THE AMERICAN SOCIETY OF BREAST SURGEONS

2016 ANNUAL MEETING

OFFICIAL PROCEEDINGS, Volume XVII

Scientific Session Abstracts

Scientific Session Awards

Abstracts presented at the Society's annual meeting 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.

All awards are supported by The American Society of Breast Surgeons Foundation.

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Quickshot Presentations

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Friday, April 15, 2016 2:15 pm–3:15 pm

Moderators: Judy Boughey, MD; Mahmoud El-Tamer, MD

Scientific Session Oral Presentations II

Saturday, April 16, 2016 2:00 pm–3:00 pm

Moderators: Michael Alvarado, MD; Jill Dietz, MD

0224 - Survey of Patient Perspectives on Receiving a New Breast Cancer Diagnosis and Testing Results: Can We Do Better?

Deanna Attai[1], Regina Hampton[2], Alicia Staley[3], Andrew Borgert[4], Jeffrey Landercasper[4]

[1]David Geffen School of Medicine at UCLA, Burbank, CA, [2]Comprehensive Breast Care, Doctors Community Hospital, Lanham, MD, [3]Akari Health, Charlestown, MA, [4]Gundersen Medical Foundation, La Crosse, WI

Objective: There is conflicting information in the literature regarding how and when physicians deliver test results to patients, and how patients prefer to receive test results. A recent discussion on a private online breast surgeon forum (The American Society of Breast Surgeons Mastery of Breast Surgery) noted variation in the way breast surgeons delivered test results. Our aim was to survey cancer patient communities to determine if there was a difference between how test results were delivered compared to how patients prefer to receive cancer-related test results.

Methods: IRB approval with waiver of informed consent was obtained for a de-identified survey, which was distributed over 11 days to both in-person and online cancer support groups. Associations of patient characteristics with their actual and preferred wait times for a new breast cancer diagnosis was performed by Pearson's chi-square or Fisher exact test. Bowker's test of symmetry was used to test for nonreciprocal association between actual and preferred patient experiences, and a significant *P* value (<0.05) was interpreted to signify a systematic preference among respondents regarding possible patient care experiences.

Results: One thousand patients completed the survey. The analysis was restricted to 784 breast cancer survivors. Survey responders were predominately white (non-Hispanic) (89.2%), college educated (78.7%), and social media savvy (online medical media usage, 97%). Fifty percent lived in communities with a population greater than 100,000. There were no differences between patient characteristics and time to receive biopsy results. Differences between patients and their timeliness and preferences were identified in other domains. Ninety-eight (79%) of 124 patients age <45 and 434 (65.8%) of 660 patients age >45 preferred an appointment within 24 hours after receipt of cancer diagnosis ($P = 0.0026$). Other significant differences in mode of communication for test results were identified by race, level of education, and online medical usage, with non-white race, non-college educated, and lower online usage associated with more preference for face-to-face mode, compared to phone and electronic modes. (See table for comparison of actual to preferred care.)

continues

Comparison of Actual and Preferred Breast Cancer Patient Care (N = 784)

Care Domain	Actual Care (N/D) %	Preferred Care (N/D) %	*P*
Communication of new cancer diagnosis			
Telephone	419/784 (54%)	268/784 (34%)	<0.0001
Face to face	309/784 (39%)	394/784 (50%)	
Other	56/784 (7%)	122/784 (16%)	
Wait time for biopsy results			
≤2 days	315/784 (40%)	646/784 (82%)	<0.0001
3–5 days	309/784 (40%)	121/784 (16%)	
≥6 days	160/784 (20%)	17/784 (2%)	
Communication of recurrent or metastatic diagnosis			
Telephone	68/156 (43%)	43/156 (27%)	0.0006
Face to face	71/156 (46%)	93/156 (60%)	
Other	17/156 (11%)	20/156 (13%)	
Wait time for radiology results			
≤2 days	397/784 (51%)	660/784 (84%)	<0.0001
3–5 days	221/784 (28%)	110/784 (14%)	
≥ 6 days	166/784 (21%)	14/784 (2%)	
Wait time for blood tests			
≤2 days	416/784 (53%)	616/784 (79%)	<0.0001
3–5 days	220/784 (28%)	150/784 (19%)	
≥6 days	148/784 (19%)	18/784 (2%)	

Conclusion: This study is limited by its narrow demographic profile; yet, even within this cohort presumed to have ready access to healthcare resources, actual care for timeliness and modes of communication did not reflect achievable or patient-desired care. In particular, patients want more timely appointments and patient-specific modes of communication than they are receiving. They also want more rapid receipt of testing results. National and local initiatives to improve performance are needed, as well as interrogation of other demographic groups. As a first step, we recommend that each patient be queried about their preference for mode of communication and timeliness, and that efforts are made to comply.

0308 - Complications of Oncoplastic Breast Surgery vs Breast-Conserving Surgery: An Analysis of the NSQIP Database

Tulin Cil[1], Erin Cordeiro[2]

[1]Women's College Hospital and University Health Network, Toronto, ON, Canada, [2]Ottawa Hospital, Ottawa, ON, Canada

Objective: Oncoplastic breast surgery aims to provide breast cancer patients with optimum oncologic outcomes and excellent cosmesis. The purpose of this study was to determine if there was a difference in surgical complications associated with oncoplastic breast surgery, compared to the traditional breast-conserving surgical approach.

Methods: We analyzed the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. The study included breast cancer patients who underwent primary breast surgery from 2005–2013. Patients undergoing concurrent high-risk nonbreast surgery, male patients, and those with metastatic disease were excluded. Univariable analysis and multivariable logistic regression were performed to determine the independent effect of oncoplastic breast surgery on postoperative morbidity and mortality, and identify predictors of postoperative complications.

Results: We identified 66,821 patients who underwent breast-conserving surgery for invasive breast cancer and/or ductal carcinoma in situ between 2005 and 2013. Patients who underwent lumpectomy with concomitant CPT (Current Procedure Terminology) codes identifying tissue transfer were categorized as having an oncoplastic procedure (n = 1,016; 1.5%). There was a steady increase in the proportion of oncoplastic cases over the study period. Compared to the standard lumpectomy group, patients in the oncoplastic group were more likely to be younger (60 vs 62 years, $p < 0.01$), have lower body mass index (29 vs 30, $p < 0.01$), were less likely to be smokers (9% vs 11%, $p < 0.01$), and more often received neoadjuvant chemotherapy (4.4% vs 2.1%, $p < 0.01$). They also had a significantly longer operative time (80 vs 59 min, $p < 0.01$). The 30-day unadjusted overall morbidity rate was not different in the oncoplastic group compared to the standard lumpectomy group (1.48% vs 1.97%, $p = 0.26$). The multivariable analysis also confirmed that oncoplastic surgery was not an independent predictor of overall complications (OR = 0.64 [0.37, 1.10]).

Conclusion: These data confirm that the use of oncoplastic techniques during breast-conserving surgery for breast cancer treatment does not confer an increased risk of surgical complications, despite the longer operative time. This is important given the increasing use of oncoplastic surgery within North America.

Demographics	**Number of Patients (%)**			
	Total **(n = 63,913)**	**Patients Who Underwent an Oncoplastic Type Lumpectomy (n = 1,016)**	**Patients Who Underwent a Routine Lumpectomy (n = 62,897)**	***P* value**
Mean age (years) [SD]	61.61 [12.64]	60.05 [12.35]	61.63 [12.64]	<0.0001
Mean BMI (kg/m^2) [SD]	30.11 [7.40]	29.40 [7.35]	30.12 [7.40]	0.002
Smoker	7,588 (11.87)	94 (9.25)	7,494 (11.91)	0.009
Year of surgery				
2005	1,259 (1.97)	24 (2.36)	1,235 (1.96)	<0.0001
2006	4,189 (6.55)	60 (5.91)	4,129 (6.56)	
2007	6,443 (10.08)	47 (4.63)	6,396 (10.17)	
2008	6,483 (10.14)	52 (5.12)	6,431 (10.22)	
2009	8,048 (12.59)	56 (5.51)	7,992 (12.71)	
2010	8,243 (12.90)	125 (12.30)	8,118 (12.91)	
2011	8,446 (13.21)	199 (19.59)	8,247 (13.11)	
2012	9,585 (15.00)	219 (21.56)	9,366 (14.89)	
2013	11,217 (17.55)	234 (23.03)	10,983 (17.46)	
Undergoing ALND	9,123 (14.27)	108 (10.63)	9,015 (14.33)	0.0008
Contralateral mastectomy	93 (0.15)	0	93 (0.15)	0.22
Diabetes	7,465 (11.68)	121 (11.91)	7,344 (11.68)	0.818
ASA Class				
1	5,066 (7.94)	93 (9.15)	4,973 (7.92)	
2	40,047 (62.78)	679 (66.83)	39,368 (62.72)	
3	17,891 (28.05)	237 (23.33)	17,654 (28.12)	0.007
4	655 (1.03)	7 (0.69)	648 (1.03)	
5	2 (0)	0	2 (0)	
Missing (ASA class)	252			
History of COPD	1,674 (2.62)	15 (1.48)	1,659 (2.64)	0.022
History of myocardial infarction (MI)	45 (0.11)	1 (0.18)	44 (0.1)	0.572
Missing (MI)		21,172 (33%)		
Hypertension	29,416 (46.03)	392 (38.58)	29,024 (46.15)	<0.0001

Demographics	Number of Patients (%)			
	Total **(n = 63,913)**	**Patients Who Underwent an Oncoplastic Type Lumpectomy (n = 1,016)**	**Patients Who Underwent a Routine Lumpectomy (n = 62,897)**	***P*** **value**
Received chemotherapy within 30 days pre-op	925 (2.16)	24 (4.40)	901 (2.14)	0.0003
Received radiation in 90 days pre-op	95 (0.22)	1 (0.18)	94 (0.22)	0.847
Missing (chemo and/or radiation receipt)	21,213 (33%)			
Total operation time (min) (median) [IQR]	59.0 [46.0]	80.0 [55.0]	59.0 [45.0]	<0.0001
Bleeding disorder	964 (1.51)	13 (1.28)	951 (1.51)	0.546
Pregnant	26 (0.07)	0	26 (0.07)	1
Preoperative steroid use	960 (1.50)	15 (1.48)	945 (1.50)	0.946
Median length of stay (days) [range]	0.0 [0–94]	0.0 [0–37]	0.0 [0–94]	0.794
Type of surgeon performing the primary surgery (eg, lumpectomy)				
General surgeon	63,689 (99.65)	1,015 (99.90)	62,674 (99.65)	0.44
Plastic surgeon	144 (0.23)	0	144 (0.23)	
Ob/Gyn	22 (0.03)	0	22 (0.03)	
Other	58 (0.09)	1 (0.10)	57 (0.09)	
Resident involvement				
Attending alone	19,646 (30.74)	247 (24.31)	19,399 (30.84)	<0.0001
Attending in OR	15,028 (23.51)	144 (14.17)	14,884 (23.66)	
Attending and resident in OR	8,180 (12.80)	157 (15.45)	8,023 (12.76)	
Missing (resident involvement)	21,059 (33%)			

0357 - A Prospective, Single-Arm, Multi-Site Clinical Evaluation of a Nonradioactive Surgical Guidance Technology for the Location of Nonpalpable Breast Lesions During Excision

Charles Cox[1], Peter Blumencranz[2], Pat Whitworth[3], Kristi Funk[4], Julie Barone[5], Alice Police[6], Freya Schnabel[7], Beth Anglin[8], Lynn Canavan[9], Alison Laidley[10], Mary Jane Warden[11], Scott Russell[1], Ebonie Carter[1], Jeff King[1], Steven Shivers[1]

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Objective: The standard technique for localization of nonpalpable breast lesions is wire localization (WL), which has been found to have several procedural and workflow-related pitfalls. Radioactive seed localization (RSL) and intraoperative ultrasound (IOUS) have been shown to result in lower margin positivity, fewer re-excisions, increased patient satisfaction, and better patient care coordination, but they too have challenges that have adversely impacted their adoption. The SAVI SCOUT® surgical guidance system is a new FDA-cleared medical device that utilizes nonradioactive, electromagnetic wave and infrared light technology to provide real-time guidance during excisional breast procedures. The purpose of this study is to evaluate the performance of SCOUT in guiding the removal of nonpalpable breast lesions across multiple sites and physicians.

Methods: Institutional Review Board approval was granted for all institutions to enroll women with a non-palpable breast lesion requiring preoperative localization for excision. Participating patients underwent localization and excision with SCOUT, which consists of an infrared-activated electromagnetic wave reflective device (reflector), handpiece, and console. Using mammographic or ultrasound guidance, the reflector was implanted into the target tissue up to 7 days prior to the scheduled excisional procedure. Before making an incision, the surgeon used the handpiece, which emits infrared light and electromagnetic waves, to detect the location of the reflector and subsequently plan the surgical incision. During the procedure, the surgeon used the handpiece to guide the localization and removal of the reflector along with the surrounding breast tissue. The console provides audible feedback on handpiece-to-reflector proximity. Primary endpoints included successful reflector placement, localization, and retrieval.

Results: To date, 128 pts have participated in the study, along with 17 surgeons and 23 radiologists from 11 institutions. The reflectors were successfully placed in 127 (99%) pts under either radiographic (mammography or stereotactic) or ultrasound guidance, either on the day of surgery or up to 7 days (avg, 2.6 days) before surgery. Thirty-seven pts underwent excisional biopsy and 85 pts had a lumpectomy. The intended lesion and reflector were successfully removed in all pts. No adverse events occurred. For 83 pts with in situ and/or invasive cancer and complete data, 13 (15.7%) had positive margins and 12 (14.5%) were recommended for reexcision.

Conclusion: The preliminary data show that real-time surgical guidance with SCOUT is an accurate technique for directing the removal of nonpalpable breast lesions and reproducible at multiple sites. The study has yielded 100% surgical success with a re-excision rate comparable to that of RSL and IOUS. Ongoing accrual to this study will validate these findings with planned enrollment of 150 pts from 11 sites.

0344 - Anti-HER-3 CD4 Th1 Response Correlates With Invasive Breast Cancer Phenotypes and Prognosis

Megan Fracol[1], Jashodeep Datta[1], Shuwen Xu[1], Elizabeth Fitzpatrick[1], Lea Lowenfeld[1], Paul Zhang[1], Carla Fisher[1], Brian Czerniecki[1]

[1]*University of Pennsylvania, Philadelphia, PA*

Objective: We have previously shown a stepwise decline in native CD4 Th1 cell immune response to human epidermal growth factor receptor 2 (HER-2), going from healthy donors (HD) to HER-2pos ductal carcinoma in situ (DCIS) to HER-2pos invasive breast cancer (IBC). It is unknown whether other anti-oncodriver Th1 responses, specifically HER-3, are similarly lost during breast tumorigenesis.

Methods: Peripheral blood from 131 subjects, including HDs, benign breast disease (BD), DCIS, and IBC patients was collected. Immune responses to 4 different HER-3 immunogenic peptides were tested via enzyme-linked immunosorbent (ELISpot) assay. Three immune response parameters were compared: (1) responsivity, or percent of subjects responding to at least 1 peptide, (2) repertoire, or number of peptides with a response, and (3) cumulative peptide response, or the summed total of the 4 peptide responses.

Results: There was a significant decline in the anti-HER-3 CD4 Th1 cell response going from HDs to IBC. Triple-negative (TN) IBC had the lowest response across all 3 immune parameters. HDs had significantly higher immune responses than both ERpos IBC and TN IBC patients across all 3 immune parameters (cumulative response: 90 vs 48 vs 40, $p = 0.03$ and $p = 0.002$, respectively; repertoire: 1.0 vs 0.5 vs 0.3, $p = 0.008$ and $p = 0.0004$, respectively; and responsivity: 76.7% vs 45.0% vs 33.3%, $p = 0.03$ and $p = 0.001$, respectively). Interestingly HER-2pos IBC displayed immune responses similar to that of HDs and BDs. There was antigen expression correlation with HER-3 expression being significantly higher in TN IBC compared to HER-2pos IBC (43.8% vs 0%, $p = 0.03$, respectively) but not significantly different between TN IBC and ERpos IBC (43.8% vs 18.8%, $p = 0.25$, respectively). Clinically, patients with recurrent breast cancer had significantly lower immune responses than patients with no subsequent recurrences across all 3 immune parameters (cumulative response: 17 vs 66, $p = 0.04$, respectively; repertoire: 0.0 vs 0.6, $p < 0.05$, respectively; and responsivity: 0% vs 55.6%, $p = 0.01$, respectively). Patients with pathologic complete responses (pCR) to

neoadjuvant treatment also had significantly higher cumulative response (144 vs 32, p = 0.004, respectively) and repertoire (0.8 vs 0.4, p = 0.05, respectively) than those with residual disease.

Conclusion: CD4 Th1 cell anti-HER-3 immune responses progressively decline during breast tumorigenesis, most notably in TN IBC, a group with limited treatment options and markedly worse prognosis with HER-3 overexpression. Restoring anti-HER-3 Th1 may offer opportunity for improving outcomes in high-risk TN IBC patients.

0409 - Postmastectomy Radiation Therapy and Overall Survival After Neoadjuvant Chemotherapy

Olga Kantor[1], Catherine Pesce[2], Chi-Hsiung Wang[2], David Winchester[2], Katharine Yao[2]

[1]University of Chicago, Chicago, IL, [2]NorthShore University HealthSystem, Evanston, IL

Objective: The survival benefit of postmastectomy radiation therapy (PMRT) after neoadjuvant chemotherapy (NAC) is unclear; especially in patients who have a pathologic compete response (pCR) to NAC.

Methods: We queried the National Cancer Data Base to identify 19,526 women who had PMRT after NAC and mastectomy for cT3N0, cN1, and cN2 disease from 1998-2007. pCR was determined based on final pathologic stage compared to clinical stage. Patients with metastatic disease were excluded. Chi-square tests and Cox regression survival modeling were used for analysis.

Results: Our cohort of patients included 2,536 women (13.0%) with cT3N0 disease, 13,026 (66.7%) with cN1 disease, and 3,964 (20.3%) with cN2 disease. Overall, 1,685 (66.4%) of cT3N0 patients, 8,920 (68.5%) of cN1 patients, and 2,885 (72.8%) of cN2 patients received PMRT. Mean follow-up time was 74 months. After adjusting for patient, tumor, and facility factors, including tumor size, grade, and estrogen receptor status, PMRT was associated with a significant overall survival (OS) benefit in patients with cT3N0 disease (5-yr OS, 81.3% with PMRT vs 78.4% no PMRT, $p < 0.01$), cN1 disease (5-yr OS, 74.5% with PMRT vs 69.5% no PMRT, $p < 0.01$), and cN2 disease (5-yr OS, 64.4% with PMRT vs 55.2% no PMRT, $p < 0.01$). In the subgroup of patients who had a nodal pCR to NAC, PMRT was not associated with an OS difference in cT3N0 (87.8% with PMRT vs 86.1% no PMRT, p = 0.22), cN1 (5-yr OS, 85.6% with PMRT vs 83.5% no PMRT, p = 0.13), or cN2 (89.4% with PMRT vs 84.7% no PMRT, p = 0.09) disease. In patients ≤45 years old or in patients with high-grade tumors, PMRT was associated with an OS benefit for the entire cohort of patients with cN1 and cN2 disease, but not in patients who had a nodal pCR ($p > 0.10$) on adjusted survival modeling.

Conclusion: PMRT is associated with improved OS in patients with cT3N0, cN1, and cN2 disease after NAC and mastectomy but there is no OS benefit for those patients with a nodal pCR. Prospective studies will provide definitive data on the need for PMRT in patients with pCR.

0242 - Are We Overtreating Ductal Carcinoma In Situ (DCIS)?

Sadia Khan[1], Melinda Epstein[1], Michael Lagios[2], Melvin Silverstein[1]

*[1]Hoag Memorial Hospi*tal Presbyterian, New*port Beach, CA, [2]The Breast Cancer Consultation Service, Tiburon, CA*

Objective: During early 2015, the media was flooded with the issue of whether or not ductal carcinoma in situ (DCIS) was being overtreated and whether favorable cases could be simply watched (core biopsy only, followed by surveillance). To help answer this question, we considered patients with DCIS treated with excision alone, with a final margin width less than 1 mm, as inadequately treated and a surrogate for no treatment (surveillance). We compared this group to patients with margin widths of 1 mm or more treated by excision alone.

Methods: We queried a prospective database for patients with DCIS treated with excision alone. Seven hundred twenty patients with pure DCIS (no invasion or microinvasion) were treated with excision alone and stratified into 2 groups based on margin width: 124 with margins less than 1 mm vs 596 with margins ≥ 1 mm.

All patients with margins <1 mm were advised to undergo re-excision but refused further treatment. Both groups were subdivided by grade. Nuclear grades I and II DCIS were statistically similar and grouped together as low-grade DCIS and compared to high grade (Grade III). Kaplan-Meier analysis was used to determine local recurrence-free survival. Differences in outcome were analyzed using the log-rank test.

Results: The results are tabulated below. The 5- and 10-year local recurrence probabilities are statistically significant (<0.001) for low grade vs high grade and for narrow margins <1 mm vs wide margins ≥1 mm. The comparison of excision alone with margins ≥1 mm for low-grade DCIS vs high-grade DCIS shows a 10-year local recurrence-free survival rate of 13% vs 36% ($p < 0.001$). The patients who had margins of <1 mm with no further treatment had higher rates of recurrence in both the low-grade group (55%) and high-grade group (67%) ($p < 0.001$). These data show that leaving low-grade DCIS untreated would lead to local recurrence in more than half the patients over 5–10 years. Mean tumor size was 17 mm, mean age was 55 years, and mean follow-up was 79 months.

Conclusion: For patients with low-grade DCIS excised with margins ≥1 mm, excision alone results in local recurrence rates of 8% and 13% at 5 and 10 years. Local recurrence rates for patients with margins less than 1 mm are simply too high to consider this adequate treatment, regardless of grade. Core biopsy and surveillance alone for DCIS, regardless of grade is not adequate.

	DCIS Excision Alone Margin <1 mm		**DCIS Excision Alone Margin ≥1 mm**	
	Grades I & II	**Grade III**	**Grades I & II**	**Grade III**
N	69	55	406	190
# Distant recurrences	0	0	2	1
# Breast cancer deaths	0	0	1	0
5-yr probability, local recurrence	18%	55%	8%	23%
10-yr probability, local recurrence	53%	67%	13%	36%

0322 - Fertility in Young Women of Child-Bearing Age After Breast Cancer: Are We Giving Them a Better Chance?

Devina McCray[1], Ashley Simpson[1], Yitian Liu[1], Colin O'Rourke[1], Joseph Crowe[1], Rebecca Flyckt[1], Stephen Grobmyer[2], Halle Moore[1], Stephanie Valente[1]

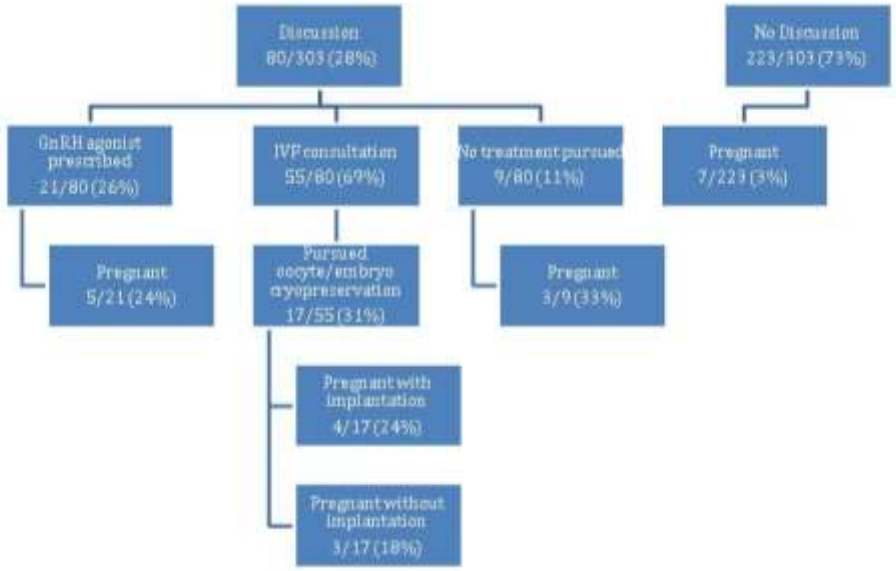
[1]Cleveland Clinic, Cleveland, OH, [2]Cleveland Clinic Foundation, Cleveland, OH

Objective: Breast cancer is the most frequent cancer occurring in women of reproductive age. Because chemotherapy and/or anti-hormonal therapy is usually recommended, it becomes important to consider fertility preservation before undergoing cytotoxic therapies that impair ovarian function and interrupt childbearing plans. There is significant advancement in assisted reproductive technologies and increasing use of gonadotropin-releasing hormone (GnRH) agonists for ovarian protection during chemotherapy. We evaluated whether patients had a fertility discussion (FD) with their physician, what options were chosen, and if pregnancy was achieved.

Methods: A retrospective chart review was performed of all women 40 and younger diagnosed with breast cancer, treated with chemotherapy and/or anti-hormonal therapy, and followed at our facility from 2006 to 2014. Patient demographics, treatment regimens, FD, in vitro fertilization (IVF) consultation, GnRH used, and successful pregnancy were evaluated.

Results: We identified 303 patients meeting inclusion criteria. Average age at diagnosis was 35.1 years (range, 20–40 years) with median follow-up of 3.7 years (range, 4 months–9.5 years). At diagnosis, 32% of women were single and 68% were married. Eighty-two (27%) women had no children at time of diagnosis. Eighty (26%) of all women had a documented FD. Of those undergoing chemotherapy, 77/262 (29%) had an FD.

Twenty-one (26%) of those women were prescribed GnRH agonist for ovarian protection while on chemotherapy, 55 (69%) underwent IVF consultation, and 5 (6%) had both GnRH agonist and IVF consultation. Nine (11%) patients who had FD chose no fertility options. Of 303 patients, pregnancy after treatment was seen in 22 (7%) women. Of women who had GnRH agonist prescribed, 5/21 (24%) became pregnant. Of the 55 patients who had an IVF consultation, 17 (31%) pursued oocyte retrieval and 4/17 (24%) became pregnant with embryo transfer. Three of 17 (18%) women became pregnant without embryo transfer and, of those, 2 women had GnRH agonist prescribed. Three of 9 (33%) patients having an FD but not pursuing further options became pregnant spontaneously. Seven patients (3%) not having an FD became pregnant spontaneously. Evaluation of patient demographics and tumor characteristics identified that successful pregnancy was associated with being younger at time of diagnosis ($P < 0.001$), and having a tumor that was ER negative ($P = 0.009$) and PR negative ($P = 0.04$).



Conclusion: Despite advances in fertility options for young women, documented FD and referral in this age group remains low. Although not every woman in this group desired pregnancy, 71/80 (89%) of those having a documented FD sought some form of fertility preservation. It is important to improve fertility option awareness in both physicians and women of childbearing age, as patients who had an FD and consultation had a higher chance of pregnancy compared to those who did not.

0422 - Re-excision Rates After Breast Conservation Surgery in the American Society of Breast Surgeons (ASBrS) Mastery Database Following the SSO-ASTRO "No Tumor on Ink" Guidelines

Jennifer Mirrielees[1], Amanda Schulman[1], Caprice Greenberg[2], Jeffrey Landercasper[3], Lee Wilke[2]

[1]University of Wisconsin, Madison, WI, [2]University of Wisconsin School of Medicine and Public Health, Madison, WI, [3]Gundersen Medical Foundation, La Crosse, WI

Objective: In February 2014, the Society of Surgical Oncology (SSO) and the American Society for Radiation Oncology (ASTRO) released new guidelines for standardizing a negative margin status after breast conservation surgery (BCS) as "no tumor on ink" in patients with an early invasive cancer. These new guidelines were widely hypothesized to reduce re-excision rates. We sought to determine if re-excision rates after initial BCS decreased in ASBrS members' surgical practices after guideline publication. To evaluate if a change occurred in the year after distribution, the ASBrS Mastery of Breast Surgery Program, a voluntary quality outcomes program, was queried for re-excision rates for BCS from January 2013 to June 2015.

Methods: De-identified data documenting BCS procedures for the study time periods of Jan 2013 to Jan 2014 and then June 2014 to June 2015 were extracted from the ASBrS Mastery of Breast Surgery Program after obtaining institutional IRB approval. The time period of Jan 2014 to June 2014 was not included in the analysis to allow for review and adoption of the published guidelines. Patients undergoing excisional biopsy for diagnosis were excluded. Procedures were analyzed by reasons for re-excision (combined from several locations in the Mastery database). Statistical *t* test was used to determine significance ($p < 0.05$)

Results: Among providers (n = 252) who recorded greater than 10 BCS procedures in both the pre- and post-"no tumor on ink" guideline periods, the overall re-excision rate after initial BCS was 17.7% (2457/13870) in the pre period, and 13.7% (1836/13370) in the post period ($p = 0.0003$). The time periods were then analyzed to determine causes for the re-excision and notable was a decrease in the percentage of re-excisions being done for close margins (<1 mm and 1–2 mm) from 36.8% (624/1693) in the pre period to 23.4% in the post period (379/1619) ($p = 0.0001$). Yet the re-excision rate in each time period for positive margins and those coded as "other" did not change significantly. The percentage of the re-excisions that were due to positive margins was 56.2% (952/1693) pre guideline publication and was 70.3% post-publication (1139/1619) ($p = 0.109$).

Conclusion: Following the publication of the 2014 SSO-ASTRO "no tumor on ink" guidelines, a reduction in overall re-excision rates after initial BCS was observed in the ASBrS Mastery database. The reason for this reduction appears to be attributable to a decrease in re-excisions for close margins. The ASBrS Mastery represents the outcomes from a dedicated group of surgeons interested in quality improvement through self-reporting and highlights its ability to evaluate a timely response to published guidelines for breast cancer patient care.

0445 - Application of the 2015 ACS and ASBS Screening Mammography Guidelines: Risk Assessment Is Critical for Women Ages 40–44

Jennifer Plichta[1], Suzanne Coopey[1], Michelle Specht[1], Michele Gadd[1], Erin Sullivan[1], Constance Roche[1], Barbara Smith[1], Kevin Hughes[1]

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Objective: The newly updated 2015 American Cancer Society (ACS) screening mammography guidelines suggest that women at average risk of breast cancer may not require screening mammograms before age 45, whereas those with an above average risk (defined as a personal history of breast cancer, confirmed or suspected genetic mutation, or history of thoracic radiotherapy at a young age) may require alternate screening regimens. The 2015 American Society of Breast Surgeons (ASBrS) guidelines are similar, with the addition of recommended screening mammograms for women with a lifetime risk of 15%–20%. In addition, the ACS MRI guidelines recommend yearly MRI plus mammography if the calculated lifetime risk is ≥20%. We sought to determine how many women ages 40 to 44 in our specialty breast practice would be eligible for screening mammograms, genetic testing, and MRIs based on the new guidelines.

Methods: Under IRB approval, we reviewed a database of patient-reported risk factors and family history of all new female patients at a single academic institution from 3/3/2011 through 10/26/2015. We excluded patients with a personal history of breast cancer. Those with a ≥5% risk of BRCA mutation by the Tyrer-Cuzick, Myriad, or BRCAPRO models or who met the NCCN guidelines were considered at risk for a genetic mutation. Those with a ≥20% lifetime risk of breast cancer by the Tyrer-Cuzick, Claus, or BRCAPRO models were considered eligible for MRI.

Results: Six thousand nine hundred sixty-four women age 40 and above who did not have a breast cancer diagnosis were seen as new patients in our breast clinic during this time period. Of these, 909 (13%) were ages 40 to 44 and make up our cohort. Of this group, our risk assessment identified 352 women (39%) deemed above average risk by the ACS criteria and an additional 103 (11%) by the ASBrS guidelines who were eligible to start screening mammography at age 40. Fifty-nine (6.5%) were found to be at risk for a suspected genetic mutation, 127 (13.8%) qualified for screening MRI, and 166 (18.3%) qualified for both genetic testing and screening MRI.

Conclusion: Fifty percent of women in our breast practice would have been eligible for screening mammography beginning at age 40, as identified by risk assessment. Some were also found to be at risk for a genetic mutation and/or qualify for MRI. It is essential that women age 40 to 44 have formal risk assessment in order to identify those who would qualify for screening mammography, screening MRIs, and genetic testing.

0277 - Time to Treatment Among Stage III Patients: Measuring Quality Breast Cancer Care

Amy Polverini[1], Rebecca Nelson[1], Emily Marcinkowski[1], Veronica Jones[1], Lily Lai[1], Joanne Mortimer[1], Lesley Taylor[1], Courtney Vito[1], John Yim[1], Laura Kruper[1]

[1]*City of Hope National Medical Center, Duarte, CA*

Objective: To optimize cancer care, several organizations have crafted guidelines to define best practices for treating breast cancer. "Timeliness of treatment" has been proposed as one of the quality metrics. Evidence to substantiate the survival benefit of timely treatment, especially for the shortest time points, such as <4 weeks, is limited. This study evaluates time to treatment in stage III breast cancer patients, the population in whom treatment time would have the most impact.

Methods: Using the American College of Surgeons and American Cancer Society jointly sponsored National Cancer Data Base, time to treatment in women diagnosed with stage III breast cancer between 2004 and 2012 was evaluated. The analyses were restricted to patients who received both surgery and chemotherapy. Time from diagnosis to first treatment (chemotherapy or surgery) was calculated and grouped according to previously proposed benchmarks: <4 weeks, 4–8 weeks, 8–12 weeks, >12 weeks. Univariate and multivariate Cox proportional hazard models were used to assess patient and treatment factors related to overall survival (OS) and are expressed as hazard ratio (HR) and 95% CIs. Kaplan-Meier curves were generated to calculate 1-, 3- and 5-year OS, with group differences assessed using the log-rank test.

Results: A total of 53,026 patients were identified, the majority of whom received first-line treatment within 4 weeks of diagnosis (N = 22,150). On univariate and multivariate analysis, increased time to treatment was associated with a decreased risk of mortality (table). The type of first-line treatment was more often surgery (65%, N = 30,134) than chemotherapy (35%, N = 16,130). When first line of treatment was surgery, mortality risk was decreased (HR, 0.60; 95% CI, 0.57–0.62) relative to chemotherapy. Having Medicaid or Medicare insurance were both associated with an increased risk of mortality (1.38, 1.30–1.47, and 1.43, 1.35–1.51, respectively). Compared to whites, black patients had increased risk (1.34, 1.27–1.40) while Asian/Pacific Islanders had decreased risk (0.66, 0.57–0.77). Hispanic ethnicity was also associated with decreased risk (0.68, 0.62–0.75). Treatment at an academic/research program was associated with a decreased risk (0.91, 0.86–0.95), whereas treatment at a community cancer program had increased risk (1.11, 1.05–1.18) when compared to comprehensive cancer programs.

			Univariate		Multivariate*	
		N (%)	HR (95% CI)	*P* value	HR (95% CI)	*P* value
Time to treatment (Surgery/chemo)	<4 weeks	22,150 (48)	(reference)	–	(reference)	–
	4 to <8 weeks	17,570 (38)	0.93 (0.89–0.97)	0.0008	0.95 (0.91–1.00)	0.0295
	8 to <12 weeks	4,588 (10)	0.86 (0.80–0.93)	<.0001	0.88 (0.82–0.94)	0.0004
	>12 weeks	2,066 (4)	0.98 (0.89–1.08)	0.7447	0.94 (0.85–1.04)	0.2199

*Multivariate analyses adjusted for type of first-line therapy, hospital type, insurance type, age, race, ethnicity, comorbidity index, grade, surgery type, adjuvant hormone therapy status, and adjuvant radiation therapy status.

