0.000
Triple-negative	30	34.5 %	201	35.2%	655	29.7%	
HR Positive, HER2 Positive	5	5.7 %	38	6.7%	121	5.5%	
HR Positive, HER2 Negative	35	40.2%	243	42.7%	1,239	56.2%	
HR Negative, HER2 Positive	12	13.8%	68	12%	120	5.4%	
Unknown	5	5.7%	20	3.5%	71	3.2%	

SLNB: Sentinel Lymph Node Biopsy; ALND: Axillary Lymph Node Dissection; ITC: Isolated Tumor Cells; HR: Hormone Receptor

***** *This category calculated percentages based on the total number of patients including the ones with unknown axillary management (ITC n = 470; Micromet n= 4,952; Macromet n=12,195).*

*** Patients included for analysis underwent NACT and SLNB + ALND*

1388221 - Factors Predicting Axillary Disease Burden in Patients with Positive Sentinel Lymph Nodes After Neoadjuvant Chemotherapy

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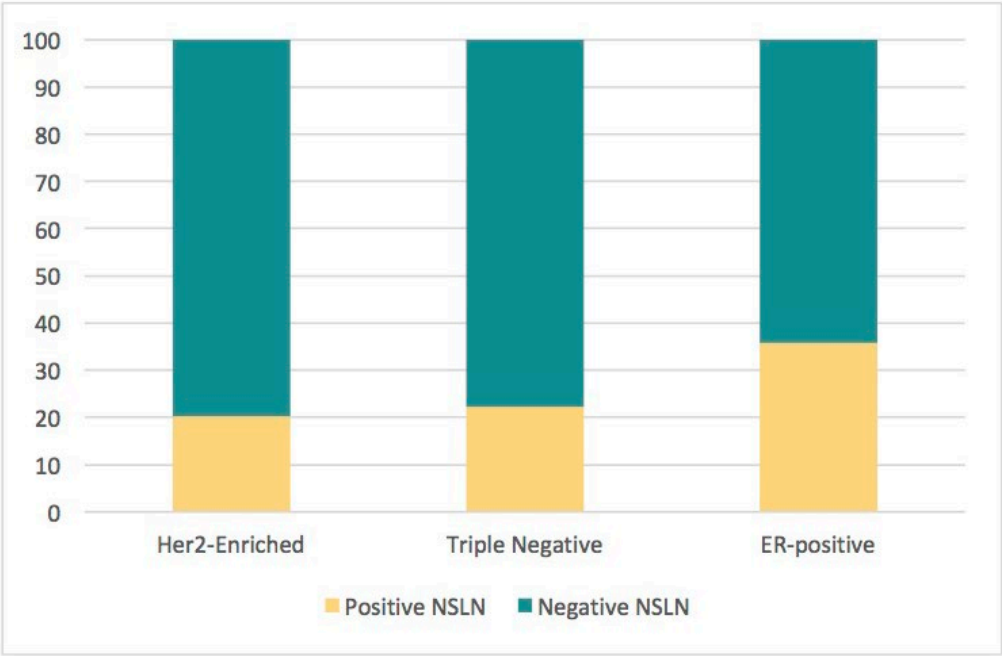
Background/Objective: Axillary lymph node dissection (ALND) is currently standard of care for patients with sentinel lymph node (SLN) metastases following neoadjuvant chemotherapy (NAC). Several nomograms are available to predict the probability of non-SLN (NSLN) metastases. We aimed to examine the rate of NSLN positivity at our institution and factors associated with it and with the burden of axillary disease.

Methods: Breast cancer patient undergoing ALND following positive SLNs after NAC during the years 2014-2021 were identified using our institutional pathology registry. Univariate and multivariate analyses were used to identify variables correlating with NSLN positivity and with the proportion of positive NSLN.

Results: A total of 109 patients were identified. 58 patients (53.2%) had positive NSLN whereas 51 patients (46.7%) had no further nodal disease beyond the SLN. The only variables that significantly correlated with positive NSLN were tumor multifocality (34% vs. 65%, p=0.01) and extracapsular extension (ECE) (29% vs. 71%, p=0.006). Age at diagnosis (</≥50 years of age), nodal status at presentation, tumor grade, ER, PR and HER2 positivity and lymphovascular invasion (LVI) did not significantly correlate with NSLN positivity. When examining the axillary nodal disease burden, in the ER-positive subgroup there was a significantly higher proportion of positive NSLN (35.7%) compared with the HER2-enriched (20.2%, p=0.000179) and the triple-negative (22.2%, p=0.0049) subgroups (figure 1).

Conclusions: ER-positivity predicts high axillary disease burden in patients with positive NSLN after neoadjuvant chemotherapy. This subgroup of patients may benefit the most from ALND as there are currently no adjuvant chemotherapy options that effectively targets residual disease.

Figure. Proportions of positive and negative NSLNs according to tumor subtype



1388425 - Combined Analysis of the MF18-02/03 Neosentiturk Studies: Factors Predicting Recurrence in ycN0/ypN-positive Breast Cancer with Sentinel Lymph Node Biopsy - Or Targeted Axillary Dissection - Alone After Neoadjuvant Chemotherapy

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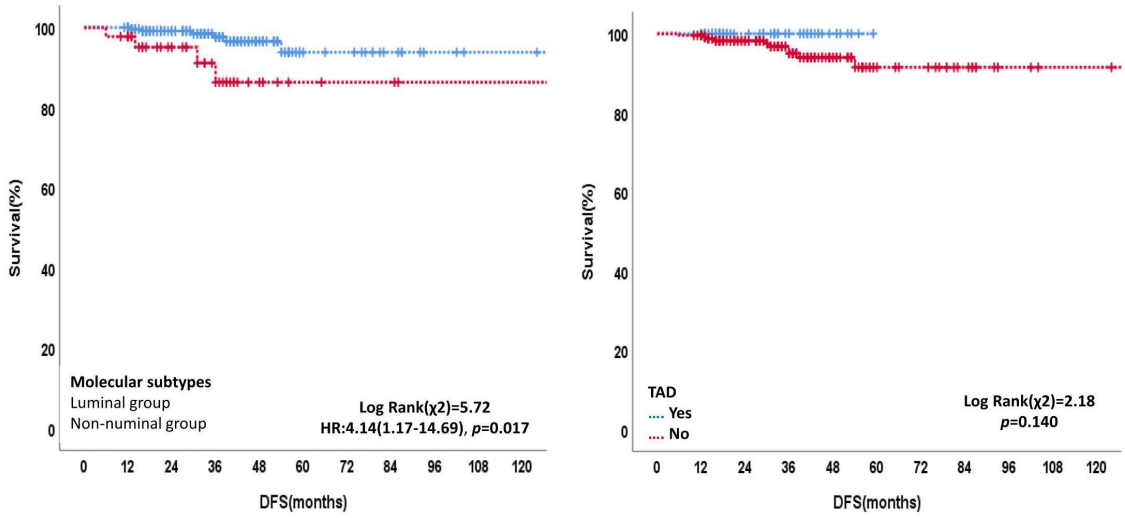
Background/Objective: Our previous study demonstrated that axillary lymph node dissection (ALND) could be omitted in meticulously selected cN(+) patients who underwent sentinel lymph node biopsy (SLNB)-alone after neoadjuvant chemotherapy (NAC) having cT1-2, or low volume residual nodal disease with luminal pathology and received axillary radiotherapy. The aim of this study is to explore the axillary and locoregional recurrence rates and factors associated with any recurrence in patients with ycN0/ypN-positive breast cancer following NAC.

Methods: This study included patients with a cT1-4N1M0 disease from 2 registries of the MF18-02/MF1803 trials who underwent either SLNB- or targeted axillary dissection (TAD)-alone without ALND. Cases with < 2 or >6 LNs and >2 pathologically metastatic LNs removed were excluded from the analysis. All patients had nodal and regional irradiation.