Conclusion: Our study of 53,026 stage III breast cancer patients was unable to corroborate current quality initiatives aimed at shorter time to treatment. While this study is likely confounded by factors not available in large population-based public datasets, the findings highlight the need for more information in determining time-to-treatment guidelines. With an increased focus on multidisciplinary coordinated care for breast cancer patients, further study is warranted to establish evidence-based treatment standards and delineate subgroups that are most impacted by treatment delays.

Quickshot Presentations

Saturday, April 16, 2016 11:45 am–1:15 pm

Moderators: Brian Czerniecki, MD, PhD; Roshni Rao, MD

0411 - Validation of the CPS+EG Staging System for Disease-Specific Survival in Breast Cancer Patients Treated With Neoadjuvant Chemotherapy

Jad Abdelsattar[1], Zahraa Al-Hilli[1], Tanya Hoskin[1], Courtney Heins[1], Judy Boughey[1]

[1]*Mayo Clinic, Rochester, MN*

Objective: Neoadjuvant chemotherapy is increasingly used in the management of early-stage operable and locally advanced breast cancer. The CPS+EG staging system, which incorporates estrogen receptor status and tumor grade along with pretreatment clinical stage and post-treatment pathologic stage, has been reported to have better correlation with outcome than classic TNM staging for breast cancer patients treated with neoadjuvant chemotherapy. Our aim was to evaluate the performance of the CPS+EG staging system in an external cohort of women treated with neoadjuvant chemotherapy.

Methods: We reviewed all patients treated with neoadjuvant chemotherapy for stage I–IIIC disease and undergoing surgery for loco-regional control at our institution between 1988 and 2014. Patients with bilateral disease, inflammatory breast cancer, and angiosarcoma of the breast were excluded. Tumor biology, Nottingham grade, clinical stage at presentation, treatment, AJCC stage after neoadjuvant chemotherapy, and follow-up data were collected. The CPS+EG score was calculated for each case and analyzed using the Kaplan-Meier method and log-rank test for the outcome of breast cancer–specific survival. The discrimination of CPS+EG and pathologic AJCC stage were assessed using the C-statistic for survival data from Cox proportional hazards regression.

Results: Seven hundred sixty-nine patients were analyzed, of whom 103 died of breast cancer during a median follow-up of 2.6 (range, 0.0–19.4) years. Median age at surgery was 51.4 (range, 21.8–85.5). Two hundred ninety-three (38%) had ER-negative tumors, and 458 (60%) were grade 3. The 5-year cause-specific survival was 82% (95% CI, 78–86) for our cohort overall. The distribution of CPS+EG scores were 6%, score 0; 12%, score 1; 26%, score 2; 29%, score 3; 21%, score 4; 6%, score 5; and 0.4%, score 6. CPS+EG groups 0 and 1 and groups 5 and 6 were collapsed due to small sample size within these groups. The 5-year cause-specific survival by CPEG score was 91%, score 0/1; 90%, score 2; 85%, score 3; 67%, score 4; and 43%, score 5/6 (figure). The CPS+EG score was significantly associated with cause-specific survival ($P < 0.001$) and showed good discrimination with a C-statistic of 0.69 (95% CI, 0.64–0.74), while AJCC pathologic stage showed a C-statistic of 0.65 (95% CI, 0.60–0.71).

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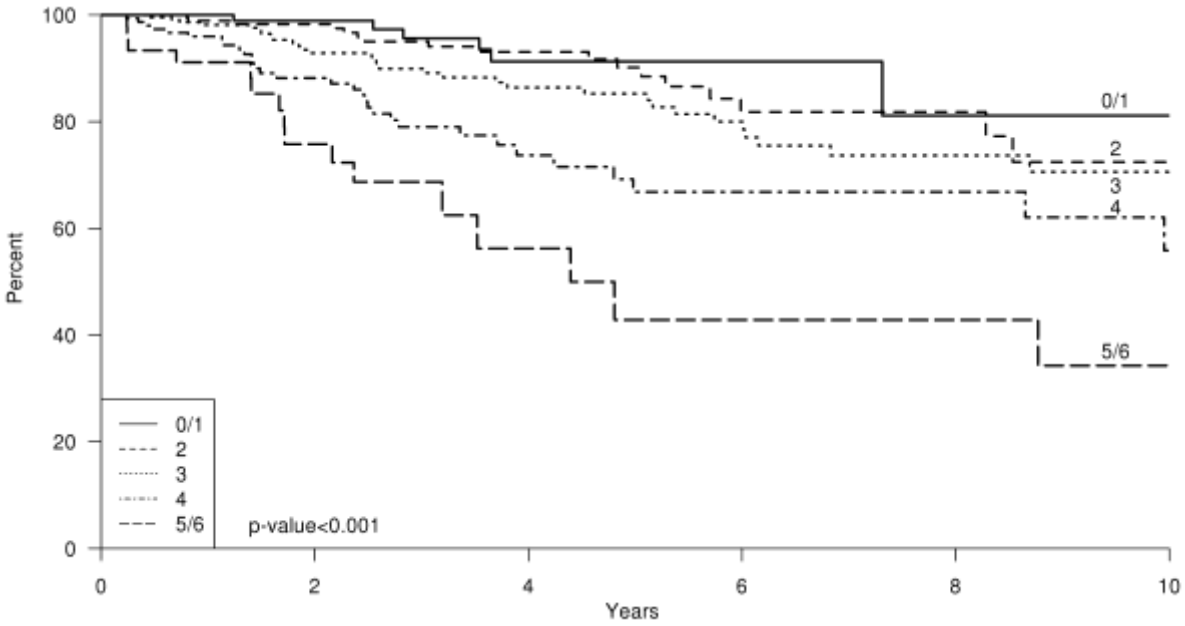

Conclusion: This study validates the CPS+EG staging system in an external cohort using Nottingham grade. CPS+EG staging system showed a significant association with cause-specific survival and good discrimination, particularly for patients in poorer prognosis groups. Inclusion of tumor biology and treatment response shows promise in improving survival estimates for patients treated with neoadjuvant chemotherapy.

0331 - Management of Phyllodes Tumors of the Breast: Applying the Correct Treatment Paradigm?

Taiwo Adesoye[1], Heather Neuman[1], Jessica Schumacher[1], Jennifer Steiman[1], Lee Wilke[1], Caprice Greenberg[1]

[1]*University of Wisconsin School of Medicine and Public Health, Madison, WI*

Objective: National Comprehensive Cancer Network (NCCN) guidelines recommend wide excision without axillary staging to treat phyllodes tumors of the breast, which have sarcomatous stroma. Without prospective trials to guide management, NCCN also recommends consideration of radiation therapy (RT) similar to soft tissue sarcoma treatment principles. Using the Surveillance, Epidemiology and End Results Program (SEER) database, we report temporal trends in initial management and factors associated with receipt of surgical and adjuvant therapy.

Methods: Using the SEER registry, we identified adult women (age >18 yr) diagnosed with phyllodes tumors who underwent surgical therapy between 2000 and 2012. Patients with a diagnosis of other breast histologies were excluded. Rates of breast-conserving surgery (BCS), lymph node evaluation, and adjuvant RT over time were assessed using the Cochran-Armitage test for trend. Factors associated with receipt of BCS, lymph node evaluation, and RT were analyzed using multivariable logistic regression.

Results: We identified 1,366 patients with a mean age of 51.3 years. In our cohort, 733 (53.7%) underwent BCS while 347 patients (25%) underwent nodal sampling. Nodal sampling was more common for patients receiving mastectomy, compared to BCS (43% vs 10%). Over the study period, BCS rates ($p = 0.41$) and rates of nodal examination ($p = 0.59$) were unchanged. Overall, 202 patients (14.8%) received adjuvant radiotherapy after surgery (17.4% after mastectomy vs 12.6% after BCS). Over time, there was a significant increase in RT utilization regardless of surgery type (BCS, 3.45% to 21.43%, $p = 0.0012$; mastectomy, 8.93% to 21.5%, $p =< .0001$). Women were less likely to receive BCS if they were older than 60 years (OR, 0.47; 95% CI, 0.33–

0.66) and had tumor size >5 cm (OR, 0.13; 95% CI, 0.09–0.21). Women were significantly more likely to receive RT if they were diagnosed in later years (OR, 2.33; 95% CI, 1.58–3.43), had tumor size >5 cm (OR, 2.94; 95% CI, 1.49–5.78), and if they had lymph nodes evaluated, compared to patients with no nodal examination (OR, 1.92; 95% CI, 1.35–2.73).

Conclusion: Over time, an increasing number of women are receiving RT after surgical management of their phyllodes tumors, regardless of whether BCS or mastectomy is performed. Additionally, 1 in 4 women have axillary nodal sampling despite lack of guidelines to support this additional surgical procedure. These practices may represent application of adenocarcinoma rather than sarcoma treatment paradigms and identify an educational gap in the care of breast diseases.

0311 – Contrast-Enhanced Digital Mammography in the Surgical Management of Breast Cancer

Mariam Ali-Mucheru[1], Bhavika Patel[1], Barbara Pockaj[1], Victor Pizzitola[1], Nabil Wasif[1], Chee-Chee Stucky[1], Richard Gray[2]

[1]Mayo Clinic Arizona, Phoenix, AZ, [2]Mayo Clinic, Scottsdale, AZ

Objective: Contrast-enhanced digital mammography (CEDM) is a new breast imaging technique. The role of CEDM in the surgical management of breast cancer has not yet been characterized.

Methods: A review of prospective breast surgery and breast imaging databases for patients who underwent CEDM prior to surgery between December 2014 and October 2015. Medical records were reviewed to supplement database information.

Results: A total of 275 patients had CEDM; 99 had malignant lesions, and 73 had surgery with 76 cancer lesions identified on pathology. The mean age was 68 years (range, 25–85). The indications for CEDM among surgical patients included: diagnostic evaluation for abnormal imaging (BIRADS 0, 4, 5, n = 46), assessment of response to neoadjuvant treatment (n = 9), and complicated imaging or dense breasts (n = 18, 9/18 surgeon requested). The histology was 67% invasive ductal carcinoma (IDC), 17% invasive lobular carcinoma (ILC), 8% ductal carcinoma in situ, 4% mixed IDC/ILC, and 4% other with 81% ER+, 65% PR+, 13% HER-2+, and 11% triple negative. CEDM identified the index cancer and extent of disease in 95% of cases (figure). It also led to additional imaging in 12% (n = 9) of cases and additional biopsies in 8% (n = 6) of cases. Of the additional biopsies, 5 cases (83%) were invasive carcinoma and 1 case (17%) was benign fibroadipose tissue. CEDM was prospectively identified as changing the surgical management in 15% (n = 11) of cancer cases. In addition to CEDM, 27 patients underwent breast magnetic resonance imaging (MRI). Among this subset of patients, MRI and CEDM identified the index cancer and extent of disease in 93% vs 89% of cases, respectively. MRI identified additional lesions not seen on CEDM in 5 cases, of which 4 had contralateral lesions with no correlation on second-look ultrasound or diagnostic mammogram; only 1 was biopsied and found to be atypical ductal hyperplasia. There were 2 cases where CEDM identified additional and contralateral lesions not seen on MRI and no biopsies were obtained. Cancer lesion size was within 5 mm of pathologic measurement in 70% of CEDM vs 72% MRI cases.

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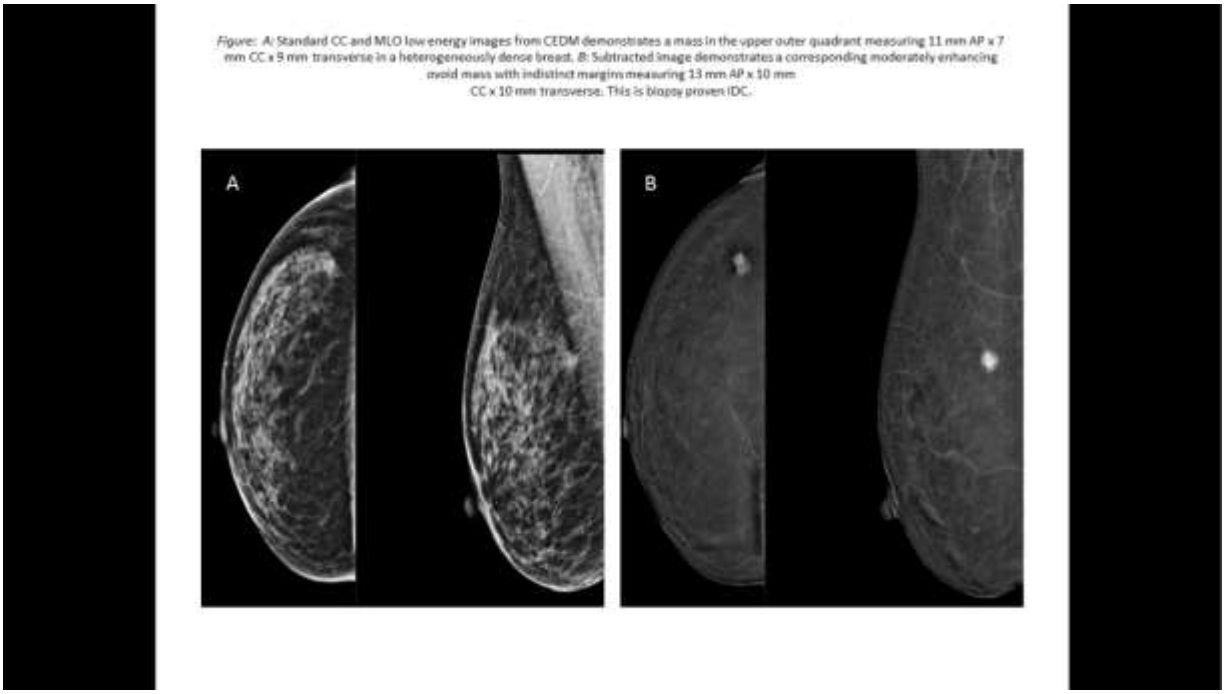


Figure: A: Standard CC and MLO low energy images from CEDM demonstrates a mass in the upper outer quadrant measuring 11 mm AP x 7 mm CC x 9 mm transverse in a heterogeneously dense breast. B: Subtracted image demonstrates a corresponding moderately enhancing ovoid mass with indistinct margins measuring 13 mm AP x 10 mm CC x 10 mm transverse. This is biopsy proven IDC.

Conclusion: CEDM appears to be a valuable breast imaging modality for diagnostic, staging, treatment monitoring, and surgical planning. CEDM provides high-quality anatomic information, albeit with the need for intravenous contrast. This initial experience suggests that CEDM has the potential to perform as well as breast MRI for surgical planning, while being much less expensive and simpler for patients. Further study is warranted.

0232 - Analysis of Operative and Oncologic Outcomes in 5351 Patients With Operable Breast Cancer: Support for Breast Conservation and Oncoplastic Reconstruction

Stacey Carter[1], Genevieve Lyons[1], Roland Bassett[1], Scott Oates[1], Isabelle Bedrosian[1], Alastair Thompson[1], Elizabeth Mittendorf[1], Mediget Teshome[1], Min Yi[1], Gildy Babiera[1], Sarah DeSnyder[1], Abigail Caudle[1], Merrick Ross[1], Patrick Garvey[1], Donald Baumann[1], Henry Kuerer[1], Kelly Hunt[1], Rosa Hwang[1]

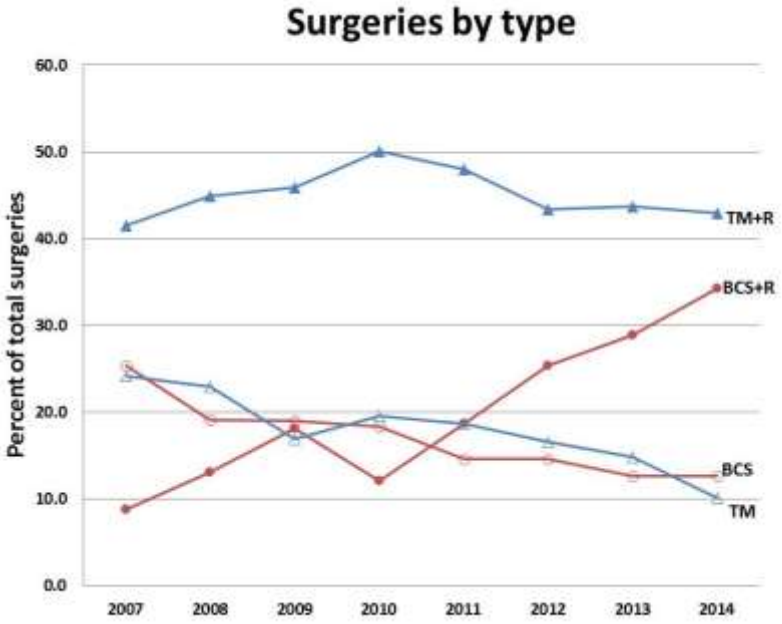
[1]*University of Texas, MD Anderson Cancer Center, Houston, TX*

Objective: Despite the proven oncologic safety of breast-conserving surgery (BCS) with radiation for patients with early-stage breast cancer, there has been a marked increase in the total mastectomy (TM) rate over the past decade for BCS-eligible patients. Oncoplastic reconstruction is an approach that enables patients with locally advanced or poorly located tumors to undergo BCS. The objectives of this study were to identify the use of BCS with oncoplastic reconstruction (BCS+R) and determine the operative and oncologic outcomes as compared to other surgical procedures for breast cancer.

Methods: We interrogated a single institution's prospectively maintained databases to identify patients who underwent surgery for breast cancer between 2007 and 2014. Surgeries were categorized as BCS, BCS+R, TM, or TM with reconstruction (TM+R). Demographic and clinicopathologic characteristics and postoperative complications were analyzed and comparisons made using Wilcoxon, chi-square, or Fisher exact tests. Survival analysis was performed using the Kaplan-Meier method.

Results: Over 7 years, 5651 operations were completed in 5351 patients. The use of BCS+R increased steadily over the study period surpassing BCS after 2011 (figure). Patients who had BCS+R were younger than BCS

patients (57 vs 58 years old, $p < 0.0015$) but older than those who had TM+R (50 years old, $p < 0.0001$). The rate of obesity (BMI > 30) in BCS+R patients was higher compared to TM+R patients (31.0 vs 20.8%, $p < 0.0001$). There were no differences seen in clinical stage, lymphovascular invasion, triple-negative status, and treatment with neoadjuvant or adjuvant chemotherapy in patients with BCS+R and TM+R. At an overall median follow-up of 3.3 years (range, 0–8.7 years), BCS+R patients had the lowest locoregional recurrence rate (LRR) when compared to any other group (2.4%, $p < 0.0003$). Overall survival (OS) for BCS+R patients was not different from BCS patients ($p = 0.29$) but lower than TM+R patients ($p = 0.003$), which is potentially due to the older age and fewer in situ cancers in the BCS+R group. Median OS was not reached for any group. Five-year survival probabilities and corresponding 95% confidence intervals were 93% (0.90; 0.95) for BCS+R patients and 96% (0.94; 0.97) for TM+R patients. Despite having an older, more obese patient population, BCS+R had fewer complications of postoperative seroma/hematomas ($p < 0.0001$), surgical site infections ($p < 0.001$), and readmission within 30 days ($p < 0.001$) compared with TM+R patients.



Conclusion: The increasing use of oncoplastic reconstruction after BCS is an attractive alternative to TM+R for similar-stage breast cancer patients. In our study, this approach was associated with a lower rate of postoperative complications and LRR.

0301 - Combining Pathologic Data With Axillary Ultrasound Information Reliably Identifies a Large Number of Newly Diagnosed Breast Cancer Patients As Node-Negative

Tiffany Chichester[1], Charles Mylander[1], Rubie Sue Jackson[1], Martin Rosman[1], Sophia Cologer[1], Reema Andrade[1], Lorraine Tafra[1]

[1]*Anne Arundel Medical Center, Annapolis, MD*

Objective: Breast cancer patients require axillary staging, which is currently performed surgically, primarily to aid in adjuvant treatment decisions. Patients who undergo negative sentinel lymph node (SLN) biopsy incur risk of surgical complications with no therapeutic benefit. It is hoped that preoperative axillary ultrasound (AXUS), alone or in combination with clinicopathological factors, could identify patients with an extremely low likelihood of harboring nodal metastasis, and who could thus avoid surgical staging of the axilla. We undertook a study to examine whether the combination of AXUS results and clinicopathological information

can reliably identify such a subset of patients. The Memorial Sloan-Kettering Cancer Center (MSKCC) nomogram for prediction of SLN metastasis was used to integrate clinicopathological information.

Methods: We utilized a retrospective database of all newly diagnosed invasive breast cancers (February 2011–October 2014) at a single institution with both preoperative AXUS and surgical staging of the axilla. Exclusions were for palpable adenopathy or neoadjuvant chemotherapy. For all patients, the MSKCC nomogram estimates were calculated, and patients were divided into quintiles by nomogram estimates. AXUS results were categorized as suspicious or nonsuspicious. Nodal burden from surgical pathology was compared across 10 categories defined by nomogram quintile and AXUS result.

Results: In 520 cancers, 406 (78%) had a nonsuspicious AXUS. Examining the 10 categories defined by MSKCC nomogram/AXUS results, the combination of (1) MSKCC nomogram-predicted likelihood of SLN metastasis ≤45% and (2) nonsuspicious AXUS was able to identify a subset of 302 patients (58% of the cohort; 95% CI, 54%–62%) with low likelihood of nodal metastasis. Only 32 of 302 low-risk patients (11%; 95% CI, 7%–15%) had SLN metastasis and only 1 patient had >2 positive lymph nodes.

Axillary Ultrasound Findings	MSKCC Nomogram Prediction of Probability of SLN Mets	Number of Positive Nodes Found Surgically		
		0	1–2	≥3
No suspicious nodes (406 of 520 patients studied)	≤45% (302)	270 (89%)	31 (10%)	1 (0.3%)
	>45% (104)	63 (61%)	28 (27%)	13 (11%)

Conclusion: Using a combination of AXUS and MSKCC nomogram estimates, a sizable percentage of newly diagnosed breast cancer patients can be identified as being at low risk of nodal metastasis. There are currently at least 2 clinical trials underway to evaluate omission of SLN biopsy in AXUS-negative patients (principal investigators: O. Gentilini and A. Cyr). A more conservative approach would be to use a combination of MSKCC nomogram estimates and negative AXUS to identify patients who might be spared a SLN biopsy. A limitation of this study is it was a small, single-institution, retrospective analysis. AXUS is operator-dependent, and it is important that qualified radiologists or breast surgeons perform these examinations and systematically document results.

0289 - Breast Cancer Recurrence Following Radio-Guided Seed Localization and Standard Wire Localization of Nonpalpable Breast Cancers – 5-Year Follow-Up From a Randomized Controlled Trial

Filgen Fung[1], Sylvie Cornacchi[1], Michael Reedijk[2], Nicole Hodgson[1], Charlie Goldsmith[3], David McCready[2], Gabriela Gohla[4], Colm Boylan[5], Peter Lovrics[1]

[1]Department of Surgery, McMaster University, Hamilton, ON, Canada, [2]Department of Surgical Oncology, Princess Margaret Hospital, University Health Network, Toronto, ON, Canada, [3]Faculty of Health Sciences, Simon Fraser University, Burnaby, BC, Canada, [4]St. Joseph's Healthcare, Department of Pathology and Molecular Medicine, McMaster University, Hamilton, ON, Canada, [5]St. Joseph's Healthcare, Department of Radiology, McMaster University, Hamilton, ON, Canada

Objective: Radio-guided seed localization (RSL) has been compared with wire localization (WL) techniques for early-stage nonpalpable breast cancer (BC), but there is only 1 nonrandomized cohort study reporting recurrence rates using the RSL technique. The purpose of this study is to compare 5-year breast cancer (BC) recurrence rates in patients randomized to RSL or WL for nonpalpable invasive and in situ BC undergoing breast-conserving surgery (BCS).

Methods: Chart review of follow-up visits and surveillance imaging were collected on patients from a multi-centered, randomized control trial that compared RSL to WL for nonpalpable invasive and in situ BC. Study inclusion criteria for the original trial were age 18 years or older, histologically confirmed invasive or in situ

BC, nonpalpable tumor requiring localization, and candidate for breast-conserving surgery (BCS). Data collected included patient and tumor characteristics, adjuvant therapies, and details of follow-up clinical visits, and type and results of surveillance imaging. Univariate analysis was used for the recurrence outcome (which included local recurrence [LR], regional recurrence [RR], and distant metastasis [DM]).

Results: Of the 305 patients from the original trial, follow-up data were available for 298 patients (98%) and median follow-up time was 65 months (5.4 years). Overall positive margin rates (tumor on inked margin) were similar for WL and RSL (11.8% and 10.5%, respectively). In total, there were 11 (4%) cases of BC recurrence and median time to BC recurrence was 26 months. LR occurred in 8 patients (6 WL and 2 RSL; p = 0.28). One WL patient had RR (this patient also had LR and DM). All 4 patients with DM died due to BC (2 WL, 2 RSL; p = 1.00). New contralateral BC developed in 8 patients (3 WL, 5 RSL; p = 0.49). Positive margins at first surgery (p = 0.024) and final surgery (p = 0.004) predicted for BC recurrence. There were no tumor characteristics or adjuvant therapies related to BC recurrence outcomes.

Conclusion: There was no difference in BC recurrence between WL and RSL groups in patients undergoing BCS for early-stage nonpalpable BC. Positive margins at initial or final surgery both predicted for BC recurrence. Tumor characteristics and adjuvant treatments of radiation, medical, or hormonal therapies did not affect BC recurrence.

0315 - Trends in Breast Reconstruction After Mastectomy and Associated Postoperative Outcomes

Nicole Ilonzo[1], Alison Estabrook[2], Ayemoe Ma[1]

[1]Mount Sinai St. Luke's Roosevelt, New York, NY, [2]Mount Sinai Roosevelt Hospital, New York, NY

Objective: The landscape of breast reconstruction has changed significantly in the past decade. This study seeks to assess trends in type of reconstruction performed after mastectomy and the impact of these approaches on immediate postoperative complications.

Methods: Data for 19,665 patients undergoing mastectomy for breast cancer were analyzed using the National Surgical Quality Improvement Program (NSQIP) database for years 2005–2013. Baseline demographics, comorbidities, and reconstruction type were collected. Primary outcomes were wound complications (dehiscence, superficial surgical site infection – SSI, deep incisional SSI), non–wound-related infections, such as pneumonia and UTI, and postoperative transfusion within 30 days of surgery. Data were analyzed by univariate and multivariate analysis.

Results: The utilization of TE after mastectomy has increased dramatically from 57.59% of reconstructions in 2005 to 71.52% in 2013 (P =.008). Immediate implant placement has increased from 10.27% in 2005 to 15.68% in 2009 (P = .03) and then stabilized to 16.18% between 2010 and 2013 (P =.11). There was no significant difference between TE and immediate implant placement (P > .05) when comparing rates of wound-related, bleeding, or non–wound-related infectious complications. Of note, the rate of wound complications after implant exchange (0.44%) was less than wound complications after immediate implant surgery (3.48%, P = .013). With respect to flaps, the rate of TRAM flap procedures significantly decreased from 22.32% to 3.05% of total reconstructions and LDMF decreased from 6.25% to 3.73% (P < .05) during this period. The overall rate of non–wound-related infections after all reconstructions decreased from 2.96% to 1.36% between 2005 and 2013 (P = .035), but wound complication rates were unchanged during this time (P = .08). As expected, there were fewer wound complications after TE (3.11%) than after LDMF (3.63%) or TRAM flap (7.06%), P < .001. There was also less postoperative blood transfusions after TE (.69%) than after TRAM flap (4.93%) or LDMF (2.81%) P < .001. There was no difference between non–wound-related infections after each procedure (P = .11).

Conclusion: TE and immediate implant utilization have drastically increased in the United States, with both surgeries having similar complication rates in select patients. The rate of non-wound complications after all reconstructions has also decreased. Further studies are needed to evaluate flap reconstruction and cost-effectiveness of each type of reconstruction.

0173 - Multi-institutional Study of the Oncologic Safety of Prophylactic Nipple-Sparing Mastectomy in a BRCA Population

James Jakub[1], Anne Peled[2], Richard Gray[3], Rachel Greenup[4], John Kiluk[5], Virgilio Sacchini[6], Sarah McLaughlin[7], Julia Tchou[8], Shawna Willey[9]

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Objective: Nipple-sparing mastectomy (NSM) is gaining wide acceptance as a result of the superior cosmetic results when successful; however, its role in a BRCA population remains controversial. Our aim was to determine the incidence of breast cancer developing in female BRCA carriers following a prophylactic NSM.

Methods: Multi-institutional retrospective review of patients with a deleterious BRCA mutation undergoing a risk-reducing NSM between January 1, 1960, and December 31, 2013. Patients with a diagnosis of breast cancer and undergoing a contralateral risk-reducing mastectomy were included, but only the risk-reducing side was included in the analysis. Breasts with high-risk lesions (ALH, ADH, ADP, FEA, or LCIS) identified preoperatively or on final pathologic analysis of the mastectomy specimen were included in the analysis. Patients found at the time of prophylactic mastectomy to have an occult cancer in the prophylactic breast were excluded, as were patients with a variant of unknown significance (VUS) or a free nipple graft.

The primary endpoint was development of a new primary breast cancer (DCIS and/or invasive breast cancer) in the surgical field following a risk-reducing NSM. This included events of the ipsilateral skin flaps, subcutaneous tissue, nipple areolar complex (NAC), chest wall, or regional lymph nodes ipsilateral to the risk-reducing mastectomy.

Results: A total of 551 risk-reducing NSMs were performed in 348 patients from 9 institutions over the time period (cases per institution, 1-91). Two hundred three patients underwent a bilateral prophylactic NSM and 145 patients underwent a unilateral risk-reducing NSM secondary to a previous or current breast cancer in the contralateral breast. Two hundred four patients had a BRCA1 mutation and 144 a BRCA2 mutation. With a median follow of 34 months and mean follow-up is 56 months, no breast cancers developed in the ipsilateral skin flaps, subcutaneous tissue, NAC, mastectomy scar, chest wall, or regional lymph nodes on the side of the prophylactic procedure. None of the patients who underwent a bilateral risk-reducing NSM developed breast cancer at any site. Twelve patients died during follow-up--7 from breast cancer, 3 from ovarian or fallopian tube cancer, and 2 from other causes. All 7 patients who died from breast cancer had a previous or synchronous contralateral breast cancer at the time of their prophylactic procedure and their stage IV disease was attributed to the known cancer.

Conclusion: NSM is highly preventative against breast cancer in a BRCA population.

0446 - Factors Associated With Recurrence Rates and Long-Term Survival in Women Diagnosed With Breast Cancer Ages 40 and Younger

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Objective: Young age at breast cancer diagnosis has been associated with higher risks of recurrence and mortality. We reassessed this assumption in a large, modern cohort of women diagnosed with breast cancer at age 40 and younger.

Methods: We identified women diagnosed with breast cancer at age ≤40 years at our institution from 1996–2008. We assessed loco-regional recurrence (LRR), distant recurrence (DR), and overall survival (OS), and correlated patient and tumor characteristics with outcomes. Kaplan-Meier estimates were calculated.

Results: Among 584 women with breast cancer at <40 years (table), median age was 37 years (range, 21-40). Median follow-up was 71.5 months (range, 5–236). Kaplan-Meier estimates for LRR rates were 4.5% at 5 years and 11.5% at 10 years; DR rates were 11% at 5 yrs and 16.5% at 10 yrs. OS was 93% at 5 years and 86.5% at 10 years. For DCIS alone (n = 120), OS was 99% at 67.5 months median follow-up, with 6 LRR and 1 DR. For invasive cancer (n = 447), OS was 87% at 73 months median follow-up, with 40 LRR and 77 DR. Among 336 lumpectomy patients, 95.5% received radiation. Of 248 mastectomy patients, 36.3% received radiation. Among 464 patients with invasive cancer, 80.5% received chemotherapy, 67% received endocrine therapy, and 54% received both. Of 120 DCIS patients, 26% received endocrine therapy. On univariate analysis of the entire cohort (n = 584), development of any recurrence was associated with a personal history of thoracic radiation, invasive disease, larger tumor size, presence of lymphovascular invasion (LVI), positive lymph nodes, chemotherapy receipt, and adjuvant radiation administration (all $p \leq 0.05$). There was no association with age at diagnosis, family history, multifocality, type of surgery (lumpectomy vs mastectomy), initial margin status, tumor grade, ER/PR status, HER2 status, triple-negative disease, endocrine therapy, or the presence of a genetic mutation. On multivariate analysis of pathology features, only tumor size (OR, 1.2; CI, 1.1–1.4) remained significant. On univariate analysis (n = 584), a worse OS was associated with a positive family history, personal history of thoracic radiation, invasive disease, larger tumor size, higher tumor grade, presence of LVI, positive lymph nodes, and recurrence (all $p \leq 0.05$); improved OS was associated with receipt of adjuvant radiation ($p \leq 0.05$). OS was not associated with age at diagnosis, multifocality, type of surgery, initial margin status, ER/PR status, HER2 status, triple-negative disease, adjuvant endocrine therapy, or the presence of a genetic mutation. On multivariate analysis of pathologic features, tumor size (OR, 1.2; CI, 1.1–1.5) and tumor grade 3 (OR, 2; CI, 1.1–3.8) remained significant.

Patient and Tumor Characteristics of Breast Cancer Patients Ages 40 and Younger

Patient/Tumor Characteristic	N = 584
Age (yr)	
<25	4 (0.6%)
25–30	34 (5.8%)
30–35	116 (19.8%)
35–40	430 (73.6%)
Positive family history	300 (51.3%)
Genetic mutation	73 (26.6%)
Prior thoracic radiation	13 (2.2%)
Type of surgery	
Mastectomy	248 (42.5%)
Lumpectomy	336 (57.5%)
Tumor type	
DCIS	120 (20.6%)
IDC	429 (73.5%)
ILC	18 (3.1%)
Other	17 (2.9%)

Tumor stage	
0	135 (23.1%)
I	196 (33.6%)
II	183 (31.3%)
III	70 (12.0%)
Tumor grade	
I	51 (8.7%)
II	150 (25.7%)
III	231 (39.6%)
Unknown	152 (26.0%)
Invasive tumor size	
<2 cm	289 (49.5%)
2–5cm	151 (25.9%)
>5 cm	24 (4.1%)
Nodal status	
Positive	218 (37.3%)
Negative	300 (51.4%)
Not staged	66 (11.3%)
Receptor status	
ER+	403 (69.0 %)
PR+	388 (66.4%)
Her2neu+	91 (15.6%)
Triple negative	71 (12.2%)
Radiation therapy	
Lumpectomy + radiation	321 (95.5%)
PMRT	90 (36.3%)
Systemic therapy	
Neoadjuvant	86 (14.7%)
Adjuvant	322 (55.1%)
Endocrine Therapy	334 (82.8%)
None	123 (21.0%)

Conclusion: Women diagnosed with breast cancer at age 40 and younger have a good prognosis, with survival at 5 and 10 years now approaching that of older women. Rates of local recurrence after lumpectomy are low, making breast conservation a reasonable option for young breast cancer patients.

0449 - The Role of Surgical Primary Tumor Extirpation in De Novo Stage IV Breast Cancer in the Era of Targeted Treatment

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Objective: Previous reports evaluating primary tumor extirpation (hereafter, surgery) in patients presenting with de novo stage IV breast cancer describe mixed results regarding overall survival (OS). In this modern era of treatment, the impact of surgery was assessed, both controlling and adjusting for potential confounders, including comorbidities, tumor burden, vitality impact of distant metastatic site, hormonal therapy of ER/PR+ disease, and targeted therapy of HER-2+ disease.

Methods: Women presenting with de novo stage IV breast cancer during 2000–2015 were retrospectively studied using a single institution's cancer registry data. Patients with severe competing comorbidities (heart failure, chronic kidney disease) were excluded, as well as those missing data for patient, tumor, or treatment variables used in matching or analysis. As primary tumor extirpation was of principal interest, patients who

underwent surgery as a first course of treatment were 1:1 matched with those treated without surgery by patient age (within ± 20 years), number of cardiovascular risk factors (smoking, hypertension, dyslipidemia, diabetes mellitus, obesity; within ± 1 factor), coronary artery disease, HER-2/neu and ER/PR, tumor grade, number of metastatic sites (tumor burden within ± 1 site), vitality impact of metastatic sites (CNS, visceral, bone), and first-course systemic and site-specific radiation (breast/chest, metastatic site) therapies received. The adjusted effects of surgery and other patient, tumor, and treatment characteristics on OS were quantified using hazard ratios (HR) derived from marginal Cox proportional hazards models, all containing surgery. Through estimation of the survivor function, OS rates were computed per study group.

Results: Of 609 total patients identified, 280 entered the matching algorithm. Women who underwent surgery (n = 58) vs those who did not undergo surgery (n = 58) within the matched-pairs population did not differ by age (mean, 62 yr) or other matched characteristics, but did significantly differ by length of follow-up (3.03 vs 1.97 yr, respectively). Single-variable adjustment led to detection of a significant surgery effect ($P < 0.04$) in 4 of 10 models of OS (table). Across models of nonsignificant surgery effects ($P = 0.06$-0.08), HRs were within the range of values produced by models revealing significance. All models suggested a 40% reduction in risk for patients receiving surgery, and 9 of the 10 models suggested 3-yr OS rates of approximately 60% for patients undergoing surgery vs. 45% for patients treated without surgery. Age, number of risk factors, ER/PR, and vitality impact of metastatic sites impacted OS.

continues

Hazard Ratios and Adjusted 3-Year Overall Survival Rates Derived From Cox Proportional Hazards Models of Overall Survival in Women Who Presented With Stage IV Breast Cancer During 2000–2015 and Were Matched by Primary Tumor Extirpation (Surgery, N = 116)

Model No.	Model Variable 1	HR (95% CI)	3-year OS rate (95% CI)	Model Variable 2	HR (95% CI)
	Surgery				
1	Performed	0.65 (0.44–1.03)	0.60 (0.48–0.75)	Patient age[a]	1.50 (1.24–1.84)*
	Not performed	Reference	0.46 (0.32–0.67)		
	Surgery				
2	Performed	0.61 (0.40–0.95)*	0.59 (0.46–0.74)	Number of risk factors[b]	1.33 (1.06–1.66)*
	Not performed	Reference	0.43 (0.31–0.61)		
	Surgery				
3	Performed	0.65 (0.41–1.02)	0.58 (0.460.74)	Tumor size[c]	0.98 (0.91–1.06)
	Not performed	Reference	0.43 (0.31–0.61)		
	Surgery			HER2neu expression	
4	Performed	0.65 (0.41–1.02)	0.58 (0.45–0.74)	Positive	0.89 (0.54–1.47)
	Not performed	Reference	0.43 (0.30–0.62)	Negative	Reference
	Surgery			ER/PR expression[d]	
5	Performed	0.59 (0.36–0.97)*	0.17 (0.05–0.58)	Positive	0.23 (0.12–0.46)*
	Not performed	Reference	0.05 (0.01–0.53)	Negative	Reference
	Surgery			Grade	
6	Performed	0.61 (0.39–0.97)*	0.63 (0.52–0.79)	I or II	Reference
	Not performed	Reference	0.49 (0.34–0.70)	III or IV	1.51 (0.89–2.56)
	Surgery				
7	Performed	0.66 (0.42–1.05)	0.58 (0.46–0.74)	Tumor burden[e]	1.30 (0.90–1.86)
	Not performed	Reference	0.43 (0.31–0.61)		
	Surgery			Metastatic site impact	
8	Performed	0.59 (0.38–0.91)*	0.58 (0.47–0.74)	Visceral	1.93 (1.15–3.25)*
	Not performed	Reference	0.42 (0.29–0.61)	Bone	Reference
	Surgery			Chemotherapy	
9	Performed	0.68 (0.43–1.08)	0.52 (0.37–0.73)	Performed	0.70 (0.40–1.23)
	Not performed	Reference	0.38 (0.25–0.59)	Not performed	Reference
	Surgery			Radiation therapy	
10	Performed	0.65 (0.41–1.03)	0.55 (0.42–0.72)	Performed	0.66 (0.35–1.25)
	Not Performed	Reference	0.40 (0.26–0.60)	Not performed	Reference

HR indicates hazard ratio; OS, overall survival; CI, confidence interval; HER2neu, human epidermal growth factor receptor 2; ER, estrogen receptor; PR, progesterone receptor; CNS, central nervous system.

*Hazard ratio significantly differs from 1.

[a] Number of times the hazard increases per 10-year increase in age.

[b] Number of times the hazard increases per 1-factor increase in cardiovascular risk.

[c] Number of times the hazard increases per 10-mm increase in tumor size.

[d] Classified as positive when either ER or PR or both are overexpressed and negative when neither ER or PR are overexpressed.

[e] Number of times the hazard increases per 1-metastatic site increase in tumor burden.

Conclusion: Even after accounting for hormonal therapy, targeted therapy, and radiation to local and distant metastatic sites, surgical extirpation of the primary tumor remains associated with an OS improvement in patients with de novo stage IV breast cancer.

Posters

0358 - Risk Factors of Breast Cancer–Related Lymphedema

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Objective: To determine the risk factors associated with the presence and severity of breast cancer–related upper arm lymphedema.

Methods: This is a prospective case control study. Patients included had breast carcinoma (128) and all had operable breast cancer that will undergo loco-regional therapy (surgery ± radiotherapy). Diagnosis for lymphedema was stated as by measurement method in which a difference of ≥2 cm at either level between the 2 arms is generally accepted for diagnosis for lymphedema. Assessment of lymphedema and risk factors was performed by logistic regression.

Results: Univariate analysis showed significant difference between the groups of patients with and those without lymphedema regarding older age (0.014), BMI > 30 (0.005), hard work (0.004), ipsilateral dominant arm (0.021), history of injury (0.001) and infection (0.001) to ipsilateral arm, positive lymphadenopathy (0.020), advanced stage of cancer (0.009), positive HER- 2 / neu receptor (0.001), level III axillary dissection (0.001) and patients who did not receive information about BCRL and /or did not follow prophylactic advice (0.001). Meanwhile, multiple logistic regression analysis showed only age (0.003), history of injury (0.004), cellulitis (0.017), advanced cancer stage (0.033), positive HER- 2/neu receptor (0.037), level III axillary dissection (0.001), and patients who did not receive information about BCRL and /or did not follow prophylactic advice (0.016) had significant relation to lymphedema. Regarding the severity of lymphedema, history of injury (0.017), cellulites (0.044), and obesity (BMI ≥ 30) (0.018) had significant association with the degree of severity.

Conclusion: Health teams and patients must be aware of the prevention and early treatment of lymphedema.

0313 - Metaplastic Breast Cancer Has a Poor Response to Neoadjuvant Systemic Therapy

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Objective: Metaplastic breast cancer (MetaBC) has been shown to exhibit a poor response to systemic therapy in the metastatic setting and high rates of recurrence in the adjuvant setting, and limited data are available regarding the response to neoadjuvant chemotherapy (NAC). We aimed to report our institutional experience with the neoadjuvant treatment of MetaBC.

Methods: Patients with MetaBC were identified from our institutional medical index. Patient demographics, tumor characteristics, treatment received, and pathological complete response (pCR) rates were reviewed.

Results: Twenty-one female patients with MetaBC received NAC from January 1991 to June 2015. The mean age at diagnosis was 52 years (range, 33–79). Four patients (19%) had a previous history of breast cancer. Five of 16 had BRCA testing and 2 of 5 were BRCA-2 positive. The tumor size distribution was T2 (n = 8), T3 (n = 9), and T4 (n = 4), and 8 had clinically node-positive disease (6 were cytology/pathology confirmed). The majority (16/21;76%) were estrogen receptor (ER), progesterone receptor (PR), and HER-2 negative, and 1/21 (5%) was HER-2 positive. The chemotherapy regimen combinations included anthracycline/taxane-based regimens in 7, anthracycline/taxane/platinum-based regimens in 9, taxane/platinum-based regimens in 3, taxane regimen in 1, and taxane/trastuzumab in 1. Twenty patients received NAC prior to surgery; of these 4 (20%) progressed on initial treatment and required change of chemotherapeutic agent used. One patient did not proceed to have surgery because of disease progression. Two patients (9.5%) with triple-negative disease achieved a complete pathological response (n = 2). Of the 8 patients with positive nodes at presentation, 3 with biopsy-proven nodal disease had a complete pathologic response in the axilla.

Conclusion: The response of MetaBC to various regimens of NAC is low and the risk for progressive disease is high with current standard regimens. At the present time, patients with MetaBC who have resectable disease should proceed directly to definitive operative management in the absence of a clinical trial directed at NAC for MetaBC.

0352 - The Impact of Molecular Subtype on Breast Cancer Recurrence in Young Women Treated With Contemporary Adjuvant Therapy

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Objective: Breast cancer is the leading cause of cancer death in women below 40 years. Triple-negative and HER2 subtypes have a particularly poor prognosis in this age group. The purpose of this study was to compare rates of recurrence among breast cancer subtypes in young patients treated with modern adjuvant systemic therapy.

Methods: A retrospective review of breast cancer patients managed at a major academic breast center between 2000 and 2015 was performed. We included 250 women with breast cancer who were diagnosed and treated at ≤ 40 years. Clinical, histopathological, therapeutic, and outcome data were recorded. Patients were classified into the following molecular subtypes: luminal A/B (ER+, PR+, HER2-), luminal /HER2 (ER+, PR+, HER2+), HER2 (ER-, PR-, HER2+), and triple-negative (ER-, PR-, HER2-). Descriptive statistics were used to characterize the study cohort. Kaplan-Meier survival analysis was performed to estimate recurrence-free survival (RFS).

Results: Median follow-up time was 27 months (range, 0.01–173.6 months). Mean age was 35 ± 4.0 years. Among all patients, 81.2% presented with invasive ductal carcinoma and 18.8% with DCIS +/- micro-invasion. 43.2% of the patients were classified as luminal A/B; 18.0%, luminal/HER2; 10.0%, HER2; and 12.8%, triple-negative. Of the patients with invasive cancer, 29% received neoadjuvant chemotherapy and 56% received adjuvant chemotherapy. Among HER2-positive patients, 74.2% received HER2-directed therapy. Twenty-nine (11.6%) patients had recurrences (14 loco-regional, 8 distant, and 7 both). At 3 years, HER2 subtype had the highest RFS, 100%; compared to 91.2% in luminal A/B; 85.6% in luminal/HER2, and 81.9% in triple-negative.

Molecular Subtype N = 250*	**Three Year Recurrence-Free Survival (%)**	**95% CI**	
Luminal A/B (n = 108, 43.2%)	91.2%	82.2–95.8	
HER-2 (n = 25, 10%)	100%		
Luminal /HER-2 (n = 45, 18%)	85.6%	65.8–94.4	
Triple-negative (n = 32, 12.8%)	81.9%	57.1–93.2	
			P = 0.06

*Total percentage does not total 100% due to 40 patients (16%) with indeterminate molecular subtype status (DCIS +/- micro-invasion)

Conclusion: In comparing outcomes among breast cancer subtypes, the HER2-positive subtype was associated with improved RFS, likely reflecting the impact of HER2-directed therapy. Those young patients with triple-negative subtype continued to have the poorest outcomes.

0402 - Management of Positive Margins in Elderly Women With Breast Cancer: Is Reoperation Necessary?

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Objective: Breast-conserving surgery (BCS) is the most common surgical procedure for elderly women with breast cancer. Management of breast cancer between young and elderly women differs, but it is unknown whether this extends to the management of positive margins after BCS. This study evaluated the management of positive margins and its effect on risk of recurrence in elderly women with breast cancer who were treated at 2 high-volume cancer centers.

Methods: Women ≥50 years diagnosed with stage I–III breast cancer who underwent BCS from 2004 to 2011 were identified from an institutional database. Data were collected across 2 subgroups: 50–69 years and ≥70 years. Negative margin was defined as "no ink on tumor." Disease-free survival (DFS) was estimated by Kaplan-Meier analysis and compared by log-rank test. A multivariable logistic regression was used to evaluate whether elderly women with positive margins were less likely to undergo reoperation after adjusting by confounders. Incidence of recurrence was evaluated by plotting the cumulative incidence function of recurrence and death without recurrence (competing risk); groups were compared using Gray's test.

Results: In total 1670 women were identified: 50–69 years (n = 1177) and ≥70 years (n = 493). Compared to younger patients, elderly women had tumors that were larger (2 cm vs 1.4 cm, $p < 0.001$), more differentiated (34% vs 25%, $p = 0.003$), more ER/PR positive (92% vs 66%, $p < 0.001$), and more HER2 negative (75% vs 71%, $p = 0.04$). Elderly women were more frequently diagnosed with stage II tumors (49%), while younger women had stage I (57%) ($p < 0.001$). Positive margins were less common in elderly than younger women (11% vs 16%, $p = 0.004$). Single BCS was provided in 89%. Of patients with positive margins, 72% had re-excision and 14% had mastectomy. Age was inversely associated with reoperation (≥70 yr, 5%, vs 50–69 yr, 15%; $p < 0.001$). After adjusting by size, grade, and positive lymph nodes, elderly women with positive margins had lower odds of undergoing reoperation (OR, 0.1; 95% CI, 0.06–0.3). Compared to younger women, elderly patients were less likely to undergo adjuvant radiation (71% vs 81%, $p < 0.001$) and chemotherapy (5% vs 41%, $p < 0.001$). The recurrence rate was 5% and did not differ between age groups (≥70 years, 5%, vs 50–69 years, 4%; $p = 0.6$). Although the cumulative incidence of death without recurrence in patients with positive margins was higher in elderly women ($p < 0.001$), the cumulative incidence of recurrence did not differ ($p = 0.2$). Five-year DFS was similar between the groups (≥70 years, 86%, vs 50–69 years, 86%; $p = 0.8$).

Conclusion: Elderly women with positive margins after BCS are less likely to undergo re-operation than younger women independent of poor prognostic factors, including size, grade, and lymph node status. Differences in the risk of recurrence and DFS were not observed between these age subgroups, suggesting that reoperation may not be necessary in elderly women. However, larger studies are necessary to confirm these findings.

0400 - The Specimen Margin Assessment Technique (SMART) Trial: A Novel 3D Method of Identifying the Most Accurate Method of Breast Specimen Orientation

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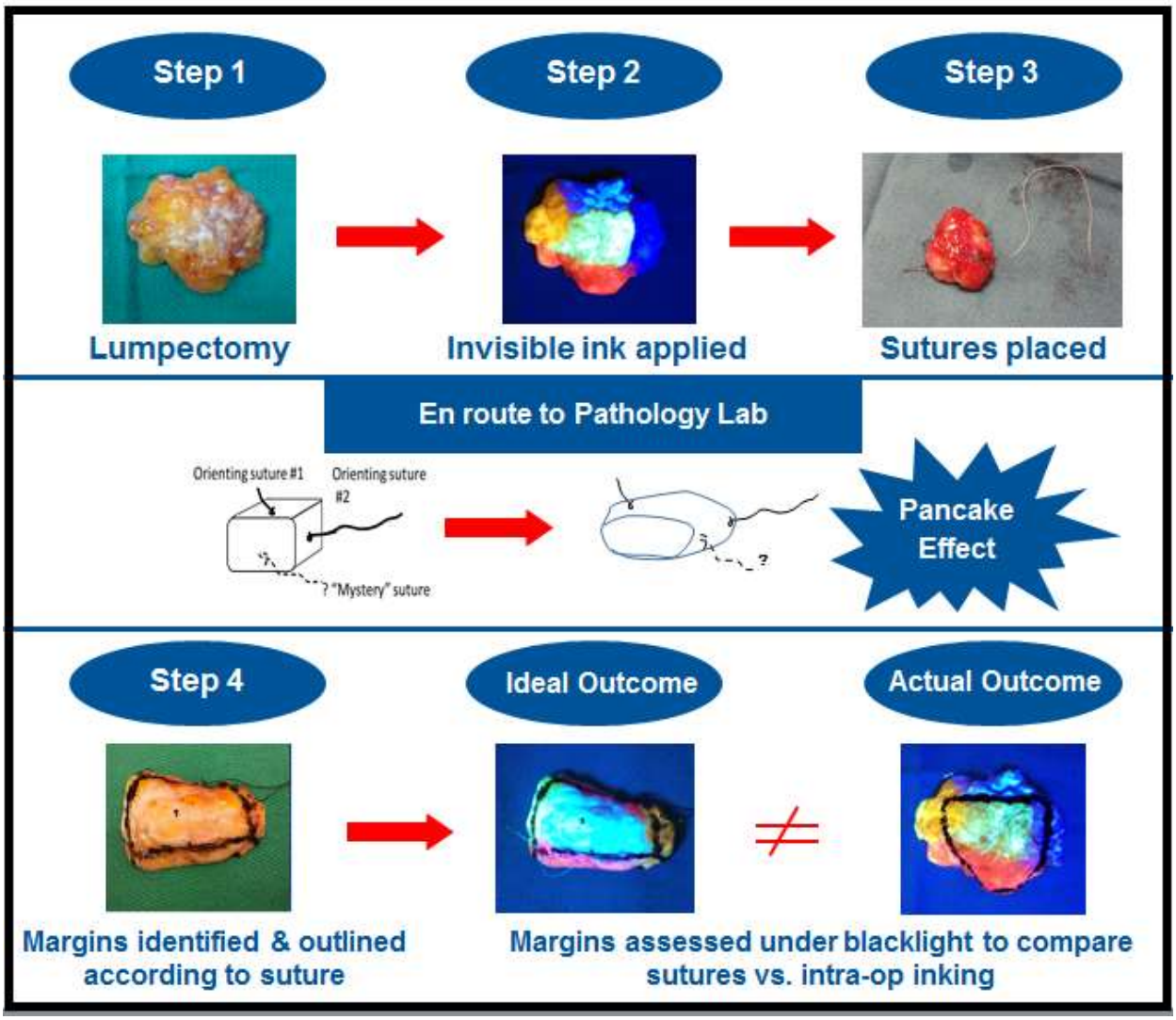
Objective: Achieving negative margins remains one of the most important determinants for local recurrence following breast-conserving therapy. Re-excision of a positive margin is recommended in order to reduce recurrence. Inaccuracies in margin labeling or orientation during surgery translate into additional unnecessary surgery or wrong margin re-excision. We report the results of the world's first prospective clinical trial that evaluates the accuracy of intraoperative specimen inking vs suturing on the same lumpectomy specimen, in a blinded fashion, using a novel 3D technique.

Methods: A prospective clinical trial was performed using sham lumpectomies within the prophylactic mastectomy or breast reduction tissue. The specimen was inked using special phospholuminescent inks that dry clear but glow under black light. In addition, specimen suturing using 2 labeled sutures was performed by the surgeon as per usual. A third "mystery" suture was placed, the location of which is known only to the surgeon but blinded to the pathologist.



Results: Seventy-three patients were accrued for the study. There was a 45% discordance between the pathologist and surgeon in identification of the "mystery" suture and a 76% discordance in identification of surface area of each margin. A median of 3 additional "surgeon identified" margins were included in the "pathologist identified" anterior margin. Using 3D imaging, we demonstrated how the specimen center of gravity and volume changes en route to the pathology department.

Conclusion: This is the first trial of its kind, comparing the 2 methods of specimen orientation in a blinded fashion on the same lumpectomy specimen. Discordance between the surgeon and the pathologist in margin orientation would influence the accuracy of margin identification and the subsequent directed re-excisions, as well as subject patients to unnecessary surgeries or prevent them from having re-excisions they need. Intraoperative specimen inking by the surgeon is a more accurate method of margin assessment. Results of this trial can be extended to other cancers in which a negative margin is prognostic.

0436 - A Randomized, Double-Blind, Placebo-Controlled Window-of-Opportunity Trial Evaluating Clinical Effects of High-Dose Vitamin D in Patients With Breast Cancer

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Objective: Considerable epidemiologic and preclinical laboratory data suggest that there is a role for vitamin D in breast cancer therapy through its tumor-suppressive effects. Window-of-opportunity trials in breast cancer are a feasible way of assessing the biologic efficacy of therapies in the pre-surgical setting. It takes advantage of the current wait times (2–6 weeks) for breast cancer surgery as a "window of opportunity" to rapidly assess biological changes in vivo with short-term administration of novel potentially therapeutic agents. The objective of this study was to assess the biologic effects of short-term, high-dose vitamin D intake on breast tumor biology, as demonstrated by changes in biomarkers of proliferation and apoptosis.

Methods: This is a prospective, randomized, double-blind, placebo-controlled phase 2 trial assessing the effect of high dose (40,000 IU) of oral vitamin D3 on breast cancer biology in patients awaiting surgical management of their primary breast cancer. Eligible patients took the study drug for at least 2 weeks leading up to the day of surgery. Pre- and post- 25-OH vitamin D blood levels were obtained. In addition, tumor biomarkers, including the Ki67 index (marker of proliferation) and caspase 3 (marker of apoptosis), were analyzed on the original diagnostic core biopsy sample and then compared to a repeated analysis on the tissue obtained at the time of the definitive surgical procedure.

Results: Eighty patients completed the study, 38 in the control group and 42 in the vitamin D group. The mean duration on the study was 19 days. Within the study cohort, 16/80 (64%) were ER positive, 55/80 (55%) were PR positive, and 65/80 (61%) were Her2 negative. Mean overall baseline blood 25-OH Vitamin D levels in the study cohort was 76.4 nmol/L, which increased to 241.9 nmol/L in the vitamin D-treated group ($p = 0.0001$). Mean Ki67 level at baseline was 35.4% overall and there was no statistically significant difference in the Ki67 obtained from the surgical specimen between the treatment group (mean = 39.3%) and the control group (41.0%). Baseline caspase 3 level was 31.2% overall and there was no statistically significant difference in the caspase 3 obtained from the surgical specimen between the treatment group (mean = 13.1%) and the control group (15.6%). However, the overall caspase 3 level (14%) obtained from the surgical specimen from both study groups was significantly lower than that obtained from the core biopsy at baseline (31.2%) ($p = 0.04$).

Conclusion: This is the first prospective randomized trial evaluating the effect of high-dose vitamin D on breast cancer proliferation and apoptosis. No significant difference was seen in these markers, despite significantly higher circulating levels of 25-OH vitamin D in the treatment arm. A significant reduction in caspase 3 was noted at surgery, which could be due to a reduction in apoptosis or technical factors affecting the measurement of caspase 3.

0259 - Breast Cancer Staging and Presentation in HIV-Positive Patients: A Multi-Institutional Retrospective Review

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Objective: The National Cancer Institute does not recognize an association between HIV and an increased risk of breast cancer; however, people infected with HIV are living longer secondary to anti-retroviral therapy. The incidence of breast cancer in HIV-positive patients continues to increase as the population ages, yet there are limited data on the presentation and stage of breast cancer at diagnosis in HIV patients treated in the U.S., as most data comes from Africa. Because of the current HIV epidemic and one of the nation's highest breast cancer mortality rate, the District of Columbia is a potential population for analysis. Given the immune-compromising effects of HIV, it was hypothesized that HIV infection would correlate with earlier age and breast cancer stage at diagnosis.

Methods: This study analyzed all breast cancer diagnoses in HIV-positive patients between January 1, 2004, and December 31, 2014, at 4 hospitals in the Baltimore-Washington, DC, area. Female patients were identified using the diagnosis codes of malignant breast cancer (ICD-9 233, 174) and HIV (ICD-9 042, V08). This study population (n = 43) was compared with all women diagnosed with breast cancer between the same dates in a Washington, DC, cancer registry (n = 3012). Age, race, receptor status, stage at diagnosis, and treatment were analyzed using logistical regression.

Results: The average age at breast cancer diagnosis, 53 years old, was significantly lower ($p < 0.001$) in HIV-positive individuals than the control, 60 years old (table). Similarly, the percent of HIV-positive patients diagnosed with breast cancer who were African-American, 90.7%, was significantly higher than the control of 80.6% ($p = 0.04$), correlating with the demographics of the population. However, the stage at diagnosis showed no significant differences between the 2 groups ($p = 0.42$) (table).

	HIV-Positive		Control		P-value
Total	**N = 43**	**%**	**N = 3012**	**%**	
Age at breast cancer diagnosis					*p < 0.001*
16-40	5	11.63	180	5.98	
41-45	3	6.98	240	7.97	
46-50	8	18.60	332	11.02	
51-55	9	20.93	334	11.09	
56-60	11	25.58	446	14.81	
61-65	4	9.30	408	13.55	
66-70	1	2.33	363	12.05	
71-75	1	2.33	272	9.03	
76-80	1	2.33	200	6.64	
80-102	0	0.00	237	7.87	
Race					*p = 0.04*
African American	39	90.70	2430	80.68	
Other	4	9.30	582	19.32	
Stage at Diagnosis					*p = 0.42*
0	11	25.58	619	20.55	
I	8	18.60	937	31.11	
II	12	27.91	832	27.62	
III	8	18.60	360	11.95	
IV	4	9.30	194	6.44	
Not available	0	0.00	70	2.32	
Receptor Status					
Luminal A	14	32.56	687	22.81	
Luminal B	4	9.30	88	9.93	
Her2 Enriched	4	9.30	55	1.83	
Basal	9	20.93	198	6.57	
Treatment					
Surgery	38	88.37	2697	89.54	*p = 0.78*
Radiation	30	69.77	1869	62.05	*p = 0.20*
Chemotherapy	26	60.47	1273	42.26	*p = 0.013*
Hormone Therapy	17	39.53	1640	54.45	*p = 0.077*

Conclusion: As HIV patients continue to live longer, their risk for developing breast cancer continues to increase. In this study, HIV-positive patients presented at a significantly lower age. This suggests that it is

imperative that HIV-positive female patients start annual screening mammography at 40 years old. Although no significant correlation was found for stage at diagnosis, earlier presentation can translate into more aggressive cancer if treatment is delayed. Further research is recommended to account for potential confounding variables and to evaluate longer follow-up in larger populations.

0346 - Could Ductoscopy Be Used to Identify Breast Cancer in Patients With Pathologic Nipple Discharge?

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Objective: An accurate preoperative identification of malignant tissue is a challenge in the surgical management of nipple discharge associated breast cancer. Ductoscopy could contribute to more accurate diagnosis by entering and targeting the interested duct. The aim of the study was to determine whether the ductoscopic findings are significant predictors of cancer associated with nipple discharge and correlated with any clinicopathological features.

Methods: Patients who had pathologic nipple discharge (PND) were recruited to have ductoscopic exploration from January 2007 to January 2015. Those with abnormal findings on ductoscopy underwent subsequent surgery. Patients with histopathologically proven in situ or invasive cancer (n = 33) were enrolled into the study. Ductoscopic abnormalities included hairy, irregular or hyperemic duct, presence of red patches or orange color, fragile or obstructed duct were considered as malignant, whereas duct ectasia, intraductal papilloma(s), or debris were considered as benign. Pathologic cytology was considered as presence of malignant or suspicious cells.

Results: The median age was 48 (30–81), and 1 of 33 patients was male. Cancer was diagnosed with duct excision following prolene-guided ductoscopy (n = 26), US/MRI-guided core biopsy (n = 6), or wire-localized excisional biopsy (n = 1). Seventeen patients (51.5%) underwent breast conservation, whereas the remaining had mastectomy with (n = 20) or without (n = 13) sentinel node biopsy. There were 19 cases diagnosed with DCIS (57.5%), whereas 14 cases had invasive cancer (42.5%). The majority had early-stage cancer (n = 17, stage 0; n = 13, stage I; n = 3, stage II). The most common ductoscopic images were as follows: hyperemic hairy irregular duct (n = 9, 27.3%), hairy irregular duct (n = 7, 21.2%), red patches/orange color (n = 4, 12.1%), and fragile intraductal lesion (n = 2, 6.1%). Patients diagnosed with DCIS were more likely to have a malignant finding in ductoscopy (79% vs 50%; p = 0.086) in comparison to cases with invasive cancer. Furthermore, cases with a malignant ductoscopic finding were more likely to have a pathologic cytology than patients with benign findings (38% vs 10%; p = 0.116). The accompanying high-risk lesions associated with cancer were intraductal papilloma (n = 5) and atypical lobular hyperplasia (n = 1). However, 3 patients who were diagnosed as intraductal papilloma in ductoscopy were found to have invasive cancer without papilloma.

Conclusion: Ductoscopy is a better identifier for DCIS in comparison to invasive cancer associated with PND. More advanced technologies are warranted for detecting early invasive cancer missed by conventional imaging.

0263 - Influence of the SSO/ASTRO Margin Re-excision Guidelines on Costs Associated With Breast-Conserving Surgery

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Objective: There is significant variability in the reported re-excision rates in patients with invasive breast cancer undergoing attempted breast-conserving surgery (BCS). This variability is a function of both the positive pathologic margin rate, and interpretation of an adequate pathologic margin. The influence of the SSO/ASTRO margin guidelines on reoperation rates, and the potential cost savings is of interest from both a quality and health economics perspective.

Methods: A retrospective analysis of all patients undergoing BCS over a 3-year period was performed (January 1, 2011, to December 31, 2013). Previously identified physician and facility related costs associated with both initial BCS, and projected costs related to reoperation was utilized to determine the potential savings associated with avoidance of reoperation.

Results: Over a 3-year period 512 patients underwent attempted BCS for invasive breast cancer. The pathologic margin status was positive in 97 (19%) patients, close but negative in 59 (12%), and 1–2 mm in 98 (19%). Reoperations occurred in 25% (126 of 512) of the BCS cohort. Based upon the pathologic margin status, reoperation occurred in 85% of those with positive margins (82/97), 25% (39 of 157) with negative margins of less than 2 mm, and 2% (5 of 257) of those with widely negative margins. Nine percent (44 of 512 patients) of the entire BCS cohort underwent reoperation in the setting of negative initial pathologic margins. Based upon our cost model, avoidance of a reoperation in these patients would result in a cost savings of $697 (95% CI, 525–893) per patient undergoing attempted BCS in our population.

Conclusion: Adherence to the SSO/ASTRO margin guidelines would result in 9% of patients avoiding unnecessary reoperation after attempted BCS, which represents approximately one third of reoperations after BCS. This guideline may help reduce some of the reported variability in the re-excision rates, and has significant cost savings associated with it. Both of these are important with respect to the quality of care provided and the costs associated with treatment.

0264 - Influence of Patient, Disease, and Physician-Related Factors on Reoperation Rates After Attempted Breast-Conserving Surgery

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Objective: Breast-conserving surgery (BCS) is the preferred surgical approach for the majority of patients with early-stage breast cancer. With BCS there are frequently issues regarding the pathologic margin status, with population-based studies reporting reoperation rates between 17% and 35%. While reoperations are inevitable, there is significant variability in the literature, suggesting this is a quality-of-care issue. Understanding the patient-, disease-, and physician-related factors influencing reoperation rates is of importance in an effort to minimize this occurrence.

Methods: A retrospective analysis of all patients referred to our cancer center over a 3-year period (January 1, 2011, to December 31, 2013) was performed. Patients undergoing initial breast-conserving surgery for either ductal carcinoma in-situ or T1 and T2 breast cancers were included. Factors considered for analysis included: patient's age at diagnosis; tumor size, histology, grade, ER/PR and HER-2, and lymph node status; and facility and surgeon case volume. Surgeon volume was treated categorically based on surgeon cases per year as: low (1–5), intermediate (6–10), high (11–24), and very high (25 or more) volume. Multivariate logistic regression analysis was performed to identify variable of significance influencing reoperation rates after attempted BCS. The general estimating equations method was applied to account for the correlation of patients operated on by a specific surgeon.

Results: Five hundred ninety-four patients underwent initial BCS, with 159 (26.8%) patients required at least 1 reoperation to ensure appropriate pathologic margins. On univariate analysis the following were associated with an increased need for reoperation including: younger age, larger tumor, lobular carcinoma, higher tumor grade, and low surgeon volume. On multivariate analysis, patient age (under 46 years age), tumor size (greater than 2 cm), and lobular carcinoma were associated with the need for reoperation after attempted BCS. Although a trend to increased need for reoperation was noted with lower volume surgeon, it did not reach statistical significance.

Conclusion: Reoperation rates after attempted breast-conserving surgery is within the expected range in our population. Younger patients and those with tumors larger than 2 cm, along with lobular histology were more likely to require secondary operations. These factors should be considered when counseling patients about the potential for reoperation if breast-conserving surgery is being considered.

0413 - Disparities in Endocrine Risk Reduction for Young Adult Women With Lobular Carcinoma In Situ

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Objective: Lobular carcinoma in situ (LCIS) is associated with up to a 21% 10-year risk of breast cancer development. Tamoxifen can reduce that risk to as low as 7%, but the side effects of this agent and similar endocrine therapies might affect their use in women of reproductive age. Therefore, this study examines patterns in the recommendation for and compliance with endocrine therapy for LCIS in women <40 years of age.

Methods: The National Cancer Database was queried for all women between ages 15 and 39 who were diagnosed with LCIS between 2000 and 2013. Patients were excluded if they had previous/synchronous ductal carcinoma in situ or invasive cancer. Compliance with endocrine treatment was assessed at the time of NCDB data capture. Socioeconomic, demographic, and treatment variables were examined to determine their impact on endocrine therapy recommendations and compliance.

Results: Of the 1650 patients identified, only 45.4% had been recommended for endocrine therapy. After adjustment for competing factors, patients recommended for endocrine therapy were more likely to be at least 35 years of age (OR, 1.4; CI, 1.1–1.7), and more likely to be black than non-Hispanic white (OR, 1.5; CI, 1.1–2.1). Endocrine therapy was less likely to be recommended for women residing in Pacific Coast regions compared to all other regions except for South Central and Mountain ($p < .001$), and less likely to be recommended for women residing more than 100 miles from the diagnosing facility (OR, 0.3; CI, 0.13–0.68). Of the 749 patients recommended for endocrine therapy, 598 (79.8%) were initially compliant with the recommendations. Of those who refused (21.2%), only residing in the Pacific Coast region increased the likelihood of refusing therapy ($p < .001$).

continues

Variable	Odds Ratio	95% CI	P value
Recommended (Rec) vs Not Rec			
35–40 vs <35	1.4	1.1–1.7	0.016
Black vs White	1.5	1.1–2.1	0.0090
N. Central vs Pacific (Pac)	2.4	1.7–3.5	<0.00010
Mid-Atlantic (Atl) vs Pac	2.1	1.4–2.9	<0.00010
New England (Eng) vs Pac	3.4	2.1–5.5	<0.00010
S. Atl vs Pac	1.7	1.2–2.5	0.0036
>100 miles vs <50	0.3	0.13–0.68	0.0041
Taking vs Rec but refused			
S. Central vs Pac	5.4	1.2–24.5	0.0283
Mid Atl vs Pac	2.2	1.2–4.0	0.0094
New Eng vs Pac	2.1	1.0–4.3	0.0408
S. Atl vs Pac	2.3	1.2–4.3	0.0099
S. Cen vs Pac	4.4	1.0–15.5	0.0229

Conclusion: A low rate of recommended therapy and a high rate of compliance suggest that the underuse of endocrine therapy in younger women with LCIS is more dependent on disparities in recommendation rather than patient compliance. This may reflect regional practice patterns, community standards of care, and/or physician bias regarding the significance of LCIS as a risk factor for invasive disease. When it comes to risk reduction, however, patients should have greater opportunity for shared decision-making. Recognizing that certain factors impact physician recommendations for patients with LCIS is the first step toward remedying this disparity.