Results: Between August 2006 to December 2021, 307 patients with cT1-4N1M0 disease underwent either SLNB-alone (n=242) or TAD-alone (n=65). The median age was 47 (range, 24-79). The median number (IQR, 25%-75%) of SLNs and total LNs removed were 3 (2-4) and 4 (3-5), respectively. More than half of the patients had macrometastatic nodal involvement (macrometastasis: 53.1%, micrometastasis: 31.6%, ITC:15.3%) and only 26.7% of patients were found to have >1 metastatic LNs. Patients with TAD were more likely to have the dual technique for SLN-mapping (52.3% vs 21.9%, p< 0.0001) and luminal pathology (95.4% vs 83.1%, p=0.009) compared to the SLNB-alone group. No further differences could be found between TAD-alone and SLNB-alone groups in other clinicopathological characteristics including age, tumor type, breast pCR, HER2-positivity or high Ki-67 score, nodal involvement as low volume metastatic disease (ITC or micrometastasis), total metastatic LNs and extracapsular extension. At a median follow-up (IQR, 25%-75%) of 33 months (IQR, 17-45), the axillary and locoregional receurrence rates were 0.33% (n=1) and 1% (n=3), respectively. The 5-year DFS rate was 92.7% in the whole cohort. No significant difference could be found in disease free survival (DFS) rates between groups including TAD-alone vs SLNB-alone, cT1-2 vs cT3-4, breast pCR (+) vs (-), SLN-mapping as dual vs single technique, 2-4 LNs vs >4 LNs removed, number of total metastatic LN 1vs 2, metastasis type as ITC, micrometastasis vs macrometastases. However, patients with non-luminal pathology were more likely to have a worse 5-year DFS-rate compared to those with luminal pathology (86.3% vs 93.8%, p=0.017, Figure 1). In multivariate Cox regression analysis, presence of non-luminal pathology remained the only significant factor associated with the increased likelihood of any recurrence (HR=4.14, CI 95%: 1.17-14.69, p= 0.036).

Conclusions: Our initial findings indicate that axillary and locoregional recurrences were observed at very low rates in a selected group of ypN-positive patients with SLN- or TAD-alone, and low metastatic nodal disease. The tumor biology as non-luminal pathology remained as the only significant factor associated with recurrence in this selected cohort. Therefore, omission of ALND could be considered for selected patients with luminal pathology and limited nodal involvement after a detailed tumor board discussion as long as nodal radiotherapy provided. However, further studies with a longer follow-up are needed before considering these criteria in standard management.

Figure. Patients with non-luminal pathology were more likely to have a worse 5-year DFS-rate compared to those with luminal pathology (86.3% vs 93.8%, p=0.017), whereas no difference could be found between patients with SLNB-alone vs TAD-alone (91.5% vs 100%, p=140).



1388348 - Axillary Surgery After Neoadjuvant Chemotherapy: Population-based Trends Over Time

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Background/Objective: Neoadjuvant chemotherapy (NAC) for breast cancer can decrease the extent of surgery required in the breast and the lymph nodes. Surgical excision can be converted from a mastectomy to a lumpectomy and from an axillary lymph node dissection (ALND) to a sentinel lymph node biopsy (SLNB). Specifically, patients with clinically mobile node-positive (cN1) disease can undergo a SLNB rather than an ALND if a complete clinical response is observed after NAC. No further surgery is required if a pathologic complete response is achieved, which can spare patients the short and long-term morbidities of an ALND, including nerve injury and lymphedema. Prior to clinical trials confirming the accuracy of SLNB in cN1 patients after NAC, ALND was the standard of care for patients undergoing NAC. Given recent advances in the surgical management of the axilla towards de-escalation of therapy, our goal was to describe recent trends in axillary surgery (SLNB and ALND) after NAC for patients with breast cancer.

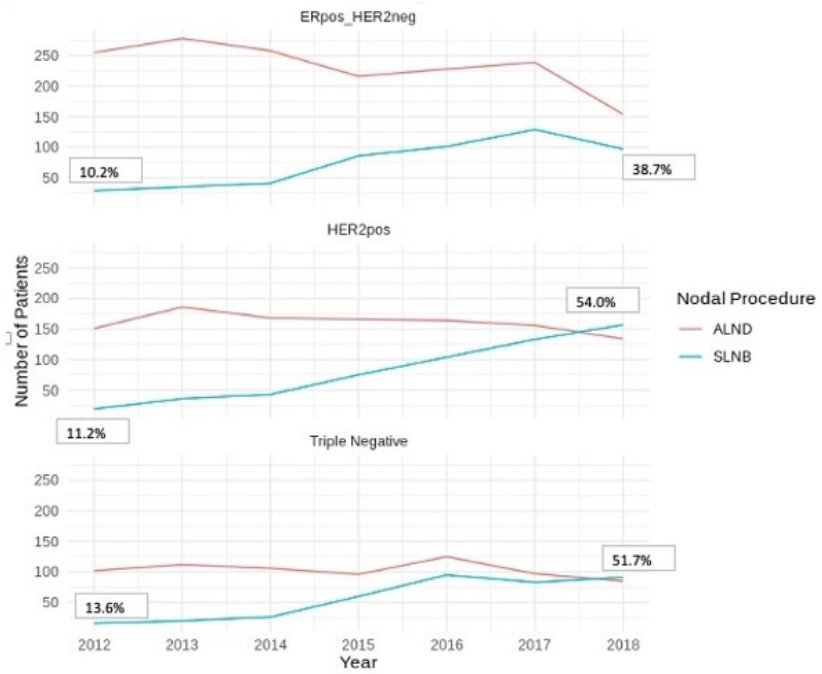
Methods: A retrospective population-based cohort study of women with unilateral Stage I-III cancer (2012-2019) who underwent NAC followed by surgery was completed using linked administrative datasets in Ontario, Canada. The primary outcome was first surgical management of the axilla (SLNB or ALND) after NAC. Temporal trends in axillary management were evaluated using Cochran-Armitage

tests. Multivariable regression assessed the association between axillary surgery and year of diagnosis (2012-2015 vs 2016-2019) while adjusting for age, rurality, deprivation quintile, comorbidity, previous breast cancer diagnosis, cancer stage, receptor subtype and receipt of consultation at a regional cancer center.

Results: Of 4952 included patients, 3476 (70.2%) underwent ALND and 1476 (29.8%) underwent SLNB as their first axillary surgery after NAC. Overall, the proportion of patients undergoing SLNB after NAC increased over time from 11.2% in 2012 to 48.1% in 2019 ($p< 0.001$). This trend persisted for each receptor subtype (Figure 1). When comparing SLNB rates between 2016 – 2019 and 2012-2015, patients were 3 times more likely to receive a SLNB after NAC during the second half of our study period (OR 2.99, 95% CI: 2.21 – 4.03). Rates of ALND after NAC for patients with N0 disease (n=1121) decreased from 61.1% to 18.6%. Of the 2837 patients with cN1 disease, 23.1% (n=654) patients underwent SLNB and 76.9% (n = 2183) underwent ALND after NAC, with a significant increase in SLNB use over time from 7.0% to 31.7%.

Conclusions: Patients with breast cancer are increasingly undergoing SLNB for initial axillary management after NAC. This trend is observed across receptor subtypes and among patients with cN1 disease at presentation. Patients with cN1 disease, especially those with triple-negative and HER2pos disease, should have an opportunity for downstaging of their axilla with NAC to potentially avoid an ALND. Despite increasing rates of SLNB, there is still a significant proportion of patients with N0 and N1 disease undergoing ALND after NAC. Further assessment to identify factors associated with ALND use for patients with N0 and N1 disease is required to reduce the potential for unnecessary morbidity secondary to ALND within this population.

Figure. Axillary surgery over time by receptor subtype



Note: percentages presented represent proportion of patients undergoing SLNB

SLNB: sentinel lymph node biopsy; ALND: axillary lymph node dissection

1388036 - Feasibility of Deescalating Axillary Surgery in cN2 Patients After Neoadjuvant Chemotherapy

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Background/Objective: De-escalation of axillary surgery with the aim of reducing morbidity is a recent advancement in the management of patients with breast cancer. Omitting axillary lymph node dissection (ALND) in patients with negative sentinel nodes following neoadjuvant chemotherapy (NACT) is an approach supported by randomized clinical trial data. However, most studies involve patients with cN1 disease, and patients with cN2 disease are not well-represented in the data. To date, there have been insufficient studies looking at cN2 disease to determine if these patients are candidates for axillary surgery de-escalation after neoadjuvant chemotherapy. Our study aims to evaluate patients with cN2 disease to determine their candidacy for axillary node de-escalation strategies.

Methods: A retrospective analysis of the National Cancer Database was conducted from 2013-2018. Inclusion criteria consists of female patients over 18 years old with invasive breast cancer and clinical N2 disease undergoing neoadjuvant chemotherapy and either ALND or sentinel lymph node biopsy (SLNB) followed by ALND. The primary outcome was absence of axillary disease after neoadjuvant chemotherapy. Descriptive statistics were performed to examine possible patient and tumor characteristics related to the primary outcome.

Results: Of 4,709 patients with invasive breast cancer with cN2 disease who underwent neoadjuvant chemotherapy and either ALND or SLNB followed by ALND, 1377 patients (29.2%) were ypN0. An additional 92 (2%) patients had isolated tumor cells, 1240 (26.3%) patients were ypN1, 1478 (31.4%) patients were ypN2, and 522 (11.1%) patients were ypN3. Achieving ypN0 was associated with HR-/HER2-, followed by HER2+ receptor status and ypT0-1.