0149 - Mammary Tuberculosis: Clinical Presentation, Treatment, and Outcome of 50 Cases

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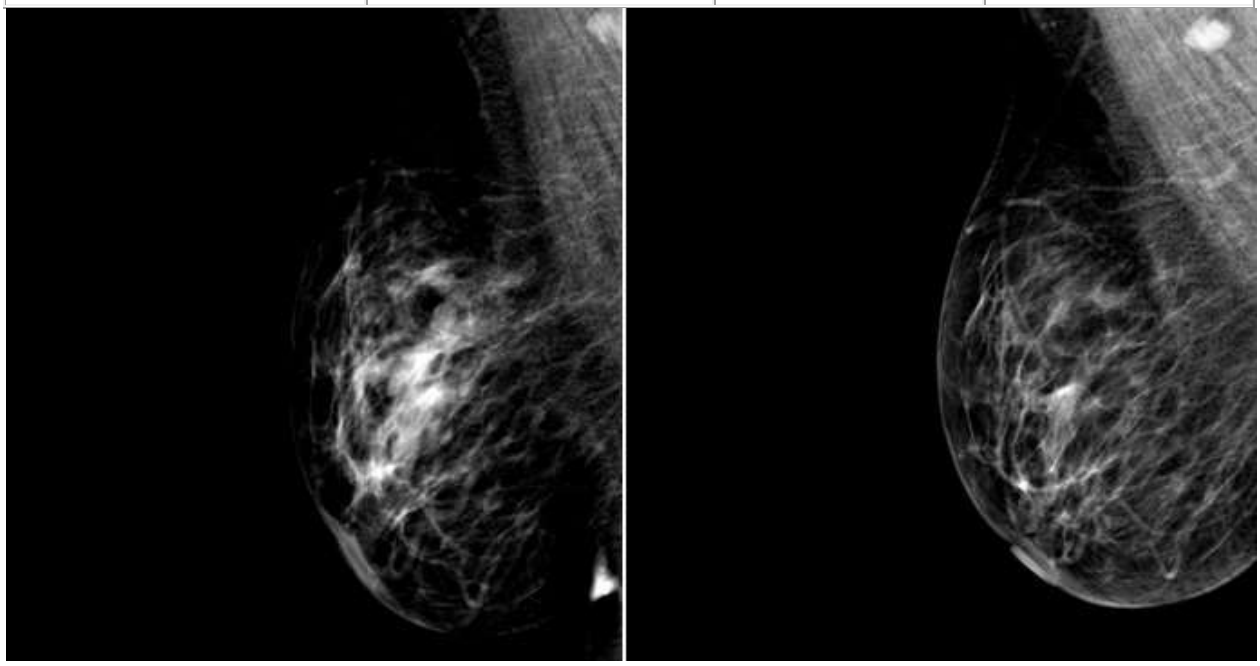
Objective: Breast tuberculosis (TB) is a rare entity. It may mimic either carcinoma or pyogenic abscess. Clinical presentation may range from abscess, discharging sinuses, lump, or skin ulceration. Breast TB may be classified into 3 types, namely nodular, disseminated, and sclerosing varieties. We present demographic features, clinical presentation, treatment details, and outcome of tuberculosis in 50 patients.

Methods: Retrospectively, data were retrieved from the electronic records of 35 patients from one institute and 15 patients from the second institute; we included all patients from 2006 to 2014. Their demographics searched were age at presentation, gender, clinical presentation, laterality, site of the lesion, histopathology, acid fast bacilli (AFB), response to anti-tuberculosis treatment (ATT), and role of surgery in diagnosis and management.

Results: A total of 50 patients were included from both centers, age range was 20–62 years; median age, 38. All were female patients. Twenty-nine patients had right breast involvement, while remaining had left breast involvement. Demographic and treatment details are summarized in the table. Most common presentation was breast lump in center A and discharging sinuses, indurations in center B. Upper outer quadrant was the most common site involved. Primary tuberculosis was more common as compared to secondary; patients with either prior history of tuberculosis, axillary lymph adenopathy, fever, night sweats were considered to have secondary tuberculosis. Radiological features range from ill-defined opacity, abscess formation to well-defined solid masses. Diagnosis was made on core biopsy in 22 patients; incision and drainage followed by tissue sampling was performed in 16 cases. Almost all patients had granulomatous mastitis (GM); 3 of our patients had diagnosis of tuberculosis mast.

Characteristics	Frequency Center A	Center B	Total	Percentage
Clinical presentation				
Lump	29	4	33	66%
Abscess	4	5	9	18%
Discharging sinus	2	11	13	26%
Nipple retraction	15	11	26	52%
Site of lesion				
Upper outer quadrant	21	7	28	56%
Central	9	6	15	30%
Upper inner quadrant	2	1	3	6%
Lower outer quadrant	3	1	4	8%
Type				
Primary Breast TB	28	6	34	68%
Secondary Breast TB	9	9	18	36%
Histopathology				
Granulomatous mastitis	32	15	47	94%
GM + invasive ductal carcinoma	3	0	3	6%
Anti-tuberculous treatment				
CR	29	12	41	82%
PR	3	1	4	8%
NR	3	2	5	10%
Surgical treatment				
Incision & drainage + tissue biopsy	5	11	16	32%
Lumpectomy	2	5	7	14%
Modified radical mastectomy	3	0	3	6%



Conclusion: Mammary tuberculosis may mimic pyogenic abscess or carcinoma; mainstay of treatment is antituberculosis drugs; role of surgery is limited for tissue diagnosis, abscess drainage, or excision of residual lump after anti-tuberculosis therapy.

0432 - Outcomes in Patients With Small Node-Negative Invasive Breast Cancer

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Objective: Patients with T1mi,a,b (≤1 cm) node-negative tumors generally have an excellent prognosis, but there is controversy whether systemic therapy is warranted in this population, especially among the more aggressive molecular subtypes. The objective of this study was to compare survival and recurrence rates in patients with small node-negative invasive breast cancer.

Methods: Review of a prospectively maintained database identified 669 patients with T1mi,a,bN0M0 invasive breast cancer from January 1, 2000, through December 31, 2013. Among those with complete tumor marker data, 71 patients had HER2+ tumors, 467 had hormone receptor (HR)+/HER2– tumors, and 45 had triple-negative breast cancer (TNBC). The 3 groups were compared with respect to patient and tumor characteristics, surgical treatment, adjuvant therapies, recurrence rate (RR), disease-free survival (DFS), and overall survival (OS). Analysis was performed to determine covariates that correlate with DFS and OS.

Results: Mean age was 60.6 years with a mean tumor size of 6.7 mm. At mean follow-up of 4.9 years, the 5-year OS was 95% and 5-year DFS was 98%. Patients with HER2+ tumors were significantly younger and had smaller tumors than the other subtypes (table). HER2+ and TNBC patients were more likely to have poorly differentiated tumors and were more likely to undergo mastectomy than HR+/HER2– patients. The HR+/HER2– group was the least likely to receive chemotherapy and the most likely to receive hormonal therapy, more so than HR+/HER2+ patients, of whom 52.3% received hormonal therapy. RR for HER2+, HR+/HER2–, and TNBC was 7.0%, 3.7%, and 4.4%, respectively ($p = 0.2$). Breast cancer–specific death rate was 1.4%, 0.9%, and 2.2%, respectively. There was no significant difference in OS ($p = 0.9$) and DFS ($p = 0.5$) among the 3 groups. On multivariable analysis, smaller tumor size ($p = 0.04$) and the use of adjuvant hormonal therapy ($p = 0.08$) were correlated with improved DFS, while younger age at diagnosis ($p < 0.01$) and the use of hormonal therapy ($p = 0.05$) were the only significant predictors of improved OS. Use of adjuvant chemotherapy was not associated with improvement in DFS or OS.

Patient and Tumor Characteristics and Survival Outcomes in T1mi,a,bN0M0 Invasive Breast Cancer by Tumor Subtype

	HER2+ (n = 71)	HR+/HER2-* (n = 467)	Triple Negative (n = 45)	p value
Mean age (years)	55.5	60.8	60.6	0.005
Mean tumor size (mm)	5.7	6.9	7.0	0.002
Histology				0.3
Ductal	54 (76.1%)	347 (74.3%)	40 (88.9%)	
Lobular	6 (8.5%)	27 (5.8%)	1 (2.2%)	
Ductal + others	9 (12.7%)	77 (16.5%)	2 (4.4%)	
Others	2 (2.8%)	16 (3.4%)	2 (4.4%)	
Grade				<0.001
Well differentiated	5 (8.2%)	208 (45.8%)	3 (7.0%)	
Moderately differentiated	22 (36.1%)	207 (45.6%)	4 (9.3%)	
Poorly differentiated	34 (55.7%)	39 (8.6%)	36 (83.7%)	

Surgery type				<.001
Lumpectomy	41 (57.8%)	335 (72.0%)	29 (65.9%)	
Unilateral mastectomy	22 (31.0%)	48 (10.3%)	7 (15.9%)	
Bilateral mastectomy	8 (11.3%)	82 (17.6%)	8 (18.2%)	
Adjuvant chemotherapy				<0.001
No	38 (55.9%)	438 (94.6%)	27 (61.4%)	
Yes	30 (44.1%)	25 (5.4%)	17 (38.6%)	
Adjuvant radiotherapy				0.1
No	39 (54.9%)	187 (42.4%)	22 (51.2%)	
Yes	32 (45.1%)	254 (57.6%)	21 (48.8%)	
Adjuvant hormonal therapy				
No	41 (58.6%)	142 (33.3%)	44 (97.8)	<0.001
Yes	29 (41.4)	285 (66.7%)	1 (2.2%)	
Recurrence				0.2
Locoregional	4 (5.6%)	7 (1.5%)	0 (0.0%)	
Contralateral breast	0 (0.0%)	4 (0.9%)	1 (2.2%)	
Distant	1 (1.4%)	6 (1.3%)	1 (2.2%)	
Death				
All	8 (11.3%)	41 (8.8%)	3 (6.7%)	
Breast cancer	1 (1.4%)	4 (0.9%)	1 (2.2%)	

*HR = hormone receptor

Conclusion: Patients with T1mi,a,bN0M0 invasive breast cancer have an excellent prognosis. The 3 molecular subtypes of T1mi,a,bN0M0 invasive breast cancer differed significantly in age, tumor size, and tumor grade, but had similar RR, DFS, and OS. Hormonal therapy use was strongly associated with improved DFS and OS, but chemotherapy was not. Tumor subtype may not influence recurrence and survival in such small early-stage tumors.

0360 - Incidence Rate and Outcomes for Palpable Ductal Carcinoma In Situ in the Contemporary Era

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Objective: Palpable ductal carcinoma in situ (DCIS) is known to be more aggressive than nonpalpable DCIS. With the advent of screening mammography, many DCIS cases are nonpalpable, but the incidence of palpable DCIS in underserved populations is not well described. We aimed to determine the incidence rate, local recurrence-free survival (LRFS), disease-free survival (DFS), and overall survival (OS) rates for palpable vs nonpalpable DCIS after controlling for relevant covariates.

Methods: We performed a retrospective single-institutional cohort study comparing palpable vs nonpalpable DCIS. We defined palpable DCIS as presenting with a breast mass in the absence of an a priori finding on screening mammography. We included newly diagnosed female DCIS patients treated between 2006 and 2013 at a large urban safety-net hospital for medically underserved populations. We excluded patients with concomitant invasive or microinvasive carcinomas that were detected either on core biopsy or definitive surgical treatment. Univariate analyses were performed using chi-square and the Kaplan-Meier method. For

multivariate analysis, we used the Cox proportional hazards model to evaluate association with LRFS, DFS, and OS.

Results: We identified 321 patients who met our inclusion criteria, the majority of which were of Hispanic background (66%). The median age was 51. Among these patients, 137 presented with palpable DCIS (42%) and 184 with nonpalpable DCIS (58%). Median follow-up time was 73 months. Univariate analysis showed that the proportion of local recurrences were higher in the palpable (n = 12, 8.6%) vs the nonpalpable cohorts (n = 9, 4.7%), p = 0.04. The rates of DFS were worse in the palpable (n = 120, 87%) vs the nonpalpable cohorts (n = 172, 93%), p = 0.04. The rates of OS were worse in the palpable (n = 125, 91%) vs the nonpalpable cohorts (n = 171, 96%), p = 0.04. Histology showed comedonecrosis for n = 87 (63%) of palpable DCIS vs nonpalpable DCIS (n = 62, 34%), p = 0.02. The results of our multivariate analysis for factors that were statistically correlated with LRFS, DFS, or OS in the palpable DCIS cohort are summarized in the table. Surgery type and receipt of radiation therapy were not statistically significant predictors and were excluded due to collinearity.

Multivariable Proportional Hazard Modeling Results

	Factor	HR	95% CI	P
LRFS	Age	0.9	0.75 to 0.99	.028
	ER-positive	0.91	0.74 to 0.99	.036
	Size of DCIS	1.96	1.67 to 2.37	.007
	Histology	1.66	1.48 to 1.92	.013
DFS	Age	0.73	0.55 to 0.86	.028
	ER-positive	0.86	0.53 to 0.91	.025
	Grade	1.66	1.05 to 2.0	.013
OS	Age	0.74	0.71 to 0.99	.028
	ER-positive	0.86	0.86 to 0.92	.025
	Receipt of endocrine therapy	0.87	0.67 to 0.93	.027

HR – hazard ratio, CI – confidence interval; LRFS – local recurrence free survival, DFS – disease free survival, OS – overall survival; ER – estrogen receptor, DCIS – ductal carcinoma in situ

Conclusion: Palpable DCIS occurred at a higher than expected rate in our study population at a safety-net hospital. Palpable DCIS was associated with worse LRFS, DFS, and OS. Comedonecrosis was the most common histology found in palpable DCIS. Our study confirms that palpable DCIS is a particularly aggressive subset of DCIS.

0176 - Is Routine Axillary Imaging Necessary in Clinically Node-Negative Patients Undergoing Neoadjuvant Chemotherapy?

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Objective: Current National Comprehensive Cancer Network guidelines recommend routine axillary imaging prior to neoadjuvant chemotherapy (NAC) in breast cancer patients considered clinically node-negative (cN0) by physical exam alone. Given that a major benefit of NAC is axillary downstaging, the role of axillary imaging in cN0 patients pre-NAC remains uncertain. The purpose of this study was to determine whether abnormal axillary imaging pre-NAC was predictive of nodal metastases post-NAC (ypN+) in cN0 patients.

Methods: cN0 patients undergoing NAC followed by sentinel node biopsy (SNB) or axillary lymph node dissection (ALND) were identified from a prospectively maintained database. Pathologic nodal status after NAC was assessed. ALND was performed for a positive sentinel node, T4 disease, failed mapping, or surgeon discretion. Rates of ypN+ and ALND were compared among patients with abnormal pre-treatment axillary imaging vs normal or no pre-treatment imaging using Fisher exact test.

Results: From 7/2008–9/2015, 259 cN0 patients received NAC followed by axillary surgery; 187 (72%) had SNB, 72 (28%) had ALND. Median age was 49 years; median tumor size was 4 cm. Forty percent were ER+/HER2–, 29% HER2+, and 31% triple-negative. All patients had pre-NAC mammogram, 26% axillary ultrasound (US), 85% MRI, and 51% PET. Abnormal nodes were seen in 97 patients (37%) by any imaging modality; pre-NAC lymph node biopsy was performed in 41 with negative (n = 39) or nondiagnostic (n = 2) results. Overall, 20% of cN0 patients were ypN+ after NAC with a median of 3 positive nodes (range, 1–15). The incidence of ypN+ was similar in patients with abnormal vs normal nodes by mammogram (p = 0.06), axillary US (p = 0.9), MRI (p = 0.2), or PET (p = 0.8) (table). Specifically, in the subset of patients who underwent axillary US, there was no difference in the incidence of ypN+ in patients with abnormal vs normal nodes (18% vs 22%). The presence of abnormal nodes on pre-NAC imaging did not make ALND more likely (p = 0.7).

Rates of ypN+ and ALND Among cN0 patients With Abnormal vs Normal or No Pre-Treatment Axillary Imaging

Imaging Modality	# of Patients (n = 259)	# Patients ypN+ (n = 52)	P value	ALND (n = 72)	P value
Mammogram			0.06		0.01
Normal nodes	236	51 (22%)		71 (30%)	
Abnormal nodes	23	1 (4%)		1 (4%)	
Axillary ultrasound			0.9		0.4
Normal nodes	27	6 (22%)		7 (26%)	
Abnormal nodes	40	7 (18%)		8 (20%)	
Not done	192	39 (20%)		57 (30%)	
MRI			0.2		0.1
Normal nodes	151	27 (18%)		39 (26%)	
Abnormal nodes	70	13 (19%)		17 (24%)	
Not done	38	12 (32%)		16 (42%)	
PET			0.8		1
Normal nodes	84	17 (20%)		23 (27%)	
Abnormal nodes	47	11 (23%)		14 (30%)	
Not done	128	24 (19%)		35 (27%)	
Any			0.7		0.7
Normal nodes	162	34 (21%)		47 (29%)	
Abnormal nodes	97	18 (19%)		25 (26%)	

ypN+, post-treatment nodal metastases; ALND, axillary lymph node dissection; cN0, clinically node negative; PET, positron emission tomography

Conclusion: Only 20% of cN0 patients were ypN+ after NAC. However, the presence of abnormal nodes on pre-treatment imaging in cN0 patients did not identify a group of patients who were more likely to be ypN+ or require an ALND after NAC; the routine use of pre-treatment axillary imaging in cN0 patients is not supported by this study.

0392 - Patient-Reported Satisfaction Following Oncoplastic Breast-Conserving Therapy

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Objective: Oncoplastic breast surgical techniques are becoming increasingly used to limit deformity in breast-conserving therapy (BCT) for breast cancer. We aimed to evaluate patient- reported satisfaction following breast-conserving level II oncoplastic techniques (reduction/mammoplasty techniques) in terms of patient satisfaction with cosmesis, as well as psychosocial and sexual well-being postoperatively.

Methods: This was a 5-year prospective study whereby patients who underwent BCT with the use of level II oncoplastic techniques were given the Breast-Q questionnaire postoperatively at 3 months. Clinical and pathological characteristics were identified from patient charts.

Results: Since 2010, a total of 802 patients underwent breast cancer surgery, of whom level II oncoplastic techniques were used in 130 (16%). A total of 88 patients completed Breast-Q questionnaires (response rate, 67.7%). Patient average age at the time of surgery was 59 years (standard deviation [SD] = 12.5 years). Tumor characteristics demonstrated a median T stage of 1 and a median N stage of 0. The average volume of breast tissue resected was 477.7 cm^3 (SD = 966.6 cm^3). Mean satisfaction with Breast-Q score was 75.1/100 (SD = 13.4) and satisfaction with nipples was 80.5/100 (SD = 22.7), while mean psychosocial well-being score was 85.4/100 (SD = 16.0) and sexual well-being was 65.7/100 (SD = 24.0).

Conclusion: Results demonstrate a high satisfaction in patients who underwent BCT aided by level II oncoplastic techniques on the Breast-Q patient-reported outcome measure. These findings demonstrate that oncoplastic breast-conserving therapy has an equivalent or higher satisfaction amongst patients when compared with those in the literature undergoing mastectomy and reconstruction. Further larger prospective studies comparing patient satisfaction of oncoplastic BCT to standard BCT and mastectomy with reconstruction are required.

0364 - Comparison of MammaPrint and BluePrint Genetic Signatures in Pre- and Post-Neoadjuvant Chemotherapy-Treated Breast Cancer

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Objective: Neoadjuvant chemotherapy (NCT) has been shown to clinically down-stage many large or locally advanced breast cancers. For patients who do not achieve a pathologic complete response (pCR), limited research has been performed to evaluate how NCT affects the gene signature profile on the residual tumor. The Neoadjuvant BReast Symphony Trial (NBRST) enrolled over 1,000 US breast cancer patients who received NCT between June 2011 and December 2014. MammaPrint (MP), BluePrint (BP), and TargetPrint were performed on all patients pre-NCT biopsy. A pilot group of 36 patients who did not achieve pCR had MP and BP signatures performed on their post-NCT breast tumor. The purpose of this pilot study is to determine if there is a meaningful difference in signatures between pre-NCT and post-NCT breast tumors.

Methods: The current analysis includes women from the NBRST study with histologically proven breast cancer who received neoadjuvant chemotherapy +/– trastuzumab, +/– pertuzumab. Pathological assessment of ER, PR, and HER2 was done according to ASCO CAP guidelines at the time of diagnosis. MP and BP assays were performed on both the pre-NCT and post-NCT breast tumor samples. The MP Index is a continuous score that is used to classify patients into high or low risk of distant metastases. In combination with MP, BP classifies patients into molecular subtypes: luminal A & B, HER2, or basal type. The Fisher exact test was used to compare outcome rates within different subgroups.

Results: Thirty-six patients with residual disease at the completion of NAC had their remaining cancer reanalyzed with MP and BP. Four of the 36 patients switched from MP high risk to MP low risk following NCT ($p < 0.001$). The change in MP Index following NCT also varied by molecular subtype. The average change in MP Index between pre- and post-treatment samples was an increase of 0.076 for luminal A (n = 12), 0.164 for luminal B (n = 12), 0.766 for HER2-type (n = 1), and 0.208 for basal type (n = 11). Overall, 4 post-treatment samples changed to luminal A subtype, 3 from luminal B ($p < 0.001$), and 1 from HER2 subtype before NCT.

		Pre-treatment		
Post-treatment	**MP Classification**	**MP Low Risk**	**MP High Risk**	**Total**
	MP low risk	12	4	16
	MP high risk	0	20	20
	Total	12	24	

Conclusion: This pilot study shows that NCT significantly changed MP risk classification in post-treatment tumors for patients of particular molecular subtypes, who did not achieve pCR. This finding suggests that the treatment may have eliminated the most susceptible tumor subclone or altered molecular characteristics of the remaining tumor. Further work will be performed to determine if the degree of change in MP Index correlates with reduction in tumor size. This correlation would allow MP to be used as a tool to monitor response to a particular therapeutic regimen in mid- and/or post-treatment samples.

0420 - NAPBC Accreditation Demonstrates Increasing Compliance With Postmastectomy Radiation Therapy Quality Improvement Measure

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Objective: The National Accreditation Program for Breast Centers (NAPBC) was established in 2008 by the American College of Surgeons as a quality improvement program for patients with breast disease. A quality measure exists within the standards of the NAPBC that every post-mastectomy patient with ≥4 positive lymph nodes should receive chest wall and regional lymph node radiation therapy. Our objective was to examine how NAPBC accreditation has affected compliance with this quality measure at individual centers, offering a first look at care delivered by NAPBC-accredited centers.

Methods: Women who underwent mastectomy at NAPBC-accredited centers were identified (2006–2013) in the NCDB. Centers that were accredited from 2009–2011 were included in the analysis. Patients were nested within centers using a mixed effects model to identify PMRT rates at each center prior to accreditation and after accreditation, adjusting for patient and tumor characteristics.

Results: Of the 18,754 patients who underwent mastectomy and had ≥4 positive lymph nodes at NAPBC centers, 12,614 (67%) received radiation at 386 centers. The median age was 58, 77% (n = 14,482) of the patients were white, 71% (n = 13,240) had invasive ductal carcinoma, and the median number of positive lymph nodes was 7 (IQR 5–12). The overall national trend of PMRT rates increased from 2006 to 2012 (≥4 positive lymph nodes, 57% to 71%). The baseline radiation rate among all NAPBC centers prior to accreditation was 62%. For each year of accreditation (2009–2011), centers had statistically significantly higher rates of radiation post-accreditation than pre-accreditation ($p < 0.001$). The rate of radiation increased post-accreditation in each accreditation year (2009, 61% to 72%; 2010, 64% to 71%; 2011, 62% to 70%). For each year post-accreditation, a center's radiation rate increased by an average of 7%. In an adjusted analysis, independent predictors of receiving radiation in patients with ≥4 positive nodes were age <60 years old (OR = 1.13; 95% CI, 1.06–1.21), lobular carcinoma (OR = 1.26; 95% CI, 1.17–1.33), ER-positive (OR = 1.16; 95% CI, 1.08–1.25)/PR-positive tumors (OR = 1.12; 95% CI, 1.05–1.19), and were treated at NCI centers (OR = 1.16; 95% CI, 1.06–1.27). Patients were significantly less likely to receive radiation if they had Medicare/Medicaid (OR = 0.79; 95% CI, 0.73–0.85), lived in the South (OR = 0.50; 95% CI, 0.44–0.57), or had a Charlson/Deyo score ≥2 (OR = 0.76; 95% CI, 0.63–0.93).

Conclusion: NAPBC accreditation is associated with higher PMRT rates and thus better adherence to the PMRT quality measure. Future studies with more centers and longer follow-up are needed to determine if this trend continues.

0276 - Preventative Health Maintenance and Screening Adherence Among Breast Cancer Survivors

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Objective: As breast cancer patients survive longer after diagnosis, they are at risk of other chronic diseases and cancers. To address this gap in survivorship care, a retrospective cohort of breast cancer patients treated at a single academic institution was examined for rates of health maintenance procedures. We compared

screening rates for common conditions between those with more aggressive tumor and staging characteristics to those with less aggressive tumors to determine if those with more aggressive cancers had lower rates of adherence.

Methods: All patients treated for invasive breast cancer from 1996 to 2013 with at least 30 days of follow-up in the health system were included. Patients with advanced cancers were defined as those with stage III or higher. High-risk tumor markers were hormone receptor negative and Her2 positive. For the primary analysis, overall adherence was defined as at least 3 of 5 health maintenance procedures. For the secondary analysis, individual rates were examined for influenza vaccination, Pap smear testing, colon cancer screening, DEXA, and mammography. Groups were analyzed using Fisher exact test.

Results: One thousand one hundred fifty-eight patients met inclusion criteria. The mean follow-up time was 63 months. Patients with lower stage cancers were more likely to engage in health maintenance ($p = 0.03$). Of all health maintenance procedures, patients were most likely to have had contralateral breast screening (777 of 1158 patients [67%]). Patients with less advanced tumors were more likely to have mammography ($p < 0.001$). Patients with hormone receptor–positive tumors were more likely to undergo mammography ($p = 0.01$) than those with hormone receptor–negative tumors. Three hundred two of 1158 (26%) patients engaged in colon cancer screening. There was no statistically significant correlation between tumor stage and likelihood of screening. A marginal association was observed between patients with hormone receptor–positive tumors and likelihood for colon cancer screening ($p = 0.06$). For influenza immunization and Pap smear screening, 306 and 349 of 1158 (26 and 30%, respectively) were screened. There were no statistically significant associations between stage and the likelihood of undergoing these screenings.

Conclusion: Patients with higher stage cancer and more aggressive tumor characteristics were less likely to engage in health maintenance. Similar to the general U.S. population, health maintenance adherence varied depending on type of intervention and was overall low. Although this study has a limited sample size and is limited to a single academic institution, these results help expose a clear gap in health maintenance care for breast cancer survivors. Continued research to examine the interaction between survival time, disease recurrence, and patient preference is warranted to explore how these may affect adherence to screening recommendations and overall survivorship.

0279 - Use of Hydrogel-Based Clip for Localization of Nonpalpable, Ultrasound-Visible Breast Lesions Reduces Need for Needle Localization

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Objective: Preoperative wire placement is the standard technique currently employed for localization of nonpalpable breast lesions. However, this technique requires an additional procedure and has the drawbacks of scheduling difficulties, significant patient discomfort, and risk of additional complication. This study examines the use of an ultrasound-visible clip (HydroMARK®) to localize nonpalpable breast lesions. The objective is to determine whether use of this clip reduces need for needle localization, and what effect the technique has on margin positivity.

Methods: As part of a performance improvement project, a retrospective chart review was performed on all patients with ultrasound-visible, nonpalpable breast lesions who underwent lumpectomy between January and October of 2015. The 7 operating surgeons across 4 Kaiser Northern California surgical centers identified for each case the type of localization, pathology and margin results, volume of tissue excised, and time from biopsy to surgery in patients who received neoadjuvant therapy.

Results: Charts were reviewed for the 171 patients who underwent lumpectomy for ultrasound-visible lesions between January and October of 2015. Type of localization for surgery fell into 3 categories: localization by ultrasound alone (USL), localization by skin marking (SM), or needle localization (NL). NL was performed

under either mammogram or ultrasound guidance. Only 23.4% of patients required NL, while 76.6% of patients with ultrasound-visible lesions required no needle localization procedures (14.0% SM and 62.6% USL). Margin positivity rate was 6.4% overall. Margins were positive in 5.4% of non-NL patients vs 11.1% in the NL group, a nonsignificant difference (p = 0.27). The volume of tissue excised was found to be lower in USL patients than NL patients, though this difference also did not reach statistical significance (92.9 vs 104.8 cm^3, p = 0.29). Notably, the hydrogel clip migrated in only 3 cases (1.8%). There were 11 patients who had undergone neoadjuvant chemotherapy, with an average of 182 days between clip placement and surgery. In 82% of these patients, no NL was necessary. The mean time from biopsy to surgery was significantly longer among those requiring NL at 215 days vs 174 in non- NL patients (p = 0.005).

Conclusion: Hydrogel-based clip is a useful localization technique which reduces the number of wire localization procedures required in nonpalpable, ultrasound-visible breast lesions. We found no statistically significant difference in positive margins rates among patients with NL vs no NL. When examined across multiple centers with a range of practice settings, this technique shows great potential to become the standard localization method in this subset of patients. The technique also shows promise in patients who receive neoadjuvant therapy.

0421 - Clinicopathological Characteristics of Nipple Discharge–Associated Breast Cancer

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Objective: Previous studies indicated that breast cancer associated with nipple discharge presents mostly as early breast cancer. The aim of the current study was to determine the clinicopathological features and molecular profiles of patients diagnosed with breast cancer presenting with pathological nipple discharge (PND).

Methods: Between January 1993 and April 2015, 132 patients diagnosed with breast cancer associated with pathologic nipple discharge were identified from 3 different cohorts. Clinicopathological characteristics were analyzed, including tumor type (ductal carcinoma in situ vs invasive cancer) and molecular subtypes (luminal A, B, nonluminal HER2-neu, and triple-negative type), according to the St Gallen Breast Cancer Conference 2015 criteria.

Results: Median age was 50 (28–83). Of 132, there were 5 male breast cancers. Cancer diagnosis was made by fine needle aspiration or US/MRI-guided core biopsy (n = 54, 42.2%), by stereotactic biopsy (n = 3, 2.3%), by excisional biopsy in 64 patients (wire-localized, n = 14, 10.9%; ductoscopy-guided, n = 22, 17.2%; other, n = 28, 21.9%) or by incisional/punch biopsy (n = 7, 5.5%). Fifty-four patients (41%) underwent breast conservation, whereas mastectomy was performed in the remaining 78 patients (59%) with (n = 80, 60.6%) or without (n = 52, 39.8%) sentinel lymph node biopsy. After final pathology, the majority of the patients were found to have ductal carcinoma in situ (DCIS) (n = 35, 26.5%) or 54 patients stage 1 cancer (40.9%), whereas 38 patients were diagnosed with stage 2 disease (28.8%) or 5 patients (3.8%) with stage 3 disease. The molecular subtypes of invasive cancer of 71 patients were as follows: luminal A (n = 35, 49.1%), luminal B (n = 23, 32.4%), nonluminal HER2-neu (n = 6, 8.5%), and triple-negative (n = 7, 9.9%). The majority of tumors were estrogen (77.1%) and/or progesterone receptor–positive (70%) and had low (≤20%) Ki-67 levels (61.5%), whereas 17.6% of patients were found to have HER2-neu positivity. Patients with invasive cancer were more likely to have a serous/bloody nipple discharge (invasive cancer, 88%, vs other, 70%, p = 0.026) and a malignant cytology (invasive cancer, 33.3%, vs other, 11.1%, p = 0.038), compared to patients with

DCIS or DCIS and micro-invasion (n = 9). The median follow-up time was 32.5 months (6–135 months). In Kaplan-Meier survival analyses, 5-year disease-free survival rates were 82% and 92.6% in patients with DCIS/DCIS and micro-invasion and invasive cancer, respectively, whereas 5-year disease-specific survival rates were 100% in patients with DCIS/DCIS and micro-invasion and 98.6% in patients with invasive cancer, respectively.

Conclusion: Breast cancer associated with nipple discharge presents mostly with DCIS and early invasive breast cancer with a luminal A molecular subtype. The excellent clinical outcome might be therefore due the tumor biology associated with good prognostic biomarkers.

0414 - The Added Value of Radiology Reviews: Additional Cancers and Avoiding False Positives

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Objective: At our institution, it is standard practice to review all outside radiological breast imaging prior to patients undergoing image guided biopsies or surgery. To date, there is limited data in the literature examining the change in management as a result of these reviews. This study was undertaken in order to examine the effect of these radiology reviews on clinical management.

Methods: A retrospective chart review of all imaging consultations from January 1, 2013, to June 30, 2015, was performed. This study includes 304 women who had outside mammograms and breast ultrasounds re-read by dedicated breast imagers at our institution. Sixteen patients were lost to follow-up and therefore excluded from the study. With respect to the initial outside report, the consultation reports were then classified as concordant, with no further work up needed, or as discordant, with additional imaging and/or biopsy recommended. If a biopsy was performed, the results were then grouped based on the final pathology findings.

Results: A total of 304 women were included in this study. Of these women, 242 (79.6%) had no change in their management and 62 (20.4%) had a change in their work-up. This included 26 (8.6%) women who were initially BIRADS 4 and after additional imaging were spared an image guided biopsy. An image guided biopsy was performed in 11 women (3.6%) and pathology was benign. Additional imaging followed by an image guided biopsy with a high risk finding was diagnosed in 10 women (3.3%). New or additional areas of breast cancer were identified in 15 women (4.9%) who underwent a biopsy, based on our additional imaging and recommendation. Of these 15 women, 3 (20%) had a new diagnosis of contralateral breast cancer.

Results	# of Studies
No change	242 (79.6%)
Downgrade	26 (8.6%)
Biopsy - benign pathology	11 (3.6%)
Biopsy – high-risk pathology	10 (3.3%)
Biopsy - additional cancer	15 (4.9%)
Total	304

Conclusion: Based on official review of breast imaging and additional evaluation, 26 (8.6%) women did not have a biopsy as originally recommended by an outside facility. This avoided a false positive finding in a substantial number of women. Additional areas of breast cancer, both ipsilateral and contralateral, were diagnosed in 4.9% of patients. Review by dedicated breast imagers should be strongly considered and incorporated into practice based on the fact that overall management was changed in 16.8% of women.

0416 - Cryoablation for Breast Cancers Less Than 1.5 cm: An Early Update on the ICE3 Trial Recruitment and Short-Term Follow-Up

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Objective: Cryoablation has been shown to be effective in eliminating small breast cancers, as demonstrated in ACOSOG 1072. Cryoablation is an office procedure that percutaneously destroys malignant lesions by exposing them to extremely low temperatures. It eliminates the need for general anesthesia, thus making it ideal for patients who desire a less invasive approach to breast cancer treatment and those with multiple co-morbidities.

Methods: The ICE3 trial is currently enrolling patients at 14 sites nationwide. This trial is predicated on the ACOSOG 1072 trial, which found that 100% of breast cancers treated with cryoablation less than 1 cm in size were successfully ablated. In this trial, the tumors were treated initially with cryoablation and then surgically excised. The ICE3 trial eliminates surgical excision. Eligibility criteria include tumors less than 1.5 cm in size, patients aged 65 and older, estrogen and/or progesterone–positive, and HER2-negative and clinically negative lymph nodes.

Results: Thus far, 41 patients with low-risk breast cancer have been treated with cryoablation on the ICE3 trial. The mean age of these patients was 76.1, with a range of 66 years to 90 years. The mean tumor size was 0.87 cm in the sagittal dimension, with a range of 0.3 cm–1.4 cm. All patients were estrogen receptor (ER) positive, and 94.7 % were progesterone receptor (PR) positive. All patients were HER2-negative on either IHC or FISH. Patients have reported excellent cosmesis. Their distress levels were assessed on the NCCN Distress Thermometer and found to be low/medium at the time of the procedure and low at 6 months' follow-up. Twenty-two patients have been followed for more than 6 months. The longest follow-up is 12 months (n = 1). To date, with this short-term follow-up, there are no recurrences. Adjuvant treatment is at the discretion of the treating physician, according to the protocol. No patients have undergone adjuvant radiation, and no patients received chemotherapy. Sentinel node biopsy is at the discretion of the treating surgeon. Three patients have undergone sentinel node biopsy. One patient had positive sentinel nodes. No serious complications or adverse events have been reported so far.

Conclusion: According to this interim review of the data for the ICE3 trial, cryoablation offers relatively small subprocedure risks to the subjects with the benefits of a minimally invasive alternative to surgical treatment of early-stage, low-risk breast cancer. Continued enrollment of patients in ICE3 trial to a goal of 160–200 participants for the largest validated breast cancer, liquid nitrogen–based cryoablation database with long-term follow-up in this population.

0209 - Tumor Board Review Impacts NCCN Guideline Concordance for Breast Cancer Patients

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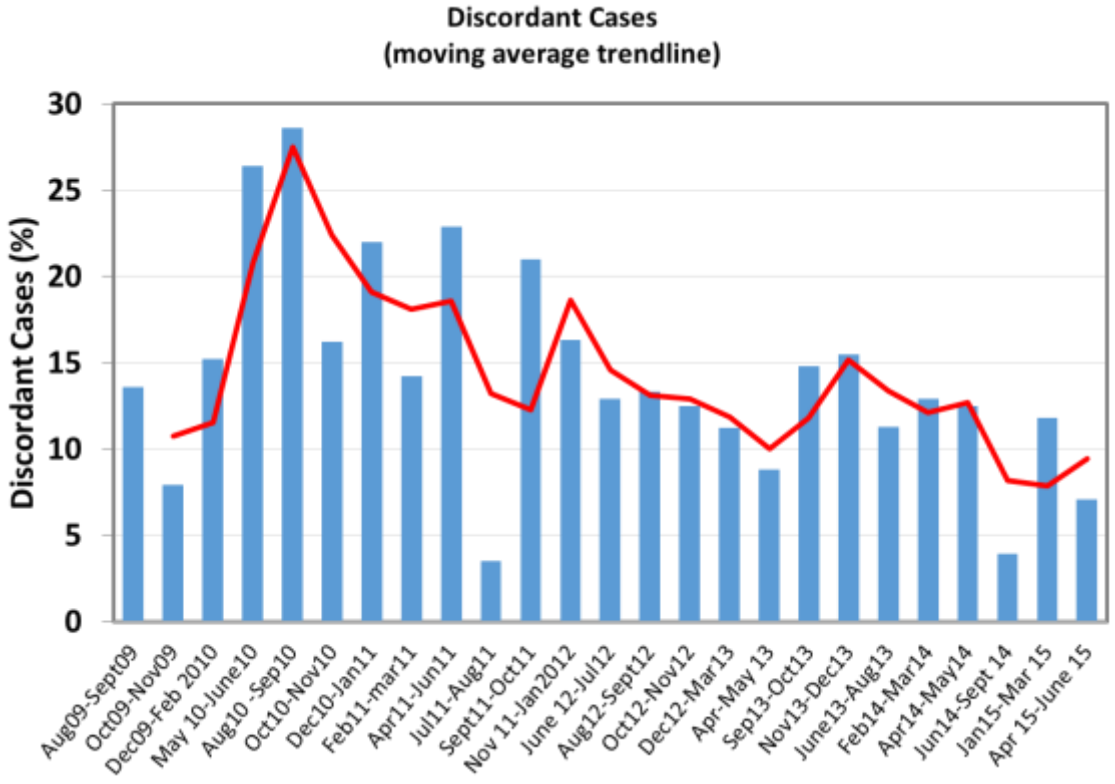
Objective: Plans of care for breast cancer patients can have high variability due to factors such as patient preference, comorbidities, and physician choice. We implemented a multidisciplinary case review of 100% of all NCCN (National Comprehensive Cancer Network) guideline discordant cases over a 6-year period at regular breast tumor boards with hopes to minimize discordance in treatment plans.

Methods: Using a novel data collection process, all Michigan Breast Oncology Quality Initiative (MiBOQI)–eligible patients (newly diagnosed breast cancer patients ages 18–99 receiving any combination of therapy except radiation alone and neoadjuvant chemotherapy), were reviewed for NCCN guideline concordance monthly to quarterly. 69.8% of patients with breast cancer in our Cancer Registry (1103/1578) were MiBOQI-

eligible and reviewed during this time period. If a patient was considered discordant, an email was sent to the primary oncology physician to notify them of the issue. Each discordant case was individually presented at the multidisciplinary tumor board for discussion, facilitating open dialogue, transparency, and education about proper NCCN guideline adherence.

Results: From August 2009 to March 2015, 1103 eligible cases were reviewed with a total of 153 discordant cases (13.9%). The 2 most common reasons for discordant care were: patient refusal of treatment (24%) and omission of care in elderly/severe comorbid patients (21%). There were 13% of discordant cases related to variations in chemotherapy treatment and 1% due to breakdown in care coordination. Overall, discordant case volume showed a significantly decreasing trend over time ($p < 0.001$) with medically preventable reasons for discordance minimized or eliminated. Notable outcomes included a QI project to minimize incorrect menopausal status coding, eliminating this as a discordant variable; eliminating delays in administration of hormone therapy for patients receiving trastuzumab; a reduction of frontline systemic chemotherapy in metastatic patients; as well as a reduction in total axillary nodal surgery.



Conclusion: Regular systematic review of NCCN guideline discordant cases at multidisciplinary tumor boards decreases variability in care delivery and improves adherence with NCCN guidelines. Investing time and resources toward meaningful data abstraction in short time intervals can positively impact patient care quality.

0423 - Impact of the Timing of Diagnosis of Genetic Mutation on the Choice of Surgical Procedure in BRCA1/BRCA2 Mutation Carriers With Breast Cancer

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Objective: BRCA mutation carriers are at increased lifetime risk of developing breast cancer. Deleterious BRCA mutation status can influence surgical treatment decisions when diagnosed with breast cancer. We sought to evaluate how the surgical decisions of BRCA mutation carriers diagnosed with breast cancer varied, based on knowledge of BRCA status at time of cancer diagnosis.

Methods: With IRB approval we reviewed all BRCA carriers at our institution who were diagnosed with breast cancer between 01/1996 and 06/2015. Patient surveys, medical record review, and institutional databases were used to identify breast operation performed for the index breast cancer, timing of BRCA test result relative to breast cancer surgery, and outcomes. Differences in surgical choice were analyzed using a chi-square test, and the Kaplan-Meier method was used to estimate breast cancer–free survival.

Results: Of 184 BRCA carriers (102 BRCA1, 82 BRCA2), index breast cancer was unilateral in 170 (92%) and bilateral in 14 (8%). Median age at cancer diagnosis was 45 (range, 21–78) and at BRCA+ identification was 46.5 (range, 12–79). Clinical stage was 10%, stage 0; 34%, stage 1; 30%, stage 2; 22%, stage 3; and 4%, stage 4. Twenty-four (13%) were known BRCA carriers who subsequently developed breast cancer, 86 (47%) were identified BRCA+ at time of cancer diagnosis, 72 (40%) had BRCA+ status identified after definitive breast cancer surgery, and timing was unclear in 2 patients. For women with known BRCA mutation prior to surgery, 14% underwent lumpectomy, 14% unilateral mastectomy, and 73% bilateral mastectomy, which differed significantly ($p < 0.0001$) from initial surgery choice in those whose BRCA mutation was not identified until after surgery (57%, lumpectomy; 25%, unilateral mastectomy; 18%, bilateral mastectomy). In patients with BRCA mutation identified after surgery who had breast(s) remaining, 11/35 (31%) ultimately underwent bilateral mastectomy for risk reduction. During a median follow-up of 3 (range, 0–20) years among patients with stage 0–3 disease, there were 15 local-regional recurrences, 12 distant recurrences, and 15 new contralateral primary breast cancers for a 5-year breast cancer–free survival estimate of 81% (95% CI,75%–89%).

Conclusion: BRCA-positive mutation status influences surgical decision-making. Rates of bilateral mastectomy were significantly higher in patients with known BRCA mutation. Identification of BRCA mutation after definitive surgery leads to a surgical management in a delayed setting. This study supports the importance of genetic testing prior to definitive surgical treatment of breast cancer in patients at elevated risk of deleterious BRCA mutation.

0231 - Should Repeat HER2 Testing Be Done on the Surgical Specimen?

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Objective: Breast cancer biomarkers allow for directed and effective medical therapy. Tumor heterogeneity and unreliable core needle biopsy testing may lead to inaccurate biomarker profiling and ineffective therapy. HER2 has been identified as a biomarker which displays variable activity in the core needle biopsy. To identify discordance in HER2 levels between initial diagnostic core needle biopsy and surgical specimens in a high-risk population of women with breast cancer.

Methods: A prospective study at a single institution of newly diagnosed breast cancer patients presenting with HER2-negative disease on core biopsy and meeting ≥1 of the following criteria: tumor size >2 cm, multifocal, or multicentric. Patients were excluded for receipt of neoadjuvant chemotherapy. HER2 testing was repeated on surgical specimens (breast and/or lymph node[s]) of enrolled patients, and comparison was made to HER2

testing from the core biopsy. The protocol specifies recruitment of 110 patients; we report an interim analysis of the first 45 patients enrolled (April 2014–October 2015).

Results: Forty-five patients were included. Forty-four patients (98%) had HER2-negative disease on re-testing of breast (n = 94) and nodal (n = 16) specimens, concordant with initial HER2 results. One patient (2%; 95% CI, 0%–13%) had a HER2-positive surgical specimen, discordant from her core biopsy. This patient's preoperative breast core biopsy showed infiltrating ductal carcinoma (IDC), grade III; ER, 100%; PR, 98%; HER2, 1+; and Ki-67, 85%. Preoperative lymph node core biopsy showed metastatic IDC. Pathology from modified radical mastectomy revealed multifocal IDC (3.5-cm main tumor with 8 satellite lesions), grade III, and metastatic carcinoma in 11/22 lymph nodes. Three foci in the mastectomy specimen and 1 metastatic axillary lymph node underwent HER2 IHC and FISH testing. The results were IHC 1+ but FISH positive; FISH testing was performed in error on this patient. Tumor heterogeneity was not identified in any patients on hematoxylin and eosin staining.

Conclusion: The incidence of HER2 discordance between core biopsy and surgical specimen was low (2%), but the confidence interval overlaps with the expected 6% based on previous literature. A significant discordance does not appear to exist between HER2 levels expressed in the diagnostic core needle biopsy and surgical specimen. Limitations of this study are the lack of patients with tumor heterogeneity and small sample size. Repeat HER2 testing on the surgical specimen will likely not alter treatment planning for the majority of patients.

0244 - Reporting Guidelines Improve Information in Axillary Ultrasound Reports

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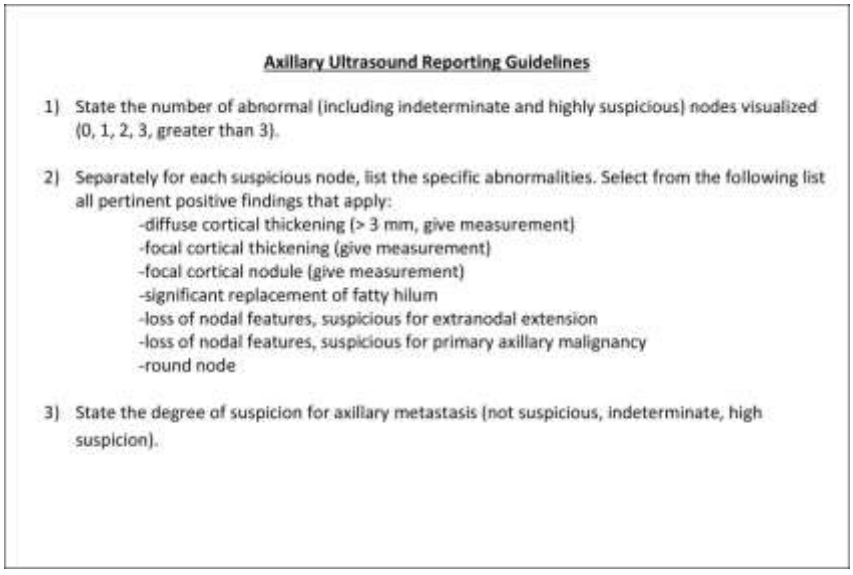
Objective: We have previously shown that negative axillary ultrasound (AUS) predicts a very low likelihood of heavy nodal disease burden. However, our analysis of the significance of positive findings on AUS has been hampered by inconsistent reporting of abnormalities. In November 2014, our institution implemented AUS reporting guidelines (figure). To identify differences in historical AUS reports generated without guidelines, compared to reports generated retrospectively using institutional AUS reporting guidelines.



Methods: A retrospective analysis was performed at a single institution of consecutive newly diagnosed breast cancer patients from February 2011–October 2014 with suspicious or indeterminate AUS. Patients were excluded for receipt of neoadjuvant chemotherapy or clinically palpable axillary adenopathy. Static images from all identified ultrasounds were retrospectively reviewed by a single fellowship-trained breast radiologist using institutional reporting guidelines. For each patient, a comparison was made between the initial ultrasound report and the revised guideline-based report. An increase in precision was defined as a change from the characteristics of cortical thickening not otherwise specified, enlarged node, or abnormality not otherwise specified, to another characteristic found in the guidelines, including focal cortical thickening, focal cortical nodule, or loss of fatty hilum.

Results: One hundred fourteen patients with suspicious or indeterminate axillary ultrasound reports were identified. After 9 patients with insufficiently recorded ultrasound images were excluded, 105 patients were included in the analysis. Fifty-four patients (51%) had no change in ultrasound report. Fifty-one patients (49%) had changes in the ultrasound report. Thirty-nine (37%) patients had ultrasound reports that became more precise. Of the patients who had a change in content, 76% of these became more precise.

Conclusion: Reporting guidelines for axillary ultrasounds have the potential to make reports more precise. This may allow for better prediction of the likelihood of nodal positivity. Improved preoperative nodal staging may allow for better treatment planning, for example by identifying candidates for neoadjuvant chemotherapy or predicting the likelihood of postmastectomy radiation. This study is limited by its retrospective nature; reviewed images were static so it was impossible to comment on the number of suspicious lymph nodes or ensure that all suspicious features were identified.

0239 - The Effect of Marital Status on Breast Cancer–Related Outcomes in Younger Women

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Objective: Marital status has been shown to affect outcomes in patients with multiple different types of malignancy, including breast cancer–related outcomes in women over the age of 65. The purpose of this study is to investigate the effect of marital status on diagnosis, treatment, and survival of women with breast cancer under the age of 65.

Methods: The SEER database was queried for all women 25–65 years of age diagnosed with an invasive breast cancer from 2010–2012. Age, race, stage at diagnosis, insurance status, education level, median income, breast cancer subtype, tumor grade, and choice of breast operation were collected and compared according to marital status. Chi-square analyses were used to identify associations between marital status and the remaining variables. Multivariate logistic regression analyses were used to predict stage at diagnosis according to marital status. Cox proportional hazards models were used to compare breast cancer survival rates according to marital status.

Results: The sample consisted of 81,964 women aged 25–65 years of age who were diagnosed with invasive breast cancer between 2010 and 2012. Unmarried women were more likely to be uninsured, present at a higher overall and T-stage, have a triple-negative phenotype, and have a poorly differentiated tumor. There was no statistically significant difference in breast operation chosen according to marital status. Despite controlling for stage, age, race, insurance status, tumor phenotype, median income and education level, unmarried women were at an increased risk of death from breast cancer than married women (HR, 1.453; 95% CI, 1.317–1.604).

Conclusion: Previous research has shown improved breast cancer–related outcomes based on marital status in women over the age of 65. However, there is no evidence examining this association in women under the age of 65. Our results demonstrate that unmarried women between the ages of 25 and 64 are more likely to present with more advanced disease and have a statistically significant higher risk of death from breast cancer, even after controlling for age, stage, race, tumor phenotype, median income, education level, and insurance status. The results of this study suggest that attention should be paid to marital status in women aged 25–64 years of

age at the time of a breast cancer diagnosis so that the appropriate resources can be mobilized and implemented. Based on this data, unmarried women with breast cancer may benefit from additional counseling, psychosocial support, and case management at the time of diagnosis to ensure their overall outcomes are optimized.

0323 - Utility of Screening MRI in Women With a Personal History of Breast Cancer

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Objective: The optimal surveillance regimen for women with a personal history of breast cancer has not been well established and the role of MRI remains to be determined. MRI as a screening tool for women with a personal history of breast cancer in this setting may lead to earlier stage at detection and offer an improved survival benefit, but may also lead to increased number of unnecessary biopsies. We sought to determine the positive predictive value of biopsy in women with a positive personal history of breast cancer screened with MRI.

Methods: This retrospective review identified patients with a personal history of breast cancer who underwent screening MRI in addition to routine follow-up from 2007 to 2015. Total number of biopsies, biopsies due to MRI, and subsequent breast cancers were examined.

Results: The average age of patients in our study was 50.3 (range, 30.5–76.8). Of the 186 patients identified who had 491 screening MRI examinations, 44 patients (23.7%) had DCIS on initial histologic diagnosis and 142 patients (76.3%) had invasive cancer. The average length of follow-up was 77 months and average number of screening MRIs during the study period was 2.64 per person. A total of 107 biopsies were performed in 74 patients, an average of 0.09 biopsies per person year. Of these, 34 (32%) were due to MRI findings alone. The PPV for biopsies prompted by MRI findings was 0.24 (95% CI, 0.10–0.38). Patients with a personal history of invasive cancer were more likely to have positive biopsy results when compared to patients with a history of DCIS (PPV, 0.25 [95% CI, 0.09–0.41] vs 0.17 [95% CI, 0.13–0.47]). Ten of the 142 patients (7%) with a history of invasive cancer had a subsequent breast cancer (5, local recurrence; 1, ipsilateral new primary; 2, contralateral; 2, metastatic). Of the 8 breast tumors, 5 were invasive and 3 were DCIS. Four of the 8 (50%) subsequent breast cancers were identified on MRI alone. One of the 44 patients (2%) with initial DCIS had a subsequent breast cancer. This patient had local recurrence as invasive ductal carcinoma found exclusively on MRI.

Conclusion: The majority of biopsies performed in women with a personal history of breast cancer undergoing screening MRI in conjunction with routine follow-up are not due to MRI-only findings. However, of the patients with a history of invasive breast cancer that were found to have a local recurrence or new breast cancer, 50% were identified by MRI alone. The PPV for patients undergoing biopsy prompted by MRI findings was significant for patients with a history of invasive cancer, but not for those with history of DCIS in this patient population.

0292 - Oncologic Safety of Nipple-Sparing Mastectomy in Women With Breast Cancer

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Objective: Nipple-sparing mastectomy (NSM) is being performed in an increasing number of women with breast cancer. There are limited data regarding the oncologic safety of this procedure.

Methods: Review of oncologic outcomes of consecutive therapeutic NSM from 2007–2012 at a single institution. Nipple-sparing mastectomy was offered to patients with no radiologic or clinical evidence of nipple involvement.

Results: Among 312 NSMs performed in 301 patients (table), 240 were for invasive cancer and 72 for ductal carcinoma in situ (DCIS). Thirty-three patients (11%) were documented mutation carriers (20, BRCA1; 10, BRCA2; 2, p53; 1, PTEN). Mean patient age was 48 years (range, 28–78). Ninety-two percent of patients were white. Twenty-two patients (7%) received neoadjuvant chemotherapy and 95 (32%) received adjuvant chemotherapy. Fifty-six breasts (18%) received postmastectomy radiation. One hundred seventy-four patients with invasive cancer and 3 patients with DCIS received endocrine therapy. At 38 months median follow-up (range, 2–93), there were 4 (1.3%) isolated chest wall recurrences, 1 (0.3%) simultaneous chest wall and regional nodal recurrence, 4 isolated regional nodal recurrences (1.3%), and 5 (1.6%) distant recurrences. No recurrence involved the retained nipple areola complex. Three of the 5 chest wall recurrences occurred in mutation carriers (2 in the same p53 patient with bilateral cancers, 1 in a BRCA1 patient), and 1 chest wall recurrence occurred in a patient who declined endocrine therapy. There were 2 cancer-related deaths in patients who developed isolated distant recurrences.

Patient and Tumor Characteristics

Patient characteristics	
Mean patient age	48 years (28–78)
Mean body mass index	24.1 kg/m^2 (17.8–41.7)
Mean calculated breast volume	479 cm^3 (54–1586)
Cancer details	
Mean invasive tumor size*	1.5 cm (0.05–6.0)
Tumor grade (n = 312)	
1	36 (11.5%)
2	164 (52.6%)
3	98 (31.4%)
Unknown	14 (4.5%)
Cancer stage (n = 283)*	
0	72 (25.4%)
1	133 (47.0%)
2	54 (19.1%)
3	18 (6.4%)
Unknown	6 (2.1%)
Receptor profile, invasive cancer (n = 240)	
ER+, PR+/–, HER2-	181 (75.4%)
ER+, PR+/–, HER2+	24 (10.0%)
ER–, PR–, HER2–	26 (10.8%)
ER–, PR–, HER2+	7 (2.9%)
Unknown	2 (0.8%)
Receptor profile, DCIS (n = 72)	
ER+	64 (88.9%)
ER–	5 (6.9%)
Unknown	3 (4.2%)

*Excluded breasts with neoadjuvant chemotherapy.

Conclusion: Rates of locoregional and distant recurrence are low after nipple-sparing mastectomy in patients with DCIS and invasive carcinoma. No patient in our series has had a recurrence involving the retained nipple areola complex.

0167 - Effects of Obesity and Overweight on Survival in Patients With Breast Cancer

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Objective: The bodyweight, defined by BMI (body mass index), is an important risk factor influencing the development of breast cancer, mainly in women during the postmenopausal period. Moreover obesity seems to reduce overall survival in breast cancer patients.

Methods: From February 2010 to December 2014, 93 breast cancer patients with BMI > 25 were surgically treated in our breast unit. All patients were female. We analyzed the clinical and pathological aspects, the outcome, and the follow-up.

Results: Twenty-six patients (24%) of the 93 analyzed were obese at diagnosis with BMI > 30; 6 were class III obese. The average age was 63 years (32–85 years). Fifty-six patients underwent quadrantectomy. In 82 patients sentinel lymph node biopsy was performed; of these, 15 underwent axillary lymph node dissection with an average of 21 lymph nodes removed. Thirty-seven patients underwent mastectomy with a simultaneous plastic reconstruction in 10 patients. Thirty-three patients (30%) had a tumor greater than 2.5 cm, unifocal in most cases. The histological type was ductal carcinoma in 78 patients, 15 patients had lobular carcinoma. The grading was G2 in most cases (72%). Twenty-nine patients received adjuvant chemotherapy. The most frequent comorbidities were cardiovascular diseases and diabetes mellitus type II. The median follow-up was 48 months. During this period we observed 3 locoregional recurrences, 4 systemic recurrences, and 3 deaths.

Conclusion: Obesity seems to be a significant risk factor concurring in the development of breast cancer, and in many literatures it is associated with a worse prognosis. It is suggested that reduction of obesity can decrease breast cancer cases by one tenth in Europe with a consequent reduction in mortality. Our results confirm that obesity is a negative factor. Since obesity is a risk factor modifiable throughout life, we hope that health education programs will be planned to address the rising problems of obesity and breast cancer.

0290 – Establishing a "New Normal": A Qualitative Exploration of Women's Body Image After Mastectomy

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Objective: Rates of unilateral mastectomy (UM) and contralateral prophylactic mastectomy (CPM) for early-stage breast cancer (ESBC) have been increasing. Concurrently, an increase in the rates of immediate breast reconstruction has also been described. However, not all women who undergo mastectomy undergo reconstruction. We wished to explore women's perceptions of body image after UM +/– CPM, and to understand decision-making around the choice for breast reconstruction.

Methods: We previously described the surgical decision-making process of women with ESBC who chose UM +/– CPM. As part of this process we wished to explore the meaning that reconstruction holds for these women and their postoperative experiences. Purposive sampling was used to identify women with ESBC who underwent UM +/– CPM across the Toronto (Ontario, Canada) area. Patients varied in their age, location of

treatment, and extent of surgery. Data were collected through semistructured interviews. Constant comparative analysis identified key concepts and themes.

Results: Data saturation was achieved after 29 in-person interviews. Fifteen women underwent UM; 14 underwent UM + CPM. Eleven women underwent reconstruction; 8 underwent UM + CPM and 3 underwent UM alone (table). Four patients were awaiting reconstruction (2 UM + CPM, 2 UM). Median age was 55. Establishing a new "normal" was the dominant theme. All women, whether they had immediate or delayed or did not undergo breast reconstruction, described their immediate postoperative period as a time of "disfigurement" and/or "loss." Women felt that within society breasts define women as "feminine" and "normal." In contrast, postmastectomy women were seen as "abnormal" or "ill." For some women, appearing "normal" was achieved through reconstruction. For those who did not want reconstruction, this was equally achieved through the use of prostheses. Reasons for choosing reconstruction included becoming "almost normal" and desiring symmetry/balance. Reasons women did not choose reconstruction included not wanting further surgery, wanting to "move on" with their lives, and satisfaction with prostheses. With or without reconstruction, most women continued to experience some degree of self-consciousness, which they addressed through "camouflaging" with clothing. Some women were bothered by ongoing changes in skin sensation and postsurgical pain. Despite these concerns, no woman voiced regret around her decision for mastectomy +/– reconstruction. The only women who expressed dissatisfaction were those awaiting reconstruction.

Patient Characteristics

	Reconstruction	No Reconstruction
Location of surgery		
Academic cancer center	5	7
Academic non–cancer center	3	3
Community center	3	8
Extent of surgery		
Unilateral mastectomy • Immediate reconstruction • Delayed reconstruction	4 (4) (0)	12 (2 awaiting reconstruction)
Unilateral mastectomy and contralateral prophylactic mastectomy • Immediate reconstruction • Delayed reconstruction	7 (3) (4)	6 (2 awaiting reconstruction)
Disease stage		
Stage 1	5	10
Stage 2	6	8

Conclusion: Most women who chose to undergo mastectomy described "establishing a new normal" after their surgery. These findings are important as despite choosing mastectomy, with or without reconstruction, most women experienced some degree of self-consciousness. While women reflected that they were not completely satisfied with their new body image, no woman regretted the extent of surgery, except those waiting for breast reconstruction.

0185 - Invasive Lobular vs Invasive Ductal Carcinoma: Are They Different?

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Objective: Invasive lobular carcinoma represents about 10% of invasive breast cancer. The remainder are predominantly invasive ductal carcinomas. Invasive lobular cancers are typically more difficult to diagnose by clinical examination and mammography. This study details the demographics and clinical outcomes when invasive lobular and ductal carcinomas are compared.

Methods: A prospective database containing 4,363 women with invasive breast cancer diagnosed between 1979 and 2015 was analyzed. Variables studied included age, tumor size, nuclear grade, palpability, hormone receptor status, HER2, the presence of lymphovascular invasion (LVI), node positivity, and molecular subtype. The patients were subdivided into invasive ductal carcinoma (n = 3858) and invasive lobular carcinoma (n = 505). Kaplan-Meier curves were generated to graphically show the difference between survival and recurrence distributions. The log-rank test was used to evaluate the difference between curves.

Results: The table compares 3,858 patients with invasive ductal carcinoma with 505 patients with invasive lobular carcinoma. Follow-up, age, palpability, LVI, nodal positivity, local recurrence, distant recurrence, and breast cancer–specific survival were similar for both groups. Invasive lobular tumors were larger, a higher percentage were estrogen and progesterone receptor positive, and a lower percentage were HER2 positive. Molecular subtyping favored the lobular cancers.

	InfDuct	InfLob	p Value
N	3858 (88%)	505 (12%)	
Avg follow-up (mo)	77 mo	79 mo	NS
Avg age (yr)	56 yr	58 yr	NS
Avg tumor size (mm)	22 mm	30 mm	<0.001
% palpable	65%	66%	NS
Avg. nuclear grade	2.29	1.85	<0.001
% ER positive	78%	91%	<0.001
% HER2 positive	17%	5%	<0.001
Lymphovascular invasion	21%	16%	NS
% Node positive	30%	30%	NS
% Basal % HER2 % Luminal A % Luminal B	232/1535 (15%) 128/1535 (8%) 659/1535 (43%) 516/1535 (34%)	3/168 (2%) 0/168 (0%) 126/168 (75%) 39/168 (23%)	<0.001 <0.001 <0.001 <0.01
Probability local recurrence, 10 years	11%	10%	NS
Probability distant recurrence, 10 years	20%	19%	NS
Probability BC death, 10 years	16%	14%	NS

continues

Conclusion: Because of their growth pattern, lobular cancers are more difficult to diagnose. That results in tumors that are generally larger than invasive ductal carcinomas. However, all prognostic factors favor invasive lobular lesions. The probability of local recurrence, distant recurrence, and breast cancer–specific death is slightly lower for invasive lobular carcinomas but the difference is not statistically significant.

0405 - Comparison of Breast Volumes Excised Through Bracketed Radioactive Seed vs Bracketed Wire Localization

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Objective: Resection of radiographic breast lesions large enough to require bracketed localization poses a significant challenge to minimize volume loss and yet ensure complete resection with adequate margins. Previous studies have demonstrated that localization with a single radioactive seed decreases excision volume and improves cosmesis. In this study, we compared the volume of tissue excised in bracketed seed localization (BSL) vs bracketed wire localization (BWL) and hypothesized that BSL excision would be associated with a lower tissue volume excised.

Methods: A retrospective review was performed of patients undergoing localization of benign and malignant breast lesions using 2 or more localizers in a bracketed approach at an academic medical center from 2004 to 2014. Data collected included demographics, histology, tumor size, volume initially excised, total volume including re-excisions, and neoadjuvant and adjuvant therapies. Student *t* test and Pearson's chi-square test were used to compare continuous and categorical data. Multivariable linear regression model was used to evaluate the association between excision volume and localization technique after adjusting for clinically relevant variables.

Results: A total of 163 bracketed localization excisional procedures (93 BSL and 70 BWL) were performed. There was no difference in median age, race, BMI, and tumor type between the 2 groups. The largest pretreatment tumor diameter was significantly greater in BSL excision group ($P < 0.01$). There was a trend toward a decrease in the initial volume and total volume excised in the BSL excision group in comparison to BWL excision group ($P = 0.4$, initial volume; $P = 0.32$, total volume). In the multivariable model, tissue volume did not differ between the localization groups after adjusting for clinically relevant variables. Re-excision rates in this study were, as expected, lower for BSL.

		Overall	Wire	Seed	P value
Number		163	70 (43%)	93 (57%)	
Age					
	<50 y	36 (22%)	15 (21%)	21 (23%)	0.38
	50–59 y	55 (34%)	25 (36%)	30 (32%)	
	60–69 y	42 (26%)	14 (20%)	28 (30%)	
	>70 y	30 (18%)	16 (23%)	14 (15%)	

Race					
	Caucasian	79 (49%)	32 (46%)	47 (51%)	0.56
	Black	45 (28%)	23 (33%)	22 (24%)	
	Hispanic	28 (17%)	10 (14%)	18 (19%)	
	Other	10 (6%)	4 (6%)	6 (6%)	
BMI (mean)		29	30	28	0.19
Largest pretreatment diameter, cm (mean)		3.2	2.7	3.7	<0.01
Tumor type					
	In situ	64 (40%)	34 (50%)	30 (32%)	0.07
	IDC	75 (47%)	27 (40%)	48 (52%)	
	ILC	11 (7%)	5 (7%)	6 (6%)	
	Other	11 (7%)	2 (3%)	9 (10%)	
Re-excision of margin		59 (36%)	38 (55%)	21 (23%)	<0.01
Initial volume, cm^3 (mean/median)		234 (167)	234 (171)	206 (164)	0.4
Total volume, cm^3 (mean/median)		232 (172)	251 (186)	218 (168)	0.32

Conclusion: A trend toward lower tissue volume excision, despite slighter larger tumor size, was observed for bracketed seed excisions compared to bracketed wire excisions. Bracketed seed localization is an acceptable alternative to facilitate breast-conserving therapy in patients with large areas of radiographic abnormality.

0316 - A Multicenter Prospective Evaluation of a Radiofrequency Identification Tag in the Localization of Nonpalpable Breast Lesions

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Objective: The purpose of this study was to evaluate the safety and efficacy of a radiofrequency identification (RFID) tag in the localization of nonpalpable breast lesions.

Methods: Institutional Review Board approval was obtained at each of the 2 participating institutions prior to initiation of this study at each site. Consecutive adult patients undergoing excision of a nonpalpable breast lesion were approached to participate. Enrolled subjects underwent placement of an RFID tag on the same day as elective operative excision. The implanted RFID tag is detected utilizing a handheld reader device placed over the skin. The sound emitted from the reader device increases in volume and pitch as the reader approaches the tag. A hookwire was also placed in the initial patients at each study site and in cases where the RFID tags were placed under stereotactic guidance. The RFID tag was the primary method utilized by the operating surgeon to localize each lesion during excision, with the hookwire serving as backup in case of tag migration or failed localization. Patient data, including breast size and lesion location (quadrant of the breast, distance to areola, depth from the skin), were collected. Successful localization and removal of the intended lesion were the primary outcomes measured. Potential complications, such as tag migration and postoperative infection, were also recorded in order to assess safety.