Conclusions: Our study examined axillary node response to neoadjuvant chemotherapy in patients with cN2 disease and demonstrated that nearly a third of patients downstaged to ypN0 following systemic treatment. Achieving a pathologic complete response in the axillary nodes was associated with specific tumor features. Our data suggests that appropriately selected patients with cN2 disease may be suitable candidates for de-escalation of axillary surgery.

Table. Summary of patient characteristics

N= 4709	**pN0** (29.2%) (N = 1377)	**ITCs** (2%) (N = 92)	**pN1** (26.3%) (N = 1240)	**pN2** (31.4%) (N = 1478)	**pN3** (11.1%) (N = 522)
Age of patient					
<40	196 (14.2%)	8 (8.7%)	146 (11.8%)	170 (11.5%)	57 (10.9%)
40-54	543 (39.4%)	39 (42.4 %)	467 (37.7%)	522 (35.3%)	146 (28%)
55-69	506 (36.7%)	35 (38%)	479 (38.6%)	582 (39.4%)	247 (47.3%)
70+	132 (9.6%)	10 (10.9%)	148 (11.9%)	204 (13.8%)	72 (13.8%)
Ethnicity					
White	987 (71.7%)	68 (73.9%)	835 (67.3%)	1092 (73.9%)	391 (74.9%)
Black	288 (20.9%)	15 (16.3%)	310 (25%)	299 (20.2%)	88 (16.9%)
Other/Unknown	102 (7.4%)	9 (9.8%)	95 (7.7%)	87 (5.9%)	43 (8.2%)
Histology					
IDC	1177 (85.5%)	71 (77.2%)	1033 (83.3%)	1148 (77.7%)	383 (73.4%)
ILC	20 (1.5%)	6 (6.5%)	36 (3%)	105 (7.1%)	59 (11.3%)
IDC + ILC	24 (1.7%)	2 (2.2%)	35 (2.8%)	49 (3.3%)	29 (5.5%)
Other	156 (11.3%)	13 (14.1%)	136 (10.9%)	176 (11.9%)	51 (9.8%)
Grade					
Grade I	18 (1.3%)	1 (1.1%)	49 (4%)	65 (4.4%)	28 (5.4%)
Grade II	268 (19.5%)	31 (33.7%)	365 (29.4%)	495 (33.5%)	180 (34.5%)
Grade III	926 (67.2%)	50 (54.3%)	697 (56.2%)	746 (50.5%)	263 (50.4%)
Grade IV/poorly differentiated	5 (0.4%)	0 (0%)	7 (0.6%)	6 (0.4%)	5 (0.9%)
Missing/Unknown	160 (11.6%)	10 (10.9%)	122 (9.8%)	166 (11.2%)	46 (8.8%)
Clinical T stage					
cT0	45 (3.3%)	1 (1.1%)	26 (2.1%)	52 (3.5%)	9 (1.7%)
cT1	139 (10.1%)	6 (6.5%)	117 (9.4%)	140 (9.5%)	49 (9.4%)
cT2	493 (35.8%)	28 (30.4%)	480 (38.7%)	480 (32.5%)	140 (26.8%)
cT3	296 (21.5%)	20 (21.7%)	284 (22.9%)	368 (24.9%)	139 (26.6%)
cT4	391 (28.4%)	36 (39.1%)	319 (25.7%)	406 (27.5%)	174 (33.3%)
Other/Unknown	13 (0.9%)	1 (1.1%)	14 (1.1%)	32 (2.2%)	11 (2.1%)
Pathologic T stage					
ypT0	700 (50.8%)	23 (25%)	142 (11.5%)	81 (5.5%)	14 (2.7%)
ypTIS	85 (6.2%)	7 (7.6%)	29 (2.3%)	16 (1.1%)	5 (0.9%)
ypT1	339 (24.6%)	31 (33.7%)	509 (41%)	425 (28.8%)	110 (21.1%)
ypT2	95 (6.9%)	15 (16.3%)	302 (24.4%)	441 (29.8%)	154 (29.5%)
ypT3	34 (2.5%)	6 (6.5%)	108 (8.7%)	247 (16.7%)	122 (23.4%)
ypT4	31 (2.2%)	4 (4.3%)	86 (6.9%)	188 (12.7%)	105 (20.1%)
Unknown	93 (6.8%)	6 (6.5%)	64 (5.2%)	80 (5.4%)	12 (2.3%)
Receptor status					
HR+/HER2-	280 (20.3%)	29 (31.5%)	548 (44.2%)	798 (54%)	281 (54%)
HR+/HER2+	333 (24.2%)	24 (26.1%)	192 (15.5%)	201 (13.6%)	66 (12.6%)
HR-/HER2+	323 (23.5%)	12 (13%)	105 (8.5%)	89 (6%)	30 (5.7%)
HR-/HER2-	409 (29.7%)	25 (27.2%)	352 (28.4%)	326 (22.1%)	126 (24.1%)
Missing/Unknown	32 (2.3%)	2 (2.2%)	43 (3.4%)	64 (4.3%)	19 (3.6%)

Stage IV

1386547 - Primary Tumor Surgery in Patients with De Novo Bone-only Stage IVA/B Breast Cancer: MetS: Protocol MF22-03, Combination Data Analysis of Prospective Studies

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Background/Objective: The development of systemic treatment (ST) regimens has increased the survival of patients with de novo metastatic breast cancer (dnMBC). The literature has a proposal for a new staging system for dnMBC to identify a subgroup of patients with a better prognosis. This study aimed to use a modified staging system in dn bone-only MBC and evaluate the impact of primary tumor surgery (PTS) on survival in this cohort of patients.

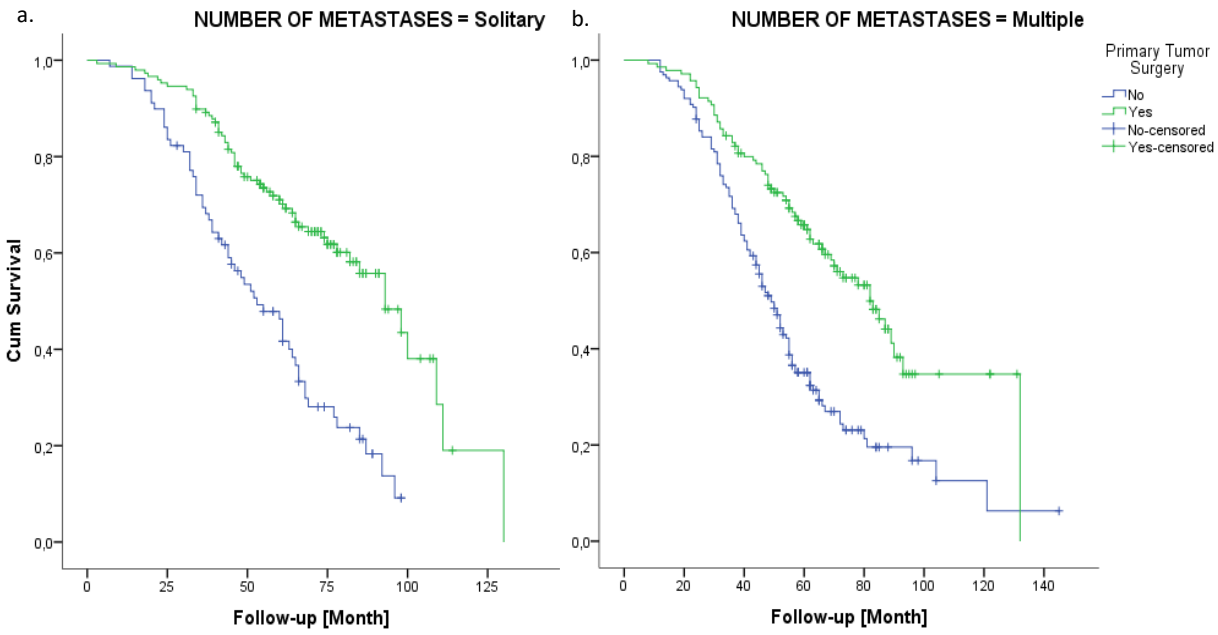
Methods: A combination of data from MF07-01 (phase 3, randomized trial) and BOMET (prospective multi-institutional registry trial) was used. Patients with bone-only metastases were included in the study. Stage IVA and IVB were defined based on hormone receptor (HR) status, HER2 status, grade, cT stage, and the number of bone metastases (solitary, multiple). Stage IVA consists of patients with either HER2-positive or HER2-negative, HR positive, cT0-1-2-3, grade 1-2-3 patients or HER2-negative, HR positive, cT4, grade 1-2 patients. Stage IVB consists of either HR positive, HER2-negative, grade 3, cT4 patients or HR negative, HER2-negative patients. Kaplan-Meier survival and cox regression analysis were used to compare survival differences between the groups.

Results: The study included 589 patients. There were 530 (89%) patients with Stage IVA and 59 (10%) patients with Stage IVB. The median follow-up time was 55 (37 –71,5) months. In the solitary bone metastasis Hazard of Death (HoD) was 43% less in Stage IVA group compared to Stage IVB group; median overall survival (OS) was 65 (39 -104) months and 44 (28 -72) months, respectively; HR 0.57; 95% CI 0.41–0.78; p = 0.0003. Regardless of the number of bone metastases, Stage IVB patients had no OS benefit from PTS (solitary metastasis p=0.07; multiple metastases p= 0.12). HoD was significantly less in the PTS patients in Stage IVA group; median OS in Stage IVA and solitary metastasis was 93 (95% CI 79.14 – 106.86) months in the PTS group and it was 53 (95% CI 41.44 – 64.56) months in the ST only group (HR 0.375; 95% CI 0.259-0.543; p < 0.001). In Stage IVA with multiple bone metastases subgroup the median OS was 82 (95% CI 68.74–95.26) months in the PTS group; it was 33 months longer than the ST only group (HR 0.453; 95% CI 0.334–0.615; p< 0.001). [Fig. 1]

Conclusions: This study shows that Stage IVA patients had better OS compared Stage IVB, and PST decreased the HoD compared with ST only group in Stage IVA patients. These findings support the

notion that a modified staging system in dn bone-only MBC can be used to identify which patients will benefit from PTS by considering clinical and pathological variables.

Figure 1. Stage 4A overall survival PTS vs ST a solitary metastases b multiple metastases



Metastases		n	Death	Median [Months]	P (Log Rank)
Solitary	ST	79	58	53 (41.4 – 64.6)	<0.001
	PTS	148	60	93 (79.1 – 106.9)	
Multiple	ST	163	118	49 (44.2 – 53.8)	<0.001
	PTS	140	66	82 (68.7 – 95.3)	

Fig. 5 Stage 4A overall survival PTS vs ST **a** solitary metastases **b** multiple metastases

Time to Treatment

1386005 - Timeliness in Breast Cancer: Does Imaging Indication Matter?

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Background/Objective: Screening mammography has been repeatedly shown to decrease breast-cancer specific mortality. Unfortunately, many patients with breast cancer are diagnosed only after experiencing symptoms, such as a palpable mass. Prior research has indicated that screen-detected breast cancers are more likely to be smaller, with a lower pathologic grade and clinical stage, and are more likely to be treated with breast-conserving therapy than those detected after presenting with clinical symptoms. Time to breast cancer treatment is another important factor in patient outcomes. The purpose of this study was to investigate the differences in outcomes and timeliness in symptomatic compared with screen-detected breast cancers in a primarily minority population.

Methods: A retrospective chart review was performed of all patients who underwent imaging, biopsy and surgery for Stage I-III breast cancer from January 2017 to March 2022 at an urban safety net hospital. Chart review was performed to determine if patients initial imaging was for routine screening mammography, or diagnostic mammography performed for symptoms such as a palpable lump. Demographics, mammography findings, tumor characteristics, and timeliness to biopsy and surgery were compared between these 2 patient populations.

Results: 232 patients were analyzed, with 100 (43.1%) in the symptomatic mammography group and 132 (56.9%) in the screen-detected mammography group. The patient population was primarily Black or Hispanic Black (56.0%) or non-Black Hispanic (30.1%), English speaking (72.0%) and obtained insurance coverage through Medicaid or Medicare (76.7%). There were no differences between the 2 groups in age, race, primary spoken language, insurance, history of psychiatric diagnosis, history of substance use disorder, or family history of breast cancer. Patients who presented with symptoms more often had initial imaging read as BI-RADS 5, or highly suggestive of malignancy, (42.5% symptomatic vs. 17.4% screened; $p<.05$) and were more likely to be diagnosed with clinical Stage III cancer (32% symptomatic vs. 18.2% screened; $p<.05$). They less often underwent breast-conserving therapy (64% symptomatic vs. 82.6% screened; $p<.05$), and were more likely to undergo neoadjuvant chemotherapy (14% symptomatic vs. 5.3% screened; $p<.05$). Delays were seen in time from initial to diagnostic imaging (4.9 days symptomatic vs. 32 days screened; $p<.05$), but times were similar from diagnostic imaging to biopsy, and to surgery.

Conclusions: Patients presenting for screening had longer times from initial mammogram to surgery, which can be explained by a time delay in obtaining diagnostic imaging. This indicates that care was more timely for patients who presented with symptoms. Symptomatic patients were also more likely to have a mammogram reading highly suggestive of malignancy, be diagnosed with at a higher clinical stage, undergo neoadjuvant chemotherapy, and have a mastectomy with or without reconstructions. While this is congruent with previous findings, it is the first investigation of its kind in an underserved

population comprised predominantly of racial minorities, and highlights the need for timely diagnostic imaging.

1384591 - Efficacy of an Integrated Community Breast Clinic Program Implementation on Improving Time to Treatment for Breast Cancer Patients

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Background/Objective: Time to treatment is increasingly emphasized in quality assessments of oncologic care. There is no question the emotional anxiety in newly diagnosed breast cancer patients is readily palpable and a driver to shorten these intervals. Community practices seeking to shift to a multidisciplinary clinic approach for consultation and subsequent care are escalating. In this study, we sought to assess the impact of implementation of an integrated breast clinic program in a community practice setting on timeliness to patient treatment, with an effort to create improved patient consultation pathways within the constraints of a community practice platform.

Methods: All female patients with biopsy-proven breast cancer from December 2015 to 2019 at a community-based practice in an integrated health system were evaluated. Breast center implementation in January of 2018 created a pivotal streamlined approach to tumor board reviews as well as surgical, oncologic and radiation oncologic consultations within the single patient encounter. Patients prior to breast center implementation (prior to Jan 2018) were compared to the post-implementation group. Patients were excluded if they sought partial management at another outside clinic for a portion of their care or did not participate in the program after January 2018. Patient demographics were abstracted from the EMR and analyzed using frequencies, percentages, and chi-squared tests for categorical variables and means with standard deviation and t-tests for continuous variables. We employed generalized linear models to examine differences in time to initial treatment and next treatment options comparing pre- and post-implementation groups.

Results: Between December 2015 and 2017, 133 patients meeting the criteria received treatment for a breast cancer diagnosis. The post implementation group consisted of 124 patients (January 2018 to December 2019). Mean age at diagnosis was 65.0 (range 31.1, 96.4), with the majority diagnosed with invasive ductal carcinoma (69.3%). Post-implementation, both time from diagnosis to initial treatment and time from first clinic visit to initial treatment were longer by a mean of 8.1 days (95% CI: 4.2, 12.0, p<.0001) and 6.2 days (95% CI: 2.5, 9.9, p=0.001), respectively. The need for plastic surgery consultation was higher (21.0% vs 10.5%, p=0.021), which increased the average time from diagnosis to initial treatment by a mean of 12.3 days (95% CI: 6.9, 17.7, p<.0001), serving as a primary driver for the change. Time from initial treatment to subsequent treatment (chemotherapy or radiation) was shorter by an average of 3.5 days (95% CI: -3.6, 10.7, p=0.33) in the post-implementation group.

Conclusions: The shift to a center approach with multidisciplinary care is being seen more frequently in community-based practices. Time to treatment, while pivotal to the patient's perception of care, is a

complex outcome to evaluate due to the multiple patient and center variables that contribute. Successful community implementation of an integrated multidisciplinary breast cancer treatment approach should seek to include options for specialty consultation. Multi-disciplinary evaluation of the patient in these settings may lead to reduced intervals of care beyond the initial time of treatment, thereby affecting time to definitive care in whole.