Results: Forty-six patients underwent placement of 47 RFID tags, 39 under ultrasound guidance and 8 with stereotactic guidance. Thirty-five patients had breast cancer, and 11 had benign lesions. In all 47 excisions, the RFID tag was successfully localized by the reader at the level of the skin prior to incision, and the target lesion was visualized within the excised specimen. There were no localization failures and no postoperative infections. Tag migration did not occur prior to incision, but in 13 cases, the tag slipped out of the lesion as it

was being retracted to make the final cut along the deep surface of the specimen. Six cancer patients had positive margins, one of which ultimately underwent mastectomy due to patient choice.

Conclusion: The use of an RFID tag system is an effective and safe method of localization of nonpalpable breast lesions in this investigation. RFID localization of nonpalpable breast tumors for surgical excision may represent an alternative method to hookwire localization.

0314 - Outcomes After Oncoplastic Surgery in Breast Cancer Patients: A Systematic Literature Review

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Objective: Breast surgeons have increasingly performed oncoplastic resection and reconstruction for surgical management of breast cancer. The present study assesses oncologic, surgical and cosmetic outcomes after oncoplastic surgery in the setting of breast cancer.

Methods: A systematic literature review identified peer-reviewed articles in PubMed using key search terms ("breast," "surgery," "operative surgical procedures," and "general surgery"). Two reviewers independently screened articles pertaining to oncoplastic surgery for breast cancer using PRISMA guidelines. Selected studies reported one or more of the following outcomes: positive margin rate (PMR), re-excision rate (RR), conversion to mastectomy rate (CMR), overall survival (OS), disease-free survival (DFS), local recurrence (LR), distant recurrence (DR), complication rate, and cosmesis outcomes.

Results: The search yielded 474 articles; 55 studies published from 1998 to 2015 met inclusion criteria. The selected studies collectively evaluated 6,011 patients with a mean age of 53.2 years over an average follow-up of 41.6 months. T1 (43.8%) and T2 (39.3%) invasive ductal carcinoma were the most common tumor histopathology, with a mean tumor size of 19.9 mm and mean specimen weight of 274.7 g (table). Wise pattern mastopexy was the most commonly utilized oncoplastic technique performed in 31.1% of patients. Positive margin rate, RR, and CMR were 10.9%, 6.0%, and 6.2%, respectively; OS and DFS were 95.1% and 85.9%, and LR and DR occurred in 3.9% and 7.5% of patients. Positive margins were widely classified throughout the studies as <10 mm, <5 mm, < 2 mm, <1 mm, and no ink on tumor. There was no statistically significant difference for PMR among these subgroups ($p = 0.162$). Ten studies reported specific margins for 1,455 patients. Among these patients, 143 (9.8%) were classified as having positive margins, of which 113 (7.8%) had "tumor on ink" ($p = 0.072$). Postoperative complications occurred in 14.3% of patients. Among 25 studies that evaluated cosmesis outcomes in 1,962 patients, oncoplastic surgery achieved excellent, good, fair, or poor outcomes in 55.2%, 31.0%, 9.4% and 4.4% of patients, respectively.

continues

Study Characteristics

Study (Year)	Type	No. of Cases	Mean Age	Mean Follow-up (Months)	Tumor Size (mm)	Most Common Tumor Grade	Most Common Tumor Location	Most Common Pathology	Positive Lymph Nodes	Adjuvant Radiation	Neoadjuvant Chemo-therapy	Most Common Cosmesis Outcome
AcostaMartin (2014)	P	52	54.2	-	23	-	-	-	-	-	-	Excellent
Aljarrah (2012)	P	54	54.2	45	-	T1	UIQ	IDC	10	49	-	Excellent
Bouvet (1998)	R	10	59	-	17.5	-	-	-	-	-	-	-
Caruso (2008)	R	63	45.3	68	-	T1	-	IDC	20	63	-	-
Caruso (2011)	R	52	-	72.6	-	T1	-	IDC	20	52	27	-
Chakravorty (2012)	R	150	59	-	21	T2	-	-	30	135	38	-
Chang (2004)	R	37	54	-	-	-	-	IDC	-	-	-	Excellent
Clough (2001)	P	101	53	-	46	T2	Central	IDC	27	88	17	-
Clough (2014)	P	277	57.4	-	-	T2	UOQ	IDC	-	-	59	-
Colombo (2015)	R	25	62	-	-	T2	LOQ	IDC	10	25	2	Good
Crown (2015)	R	329	60.7	-	15.4	-	-	-	-	-	-	-
Cutress (2011)	R	11	55	56.4	24	-	UOQ	IDC	1	11	-	-
Da Silva (2007)	R	30	48.6	15.5	25.5	T1	-	IDC	-	-	2	-
Egro (2014)	P	117	53.6	46.1	17	-	UOQ	IDC	-	-	22	-
El-Marakby (2011)	P	50	46.5	33.9	-	T2	UOQ	IDC	10	46	-	Good
Emiroglu (2015)	R	42	48	61	27	T2	-	IDC	34	18	32	Good
Emiroglu (2015)	R	82	50	121	26	T1	UOQ	IDC	30	-	-	-
Fitoussi (2009)	R	540	52	49	29.1	-	UOQ	IDC	-	-	93	-
Giancalone (2007)	P	31	51.3	-	20	T1/T2	-	-	6	-	-	-
Grubnik (2012)	P	251	56.3	50	15.4	T1	UOQ	IDC	61	228	64	Good
Hamdi (2013)	R	119	48	48	-	-	-	-	-	-	-	-
Hernanz (2011)	R	41	44	58	22	-	UOQ	IDC	29	41	-	Good
Huemer (2006)	P	32	61.3	33.8	-	T1	Central	IDC	11	-	-	Excellent
Kaur (2005)	P	30	48.7	-	-	T1	UOQ	-	-	-	-	-
Kaviani (2013)	R	240	47.6	26	26.2	T2	UOQ	IDC	109	240	-	-
Kim (2012)	P	33	45.6	24.5	23	-	LOQ	IDC	12	-	-	Good
Kronowitz (2006)	R	41	57	-	-	T1	UOQ	-	8	33	-	-
Lorenzi (2015)	R	454	-	86.4	-	T1	-	-	204	454	-	-
Losken (2006)	R	53	47	39	-	T1	-	DCIS/LCIS	12	46	-	-
Losken (2014)	R	83	52.8	-	12	T1	-	-	-	-	29	-
Malhaire (2015)	R	73	58	40	-	-	-	-	-	-	-	-
Mansell (2015)	R	119	53	-	-	T2	-	-	37	118	7	-
Mazouni (2013)	R	45	-	46	40	T2	-	IDC	23	-	-	Excellent
McCulley (2005)	P	50	53	-	28	-	-	-	28	46	-	Excellent
McCulley (2005)	P	11	52.7	-	17.3	-	Central	-	-	-	-	Good
Mendonca (2005)	P	74	46	22	-	T1	UOQ	-	49	74	-	Excellent
Meretoja (2010)	P	90	57	26	-	T1	-	IDC	60	68	-	-
Moustafa (2014)	R	21	49.5									

Conclusion: The present study is the largest comprehensive literature review to date on oncoplastic surgery for breast cancer. The results confirm that oncoplastic surgery is a safe treatment option that preserves cosmesis without compromising recurrence or survival in patients with T1-T2 invasive breast cancer. Reported PMR and RR are low, though rates reported in this study may not reflect current rates in oncoplastic surgery given recent changes in margin guidelines. Future studies should evaluate the feasibility of classifying negative margins as no ink on tumor in oncoplastic surgery.

0303 - Is Beauty in the Eye of the Beholder? Comparison of Patient Satisfaction Using the BREAST-Q and Surgeon-Rated Aesthetic Outcome in Autologous Breast Reconstruction

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Objective: As breast reconstruction techniques continue to be refined, it is becoming increasingly important for surgeons to be able to evaluate aesthetic outcome and relate this to patient satisfaction. The BREAST-Q is a validated patient-reported outcome measure for patient satisfaction following breast reconstruction, and currently there are no studies on the relationship to surgeon-rated aesthetic outcome. Therefore the objective of this study is to compare a newly developed, surgeon-rated 10-point aesthetic assessment scale with the "Satisfaction with Breast" subscale of the BREAST-Q following autologous breast reconstruction.

Methods: Forty-five patients who underwent breast reconstruction using either a free muscle-sparing TRAM or DIEP flap between 2009 and 2013 by a single surgeon were randomly selected. Standardized preoperative and postoperative photographs (minimum, 6 months) were provided to 3 uninvolved breast reconstruction surgeons. Surgeon-rated aesthetic assessment evaluated 5 sub-items: volume, shape, symmetry, position, and scarring, as well as overall aesthetic appearance using a 10-point scale. The scale was designed based on recommendations made from our systematic review on aesethetic scoring tools (*Ann Surg Onc*, Online First, Feb 2015). The "Satisfaction with Breast" subscale of the BREAST-Q was completed by patients after a minimum of 1-year follow-up. The surgeon-rated scale was evaluated for internal consistency by Cronbach alpha statistic and the inter-rater agreement by weighted kappa statistic. The relationship between the surgeon-rated aesthetic assessment and BREAST-Q patient satisfaction scores was studied by Spearman correlation.

Results: The mean BREAST-Q patient satisfaction score was 67.13 of 100 (range, 22 to 100). The new surgeon-rated 10-point aesthetic assessment scale demonstrated high internal consistency (Cronbach α range, 0.87 to 0.96), and mean overall aesthetic appearance was 6.87 (range, 2 to 10). The inter-rater agreement among the 3 surgeons was fair for all items (kappa, 0.24 to 0.35) except volume, position, and scarring (0.07 to 0.21). For all 3 surgeons, the surgeon-rated aesthetic score on each sub-item correlated strongly with the overall aesthetic score given by that surgeon (Spearman coefficient, 0.69 to 0.91), except for scarring (0.27 to 0.48). However, weak correlation was found between surgeon-rated aesthetic scores and patient-reported BREAST-Q scores (Spearman coefficient, 0.00 to 0.27).

Correlation Between Surgeon's Overall Aesthetic Scores and Patient Satisfaction BREAST-Q Scores

Overall Score	N	Correlation	95% Confidence Limits		P Value
Surgeon 1	45	0.26	–0.03	0.52	0.0825*
Surgeon 2	45	0.19	–0.11	0.45	0.2246
Surgeon 3	45	0.26	–0.04	0.51	0.0906*
Mean	45	0.27	–0.02	0.53	0.0685*

*Statistically significant correlation coefficients with significant level set at $p < 0.1$

Conclusion: The newly developed, surgeon-rated 10-point assessment scale demonstrated high internal consistency; however, it displayed only fair inter-rater agreement and had only weak correlation with the BREAST-Q patient satisfaction scores. These findings are consistent with previous literature and suggest that the patient's own evaluation and level of satisfaction with their reconstructed breast are not directly related to the aesthetic ideals of the surgeon.

0179 - Does Sentinel Lymph Node Biopsy Impact Systemic Therapy Recommendations?

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Objective: Decisions regarding systemic therapy of breast cancer are increasingly made based on biologic characteristics of the breast cancer rather than tumor size and lymph node status.[1] Sentinel lymph node biopsy (SLN) is not without morbidity (5% risk of lymphedema and 11% risk of neuropathy).[2] There is an active prospective trial in Milan (SOUND) to examine the safety of omitting SLN in stage I-III breast cancer.[3] We hypothesize that a subset of breast cancer patients can be identified where SLN would not influence systemic therapy recommendations.

Methods: Data were evaluated from a consecutive sample of 107 patients with stage I–III breast cancer diagnosed in 2012–2013 who had SLN performed. Variables collected included age, race (white vs non-white), tumor size, receptor status, HER2 status, OncotypeDx recurrence score (RS), SLN results, and systemic chemotherapy and/or endocrine therapy. A board-certified senior medical oncologist reviewed these data, blinded to the SLN results. He was asked if his recommendation for systemic therapy for each patient would require knowledge of the SLN result. In those cases where systemic therapy decisions could be made without the SLN result, the SLN blinded recommendation was compared to actual treatment recommended.

Results: Of 107 cases, SLN status would have impacted chemotherapy recommendations in only 14.0% (n = 15). In 85.9% of cases (n = 92), SLN results did not impact chemotherapy recommendation. SLN result did not impact endocrine therapy recommendation in any patient. Of the 15 patients for whom SLN did impact chemotherapy recommendation, 9 were receptor positive and HER2 negative, 4 were triple negative, and 2 were receptor negative and HER2 positive. Among these 6 receptor-negative cases, all had either T1b or smaller tumors or multiple co-morbidities. Of the 9 receptor-positive HER2-neg cases for whom SLN made a difference, 7 were 2 cm or larger, and none had a high RS. The 2 receptor-positive HER2-neg patients with tumors <2 cm had RS < 14.

Conclusion: SLN does not impact endocrine therapy recommendation for any patient. SLN does not impact chemotherapy recommendation for the majority of stage I–III breast cancer patients. Subsets of patients for whom SLN results are less likely to impact systemic therapy recommendations include (1) receptor-positive, HER2-neg patients with RS >29; (2) receptor-positive, HER2-neg patients with RS <29 and tumors 2 cm or larger; and (3) receptor-negative, HER2-pos or neg patients, with tumors T1c or larger and not a large number of co-morbidities.

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0387 - Low Upstage Rate of Imaging-Detected Intraductal Papillomas Without Atypia May Not Necessitate Surgical Excision

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Objective: Intraductal papillomas (IPs) represent 5% of pathology found on percutaneous core needle biopsy (CNB) for imaging-detected abnormalities. They present as calcifications, nodules, or intraductal filling defects that may or may not be associated with nipple discharge or breast masses. Though IPs confer a slightly higher risk for future breast cancer, the upstage rate to carcinoma on excisional breast biopsy (EBB) of these lesions with current CNB is variable and ranges from 0 to 30%. We retrospectively reviewed our institutional experience to determine upstage rate and to identify patients who may not require EBB.

Methods: This project was approved by the Quality Improvement Board and deemed IRB exempt. The electronic medical records were retrospectively searched for all CNBs containing IPs across the University Health System from December 2013 to December 2014. Patient age, symptoms, imaging characteristics, method of biopsy, EBB results, and upstage rate were recorded. Data was analyzed using chi-square and one-way ANOVA on Prism 6.0 software. Significance was defined as a p value < 0.05.

Results: A total of 263 patients with IP on CNB were identified: 227 without atypia and 36 with atypia. In the IP without atypia group, 147 had an EBB and 80 did not. In the IP with atypia group, 31 had an EBB and 5 did not. Patients with atypia on CNB were more likely to be older. There was no significant difference in the presentation, lesion size, or method of biopsy among the groups ($p = 0.10$). In the group without atypia who had an EBB, 9% (14/147) had an additional high-risk lesion on final pathology. The upstage rate for pts who had an EBB was 2% (3/147) in the group without atypia and 29% (9/31) in the group with atypia ($p < 0.05$). In the patients who did not have surgery, 52% (44/85) had repeat imaging within 6 months to 1 year of CNB and there were no incidents of imaging change, need for another CNB, or diagnosis of cancer.

Patient Characteristics and Outcomes

	Intraductal Papilloma Without Atypia		Intraductal Papilloma With Atypia		p value
	Surgical Excision	Observation	Surgical Excision	Observation	
N	**147**	**80**	**31**	**5**	
Age, years (mean ± SEM)	53 ± 0.9	58 ± 1.3	62 ± 2.4	68 ± 6.6	<0.0001
Presentation (%)					0.45
Asymptomatic	100 (68%)	61 (76%)	24 (78%)	2 (40%)	
Symptoms (mass or discharge)	43 (29%)	18 (23%)	6 (19%)	3 (60%)	
Unknown	4 (3%)	1 (1%)	1 (3%)	0	
Imaging finding (%)					0.01
Calcifications	26 (18%)	32 (40%)	10 (32%)	2 (40%)	
Nodule/ architectural distortion	97 (66%)	45(56%)	20 (65%)	3 (60%)	
Intraductal filling defect	16 (11%)	2 (3%)	1 (3%)	0	
Unknown	8 (5%)	1 (1%)	0	0	
Lesion size for nodule or distortion seen on imaging (mean ± SEM)	7.8 ± 0.4 mm	6.9 ± 0.6 mm	9.0 ± 1.0 mm	8.0 ± 1.0 mm	0.38

Method of biopsy (%)					0.10
Stereotactic	32 (22%)	30 (37%)	9 (29%)	3 (60%)	
Ultrasound	109 (74%)	45 (56%)	19 (62%)	2 (40%)	
MRI	5 (3%)	3 (4%)	1 (3%)	0	
Unknown	1 (1%)	2 (3%)	2 (6%)	0	
Upstage to carcinoma on surgical excision	3 (2%)	N/A	9 (29%)	N/A	<0.0001

Conclusion: IP with atypia found on CNB still warrants surgical excision because of high upstage rates. However, for patients with IP without atypia, the low upstage rate regardless of imaging characteristics makes observation with surveillance imaging a reasonable plan of care. In a subset of patients, the additional finding of atypia on EBB may influence future screening and recommendations for risk reduction. Longer term follow-up is also needed for the groups who did not have an EBB.

0418 - FEA on Core Needle Biopsy Does Not Always Mandate Excisional Biopsy

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Objective: Flat epithelial atypia (FEA) is a proliferative lesion of the breast where cells demonstrate columnar change and cytologic atypia, and is distinct from classic atypical hyperplasias, including atypical ductal hyperplasia (ADH) and atypical lobular hyperplasia (ALH). While many patients undergo excisional biopsy, management of FEA-identified on core needle biopsy (CNB) is controversial, and the rate of associated DCIS and invasive cancer is not well defined.

Methods: A prospective database was reviewed and identified with FEA diagnosed by CNB performed between 01/2010 and 07/2015. Data collected included age at presentation, imaging findings, pathologic findings following surgical excision, and subsequent development of breast cancer.

Results: Mean age of patients was 58 years. Of the 132 patients, 62 patients had FEA associated with DCIS and invasive ductal cancer (IDC) on CNB and were excluded from analysis. Thirty-two patients had FEA plus ADH or ALH, 4 patients with FEA plus LCIS, and 37 patients had FEA alone or with other nonpathologic findings. Two (6.3%) of 32 patients with FEA plus ADH had DCIS or IDC on subsequent excisional biopsy. Of the 37 patients with FEA alone on CNB, 3 patients (8.1%) had a CNB without subsequent excisional biopsy. Of the 34 patients who underwent excisional biopsy for FEA alone, only 1 (3%) patient was found to have IDC on excision. Twenty-two (64%) of the 34 patients with FEA who underwent excisional biopsy presented with calcifications on mammography. All of these patients had benign findings on excisional biopsy. Twelve (35%) of 34 patients with FEA alone underwent CNB for a mass or asymmetry noted on imaging. Of these 12 patients, 10 (83%) had benign findings on excisional biopsy. One patient had ALH and a papilloma on excision, and 1 patient had a 3-mm invasive carcinoma with focal associated DCIS. With a mean follow-up of 24 months, only 1 patient with FEA alone subsequently developed IDC, and this was in the contralateral breast.

Conclusion: FEA is often found in combination with ADH and ALH as well as carcinoma on CNB. Pure FEA was only associated with IDC in 1 of 12 (8%) of patients with a mass on imaging, however none of the patients where CNB was done for calcifications alone were upstaged on excision. These findings may suggest that excisional biopsy is not warranted in patients with pure FEA on CNB for calcifications, and these patients could be managed with imaging surveillance.

0426 - Oncological and Surgical Outcomes After Nipple-Sparing Mastectomy: Do Incisions Matter?

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Objective: While nipple-sparing mastectomy (NSM) for the treatment of breast cancer (BC) is becoming more accepted, technical aspects for performance of the operation are still evolving. NSM has been noted as a risk factor for complications following mastectomy but the data regarding specific technical factors contributing to this risk is limited. This study examined the influence of technical aspects on early postoperative outcomes of NSM.

Methods: Review of a prospectively maintained database at an academic medical center identified 1054 patients who had mastectomies between 01/2012 and 06/2015; 201 patients had NSM. We compared the effect of location of incision and dissection technique on complications.

Results: Three hundred and fifty-one NSMs were performed in 201 patients, of which 144 patients (72%) had BC. Forty-four (28%) patients were BRCA mutation carriers. Mean patient age was 47 years. Inframammary (47%) or periareolar (35%) incisions were most frequent. Tumescence was used in 203 (58%) NSMs. Skin flaps were created using sharp dissection in 213 (61%) and electrocautery in 138 (39%) breasts. Three patients had no reconstruction, 125 patients (62%) underwent expander-based reconstruction, 15 patients (7%) underwent autologous tissue reconstruction, and 58 patients (29%) underwent immediate implant reconstruction. Nipple areola complex (NAC) necrosis was seen in 40 (11%) breasts (table). While not impacted by dissection technique, a higher rate of NAC complications was seen with periareolar incisions ($p = 0.02$). Tumescence with sharp dissection did not result in statistically significant rates of increased flap necrosis. Eleven patients (7%) had a positive margin in the mastectomy specimen or nipple core biopsy. Ten patients (91%) had a positive anterior/deep margin, of which 7 (64%) had an inframammary approach. Sharp vs electrocautery dissection did not affect margin status. Fourteen (7%) patients had an infection requiring extended IV antibiotics. Sixteen (8%) patients suffered implant loss as a result of infection or skin necrosis. Dissection technique was not associated with implant loss ($p = 1.0$) or infection ($p = 0.84$). Twenty-two patients (11%) had postmastectomy radiation and, of these, 5 (22%) required implant removal due to complications.

Complications of Nipple-Sparing Mastectomy (N = 351)

	Incision			Technique	
	Inframammary	**Periareolar**	**Other**	**Sharp**	**Cautery**
NAC* necrosis [n = 40, 11%]					
Partial [n = 37 (%)]	14 (38)	19 (51)	4 (11)	20 (54)	17 (46)
Complete [n = 3 (%)]	0	3 (100)	0	0	3 (100)
Skin flap necrosis [n = 6, 2%]					
Superficial [n = 4 (%)]	2 (50)	0 (0)	2 (50)	3 (75)	1 (25)
Full thickness [n = 2 (%)]	1 (50)	1 (50)	0	2 (100)	0
Skin and NAC necrosis [n = 16, 5%]					
Superficial [n = 9 (%)]	6 (67)	2 (22)	1 (11)	4 (44)	5 (56)
Full thickness [n = 7 (%)]	3 (43)	2 (29)	2 (29)	3 (43)	4 (57)
Hematoma [n = 8, 2%]	3 (38)	5 (63)	0	5 (63)	3 (38)

*NAC, nipple areolar complex.

Conclusion: NSM has an acceptable complication rate. While minor complications are common, NAC necrosis requiring excision or implant loss is rare. Postmastectomy radiation is a significant risk factor for implant loss. Inframammary incisions have fewer complications but may result in tumor-involved margins.

0206 - The Effect of BMI on OR Utilization in Breast Surgery

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Objective: More than one third of adults in the United States are obese. Studies have shown that obesity-related comorbidities increase health care costs, but the effect of obesity on operating room utilization has not been completely evaluated. The purpose of our study was to examine how operative time (OPT) for common procedures in breast surgery is affected by patient BMI. We hypothesized that BMI has more of an effect on OPT for extensive procedures, such as axillary lymph node dissection (ALND) and mastectomy, than for minimally invasive procedures, such as lumpectomy and sentinel lymph node biopsy (SLNB).

Methods: OPT, weight, and height for 10 breast surgeries were identified from the American College of Surgeons 2010 National Surgical Quality Improvement Project database, and BMI was then calculated from these values. The procedures were sorted by CPT codes. Only female patients were included, and those who underwent additional procedures or had incomplete data were excluded. Patients were divided into groups based on their BMI (group 1: <25, group 2: 25–35, and group 3: >35). Using the 2-sample *t* test, OPT was compared among the lowest and highest BMI categories. We specifically looked at lumpectomy, lumpectomy plus SLNB, lumpectomy plus ALND, mastectomy, mastectomy plus SLNB, and modified radical mastectomy (MRM).

Results: Overall, 16,077 patients were included in the analysis. Group 1 had 5,606 patients, group 2 consisted of 7,697 patients, and group 3 contained 2,774 patients. When BMI groups 1 and 3 were compared for all procedures, a significant difference of 14 min ($p < 0.0001$) was seen. As shown in the table, for these same groups, a significant difference in OPT was noted for lumpectomy alone and lumpectomy plus SLNB. However, BMI had a much more dramatic effect on OPT for procedures that included ALND and mastectomy.

Results by Procedure

	No. of Patients	OPT (min)	Difference (p value)
Lumpectomy BMI group 1 BMI group 3	 3395 1471	 37 41	4 (<0.0001)
Lumpectomy + SLNB BMI group 1 BMI group 3	 728 427	 73 80	7 (0.0002)
Lumpectomy + ALND BMI group 1 BMI group 3	 178 108	 92 110	18 (0.0027)
Mastectomy BMI group 1 BMI group 3	 378 206	 91 112	21 (0.0002)
Mastectomy +SLNB BMI group 1 BMI group 3	 392 218	 102 127	25 (0 < 0.0001)
MRM BMI group 1 BMI group 3	 414 275	 104 129	24 (<0.0001)

Conclusion: Patient BMI significantly affects OPT for lumpectomy and SLNB, but the difference is much greater for ALND, mastectomy, and MRM. Therefore, when scheduling more extensive breast surgical procedures for obese patients, additional time should be allotted to improve OR utilization.

0160 - The Cost of Efficiency: Budget Impact Analysis of a Breast Rapid Diagnostic Unit

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Objective: Recent implementation of a streamlined rapid diagnostic unit (RDU) for suspicious breast lesions has significantly decreased wait times to definitive diagnosis. However, its economic impact remains unknown. This project defines the costs associated with development, implementation, and ongoing maintenance of a breast RDU from the perspective of a universal health care system.

Methods: A budget impact analysis was performed identifying all direct costs associated with planning and implementation of the RDU (consulting, personnel training, infrastructure development, pilot testing, research database management) and ongoing maintenance (scheduling, diagnostic tests, physician billings). Diagnostic fees included imaging, biopsy, pathology processing, and physician interpretation. Sensitivity analyses were performed to forecast costs based on feasible variations in key components. Costs are adjusted 2015 valuations reported in Canadian dollars using healthcare-specific Consumer Price Indices.

Results: Start-up costs of the RDU were $341,822, accounting mainly for new infrastructure implementation and personnel training. Average ongoing operational costs, including database management, validation of rapid tissue processors, and support staff, was $155,137 per year. An average clinical cost for achieving a diagnosis (imaging, biopsy, physician consult) was $654 per patient. Sensitivity analysis revealed that, if running at maximal institutional capacity, the total annual clinical cost for achieving a diagnosis could range between $123,930 and $679,533.

Conclusion: Establishment and maintenance of a breast RDU requires significant investment in order to achieve reductions in time to diagnosis. However, expenditures ought to be interpreted in the context of institutional patient volumes, and tradeoffs in patient-centered outcomes, including reduction in patient anxiety, and possibly shorter times to definitive treatment. This study can be used as a resource-planning tool for future RDUs in healthcare systems wishing to improve diagnostic efficiency.

0223 - Excisional Biopsy by Seed Localization Decreases Amount of Excised Tissue Compared to Wire Localization

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Objective: Surgical excision of nonpalpable breast lesions requires a localization procedure in order to accurately target the area of concern. Traditionally, this has been done by wire localization--passing a hookwire into the lesion using mammographic or sonographic guidance. An alternative is localization with a radioactive seed. Seed localization does not require the patient to have an external wire in the breast. It can be performed up to 5 days in advance. We started a seed localization program at our institution in July 2014. The purpose of this study was to determine whether seed localizations decrease operative time and the amount of tissue excised when compared to wire localizations.

Methods: We retrospectively reviewed 123 surgical excisional breast biopsies done at our academic medical center. We included 64 excisional biopsies by wire localization performed between September 2013 and March 2014 and 59 excisional biopsies by seed localization performed between September 2014 and March 2015. Only excisional biopsies performed for benign or high-risk lesions were included. For each case,

operative time was obtained from hospital operative records, and specimen weight and volume was obtained from pathology reports.

Results: The average specimen volume was significantly lower for cases performed by seed localization compared to wire localization cases (34.1 vs 51.0 cm^3, p = 0.005). The average specimen weight was also significantly lower for seed localization (14.0 vs 19.7 g, p = 0.004). There was a trend toward decreased operative time for seed localization but this was not statistically significant (32.7 vs 34.5 min, p = 0.29).

Conclusion: We started a seed localization program with the aim of increasing convenience to the patient as well as flexibility of scheduling. We found that this procedure also decreases the average amount of breast tissue removed during excisional biopsy, as measured by either specimen weight or volume. This is likely because seed localization allows more precise targeting of the lesion within the breast in 3 dimensions. There was a trend toward decreased operative time, which may further decrease as our experience with the seed localization procedure continues. Based on these results, we will evaluate our results from seed localizations compared to wire localization for partial mastectomies done for invasive and in situ carcinoma to determine whether seed localizations impact the amount of tissue removed and re-excision rates.

0281 - STAT Reasons and Ordering Outcomes for Hereditary Breast Cancer Genetic Testing

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Objective: When indicated based on personal and family history, women facing a diagnosis of breast cancer often undergo hereditary cancer genetic testing. Turnaround times for genetic testing range from 7 days to 4 weeks and vary based on genes analyzed, technology, and laboratory workflow. Genetic testing is processed "STAT" when deemed necessary by the ordering clinician. For these cases, the laboratory uses extra resources to expedite testing, as identification of a pathogenic mutation may directly impact the patient's management plan. For example, a woman with a positive genetic test result may choose to undergo prophylactic bilateral mastectomy rather than lumpectomy in order to reduce the risk for another breast cancer primary. We evaluated a cohort of STAT hereditary cancer test orders to determine indications for these requests and potential outcomes of the results.

Methods: Test request forms for 1,137 breast-related STAT orders from April–June of 2015 were reviewed. Information about personal diagnosis, reason for STAT request, test performed, and genetic test results was gathered.

Results: The majority of breast-related STAT requests (n = 701; 61.6%) were for multigene panel tests (MGPT). The remaining orders were for BRCA1/2 only (n = 264; 23.2%), BRCA1/2 with reflex to a MGPT (n = 165; 14.5%), and non-BRCA1/2 single-gene tests (n = 7; 0.6%). Most probands had invasive breast cancer or DCIS at the time of testing (n = 1,120; 98.5%) and the remainder (n = 17; 1.5%) had a past history of breast cancer or a nonmalignant breast lesion. Upcoming surgery was indicated as the reason for the majority of STAT orders (n = 1079; 94.8%), whereas nonsurgical treatment decisions, such as chemotherapy or clinical trials, were indicated less frequently (n = 33; 2.9%). Overall, 119 (10.5%) mutation-positive probands were identified; 73 of which harbored mutations in genes that would warrant consideration of bilateral prophylactic mastectomies as per current NCCN guidelines, including BRCA1 (n = 31), BRCA2 (n = 36), PTEN (n = 1), and TP53 (n = 5). Additionally, NCCN guidelines contraindicate radiation therapy for individuals carrying germline TP53 mutations. The remaining 46 probands carried mutations in genes for which no breast surgical NCCN guidelines exist (APC, ATM, BARD1, BRIP1, CHEK2, MLH1, MUTYH, NBN, PALB2, PMS2, and RAD51C).

Conclusion: Most probands undergoing STAT testing were pending breast cancer surgery. Surgical decisions were potentially impacted by positive test results for at least 6.4% of patients, and many individuals who had negative test results likely elected breast-conserving surgery. STAT orders may not have been urgent in 1.5% of cases since these patients were not pending treatment. STAT testing requires extra resources and should be

utilized only when timing is critical; however, it can be essential in guiding medical management for patients facing immediate treatment decisions.

0169 - 640 Patients Treated With Intraoperative Radiation Therapy (IORT): Initial Report

Melinda Epstein[1], Sadia Khan[1], Peter Chen[1], Brian Kim[1], Lisa Guerra[1], Lincoln Snyder[1], Colleen Coleman[1], January Lopez[1], Ralph Mackintosh[1], Cristina DeLeon[1], Melvin Silverstein[1]

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Objective: Intraoperative radiotherapy (IORT) permits accurate delivery of radiation therapy directly to the tumor bed at the time of surgery, greatly simplifying breast conservation. Two prospective randomized trials have been published (ELIOT and TARGIT), supporting IORT as a possible alternative to whole-breast radiation therapy (WBRT). This report documents the study requirements, patient characteristics, and short-term outcome for 640 breast cancer patients treated with IORT from June 2010 to June 2015.

Methods: To be eligible for IORT as the only radiation therapy, final pathology had to confirm tumor size ≤ 30 mm, tumor margins ≥ 2 mm, negative lymph nodes, and no extensive lymphovascular invasion. All patients were studied preoperatively with physical examination, digital mammography, ultrasound, and MRI. These tests were used to select patients thought to meet the study criteria. Patients that violated 1 or more parameters on final pathology were referred for additional surgery and/or WBRT with IORT becoming the boost. IORT was delivered using the Xoft Axxent® Electronic Brachytherapy (eBx®) System.

Results: Six hundred forty patients received IORT. Four hundred thirty-seven (68%) met all study criteria and were treated with IORT as their entire course of radiation therapy. Ninety-nine (16%) additional patients failed 1 or more study criteria but elected no additional local treatment. Of the 104 remaining patients who violated IORT parameters, 17 (8.4%) underwent re-excision, 15 (7.4%) opted for mastectomies, and the remaining 72 (35.4%) were treated with WBRT. There have been 11 local recurrences (6 invasive), no distant metastases, and no breast cancer–related deaths. Two local recurrences were within the IORT field, 8 outside, and 1 in a different quadrant. Four local recurrences were in patients who failed ≥1 of the study criteria. Of the 11 who recurred, 3 were converted to mastectomy and 8 were re-excised, 1 of whom was treated with WBRT in addition to re-excision. Currently, with limited follow-up, Kaplan-Meier analysis projects 3.5% of patients will recur at 3 years.

continues

Variable	
N	640
Tumor type	
DCIS	122 (19%)
Infiltrating ductal	469 (73%)
Infiltrating lobular	49 (8%)
Average follow-up (mo)	20 mo
Average. age (yr)	64 yr
Average tumor size	15.5 mm
Average nuclear grade	2.03
Immediate IORT	613 (96%)
Delayed IORT (postpathology)	27 (4%)
Protocol violations	260 in 203 patients
Extensive LVI	23 (11%)
Margin <2 mm	115 (56%)
Positive lymph nodes	26 (13%)
Tumor size >30 mm	96 (47%)
>1 protocol violation	203 (32%)
>2 protocol violations	54 (9%)
>3 protocol violations	5 (0.8%)
4 protocol violations	0 (0%)
Treatment after protocol violation	
Mastectomy	15 (7%)
No additional local treatment	99 (49%)
Re-excision	17 (8%)
WBRT	72 (35%)
Number of local recurrences	11 (1.7%)
Median time to local recurrence	24.2 mo
3-year probability local recurrence	3.5%
Number of distant recurrences	0 (0%)
Number of BC deaths	0 (0%)

Conclusion: IORT is a promising new modality that greatly simplifies the delivery of post-excisional radiation therapy. IORT makes breast conservation possible for women who could not be available for 3–6 weeks of conventional whole-breast radiation therapy. Follow-up is too short to make any definitive conclusions about this modality other than that it can be done safely.