Table. Patient and treatment characteristics

	Pre Implementation (N=137)	Post Implementation (N=126)	Total (N=263)	P-value
Time to first treatment from diagnosis (days)				<.0001[1]
N	137	126	263	
Mean (SD)	26.2 (15.89)	34.6 (16.06)	30.2 (16.50)	
Median	23.0	32.0	27.0	
Range	0.0, 140.0	7.0, 91.0	0.0, 140.0	
Age at diagnosis				0.4189[1]
N	137	126	263	
Mean (SD)	64.3 (12.31)	65.6 (13.43)	64.9 (12.85)	
Median	65.0	67.5	65.8	
Range	31.1, 90.6	32.5, 96.4	31.1, 96.4	
Distance from Facility				0.3289[1]
N	137	126	263	
Mean (SD)	27.5 (49.21)	42.3 (163.51)	34.6 (118.61)	
Median	22.0	25.5	24.0	
Range	1.0, 555.0	1.0, 1789.0	1.0, 1789.0	
First type of treatment, n (%)				0.0209[2]
Chemotherapy	9 (6.6%)	17 (13.5%)	26 (9.9%)	
Endocrine	0 (0.0%)	3 (2.4%)	3 (1.1%)	
Surgery	128 (93.4%)	106 (84.1%)	234 (89.0%)	
Diagnosis, n (%)				0.1406[2]
DCIS	14 (10.2%)	19 (15.1%)	33 (12.5%)	
HIGH GRADE DCIS	4 (2.9%)	10 (7.9%)	14 (5.3%)	
INVASIVE DUCTAL	102 (74.5%)	80 (63.5%)	182 (69.2%)	
INVASIVE LOBULAR	11 (8.0%)	14 (11.1%)	25 (9.5%)	
INVASIVE LOBULAR BILATERAL	1 (0.7%)	0 (0.0%)	1 (0.4%)	
INVASIVE MUCINOUS WITH DCIS	1 (0.7%)	0 (0.0%)	1 (0.4%)	
MUCINOUS ADENOCARCINOMA	1 (0.7%)	0 (0.0%)	1 (0.4%)	
MUCINOUS CARCINOMA	1 (0.7%)	3 (2.4%)	4 (1.5%)	
PAPILLARY	1 (0.7%)	0 (0.0%)	1 (0.4%)	
PAPILLARY CARCINOMA	1 (0.7%)	0 (0.0%)	1 (0.4%)	
Plastic surgery consultation, n (%)				0.0123[3]
No	123 (89.8%)	99 (78.6%)	222 (84.4%)	
Yes	14 (10.2%)	27 (21.4%)	41 (15.6%)	
MRI, n (%)				0.5286[3]
No	119 (86.9%)	106 (84.1%)	225 (85.6%)	
Yes	18 (13.1%)	20 (15.9%)	38 (14.4%)	

[1]Unequal variance two sample t-test; [2]Fisher Exact p-value; [3]Chi-Square p-value;

1388079 - Guideline Compliance for Breast Cancer Treatment During the COVID-19 Pandemic

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Background/Objective: During the early stages of the COVID-19 pandemic, a consortium of breast cancer societies published recommendations on the prioritization and treatment of breast cancer patients. Clinical scenarios were divided into priority levels and each subset of patients was triaged to a different treatment recommendation. The objective of this study is to determine whether surgeons were treating their newly diagnosed breast cancer patients in accordance with the pandemic recommendations published in 2020 by the consortium.

Methods: We examined newly diagnosed clinical Stage 0-IV breast cancer patients who were entered into the National Cancer Database (NCDB) between 2018 and 2020. We analyzed timeliness of breast cancer treatment stratified by COVID-19 consortium priority level and tumor type. Time from diagnosis to first treatment was examined and compared between years 2018, 2019 and 2020. According to the recommendations, patients with triple-negative breast cancer (TNBC) and HER2+ tumors were recommended to undergo neoadjuvant chemotherapy or HER2 targeted therapy. Patients with ER+ DCIS and ER+ HER2- cT1-2N0-1 tumors were recommended to undergo neoadjuvant hormone therapy and to delay surgery until after the pandemic.

Results: 427,218 patients with clinical Stage 0-IV breast cancer were included in this study. The patients had a mean age of 61 years. The median time from diagnosis to first treatment for all patients treated in 2018, 2019 and 2020 was 33, 35 and 33 days, respectively. For patients with clinical Stage I-III TNBC, the median number of days from diagnosis to first surgery was 47, 51, and 56 days in 2018, 2019 and 2020, respectively. The number of TNBC patients undergoing neoadjuvant chemotherapy increased from 3,784 (36%) in 2018 to 4,474 (39.4%) in 2019 and then to 4,498 (43.6%) in 2020. For patients with HER2+ clinical Stage I-III cancer, the median number of days from diagnosis to first surgery was 45, 50, and 51 days in 2018, 2019 and 2020, respectively. 4,727 (39.3%) HER2+ clinical Stage I-III patients underwent neoadjuvant therapy in 2020 compared to 4,396 (33.4%) in 2018 and 4,719 (36.3%) in 2019. No significant change in the time to first treatment was demonstrated for patients with cT1-2N0-1, ER+, HER2- cancer or patients with ER+ DCIS from 2018-2020. However, the use of neoadjuvant hormone therapy increased during the pandemic. 3,634 patients (7.3%) with cT1N0 ER+, HER2- tumors were on neoadjuvant hormone therapy in 2020 compared to 1108 (2.2%) in 2018 and 1337 (2.4%) in 2019. For patients with ER+ DCIS, 641 patients (4.6%) were on neoadjuvant hormone therapy in 2020 compared to 186 patients (1.1%) in 2018 and 132 patients (0.8%) in 2019.

Conclusions: The use of neoadjuvant hormone therapy more than doubled for ER+ tumors during the COVID-19 pandemic. The pandemic appears to have had minimal impact on the time from diagnosis to first treatment, although it may be difficult to appreciate the true impact given the absence of month-to-month data.

1388095 - Impact of the COVID-19 Pandemic on Delays to Breast Cancer Surgery: Ripples or Waves?

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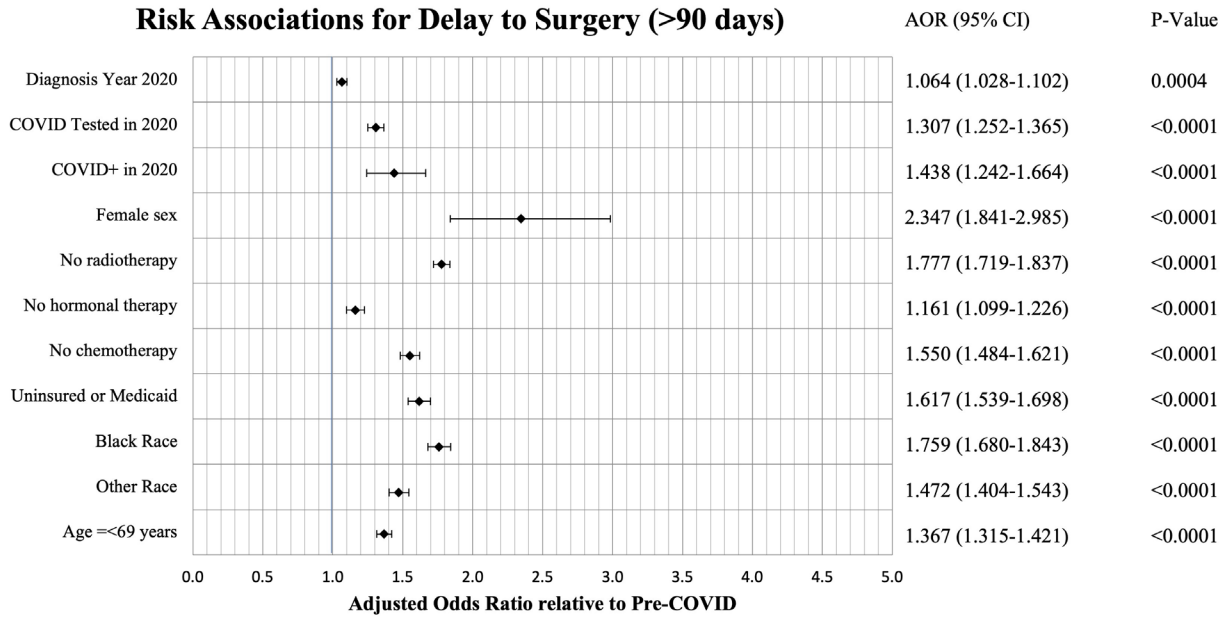
Background/Objective: Adherence to current recommendations for the optimal time from diagnosis to treatment for patients with breast cancer may have been disrupted by the COVID-19 pandemic. This study sought to evaluate the impact of the COVID-19 pandemic on time to surgery or chemotherapy for patients diagnosed with breast cancer.

Methods: The National Cancer Database was queried for patients diagnosed with all stages of breast cancer from 2018 to 2020. Cohorts were categorized by year of diagnosis in relation to the COVID-19 pandemic: Pre-COVID (2018-2019) and COVID (2020). Sub-analyses were performed for patients who were tested for COVID-19 as well as those who had a positive result. Categorical variables were compared using chi-square analysis. Multivariate logistic regression was used to identify predictors for delayed time to surgery (DTS, >90 days) or chemotherapy (DTC, >120 days), based on previous literature.

Results: We identified 234,980 patients diagnosed with breast cancer in 2018 and 2019 compared to 105,733 breast cancer patients diagnosed in 2020. Of the latter group, 49,412 underwent documented COVID-19 testing and 3,172 had a positive COVID-19 result. While overall patient characteristics between 2020 and pre-COVID were similar, a larger proportion of patients with a history of COVID-19 were Black, lived in rural areas, were uninsured or on Medicaid, and had a higher stage at diagnosis. Patients were more likely to have DTS if they were female, uninsured or on Medicaid, Black, other non-white race, or age ≤ 69 years when compared to pre-COVID patients. Diagnosis in 2020 did not significantly delay chemotherapy overall; however, Black race, other non-white race, age ≤ 69 years, and no hormonal treatment were associated with DTC in 2020 compared to pre-COVID.

Conclusions: Our results demonstrate that the COVID-19 pandemic was associated with significant DTS for breast cancer overall, however no difference was appreciated for DTC. Delays to treatment had a disproportional effect on vulnerable patient populations, who are already negatively impacted by existing health care disparities. The true clinical effects of these delays, if present, are yet to be realized, but there may be downstream effects on outcomes for breast cancer patients which should be investigated in the future. We also recommend further investigation into strategies to mitigate health care disparities in timely breast cancer treatment.

FIGURE. Impact of COVID on Delay to Surgery: multivariate logistic regression plot of odds ratios and 95% confidence intervals adjusted by socioeconomic factors



Tumor Genetics

1386545 - Adoption of the TAILORx Precision Treatment Paradigm: A Single-institution Experience

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Background/Objective: Adjuvant chemotherapy has the potential to reduce the risk of recurrence of breast cancer for many patients. The advent of 21-gene recurrence-score assay known as Oncotype Dx has allowed for individualizing chemotherapy to women who may receive benefit. The recurrence score ranges from 0-100, with a low score (0 -10), intermediate score (11-25), and high score (26 and higher). A low recurrence score is prognostic for a low rate of distant recurrence at 10 years, unlikely to be affected by chemotherapy; a high score is prognostic for significant benefit from adjuvant chemotherapy. The uncertainty of whether chemotherapy is beneficial for the intermediate recurrence score was clarified by the TAILORx trial published in 2018, whereby no benefit of chemotherapy was found in women over age 50. The aim of this study was to determine if there was a difference in chemotherapy administration at our institution based on the published results of the TAILORx trial.

Methods: Women with early-stage, node-negative, ER/PR-positive, HER2-negative breast cancer of age 18-75 within the network's Tumor Registry from February 2014 to December 2022 were included. Data were collected on date of diagnosis, chemotherapy administered, tumor size, and Oncotype Dx score. Data from women diagnosed before July 2018 was compared to those diagnosed after July 2018, when TAILORx was published.

Results: A total of 3069 women treated at our institution were included after IRB approval. There were 1498 patients over age 50 before July 2018, out of 1751 total patients before July 2018., There were 1126 patients over age 50 after July 2018, out of 1318 total patients after July 2018. Overall, 11% (172) of women over 50 received chemotherapy before July 2018, while 9% (105) received chemotherapy after July 2018, with no significant difference between the proportions (p-value 0.08). However, chemotherapy use was significantly related to Oncotype range for women over 50. The percentage of women over age 50 with an intermediate Oncotype recurrence score who received chemotherapy was found to be significantly higher before July 2018 than compared to after (5.5% {12} vs 1.16% {3}, p-value 0.006).

Conclusions: The results of the TAILORx trial suggest that women younger than 50 with an intermediate Oncotype recurrence score may have benefit from chemotherapy, while those over age 50 do not. At our institution, chemotherapy use in the intermediate score range in patients over age 50 declined significantly after July 2018 when the study was published, sparing them from unnecessary chemotherapy. This confirms good adherence to updated national treatment paradigms.

FIGURE. Chemotherapy administration pre- and post-July 2018 in each oncotype range

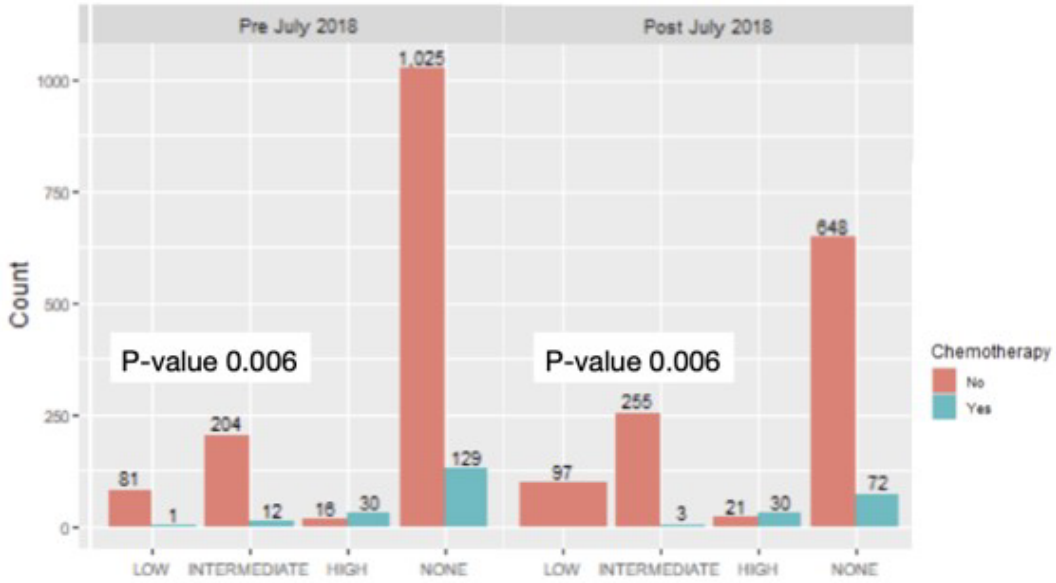

Figure 1. Number of patients who received chemotherapy before and after July 2018 in each Oncotype Range. The percentage of women over age 50 with an intermediate Oncotype recurrence score who received chemotherapy was found to be significantly higher before July 2018 than compared to after (5.5% {12} vs 1.16% {3}, p-value 0.006

1386988 - Circulatory Micro-RNAs in Breast Cancer Patients After Definitive Surgery

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Background/Objective: Breast cancer (BC) continues to be a global health concern due to its impact on morbidity and mortality in women. Despite early detection and novel treatments, some patients recurred within a short period of time or had disease progression while on definitive treatment. MicroRNAs (miRNAs), small non-coding RNAs, have been shown to be crucial in proper cell function and regulation. In vitro experiments have proven that some miRNAs such as 23b, 27b, and let-7a, were involved with breast cancer metastasis. The perturbation of these pathways following alteration of miRNA expression contributes to the regulatory roles in cancer pathobiology and progression in cancer. Our lab recently showed that there is increased circulatory miRNAs expression (let-7 and 125a) in patients with newly diagnosed breast cancer compared to patient without any known cancer. In this study, we examined these microRNAs pattern after definitive surgery. We aim to identify molecular markers that helps stratify risk of recurrence can help clinicians and patient make informative choices with their treatment.

Methods: Thirty newly diagnosed breast cancer patients and thirty patients without any known cancer diagnosis (control) were recruited between April 2021 to May 2022 at the University Medical Center. Plasma samples were collected at diagnosis and at least 2 weeks after surgical excision. Plasma miR-125-3p, 23b, 27b, let-7a, 192-5p, 451a were isolated and their expression was measured using qRT-PCR method.

Results: MicroRNA expression was not significantly different in circulating plasma miR-125-3p, 23b, 27b, let-7a, 192-5p, 451a in patient with breast cancer after surgery compared to controls.

Conclusions: Circulatory miRNAs represent potential markers for molecular identification of residual disease, stratification of risk of recurrence, and monitoring of treatment. However, the role of miRNAs expression after surgical excision should be further explored during different time periods after surgery and with a larger patient population.