0171 - Complications in 640 Patients Treated With Intraoperative Radiation Therapy (IORT)

Melinda Epstein[1], Sadia Khan[1], Peter Chen[1], Brian Kim[1], Lisa Guerra[1], Lincoln Snyder[1], Colleen Coleman[1], January Lopez[1], Ralph Mackintosh[1], Cristina DeLeon[1], Melvin Silverstein[1]

[1]*Hoag Memorial Hospital Presbyterian, Newport Beach, CA*

Objective: Intraoperative radiotherapy (IORT) permits the accurate delivery of radiation therapy directly to the tumor bed at the time of surgery. Minimal data are available about the local effects and complications associated with this modality of treatment using the Xoft Axxent® Electronic Brachytherapy (eBx®) System.

Methods: Six hundred forty patients were treated with IORT delivered using the Xoft Axxent® Electronic Brachytherapy (eBx®) System. Data were collected at 1 week, 1 month, 3 months, 6 months, and 1 year

postoperatively. Thereafter, data were collected yearly. Acute complications were defined as those occurring within the first month. Chronic complications were those that persisted beyond 6 months.

Results: The table details patient demographics as well as acute and chronic complications. Most patients who experienced complications experienced more than one.

Variable	N (%)
N	640
Average age	64 yr
Average follow-up	19.1 mo
Acute hematoma (required drainage)	10/640 (1.7%)
Acute seroma (required drainage > 3 times)	2/640 (0.3%)
Infection (required antibiotic or surgery)	5/640 (0.8%)
Necrosis (required surgery)	1/640 (0.2%)
Acute erythema Severity grade I Severity grade II Severity grade III	137/640 (21%) 114/137 (83%) 21/137 (15%) 2/137 (2%)
Chronic seroma (present at 6 mo)	12/469 (2.6%)
Chronic fibrosis (present at 6 mo) Severity grade I Severity grade II Severity grade III	70/640 (11%) 63/70 (90%) 6/70 (8.6%) 1/70 (1.4%)
Chronic hyperpigmentation (present at 6 mo) Severity grade I Severity grade II Severity grade III	48/640 (7.5%) 48/48 (100%) 0/48 (0%) 0/48 (0%)
Patients with acute complications	134/640 (21%)
Patients with chronic complications	101/640 (16%)

Conclusion: IORT is a promising new treatment modality that greatly simplifies the delivery of postexcision radiation therapy. While 21% of patients had acute complications and 16% had chronic complications, most were mild. If grade I erythema, fibrosis, and hyperpigmentation are removed, only 27/640 (4.2%) had significant complications.

Addendum: A flexible tungsten rubber shield was used during the first 27 IORT cases to protect the internal organs from radiation therapy. Tungsten particles from these shields were identified in all 27 patients when they underwent their first postoperative mammography at 6 month. This was immediately reported to the FDA and the IORT program was halted until a stainless steel shield was available 9 months later. All 27 patients were immediately advised and referred to appropriate consultants. No significant illnesses have been reported to date, secondary to tungsten exposure. This complication is not included in the table above.

0363 - Institutional Experience of Applying ACOSOG Z0011 Criteria to Breast Cancer Patients Underrepresented in the ACOSOG Z0011 Trial

Daniel Farrugia[1], Emilia Diego[1], Atilla Soran[1], Alessandra Landmann[1], Priscilla McAuliffe[1], Marguerite Bonaventura[1], Ronald Johnson[1], Gretchen Ahrendt[1]

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Objective: The ACOSOG Z0011 trial established the feasibility of omitting axillary lymph node dissection (ALND) in patients undergoing breast conservation therapy (BCT) for T1-T2 breast cancers who are clinically node negative and have <3 positive sentinel lymph nodes (+SLN). The majority of patients had estrogen receptor positive (ER+) tumors and micrometastatic +SLN. We hypothesized that Z0011 principles of management can be expanded to patients with criteria that were underrepresented in the trial, including age < 50, invasive lobular cancer (ILC), triple-negative breast cancers (TNBC), high-grade tumors, or evidence of extracapsular extension (ECE) on SLNB.

Methods: After institutional approval, the Cancer Registry was queried for patients with T1-T2, cN0 disease undergoing BCT who proved to be pN1 on SLNB at our institution from 2011–2014. Chart review was performed to retrieve demographic and clinicopathologic data. Patients who had neoadjuvant therapy, metastatic disease, prior history of breast cancer, ALND, or omitted adjuvant radiation therapy (RT) were excluded.

Results: Of 183 patients with 1–2 +SLN on SLNB treated with BCT and omitting ALND, 118 had criteria that were under-represented in Z0011, including 47 (39.8%) under age 50 or premenopausal, 36 (30.5%) with grade 3 tumors, 43 (36.4%) with ECE on SLNB, 5 (4.2%) with TNBC, and 21 (17.8%) with ILC (table). Sixty-five patients had demographics of the typical Z0011 patient. In patients having underrepresented criteria, 87 (73.7%) had only 1 criterion and 3 (2.5%) had >2 criteria. Patients with underrepresented criteria were more than twice more likely to receive adjuvant chemotherapy (47.5% vs 20.0%, RR = 2.37, p = .0002, 95% CI [1.41, 4.00]). Mean follow-up was 27.5 months (median, 27; range, 2–53). There was a single distant recurrence (0.85%) and no locoregional recurrences in the 118 patients with underrepresented criteria. This patient had a grade 3 tumor with ECE on SLNB and sustained recurrence in liver and bone. One patient in this group died of unrelated causes. There was no recurrence in the 65 patients with typical Z0011 demographics.

Conclusion: There was no difference in LRR or overall breast cancer recurrence in this group of patients having underrepresented criteria in the Z0011 trial at a median of 27 months of follow-up. Our results support the hypothesis that Z0011 principles of axillary management may be expanded to patients under age 50, high-grade tumors, evidence of ECE on SLNB, TNBC, and ILC. We are accruing further prospective data and will update our findings after longer follow-up.

Recurrence in Patients With Underrepresented Z011 Criteria Omitting ALND

Underrepresented Criterion	n	Chemo (%)	Hormone (%)	Recurrence (%)
Age <50/premenopausal	47	25 (53.2)	45 (95.7)	0 (0)
Grade 3 tumor	36	23 (63.9)	27 (75)	1* (2.78)
Extracapsular extension	43	16 (37.2)	37 (86.0)	1* (2.33)
Triple-negative cancer	5	5 (100)	0 (0)	0 (0)
Invasive lobular cancer	21	7 (33.3)	21 (100)	0 (0)
No underrepresented criteria (typical Z0011 demographics)	65	13 (20.0)	65 (100)	0 (0)
≥1 underrepresented criteria	118	56 (47.5)	106 (89.8)	1* (0.85)
1 underrepresented criterion	87	39 (44.8)	83 (95.4)	0 (0)
>1 underrepresented criteria	31	17 (54.8)	23 (74.2)	1* (3.23)

*This sole recurrence is shown multiple times due to the presence of multiple criteria and refers to the same patient with a grade 3 tumor and ECE on SLNB.

0329 - The Impact of Body Mass Index on the Prognostic Power of Circulating Tumor Cells and Pathologic Complete Response Following Neoadjuvant Chemotherapy for Breast Cancer

Oluwadamilola Fayanju[1], Carolyn Hall[1], Jessica Bauldry[1], Mandar Karhade[1], Lily Valad[1], Henry Kuerer[1], Sarah DeSnyder[1], Carlos Barcenas[1], Anthony Lucci[1]

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Objective: Pathologic complete response (pCR) after receipt of neoadjuvant chemotherapy (NACT) and the presence of systemic microscopic disease in the form of circulating tumor cells (CTCs) at diagnosis are both important prognosticators of breast cancer outcome. As rates of obesity increase in the United States, it is unclear if body mass index (BMI) affects the prognostic significance of these clinical characteristics. Here, we examine the effect of BMI at diagnosis on the predictive power of models containing pCR and CTCs in forecasting prognosis of breast cancer patients following NACT.

Methods: Study participants were stage I–III breast cancer patients diagnosed from 3/2005 to 3/2015 who received NACT as part of a prospective trial on CTCs and whose postoperative pathologic review definitively described pCR. Predicted event-free survival (EFS; ie, no recurrence or death) was calculated using Cox proportional hazards models that included BMI, pCR, CTCs, age, race, tumor grade/size/biomarkers, menopausal status, anthracycline/taxane type, nodal status, and the presence of inflammatory breast cancer or lymphovascular invasion as covariates. We report hazard ratios (HRs) with 95% confidence intervals (CIs) significant at 2-tailed $p < 0.05$ and Harrell's C indices, which indicate the ordinal predictive power of the models.

Results: Of 113 patients, 93 (82%) had CTC values, and 34 (30%) had pCR; 91 (81%) had stage III disease, and 50 (44%) were obese (BMI $\geq$ 30). In bivariate modeling, pCR was associated with increased likelihood of EFS (HR, 0.07; CI, 0.01–0.51, $p < 0.01$), while presence of CTCs was associated with decreased likelihood of EFS (HR, 3.88; CI, 1.79–8.41; $p < 0.01$) at 30-month follow-up. Although BMI was not associated with EFS in either model, addition of BMI stratified by obesity (BMI < 30 vs BMI $\geq$ 30, see figure) improved the predictive power of CTCs (Harrell's C index of 0.67 for univariate model without BMI vs 0.72 for bivariate model with BMI) and pCR (Harrell's C index of 0.65 for univariate model without BMI vs 0.68 for bivariate model with BMI). The trivariate model with CTCs, pCR, and BMI had a Harrell's C index of 0.8, while the full multivariate model had the highest Harrell's C index (0.86) among our models and, accordingly, the greatest predictive power.

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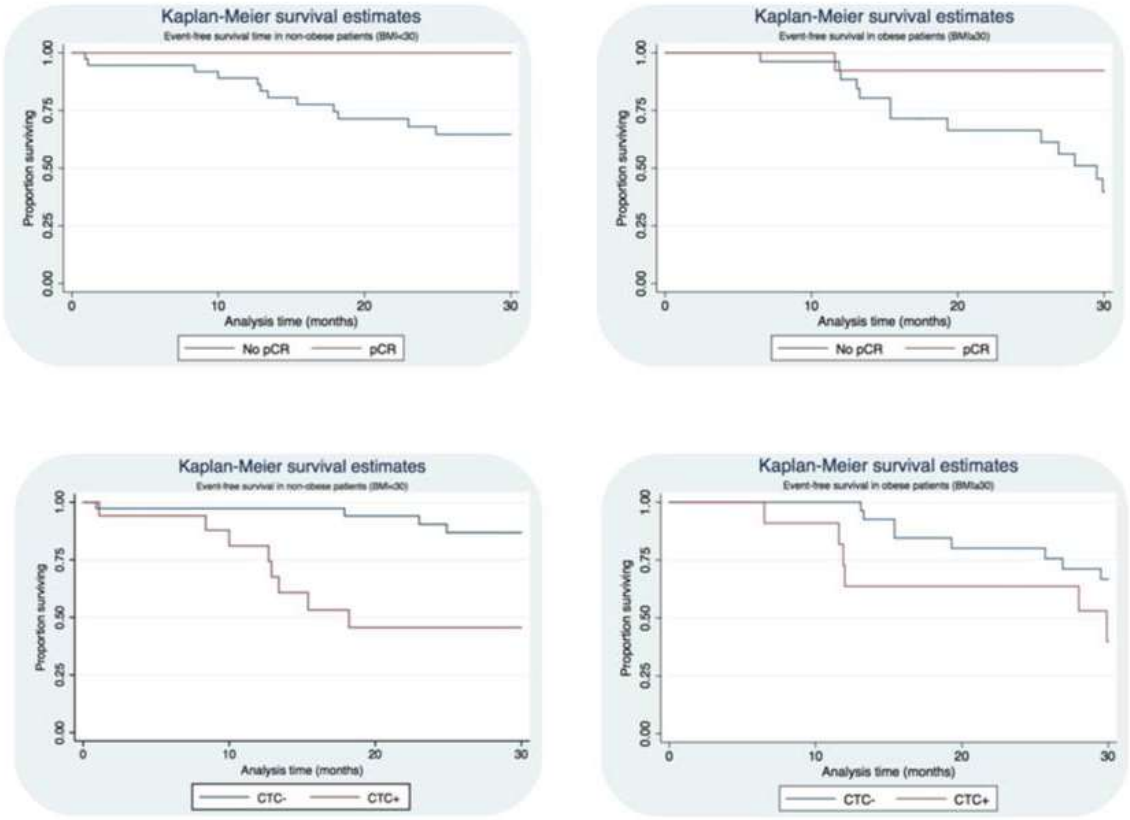

Conclusion: Although BMI was not independently associated with EFS in our cohort, it may nonetheless be an important contributor to predicting the likelihood of disease recurrence in breast cancer patients who receive NACT and in whom CTCs are present at diagnosis. The significance of both CTCs and pCR as prognosticators in obese patients warrants further investigation.

0320 - Who Bleeds After Breast Cancer Resection? A Contemporary Analysis of the ACS-NSQIP Database

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Objective: Postoperative bleeding is a common cause for unplanned return to the operating room in patients undergoing operative intervention for breast cancer. We aim to identify preoperative risk factors associated with increased risk of postoperative bleeding.

Methods: All patients who underwent breast cancer surgery were identified in the 2007–2012 ACS-NSQIP database. Patients who experienced postoperative bleeding requiring transfusion and/or an unplanned reoperation for hemorrhage or hematoma within 30 days were identified. Postoperative bleeding risk was compared by type of surgery as well as by other preoperative and perioperative risk factors. Univariate analyses and multivariate logistic regression were performed.

Results: 71,294 patients were identified who underwent surgical excision of breast cancer between the years of 2006 and 2012. Of these, 28,653 (40.2%) underwent lumpectomy; 24,380 (34.2%) underwent simple or subcutaneous mastectomy; 16,858 (23.7%) underwent modified radical mastectomy; and 1,403 (1.97%) underwent radical mastectomy. Six hundred eleven (0.86%) patients experienced postoperative bleeding

requiring blood transfusion and/or return to the operating room. In univariate analyses, risk factors associated with postoperative bleeding episodes included younger age; higher BMI; black race; higher ASA classification; greater complexity of procedure; presence of resident in the operating room; disseminated cancer; preoperative transfusion; weight loss; chemotherapy; abnormal preoperative laboratory values, such as elevated INR and decreased hematocrit; and personal history of diabetes, bleeding disorder, and steroid use. In multivariate analysis, each BMI increase of 1 point carried increased risk of bleeding of approximately 3% (OR, 1.03; 95% CI, 1.017–1.043). Participation of a resident in the surgery was associated with a 57% increase in risk of bleeding (OR, 1.57; 95% CI, 1.21–2.03). Simple mastectomy carried an 8.6-fold increased risk, compared to lumpectomy (OR, 8.63; 95% CI, 5.20–14.3); radical mastectomy had estimated 10.9 times the risk of lumpectomy (OR, 10.9; 95% CI, 5.28–22.3). In addition, preoperative transfusion, preoperative hematocrit levels, existence of a bleeding disorder, and presence of disseminated cancer were all significant independent predictors of bleeding risk.

Conclusion: In this analysis of a national cohort of breast cancer patients, multiple risk factors were associated with increased likelihood of a postoperative hemorrhage. While hemorrhage is relatively rare following breast surgery, there are significant implications to the event, including risk of reoperation. Identification of at-risk patients may enable for improved preoperative patient education and operative planning.

0305 - Acupuncture As Treatment for Flap/Nipple Ischemia Following Nipple-Sparing Mastectomy

Jennifer Garreau[1], Heather Farley[2], Margie Glissmeyer[1], Nathalie Johnson[1]

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Objective: Nipple-sparing mastectomy (NSM) can offer enhanced cosmetic outcome. Inherent with this technique is a higher risk of nipple/flap ischemia that may lead to loss of the nipple and require surgical revision. Acupuncture has been described to improve circulation. We evaluated the efficacy of acupuncture for reversing ischemia after NSM.

Methods: A retrospective review of all nipple-sparing mastectomies performed at a community hospital in 2014 was evaluated.

Results: There were 100 NSMs performed on 55 patients. Eleven NSM patients (20%) had some degree of nipple/flap ischemia. Eight of 11 (73%) were referred to acupuncture and reported improved flap/nipple appearance. Of these, 2 patients required additional procedures and only 1 patient had nipple loss. Patients reported improved pain control as well.

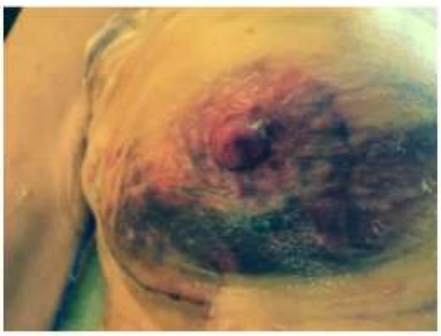

Figure 1A – pre-treatment

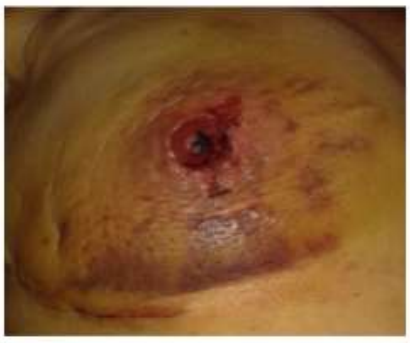

Figure 1B – 3days post-treatment

Conclusion: Acupuncture techniques can improve circulation and may be used to reverse ischemic changes after NSM. It is most effective when started within the first 24 hours after surgery.

0375 - A Cost-Effective Handheld Breast Scanner for Use in Low-Resource Environments: A Validation Study

Rula Geha[1], Robyn Broach[2], Mihir Shah[3], Matthew Campisi[3], Lucy De La Cruz[1], Brian Englander[4], Ari Brooks[2]

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Objective: The incidence of breast cancer is rising worldwide, with the majority of new breast cancers in developing nations. These countries lack healthcare infrastructure and resources to support mammogram-led screening programs. There is a need to develop low cost and widely effective screening for breast pathology. We are evaluating the IBreastExam (iBE) (UE LifeSciences Inc.), a handheld breast scanning device to "palpate" the breast electronically. A green/red map of the breast is constructed as the device moves. The device can be utilized by community health workers to screen women for breast abnormalities with the intent that positive findings would lead to imaging and/or biopsy. This purpose of this study is to determine the sensitivity of the iBE in a population undergoing diagnostic breast imaging for palpable and/or screening-detected lesions.

Methods: Women and men over age 18 presenting to the clinic or breast imaging center for a diagnostic workup were eligible. After obtained consent, patients underwent a 15- to 20-min iBE exam performed by an iBE-trained ultrasound technician. The patients then underwent their indicated imaging. Demographic, imaging and biopsy data were recorded. Not all patients had both breasts evaluated with the iBE. The iBE findings were grouped in 1 of 4 definitive clock quadrants in order to directly compare with the imaging position results. Each quadrant was analyzed independently.

Results: Eighty-nine patients were enrolled. Seventy-eight had complete iBE exams for analysis; 77 female and 1 male. Ten patients underwent bilateral exams. The mean age of the patients was 42 (21–79). All patients were evaluated by ultrasound; 52 had diagnostic mammography and 39 had biopsies. Imaging and/or biopsy confirmed a mass (fibroadenoma, cyst, papilloma, myofibroblastoma, fat necrosis, DCIS, or cancer) in 60 patients. Eighteen were negative. Twelve patients had a cancer diagnosed; mean size was 1.9 (0.6–3.8 cm). In total, 342 quadrants were scanned in 78 patients; 77 quadrants had lesions confirmed on imaging, and 265 quadrants were negative on imaging. iBE correctly identified 66 of 77 lesions for a sensitivity of 86%, specificity is 89%. The iBE correctly identified 10 of 12 malignancies (83%), the 2 lesions missed were under 1 cm: a 5-mm DCIS and a 7-mm mucinous carcinoma.

Conclusion: This validation study demonstrated excellent sensitivity of iBE for the identification of clinically significant lesions in patients presenting for diagnostic imaging. A larger study in the general screening population will allow for better assessment of the specificity of this tool.

0228 - Successful Ultrasound-Guided Segmental Mastectomy and Excisional Biopsy Using Hydrogel-Encapsulated Clip Localization As an Alternative to Wire Localization

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Objective: Wire localization is currently the most widely used preoperative localization strategy for surgical guidance during excision of nonpalpable breast lesions. Disadvantages of wire localization consist of patient discomfort, wire-related complications, such as wire displacement or fracture, and operating room delay related to technical challenges during wire placement. Our institution has implemented the technique of intraoperative ultrasound (US)-guided excision using hydrogel-encapsulated (HydroMARK ®) biopsy clips for lesion localization. We hypothesize that this method is as effective as wire localization for breast-conserving therapy.

Methods: This is a retrospective review of all patients who underwent either segmental mastectomy or excisional biopsy using wire localization or hydrogel-encapsulated clip localization between January 2014 and July 2015. Data on margin status, specimen size, need for re-excision, and procedure time for preoperative lesion localization were collected and analyzed. Statistical analyses for differences between groups were performed using *t* tests and Mann-Whitney rank sum analyses.

Results: Two hundred and twenty consecutive patients underwent segmental mastectomy or excisional biopsy between January 2014 and July 2015. One hundred and seven excisions were performed using hydrogel-encapsulated clip localization, and 113 excisions were performed using the traditional wire localization technique. Sixty-eight percent of our patients underwent excision for malignant pathology. Four patients were converted from US localization to wire localization due to inability to identify the biopsy clip preoperatively. Single-wire localization procedure time ranged from 20 min to 180 min, with an average of 46 min, as compared to 5 min for ultrasound localization ($p < 0.001$). Successful intraoperative US localization and excision was performed on 100% of patients, as confirmed by biopsy site changes and pathology on permanent sections. There was no difference in the rate of re-excision for margin positivity or specimen size between patients undergoing traditional wire localization techniques as compared to hydrogel-encapsulated clip guided excision.

	Wire Localization	Intraoperative US-Guided Excision	P Value
Number of excisions	113	107	
Specimen size (median)			
IDC	29.0 g	29.1 g	P = 0.745
DCIS	17.2 g	15 g	P = 0.817
Re-excision rate (%)			
IDC	14%	16%	P = 0.653
DCIS	39%	40%	P = 0.796
Localization procedure time (mean)	46 min	4.7 min	P < 0.001

Conclusion: Intraoperative ultrasound-guided excision of nonpalpable breast lesions using a hydrogel-encapsulated biopsy clip for breast-conserving therapy is a safe and feasible alternative to the traditional preoperative wire localization excision. This technique will lead to improvement in patient experience, operative efficiency, and alleviate wire localization-related complications.

0298 - Does Exogenous Insulin Contribute to the Development of More Aggressive Subtypes of Breast Cancer?

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[1]University of Pennsylvania, Philadelphia, PA, [2]Wistar Institute, Philadelphia, PA, [3]University of Pennsylvania Health System, Philadelphia, PA

Objective: Insulin resistance, as seen in type 2 diabetes (DM2) and metabolic syndrome (visceral adiposity, insulin resistance, fasting hyperglycemia, etc.), is associated with higher incidence of breast cancer and worse overall prognosis. Several studies have demonstrated a strong association between hyperinsulinemia, elevated IGF-1 levels, and poor breast cancer prognosis, including distant recurrence and mortality.

Methods: Insulin is a growth-promoting hormone with tumorigenic potential via activation of IGF-1 pathways and is known to have mitogenic, anti-apoptotic, and angiogenic properties. In vitro and in vivo studies have shown insulin receptor overexpression in breast tissue. More recently, studies have highlighted an association

between insulin resistance and central adiposity with overexpression of HER2+ on tumors in postmenopausal women, which supports hyperinsulinemia as a pro-inflammatory and mitogenic environment allowing for proliferation of more aggressive breast cancer subtypes. It is unclear, however, whether the exogenous administration of insulin impacts breast cancer risk and survival. We hypothesize that the administration of exogenous insulin is associated with increased risk of more aggressive breast cancer subtypes (ie, HER2+), worse prognosis, and reduced survival compared to nondiabetics and diabetic patients who received medications known to decrease circulating insulin levels (ie, metformin). To test this hypothesis, we performed a retrospective chart review of breast cancer patients who had surgery at a single-institution from 1995 to 2013 (n = 1214).

Results: As expected, insulin use is strongly associated with DM2 ($p < 6.36 \times 10^{-54}$) and moderately associated with increased BMI ($p < 0.037$). Of patients taking insulin, 85% were either overweight or obese, underscoring the strong association between DM2, obesity, and insulin resistance. On multivariate analysis using a Cox-proportional hazard model and stratifying by BMI, weight, and race for a preliminary subset of patients with available clinical, pathologic, and demographic covariates (n = 307), we found that insulin use, age, nodal status, and tumor size were independently predictive of survival (log-rank test, $p < 1.15 \times 10^{-6}$). Specifically, insulin use prior to breast cancer diagnosis significantly reduced overall survival as compared to those without a history of insulin use (HR = 13.09; 95% CI, 1.94–88.16; Kaplan-Meier log-rank test, p < 2.97e-07). Data collection and analysis are ongoing for the full patient cohort.

Conclusion: Our findings suggest a link between hyperinsulinemia secondary to exogenous insulin and development of more aggressive breast cancer. In light of the recent American Cancer Society report on increased incidence and higher mortality of breast cancer among black women and potential link to obesity and metabolic syndrome, it is imperative to evaluate the impact of exogenous insulin on breast cancer proliferation as a strategy for intervention.

0330 - Take It All! - The Decision to Pursue Bilateral Mastectomy for Ductal Carcinoma In Situ (DCIS)

Katherine Glover-Collins[1], Julie Margenthaler[1]

[1]*Washington University in St Louis, St Louis, MO*

Objective: Breast-conserving therapy remains a viable option for most women with DCIS, resulting in similar survival outcomes to those who pursue mastectomy. Despite this, bilateral mastectomy rates are increasing in patients with DCIS. This study was undertaken to evaluate the patient's motivation behind the choice for bilateral mastectomy for the treatment of DCIS.

Methods: This was an IRB-approved retrospective chart review and questionnaire–based study of women aged 18 and older in our institutionally maintained breast cancer database who have undergone a mastectomy over a 10-year period. A custom-designed written survey with 18 questions was developed and queried on demographics, surgical choices, patient rationale, and presence of known hereditary cancer syndromes. The survey also included questions to determine the involvement of specific members of the multidisciplinary team (ie, surgeons, medical oncologists, and/or radiation oncologists) and the timing of these consultations.

Results: Three hundred forty-eight women who had undergone mastectomy for a diagnosis of breast cancer were included in the study. Of those, 64 (18%) were diagnosed with DCIS by final pathology. Nearly half underwent bilateral mastectomy (30/64), despite being eligible for and offered BCT by their breast surgeons. The most cited reasons for mastectomy over BCT in descending order were perceived reduction of risk of breast cancer recurrence, improvement in survival, and chance to omit radiation therapy. The decision for bilateral mastectomy in 53% of these 30 women was for prophylactic reasons without a known genetic abnormality. Thirty-seven percent of these 30 women underwent genetic testing, however there were no genetic mutations found. Thirty-three percent opted for bilateral mastectomy for improved cosmesis and 90% of these women subsequently underwent reconstruction.

Conclusion: These data suggest that women with stage 0 DCIS are under the impression that more extensive surgery will provide a better outcome in terms of survival and risk of recurrence. Better patient education and communication tools are needed in order to guide practitioners in their consultations so that surgical overtreatment may be avoided.

0275 - Evaluation of Percutaneous Vacuum-Assisted (VA) Intact Specimen Breast Biopsy Device for Ultrasound (U/S) Visualized Breast Lesions: Upstage Rates and Long-Term Follow-Up (F/U) for High-Risk Lesions (HRL) and DCIS

Cathy Graham[1]

[1]*Case Western Reserve University School of Medicine, University Hospitals of Cleveland, Cleveland, OH*

Objective: Percutaneous core needle biopsy (PCNB) of U/S visualized breast lesions is considered standard of care for initial diagnosis. Use of large-gauge VA-PCNB devices has improved accuracy; but there still remains 12%–18% underestimation rate of malignancy. The VA Intact biopsy device, which provides a larger, intact specimen, was assessed for upstage rates of U/S-guided percutaneous biopsies. Long term f/u for subsequent malignancy at the biopsy site was also assessed.

Methods: This retrospective study reviewed 469 consecutive U/S visualized breast lesions, <2.0 cm in size, BIRADS 4 or 5, which were biopsied using the Intact Breast Lesion Excision System (BLES) between July 2007 and August 2014 at a single institution. All nonconcordant lesions (0.8%), DCIS (1.7%), and ICAs (9.8%) were surgically excised. Surgical excision was recommended for all HRLs (13.0%). The upstage rate to DCIS or ICA was determined. All patients, including those with HRL that were not surgically excised, were followed for a mean of 48 months (13–91 months) with serial imaging and clinical breast exams to determine the incidence of re-biopsy or the development of DCIS or ICA at the previously biopsied site.

Results: See table. Twenty-three of 61 HRL (37.5%) were not excised (patient preference), but observed with close f/u. Five (8.5%) patients with HRL on BLES were lost to f/u before the planned 2 years. Of the 23 HRLs diagnosed with BLES but not surgically excised, none were upstaged to DCIS or ICA over a mean f/u of 48 months. During the f/u period, no patient was diagnosed with DCIS or ICA at or near the original BLES biopsy site.

BLES Pathology	# of Patients	# Excised	# Upgraded After Excision	% Upgrade	% With Recurrent Issues At or Near BLES Site During Follow-Up Period
Benign	355	0	N/A	N/A	0%
HRL	61	33	1	3.03%	0%
DCIS	8	8	0	0	0%
ICA	45	45	0	0	0%
Total	469	86	1	1.16%	0%

Conclusion: (1) Percutaneous biopsy of U/S visualized lesions can be performed accurately using IntactR BLES. (2) Upstage rate is significantly lower using BLES with U/S guidance than previously published data using large-gauge VA-PCNB. (3) HRLs, when diagnosed with BLES under U/S guidance, have a very low upstage rate at surgical excision. It may be possible to observe these lesions without surgical excision when they present as U/S findings and undergo BLES.

0396 - Symptomatic Axillary Seroma After Sentinel Node Biopsy: Incidence and Treatment

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Objective: Seroma formation can be a postoperative nuisance for both the patient and surgeon. Unfortunately few studies investigate predisposing factors for symptomatic axillary seroma after sentinel lymph node biopsy. Herein we sought to quantitate the risk of symptomatic seroma and characterize necessary interventions.

Methods: We performed a retrospective review of 691 women undergoing breast-conserving surgery (BCS) and sentinel node biopsy (SLNB) at our institution between 7/2007 and 1/2015. Patients were routinely mapped with technetium sulfur colloid and never had drains placed at the time of initial surgery. Blue dye was used at surgeon discretion. Surgeons dissected sharply or with standard electrocautery. We correlated patient and tumor characteristics with symptomatic seroma using logistic regression models for univariate and multivariate predictors. All statistical tests were 2-sided with $p < 0.05$ considered significant.

Results: Overall, 128 of 691 (19%) women had clinically detected axillary seromas of which 99 of 128 (77%) required further intervention for symptom relief. Patients having seroma were similar in age, BMI, race, tumor type, T and N stage, and number of nodes removed as those without seroma (all $p > 0.11$). Seroma rates did not vary according to surgeon or nodal-mapping technique and were not affected by deep suture closure of the axillary cavity ($p = 0.9$). Multivariate analysis identified diabetes, smoking, and SSI as the only predictors of symptomatic axillary seroma with OR of 1.91, 1.85, and 25.52 (all $p < 0.02$), respectively. Among the 99 of 128 patients with symptomatic seroma, the majority (81/99, 82%) resolved with a mean of 1.3 aspirations, while the remaining required the additional placement of an axillary drain (14/99, 14%) or additional surgery for resolution after prolonged drain placement (4/99, 4%).

Conclusion: Axillary seroma occurs in 1 of 5 patients undergoing BCS with SLNB and is not influenced by tumor, nodal mapping, or surgeon characteristics. Seroma management infrequently requires more than simple aspiration though drain placement at initial surgery should be considered in smokers or patients with diabetes. Further research into seroma prevention is necessary as even simple treatment still requires multiple patient appointments for resolution.

0371 - Barriers to Genetic Testing in Newly Diagnosed Breast Cancer Patients: Where Can We Improve?

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Objective: Results of genetic testing in breast cancer patients influences surgical treatment and modifies screening for family members. However, even at our high-volume National Accreditation Program for Breast Centers (NAPBC) and Committee on Cancer (COC)–accredited breast center, not all patients at risk for a genetic mutation are seen by genetic counselors. The goal of this study was to compare characteristics between patients who complete genetic counseling vs those who do not and identify barriers limiting appointment completion.

Methods: The study cohort included newly diagnosed breast cancer patients meeting National Comprehensive Cancer Network (NCCN) guidelines for genetic counseling from January 1, 2014, to June 30, 2015. Data on demographics, pathology, imaging, and genetic testing outcomes was collected. A telephone survey was performed among patients who were referred but did not complete a genetic counseling appointment to identify barriers to appointment completion. Comparisons were done using 2-sample *t* tests, Wilcoxon rank-sum tests, and chi-square tests. Statistical significance was defined as $p < 0.05$.

Results: In total, 532 patients met NCCN criteria for referral to genetic counseling, and 313 (59%) completed an appointment. One hundred twenty-seven (24%) were not referred to genetic counseling and 89 (17%) were

referred but did not complete an appointment. The vast majority of patients who saw a genetic counselor had genetic testing (92%), and 9.3% of those tested had pathologic mutations. Age was the only statistically significant difference in patients who were referred to genetic counseling, with the average age being 10 years younger than a nonreferred patient. Three hundred thirteen completed appointments, for a 77% appointment completion rate when referred. The 89 women referred to genetics who did not complete an appointment were surveyed: 14 stated they were too busy, 12 were not interested in testing, 8 had financial concerns, 4 did not know they were referred, 3 stated there was too much pre-appointment preparation, 3 stated that family history had become less worrisome once they obtained more information, 11 had other reasons, 21 patients were unable to be reached, and 2 patients were deceased.

Conclusion: Multiple reasons were identified as barriers to genetic counseling in newly diagnosed breast cancer patients. The top reason was not being referred, and therefore provider education must be improved. To increase the rate of appointment completion, we should attempt to make appointments more convenient by coordinating them with other scheduled appointments. We should also provide information about cost and insurance coverage in the pre-appointment materials.

0419 – Triple-Negative Breast Cancer: Identifying an Unacceptable Time to Treatment

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Objective: Acceptable interval times from diagnosis to treatment in cancer continue to be a source of controversy. Given the focus on quality outcomes within a background of healthcare network consolidation, acceptable time intervals need to be based on data rather than arbitrary administrative benchmarks. The aggressive behavior of triple-negative breast cancer (TNBC), which responds primarily to chemotherapy and has high rates of recurrence in a short time interval, allows for an assessment of the impact of a delay from diagnosis to treatment. This study evaluates the oncologic impact of increasing time intervals from diagnosis to treatment in TNBC.

Methods: This study is a retrospective review of TNBC patients treated between January 2004 and August 2015 at an academic center. Data collected included demographics, pathologic factors, treatment, recurrence, and survival. Interval to initial treatment was defined as days from pathologic diagnosis to first local or systemic treatment. Statistical analysis included both a *t* test and Cox regression analyses to evaluate impact of time to treatment on overall survival and LRR. Variables, including stage, tumor size, age, race, and tumor proliferative rate, were also evaluated.