1387700 - ECHS1 Mediates Metabolic Disruption in Hormone Receptor-positive Breast Tumor Microenvironment

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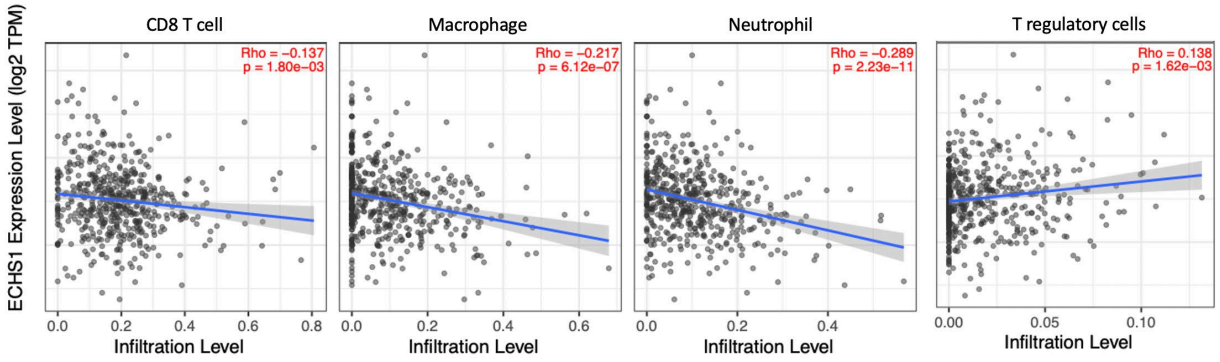
Background/Objective: Obesity is an established risk factor for hormone receptor-positive (HR+) breast cancer in postmenopausal women. Unchecked hyperadiposity causes systemic perturbations in metabolism and subclinical chronic inflammation, which promotes several types of cancer. Murine models of high-fat diet-induced obesity have shown alterations in fatty acid binding proteins and proteins involved in mitochondrial beta-oxidation, including ECHS1, promote increased uptake of fatty acids by primary tumor cells. This creates a metabolic tug of war between tumor cells and immune cells in the tumor microenvironment, thereby depriving cytotoxic immune cells of the metabolic reprogramming necessary for their anti-tumor functionality. Nonetheless, how these metabolic gene expression changes affect the breast tumor microenvironment of obese individuals remains elusive. We hypothesize that increased expression of enoyl-CoA hydratase short chain 1 (ECHS1), a mitochondrial protein involved in the fatty acid beta oxidation pathway, leads to dysregulation of immune function in the breast tumor microenvironment and subsequently increases risk of cancer progression.

Methods: To test this hypothesis, proteomic and genomic expression and survival characteristics of ECHS1 in invasive breast cancer was explored in The Cancer Genome Atlas and the Clinical Proteomic Tumor Analysis Consortium (CPTAC). The effects of ECHS1 expression on immune infiltration in the tumor microenvironment were further explored by using a regression framework. We also performed single cell RNA sequencing analysis for differential expression of ECHS1 in various breast cells. Additionally, the expression level of ECHS1 was validated in silico in adipose tissue to elucidate the increased dysregulation of immune reaction and risk of progression of breast carcinoma in obese individuals.

Results: There is significantly increased expression of ECHS1 at both the RNA and protein level in HR+ breast cancer ($p < 0.001$ for both), but not in Herceptin 2 receptor-positive (HER2+) or triple-negative breast cancer (TNBC). High expression of ECHS1 in female breast cancer is also associated with significantly decreased survival as compared to low expression profiles based on TCGA analysis. Further, we found a significantly negative correlation of CD8+ T cells, neutrophils, and macrophages, and a significantly positive correlation of T-regulatory cells with ECHS1 expression in the breast tumor microenvironment. We also observed increased expression of ECHS1 in luminal epithelial cells compared to myoepithelial cells based on single cell RNA sequencing data. Lastly, high expression of ECHS1 protein expression based on immunohistochemistry was confirmed in human adipocytes.

Conclusions: Collectively, our observations support the hypothesis that preferential uptake of free fatty acid through increased expression of ECHS1 in HR+ breast cancer impairs the cytotoxic and anti-tumor effects of CD8+ T cells in the breast tumor microenvironment. These findings also suggest that immune dysregulation is further amplified in obese individuals given increased levels of adipose cells and higher ECHS1 expression. Altogether, ECHS1 is a putative biomarker and potential therapeutic target as downregulation of ECHS1 in the tumor microenvironment may improve survival in obese patients with HR+ breast cancer.

Figure. Immune cell composition and abundance based on TCGA tumor transcriptomics profile. Immune cell infiltration has a statistically significant correlation with ECHS1 expression in the breast tumor microenvironment.



1377001 - Discovery of Therapeutic Targets for Refractory Triple-negative Breast Cancer

Kelly Elleson[1], Narges Tafreshi[1], Eric Welsh[2], Weihong Sun[1], Zena Sayegh[1], Laila Khazai[3], Marilyn Bui[1], M. Catherine Lee[1], David Morse[1]

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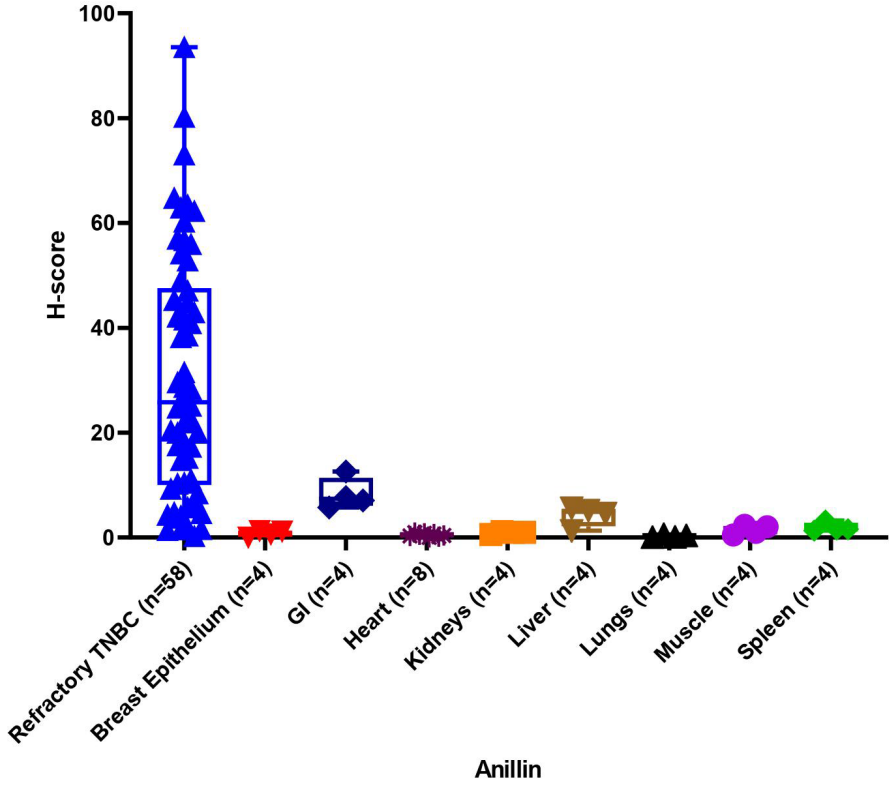
Background/Objective: Cell-surface targeted therapies have been successful for breast cancer in general, however, treatment-resistant triple-negative breast cancer (rTNBC) poses an ongoing clinical challenge for which there are currently no approved targeted therapies. Our aim is to identify therapeutic targets broadly expressed with high penetrance in refractory TNBC as possible targets for drug development.

Methods: Publicly available expression microarray data from TNBC patient specimens were profiled to identify genes with elevated mRNA expression. Genes were ranked based on level and breadth of expression among TNBC, and druggability (i.e., have known drugs, structure activity relationships, or are expressed on the cell surface). A rTNBC tissue microarray (TMA) was constructed for IHC staining by reviewing a single institution prospective database of all Stage I-III TNBC breast cancer cases between 2008-2016 to identify patients with archival tumor specimens representing either metaplastic TNBC or residual TNBC after neoadjuvant chemotherapy; 59 cases were identified with sufficient tumor for TMA construction. Cases were independently reviewed by a breast pathologist for confirmation. Controls included normal breast epithelium, gastrointestinal, heart, kidney, liver, lung, muscle, and spleen tissues, and BT-549, Hs578t, MDA-mb-157, and MDA-mb-231 TNBC cell lines were included.

Results: Of the 4312 genes identified with elevated mRNA expression in TNBC, 95 genes had high and broad mRNA expression in TNBC and low expression in normal tissues of concern for toxicity. The top 14 genes based on rTNBC expression and druggability were selected for determination of protein expression by immunohistochemistry (IHC) staining of TMA sections and analyzed for expression by automated H-scoring. From 59 rTNBC cases, 160 tumor cores were included in in the TMA, and of the 14 gene candidates chosen for IHC, elevated ANLN (Figure 1) and FOXM1 protein expression was observed in rTNBC relative to normal tissues of concern. CXCL11 (nuclear), MELK and TOP2A (cytoplasmic and nuclear), and SLC7A5 (cell-surface) proteins were upregulated in rTNBC relative to most normal tissues. ANLN, CXCL11, FAM64A and MCM10 (cytoplasm), MELK, SLC7A5, TOP2A, and TTK proteins were upregulated in rTNBC relative to normal breast epithelium. APOER2, FAM64A, KIF20B, and nuclear MCM10 were downregulated in rTNBC relative to normal tissues. CENPA and FAM64A were upregulated in some rTNBCs and downregulated in others. All differences were significant by ANOVA ($p< 0.01$ to 0.0001). PLK4 and PRAME did not have mentionable differences in protein expression.

Conclusions: This study has discovered potential therapeutic targets for development of novel rTNBC targeted therapies. ANLN and FOXM1 were found to be upregulated in rTNBC while downregulated in breast epithelium and tissue lines, providing a therapeutic target for drug development with potentially few side effects. Four other proteins were observed with generally lower expression in normal tissues, which could potentially be targeted to deliver a reduced therapeutic index. Combination therapies against these rTNBC targets could be used to increase efficacy in patients with rTNBC.

Figure. IHC protein expression profiles for Anillin in patient specimens of breast epithelium, refractory TNBC, and other normal tissues. Values are presented as whisker/box plots with whiskers representing the full range of values, the bottom and top of the boxes represent the 25th and 75th percentile, and middle lines represent the median.



1384260 - Increased Lipid Phosphate Phosphatase 2 Expression Is Associated with Decreased Breast Cancer Patient Survival

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Background/Objective: Lysophosphatidic acid (LPA) is a potent extracellular bioactive lipid that signals through transmembrane LPA receptors to promote cancer progression and therapy resistance, and LPA is degraded by the extracellular enzymatic activity of the lipid phosphate phosphatases (LPP1-3). However, LPP2, unlike LPP1 and LPP3, is surprisingly upregulated and drives cellular proliferation in many preclinical breast cancer models, but this finding, including the expression patterns of the LPPs in the breast tumor microenvironment, has not been studied in human tumor specimens.

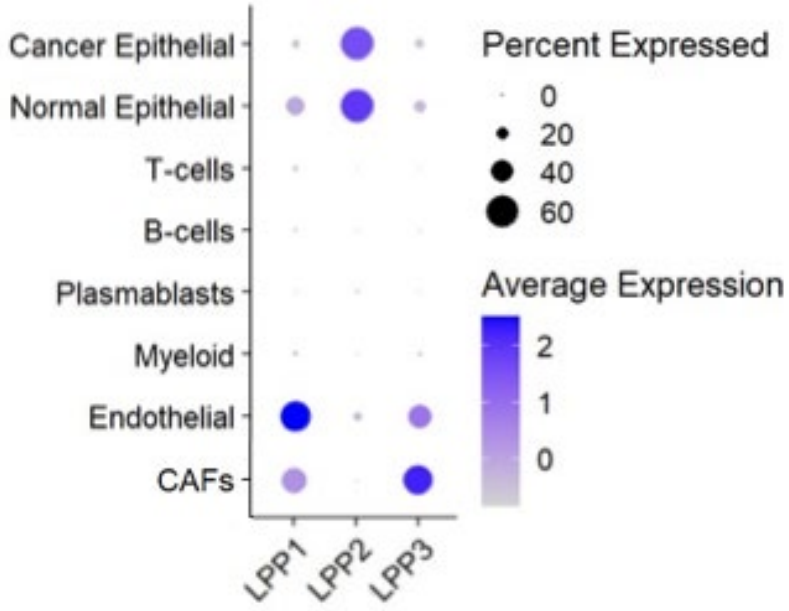
Methods: LPP expression was measured in normal breast tissue (114 samples) and breast tumors (1097 samples) in The Cancer Genome Atlas (TCGA), and in single cell RNA sequencing data from 2 published cohorts comprised of 31 tumors containing 150,000 cells. We analyzed over 6500 breast cancer tumors

from 3 large cohorts: TCGA, the Molecular Taxonomy of Breast Cancer International Consortium (METABRIC), and GSE96058. LPP expression was dichotomized into high and low expression groups by the median. We performed Gene Set Enrichment Analysis (GSEA) using the Hallmark gene sets to investigate LPP biological function, and estimated high LPP expression effects on proliferation and antitumor immunity. Disease specific survival (DSS) and overall survival (OS) between high and low expression groups were also examined.

Results: mRNA levels for LPP1 and LPP3 in tumors were decreased nearly 4-fold compared to normal breast tissue, but LPP2 was increased in tumors by about 1.5 fold (all p< 0.001). On single cell analysis, LPP1 and LPP3 expression was overwhelmingly highest in endothelial cells and cancer associated fibroblasts, respectively, while virtually all LPP2 expression occurs in epithelial cells, including cancer cells (Figure 1, p< 0.0001). LPP2 expression was highest in grade 3 and metastatic tumors, with an increase of almost 30% compared to lower grade and non-metastatic tumors (p< 0.001, 0.005 respectively). On GSEA, MYC gene signaling pathways, representing cellular proliferation processes, were among the most enriched gene sets, with normalized enrichment scores of 1.47-1.96, and false discovery rates 0.001-0.03. Proliferation scores were increased (p=0.005), and cytolytic (CYT) scores, as a marker of antitumor immunity, were significantly decreased in the METABRIC and GSE960808 cohorts (both p< 0.001). DSS in the TCGA cohort was hazard ratio 1.75 (95% confidence interval 1.12-2.78, p=0.01) and OS 1.40 (1.02-1.23, p=0.04); DSS in the METABRIC cohort 1.19 (1.02-1.41, p=0.03) and OS 1.10 (0.98-1.23, p=0.1); and OS in the GSE96058 cohort 2.38 (1.05-5.55, p=0.03).

Conclusions: LPP2 is unique among the LPPs for being overexpressed in human breast tumors and decreasing patient survival in part through MYC-mediated cellular proliferation and immune system evasion. This study represents the first validation of preclinical models of LPP2 biological function in human breast cancer specimens. Because it is both upregulated and functions at the cell membrane surface, it represents a potentially druggable target. The results of this study may support the development of first-in-class inhibitors against this enzyme.

Figure. Dot plot of LPP mRNA expression by tumor cell type. Average expression is on a log2 scale.



1388176 - Can MammaPrint Predict Response to Neoadjuvant and Definitive Endocrine Therapy?

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University Hospitals / Case Western Reserve University School of Medicine, Cleveland, OH

Background/Objective: The MammaPrint (MP) genomic assay predicts breast cancer recurrence risk and is used clinically to determine the benefit of chemotherapy and extended adjuvant endocrine therapy for ER+ breast cancer. Our aim was to describe the association of MP score with response to neoadjuvant endocrine therapy (NAET) and definitive endocrine therapy (DET) to determine if it can be used to identify patients who benefit most from these treatments.

Methods: Female patients with hormone-receptor-positive invasive breast cancer who received NAET or DET 2019-2021 were included. Core needle biopsy was routinely sent for MP testing per institutional protocol during this time period. Patients with triple-negative breast cancer, HER2+ cancer, and de novo metastatic disease were excluded. Patient, tumor and treatment characteristics were obtained from medical record review. The cohort was stratified by duration of endocrine therapy and by MP score. Descriptive statistics analyzed differences between groups.

Results: Of 75 patients with 80 biopsies, 34 underwent NAET and 46 received DET. The NAET group was significantly younger (median age 71.5, [IQR 67-78] NAET vs. 84, [IQR 78-88] DET) and had fewer co-morbidities (median 1 NAET vs. 3 DET). 41.2% of the NAET cohort received ≥6 months of therapy (median 4.5, IQR 2-6) and median duration of DET was 15 months (IQR 11-24). NAET response was similar regardless of duration with 14 patients (41.1%) achieving at least a partial response (35.0% < 6 months vs. 50.0% ≥6 months, p=0.562). Low risk MP was more common in those receiving NAET than DET (73.5% vs. 54.4%). High risk MP did not correlate with greater disease burden (AJCC clinical Stage I low risk MP 56.0% vs. high risk MP 60.0%, p=0.936). In the NAET cohort, 52.0% low risk vs. 55.6% high risk MP patients had breast conservation; however, axillary lymph node dissection was performed more often in high risk MP patients (33.3% vs. 8.0% low risk MP). Response to NAET was moderate in both MP groups, and pCR was rare: 4.0% low risk MP vs. 0.0% high risk MP. 44.4% of patients with high risk MP completed adjuvant chemotherapy after NAET compared with only 16.0% in the low risk group. Of these 7 adjuvant chemotherapy recipients, 5 (71.4%) were upstaged at surgery, 2 (28.6%) had pN3 disease, and 3 (42.9%) were < age 60. Response to therapy was similar in the DET group across MP score: 44.0% of low risk and 42.9% of high risk patients achieved therapy response on surveillance imaging with a median decrease of 0.5 cm (IQR 0.1-1.0) in low risk MP and 0.4 cm (IQR 0.0-0.7) in high risk MP.

Conclusions: Tumor response to NAET or DET did not differ significantly in low vs. high risk MP. MP score may help identify which patients with ER+ disease will benefit from adjuvant chemotherapy after a poor response to NAET. Clinical factors such as age and co-morbidity should remain the primary factors in decisions for NAET, surgery, and DET.