Results: Median follow-up was 54 months for 301 TNBC patients. Mean interval to treatment was 46 +/– 2 days. Interval to treatment did not significantly impact overall survival ($p = 0.22$), although there was a trend toward worse survival with delays >90 days ($p = 0.08$). LRR was seen in 26 patients (9%). Median time to recurrence was 17.8 months, with time to treatment of 35 days seen in patients with an LRR, where a time to treatment of 47 days was seen in patients without a documented LRR. A shorter delay in time to treatment did not impact LRR. As expected, higher initial stage and tumor size impacted survival ($p = <0.0001$, $P = 0.0002$). There was no statistically significant difference observed with race, age, or tumor proliferative rates on either LRR or survival. There was a trend for higher LRR within patients less than 50 years of age ($p = 0.1$).

Conclusion: With 4.5-year follow-up, a delay from time of pathologic diagnosis to time to initial treatment does not appear to adversely affect survival or LRR. This is consistent with our prior study revealing that a reasonable time from diagnosis to initial treatment is acceptable to allow for adequate workup and consultations to guide treatment decisions.

0286 - Margin Consensus Guideline Effect on Re-Excision Rates, Conversion to Mastectomy and Specimen Volumes

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Objective: The 2014 Society of Surgical Oncology–American Society of Radiation Oncology consensus guideline on margins for breast conservation surgery defined "no tumor on ink" as an adequate margin for invasive carcinoma. Its purpose was to decrease unnecessary re-excisions and improve cosmetic outcomes. We sought to compare re-excision rates and specimen resection volumes before and after these guidelines were implemented at an academic institution.

Methods: Data were gathered retrospectively from an IRB-approved, prospectively maintained database about patients with invasive carcinoma, stage I and II, who underwent partial mastectomy. Patients with DCIS only, diagnosed with excisional biopsy and receiving neoadjuvant chemotherapy, were excluded. The patients were split into 2 groups based on when they received treatment, before March 1, 2014 (pre-consensus [PC]) and after March 1, 2014 (post-consensus [PTC]), date of institutional guideline implementation. The groups were compared in a univariate analysis to investigate differences in re-excision rates, conversion to mastectomy, specimen volumes, use of selective resection margins, and selective resection margin volumes.

Results: A total of 165 partial mastectomy patients were examined, with 124 in the PC group and 42 in the PTC group. The 2 groups were found to be different with regard to tumor grade and ER status ($p = 0.0084$ and 0.001, respectively). The PC group had a total of 40 (32%) patients return to the operating room, 27 having re-excisions and 11 were converted to mastectomy. Two patients had margin re-excisions followed by mastectomy conversion. In the PC group, 5 mastectomy and 12 partial mastectomy patients had no tumor on ink on initial evaluation. After release of the guidelines, the re-excision rates were significantly reduced to 1/42 (2.4%) ($p < 0.0001$), with no mastectomy conversions. The median resection volumes trended downward, 84.2 cm^3 and 55.9 cm^3 in the PC and PTC groups, respectively ($p = 0.15$). Selective margin resection was utilized more frequently in the PTC group (33/124 PC vs 24/41 PTC, $p = 0.0006$), but the PTC median selective margin resection volumes were significantly smaller (50 cm^3 vs 13.2 cm^3, $p = 0.029$).

Patient Characteristics and Results

Variable	Pre-Consensus (n = 124)	Post-Consensus (n = 42)	p Value
Median age, years (range)	60 (26-85)	60 (43-84)	0.48
Median tumor size, cm (range)	1.7 (0.1-9.0)	1.4 (1.0-3.6)	0.10
ER positive, n (%)	93 (75%)	41 (98%)	0.001
PR positive, n (%)	83 (67%)	35 (85%)	0.07
Her-2 positive, n (%)	11 (10%)	2 (6%)	0.73
Tumor grade, n (%)			
Grade I	26 (22%)	17 (42%)	0.008
Grade II	44 (37%)	16 (40%)	
Grade III	49 (41%)	7 (18%)	
Node positive, n (%)	32 (26%)	7 (17%)	0.29
Histologic type			
Invasive ductal, n (%)	98 (79%)	31 (77.5%)	0.68
Invasive lobular, n (%)	16 (13%)	4 (10%)	
Mixed, n (%)	4 (3%)	1 (2.5%)	
Other, n (%)	6 (5%)	4 (10%)	

Re-excisions, n (%)	40 (32%)	1 (2%)	<0.0001
Partial mastectomies, n	27	1	
Mastectomies, n	13	0	
Operations with selective margin resection, n (%)	33 (27%)	24 (57%)	0.0006
Median selective margin volumes, cm3 (range)	50 (0.5–553)	13.2 (1.1–154)	0.029
Median total resection volume, cm^3 (range)	84.2 (2.4–647)	55.9 (16.5–342)	0.15

Conclusion: Institutional implementation of the 2014 margin guidelines resulted in a significant decrease in the number of re-excisions, conversions to mastectomy, and selective margin volume, and a trend toward smaller resection specimens. Smaller specimen and selective resection margin volumes may improve cosmetic outcomes.

0248 - SONIC-PBI – A Novel Protocol to Complete Breast Cancer Surgery and Radiation Within 10 Days

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Objective: Fifteen percent to 45% of patients do not receive the adjuvant radiotherapy recommended after breast-conserving cancer surgery. Whole- or partial-breast irradiation (PBI) typically is initiated 3 to 6 weeks after operation and administered over a 1- to 6-week period. We instituted a protocol for same-day operation and intraoperative catheter placement for PBI (SONIC-PBI). We hypothesized that with frozen-section assessment of margins and sentinel lymph nodes (SLN) all locoregional treatment could be completed within 10 days, with acceptable complication rates and cosmesis.

Methods: Patients ≥ age 50 with clinical T1 ER+ SLN-negative invasive ductal cancer or pure DCIS were prospectively registered. Protocol treatment was operation and catheter placement, day 1; simulation and confirmation of final pathology, day 2; initiation of radiation, day 3. Cosmesis was assessed using photographs graded independently by 3 investigators with a 4-point validated scoring system in 51 patients with ≥6-month post-treatment photos.

Results: From 10/2012 to 8/2015 we enrolled 123 patients; 110 (90%) underwent intraoperative placement of a strut-adjusted volume implant device (SAVI, Cianna Medical, Aliso Viejo, CA), while 13 did not, due to intraoperative pathology findings (6 SLN+, 7 extensive disease, 2 other). Eighty-two APBI patients (75%) were prescribed 34 Gy in 10 BID fractions/5 days, while 22 (20%) had 32 Gy/8 BID fractions/4 days, 5 (5%) had 21 Gy/3 QD fractions/3 days, and 1 received 8 Gy/2 fractions as a boost only (due to delayed +SLN). One hundred nine patients (99%) who had intraoperative catheter placement completed all locoregional therapy within 9 days. Patient, tumor features are summarized in the table. The 30-day complication rate was 7/110 (6%). The 1-year complication rate, evaluable in 81 patients, was 17% (14 patients): SSI in 5 (6%), symptomatic seroma in 5 (6%), other in 6 (7%) and correlated with device size ($p = 0.05$) but not tumor size or location. The ipsilateral breast local failure rate was 2%. Scored cosmesis was excellent in 27 (53%), good in 18 (35%), and fair in 6 (12%).

Variable	Number (%) or Median (IQR)
Age, mean, range, years	66, 45–84
Presentation, abnormal mammogram	104/110 (95%)
Pathologic tumor size, mm, mean, range (invasive)	11, 0.9–24
Pathologic tumor size, mm, mean, range (DCIS)	9.4, 1–45
ER+ (DCIS)	20/21 (95%)
ER+ (invasive cancers)	89/89 (100%)
HER2+ (invasive cancers)	4/89 (4%)
Ki67, median, IQR (invasive cancers)	9.1, 6.1–14.4
Minimal tumor free margin, mm, median, IQR	5, 4–7
Number of margins re-excised intraoperatively 0 1 2 3	 58/110 (53%) 30/110 (27%) 15/110 (14%) 7/110 (6%)
PBI catheter size 6-1 mini 6-1 8-1 10-1	 24 (22%) 66 (60%) 17 (15%) 3 (3%)
Adjuvant hormonal therapy (ER+ patients)	70/109 (64%)
Adjuvant chemotherapy	3/89 (3%)

Conclusion: With the use of intraoperative frozen-section pathology, SONIC-PBI was successful in 99% of patients undergoing intraoperative brachytherapy catheter placement, substantially shortening locoregional treatment time. Our complication and recurrence rates were low, and cosmesis was good or excellent in most cases. This approach is efficient, allowing completion of definitive locoregional therapy within 9 days, and may enhance compliance with adjuvant radiotherapy. SONIC-PBI is an option for early-stage breast cancer in practices with low-margin positivity rates.

0306 - Radiographically Guided Shave Margins May Reduce Lumpectomy Re-Excision Rates: A Single-Surgeon Experience

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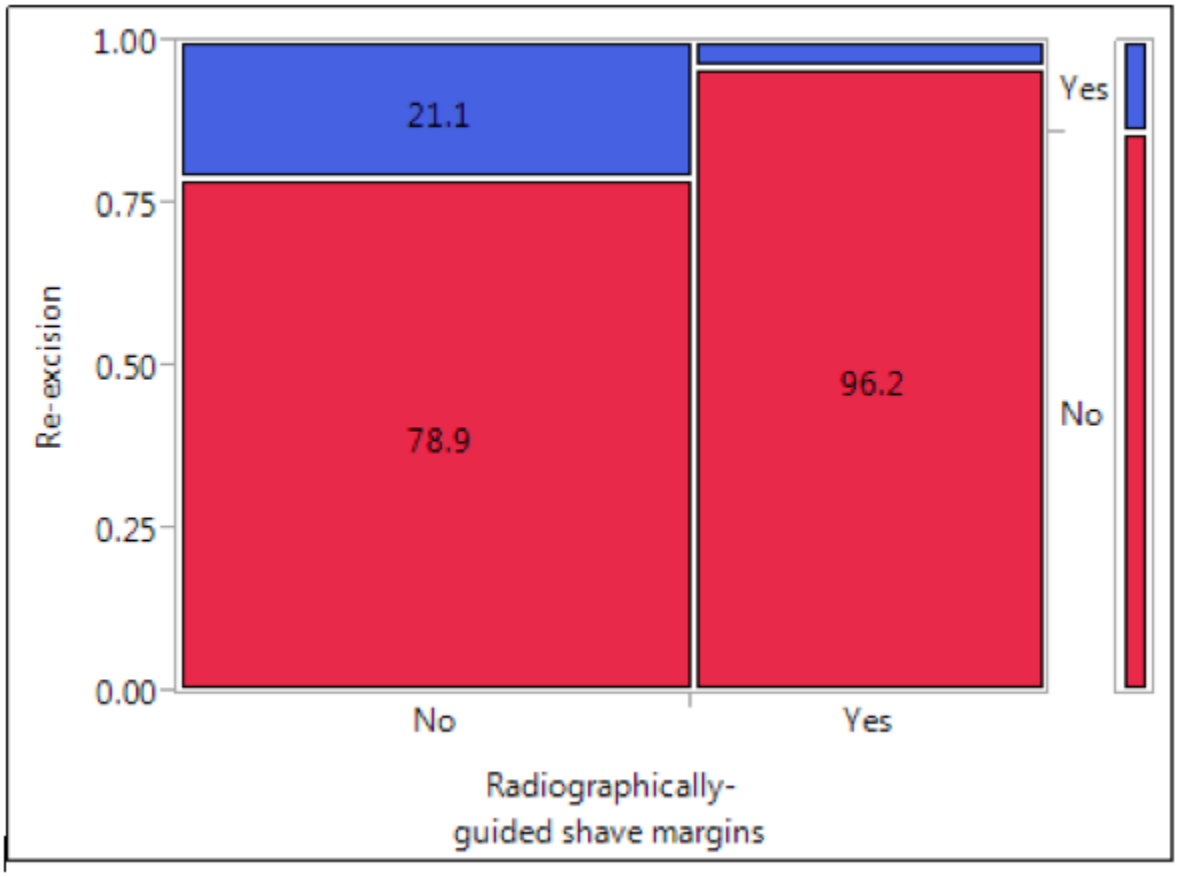
Objective: The principle of breast conservation balances adequate oncologic resection and ideal cosmesis. Strategies to minimize margin re-excision optimize patient care and health care costs. Using radiographic guidance allows for real-time re-evaluation of margins. We hypothesize that routinely using radiographically guided shave margins decreases re-excision rates.

Methods: This is a single-surgeon, IRB-approved, HIPAA-compliant retrospective chart analysis of 182 patients who underwent breast conservation therapy from January 2013 to January 2014. In this timespan, a new technology was introduced to radiographically guided shave margins. The control group is thus defined as those who underwent traditional lumpectomy with selective shave margins. After performing the lumpectomy, orienting sutures were placed and the specimen radiographed. Based on proximity to each of 6 margins, additional shave margins were obtained. In addition, a new ultrasound probe, which allows directed intraoperative cavity sonography, was intermittently utilized in this timespan as well. Pathological factors and re-excision rates between the control arm and the radiographically guided (RG) arm were evaluated using chi-square analysis and Fischer exact test using SAS, JMP 1.1.

Results: Of the 182 patients studied, 93 patients were included in the control group and 89 in the RG arm. The re-excision rate was 18.3% in the control arm and 10% in the radiographically guided arm (p = 0.11). Pathology in the 182 cases included: 14.84% DCIS, 11.54% invasive mixed lobular-ductal, 8.79% invasive lobular, and 64.84% invasive ductal. Tumor type did not demonstrate statistical significance on re-excision rates (p = 0.22). Neoadjuvant chemotherapy was administered in 14.8% of cases with no statistically significant difference in re-excision rate (p = 0.24). A subset analysis was performed of the 89 patients in the RG arm to determine effect of intraoperative ultrasonography. In 29.21% no ultrasound was used, in 47.19% intracavitary ultrasound was used, and in 23.6% transcutaneous ultrasound was used. There is no statistically significant difference in re-excision rates (p = 0.38), however, the likelihood of type 1 error is high due to insufficient datapoints. In the subset of 64 patients in which no ultrasound was used, RG-shave margins were obtained in 40.63% of patients and selective shave margins in 59.38% with a resultant re-excision rate of 3.85% in the RG arm vs 21.05% in the traditional arm (p = 0.03).



Conclusion: Radiographically guided shave margins best decrease re-excision rates in sonographically occult lesions. This new technique has the potential to not only reduce re-excision rates, but also decrease size of shave margins, and ultimately improve cosmetic outcomes while reducing health care costs.

0183 - Does Axillary Nodal Metastasis Detected on Ultrasound Mandate Axillary Lymph Node Dissection?

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Objective: The Z11 trial showed that axillary lymph node dissection (ALND) does not benefit patients with 1–2 positive sentinel lymph nodes (SLN) who undergo lumpectomy and whole-breast radiation. Since the Z11 trial did not consider axillary ultrasound (AUS) findings, it is unclear how to manage the axilla in patients with nodal disease identified on AUS but no palpable adenopathy. We undertook a study to examine nodal disease burden in patients with positive AUS-guided lymph node needle biopsy (LNNB) who underwent ALND.

Methods: From an institutional database, all newly diagnosed invasive breast carcinomas from 2/2011–10/2014 with both preoperative AUS and surgical axillary staging were identified. Exclusions were for palpable adenopathy, neoadjuvant chemotherapy, or previous axillary surgery. For the subgroup of patients with positive AUS-guided LNNB who underwent ALND, we examined (1) total nodal disease burden on pathology and (2) association between number of suspicious nodes on AUS and number of positive nodes on pathology.

Results: Five hundred twenty cases were included; 114 (22%) had suspicious AUS. Ninety-three patients underwent AUS-guided LNNB, of which 44 (47%) were diagnostic of nodal metastasis. Among 41 patients who underwent ALND after positive AUS-guided LNNB, 32% (n = 13) had 1–2 positive nodes, 12% (n = 5) had 3 positive nodes, 32% (n = 13) had 4-9 positive nodes, and 24% (n = 10) had ≥10 positive nodes. Sixty-eight percent (95% CI, 52-81%) of patients who underwent ALND after positive AUS-guided LNNB had ≥3 positive nodes on ALND. The number of suspicious nodes on AUS was not predictive of the likelihood of heavy nodal disease burden, defined as ≥3 positive nodes on ALND (p = 0.37, table). Even in patients with only 1 suspicious node on AUS, 62% (95% CI, 39-81%) of patients had ≥3 positive nodes on ALND.

Association Between Number of Suspicious Lymph Nodes (LN) Reported on Axillary Ultrasound (AUS) and Proportion of Patients With ≥3 Positive LN on Pathology, Among Patients With Positive AUS-Guided LN Needle Biopsy Who Underwent Axillary Lymph Node Dissection (ALND)

Number of Suspicious LN on AUS	% of Patients With ≥3 Positive LN on Pathology, Among Patients With Positive AUS-Guided LN Needle Biopsy Who Underwent ALND (n = 41)1
1	13/21 = 62% (95% CI, 39–81%)
≥2	15/20 = 75% (95% CI, 52–90%)

1p = 0.37 (2-tailed p-value for the difference in proportion of patients with ≥3 positive LN on pathology)

Conclusion: Patients with positive AUS-guided LNNB had heavier nodal burden than the Z11 control arm, in which 21% of patients had ≥3 positive nodes on ALND. This calls into question whether the Z11 results should be applied in cases of positive AUS-guided LNNB. However, 32% of patients with positive AUS-guided LNNB had only 1–2 positive nodes on ALND, indicating that ALND overtreats some patients with AUS-detected disease. Although the goal is to use AUS to distinguish patients who need ALND from those who do not, number of suspicious nodes on AUS was not able to identify a subgroup with low nodal burden among those with positive AUS-guided LNNB. Further work is needed to identify predictors of disease burden among patients with positive AUS-guided LNNB. A study limitation is that it relied on AUS reports, which varied in precision, and attempt may not have been made in all cases to quantify suspicious nodes beyond the first. Uniform AUS reporting may improve the ability to predict nodal burden.

0381 - Impact of Genetic Evaluation on Treatment Decisions in Early-Stage Breast Cancer

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Objective: The NCCN guidelines offer recommendations for genetic risk evaluation and testing in patients newly diagnosed with breast cancer (BC). We studied the impact of referral of eligible patients to our cancer genetics program on treatment decisions with regard to choice of surgery, imaging, and systemic treatment.

Methods: An electronic retrospective chart review of newly diagnosed BC patients was done from July 2012–July 2014. Patients who received a genetic referral were compared to those who did not receive a genetic referral. Data collected included age, histology, laterality of cancer, hormone receptor status, prior history of cancer, neoadjuvant chemotherapy, plastic surgery consultation, genetic referral, reason for genetic referral, MRI, and type of surgery and reconstruction. Data were evaluated using Wilcoxon 2-sample rank-sum tests, Pearson chi-square tests and exact Pearson chi-square tests, Fisher exact tests, and exact Cochran-Armitage trend tests, based on whichever was most appropriate for the variables being tested.

Results: Five hundred patients with a new BC diagnosis seen within the inclusion dates were analyzed. One hundred eighty-eight patients met the NCCN criteria and were referred to genetics for risk assessment and possible testing. The reasons for genetic referral included a positive family history (n = 69), age (n = 51), or both (n = 29). One hundred fifty-two (81%) of the referred patients underwent genetic testing. Thirteen patients (6.9%) tested positive for BRCA 1 or 2. All BRCA-positive patients chose bilateral mastectomy. Of the patients who tested negative for BRCA 1 and 2, 87 (46%) had breast-conserving surgery, 43 (23%) had unilateral mastectomy, and 45 (24%) chose bilateral mastectomy In addition, a statistically significant difference was found in the referred patients with respect to age, hormone receptor status (ER and PR), neoadjuvant chemotherapy, plastic surgery consult and subsequent reconstruction, and MRI usage.

Conclusion: Comprehensive genetic evaluation in newly diagnosed BC patients is important in the decision-making process. Patients meeting criteria for genetic risk evaluation were more likely to have MRI, receive neoadjuvant chemotherapy, and choose aggressive local treatment. In our study, women chose a bilateral mastectomy despite negative testing. As indications for genetic evaluations broaden and prevalence of panel testing increases, mastectomy rates in this group need to be closely monitored.

0424 - Post-Traumatic Stress and Fear of Progression Symptoms in Breast Cancer Patients Comparing Stage, the Use of Adjuvant Chemotherapy, and Breast Conservation

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Objective: Prior studies have demonstrated the psychological impact of a breast cancer (BC) diagnosis on women, specifically regarding symptoms of posttraumatic stress. However, few studies have examined the presence of post-traumatic stress (PTS) and fear of progression (FOP) symptoms in BC patients based on pathologic stage, modalities of treatment, and surgical approach.

Methods: In this IRB-approved study, patients treated for BC by a single surgeon from 2006–2015 were eligible and contacted. Fear of Progression SF-12 and Post Traumatic Stress Disorder Civilian PCL-C questionnaires were provided in person, by postal mail, or by email. Demographic, staging, and treatment data were also collected. Patients were excluded if they were deceased, were inmates, spoke non-English as a primary language, had a history of mental illness or other malignancy, or had stage IV disease. FOP and PTS symptom frequency and severity in BC patients were compared, based on age at diagnosis, pathologic stage, time since diagnosis, adjuvant therapy, and surgical approach (mastectomy vs breast conservation). Results were analyzed with 2-sample *t* test with p values <0.05 being significant.

Results: Of 205 total BC patients, 50 were excluded. Questionnaires were successfully provided to 92 patients. Sixty-four patients (70%) responded. The mean age at diagnosis of BC respondents was 52 (±12) years. Mean time since diagnosis was 43 months (range, 3–132). Thirteen percent of patients had ductal carcinoma in situ

(DCIS). Of those with invasive disease, 48% were stage I; 28%, stage II; and 9%, stage III. BC respondents reported a mean of 5.1 (±3) of 12 FOP symptoms (43%) and 2.6 (±3.3) of 17 PTS symptoms (15%). The most common PTS symptom category was "hyperarousal;" however, the category with the greatest symptom severity was "effortful avoidance." Patients less than 50 years of age experienced significantly more symptoms of FOP ($p = 0.04$) and PTS ($p = 0.005$), as well as greater symptom severity in FOP ($P = 0.04$) and PTS ($p = 0.01$). Regarding time since surgery, patients reported a significant deterioration during the 7 to 12-month period in both FOP and PTS symptoms compared to the 0- to 6-month period. The symptoms beyond 1 year showed a trend toward improvement; however, this did not reach statistical significance. FOP and PTS symptom frequency and severity were statistically similar regardless of stage (0–III), surgical approach (breast conservation vs mastectomy), and the use of adjuvant chemotherapy.

Conclusion: Breast cancer affects patients similarly with symptoms of FOP and PTS, regardless of stage, prognosis, the use of mastectomy vs breast conservation, or the use of adjuvant chemotherapy. In this study only patient age was significantly associated with differences in FOP and PTS. During the time following diagnosis, the 7- to 12-month range was associated with the worst quality of life based on these measures, which failed to improve significantly beyond 1 year.

0425 - Predictors of Complete Response to Neoadjuvant Chemotherapy in Breast Cancer

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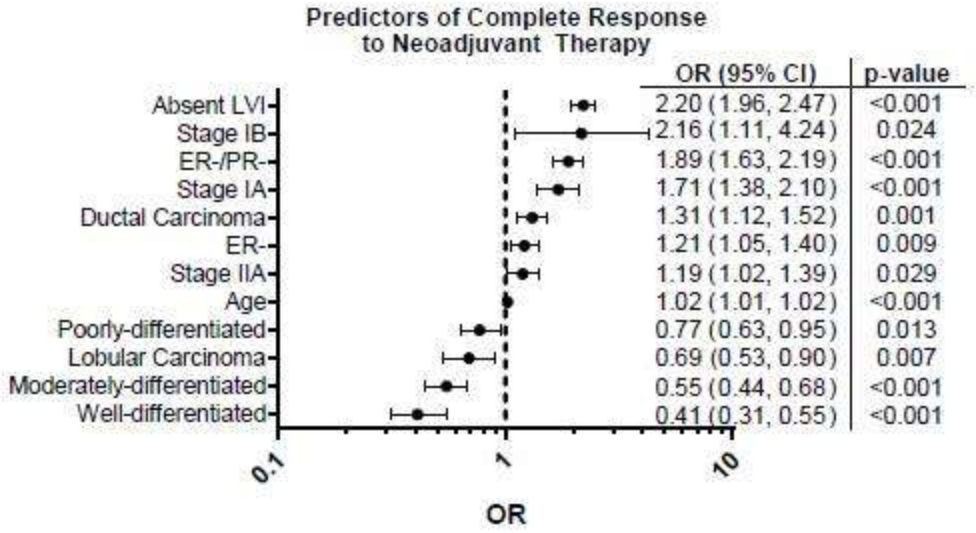
Objective: Neoadjuvant chemotherapy (NAC) for breast cancer can be used to downstage patients to facilitate breast-conserving surgery, and a complete pathologic response has been shown to be associated with improved survival. We sought to characterize those patients receiving NAC and analyze predictors of complete response (CR).

Methods: Using the National Cancer Data Base, we identified 49,850 women with clinical stage I–IIIC breast cancer who received NAC from 2004–2011. We analyzed the clinical characteristics of this cohort and performed multivariable analysis to identify those factors predicting CR to NAC.

Results: Of the patients meeting inclusion criteria, 57% of patients were >50 years of age, with overall mean age 54 ± 13 years. By race, 77% of patients were Caucasian and 17% were African American. Invasive ductal carcinoma was seen in 78% of tumors, invasive lobular carcinoma in 7%, and unknown/other pathology in 15%. Clinical stage I, II, and III (including subcategories) were represented in 11%, 52%, and 37% of patients, respectively. Estrogen receptor was expressed in 60% of tumors (ER+), and 78% of ER+ tumors also expressed progesterone receptor (PR+), with 47% of the overall population ER+/PR+. Nearly all PR+ tumors were also ER+ (96%). Her2 overexpression (Her2+) was seen in 8% of tumors, although 74% of patients did not have reported Her2+ data. Triple-negative receptor status (TN), ER–/PR–/HER2–, was seen in 7% of patients, with 29% of all patients missing expression data for at least 1 receptor. The figure shows results of multivariable analysis of significant predictors of response to NAC among the 13,825 women with complete pathological data. Insurance status and year of treatment were not statistically significant and were not included in the analysis. Her2+ status was excluded due to missing data. Strong predictors of CR (OR > 1.5) included absence of lymphovascular invasion (LVI), early-stage disease, and ER–/PR– status, whereas well and moderately differentiated tumors strongly predicted (OR < 0.67) partial or no pathological response. Invasive ductal carcinoma was associated with CR (OR, 1.31), but invasive lobular carcinoma had the opposite association (OR, 0.69).



Conclusion: We have demonstrated in a large national cohort that NAC is most effective in patients with hormone receptor negative, early clinical stage disease without LVI. These women benefit most and should be strongly considered for NAC, whereas well-differentiated tumors and those with lymphatic involvement are less likely to benefit.

0261 - Prognostic Factor for Partial Responder and Validation of Tumor Response Ratio After Neoadjuvant Chemotherapy in Breast Cancer Patients

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Objective: In the treatment of breast cancer, neoadjuvant chemotherapy (NAC) is useful in reducing the size of breast cancer before surgical intervention. Patients who show complete response (pCR) to NAC are known to have improved overall survival (OS). However, the relationship between prognosis and patients with partial response are yet unclear. In this paper, we evaluated the prognostic factor in neoadjuvant setting and tumor response ratio (TRR) method.

Methods: Clinicopathologic factors were evaluated to predict overall survival. TRR was calculated by dividing pathologic tumor size by clinical tumor size. TRR was then categorized into 4 groups as in the previously published TRR study: TRR 0 (pCR), complete remission; >0~0.4, strong partial response (SPR); >0.4~1.0, weak partial response (WPR); >1.0, tumor growth (TG); and the relationship between different TRR groups and survival was determined using statistical evaluation.

Results: Clinical N stage ($p = 0.02$), overall stage ($p = 0.04$), pathologic N stage ($p = 0.03$), hormone receptor status ($p = 0.01$), and lymphovascular invasion ($p = 0.02$) were significantly associated with the overall survival. Pathologic overall stage and TRR did not show statistical significance for overall survival. Patients with pCR showed best survival rate throughout the current staging system and TRR method.

Conclusion: Clinicopathologic factors are easily applicable and valuable to predict overall survival; clinicians could make use of these parameters without suspicion until the introduction of an accurate, simple, and highly discriminating method to assess the partial responder.

0343 - Trends in Autologous Breast Reconstruction: A National and Regional Overview

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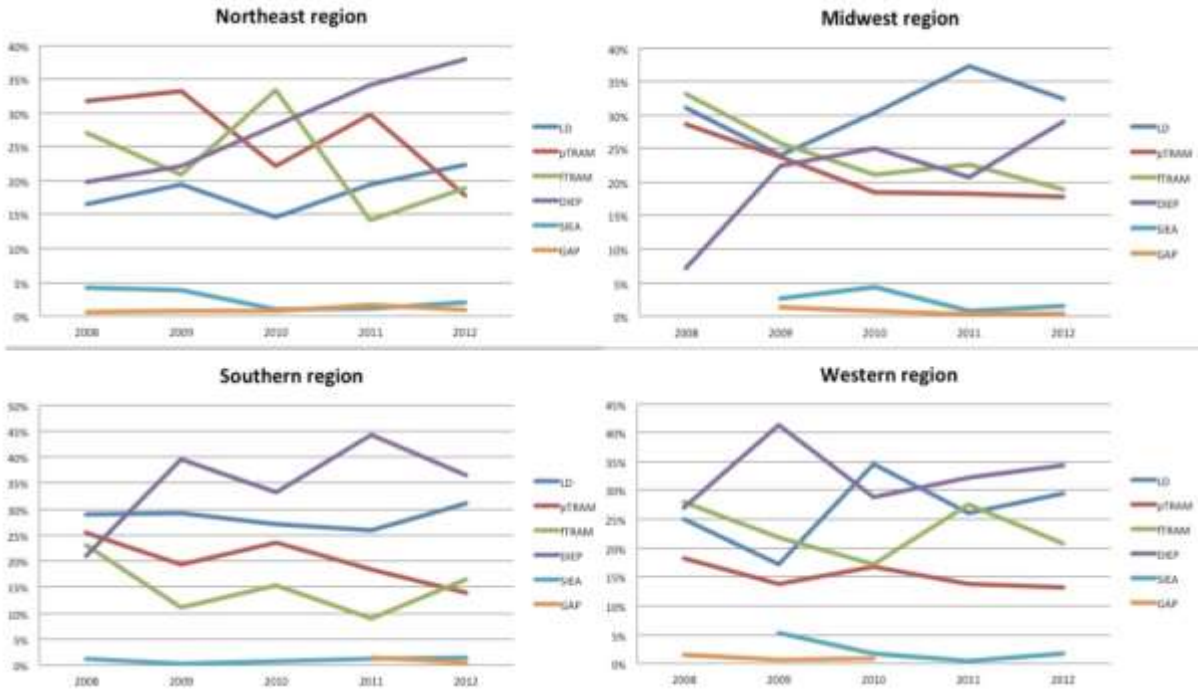
Objective: The incidence of breast cancer (BC) cases has increased significantly over the last decades. It is estimated that 232,670 new cases of invasive BC were diagnosed in women in the U.S. in 2014. Hence, breast reconstructive procedures follow this trend constituted both by autologous and implant-based reconstructions. The aim of this study was to assess national and regional trends in different types of autologous breast reconstruction (BR).

Methods: A serial cross-sectional study of autologous BR trends was performed using the Nationwide Inpatient database from 2008 to 2012. Data on BC and mastectomy rates, type of BR performed (implant-based or LD, pTRAM, fTRAM, DIEP, SIEA, GAP flap), and sociodemographics were obtained and analyzed. Furthermore, national and regional reconstruction trends over time were plotted and analyzed.

Results: A total of 427,272 patients were diagnosed with BC, of which 343,165 underwent mastectomy and 152,256 BR. Of patients undergoing BR, 16.4% underwent autologous BR and 78.3% implant-based BR. Overall, autologous BR demonstrated a significant increase between 2008 and 2012 (from 6.4% in 2008 to 17.6% 2012, $p < 0.001$) with the DIEP flap being the most prevalent flap type (32.4%). When stratified into regions, the Northeast region and Western region demonstrated a significant decreasing trend, while the Midwest and the Southern region demonstrated a significant increasing trend in autologous BR performed over time. The majority of all autologous BR were performed in the Southern region (37.4%). Subgroup analysis demonstrated an increasing trend for both LD and DIEP flap both on national and regional level (figure). pTRAM, fTRAM, SIEA, and GAP flap decreased significantly over time ($p < 0.001$). Interestingly, most pTRAM (35.7%), fTRAM (32.9%), SIEA (34.5%), and GAP (36.3%) flaps were performed in the Northeast region, while most DIEP (41.0%) and LD (43.8%) flaps were performed in the Southern region.



Conclusion: Epidemiologic analysis of autologous breast reconstructions identifies the most important procedural, geographical, and patient characteristics. Autologous BR followed a significantly positive trend over time. Whereas in the Northeast region and Western region, autologous BR showed a negative trend, it has showed a significantly positive trend in the Midwest and the Southern region.

0410 - The Rise and Fall of Breast-Conserving Surgery in the United States

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Objective: Adoption of breast conservation surgery (BCS) in the 1990s was variable between regions across the country. We hypothesize that geographical variation in BCS rates remain, despite the changing trends in BCS over the past decade.

Methods: The National Cancer Data Base was queried to identify women with pathologic stage 0–II breast cancer who underwent breast surgery. Patients who received neoadjuvant therapy and those with metastatic disease were excluded. Chi-square and logistic regression were used to examine trends in BCS rates and predictors of BCS.

Results: From 1998–2012, 1,854,336 women underwent surgery for pathologic stage 0–II breast cancer: 344,130 (18.6%) were stage 0; 914,066 (49.3%), stage I; and 596,140 (32.1%), stage II. The overall rate of BCS increased from 55.3% in 1998 to peak at 65.9% in 2006 and declined to 62.4% in 2012. Trends differed by age; in women >40 years old, BCS rates increased by 8.0% since 1998 vs a 16.5% decline in women ≤ 40 years old (figure). Overall BCS rates ranged from 51.7% in the East South Central region to 72.0% in New England ($p < 0.01$). Despite adjusting for patient, tumor, and facility characteristics, patients in the high BCS regions (New England/Mid-Atlantic/Pacific) were 1.6 times more likely to undergo BCS than patients in the low BCS regions (West North Central/West South Central/East South Central) [OR, 1.60; 95% CI, 1.58–1.64]. Those centers with the lowest BCS rates (44%) in 1998 (West North Central/West South Central/East South Central) remained the lowest performing centers in 2012. Likewise, the highest performing centers (New England/Mid-Atlantic/Pacific) in 1998 remained the highest performing centers in 2012 with BCS rates of 66.2%. From 2010–2012, compared to low BCS regions, the regions with high BCS rates had significantly more academic centers (37.1% vs 26.7%), metropolitan areas (89.8%), patients living within 25 miles of the treating facility (87.7% vs 72.7%), higher breast cancer incidence (29.5% vs 19.5% in the highest quartile), and patients with high socioeconomic status (64.7% vs 48.4%), all $p < 0.01$. Tumor characteristics and other demographics were similar between all regions. Results were similar in a subgroup analysis of women ≤40 years old.

continues

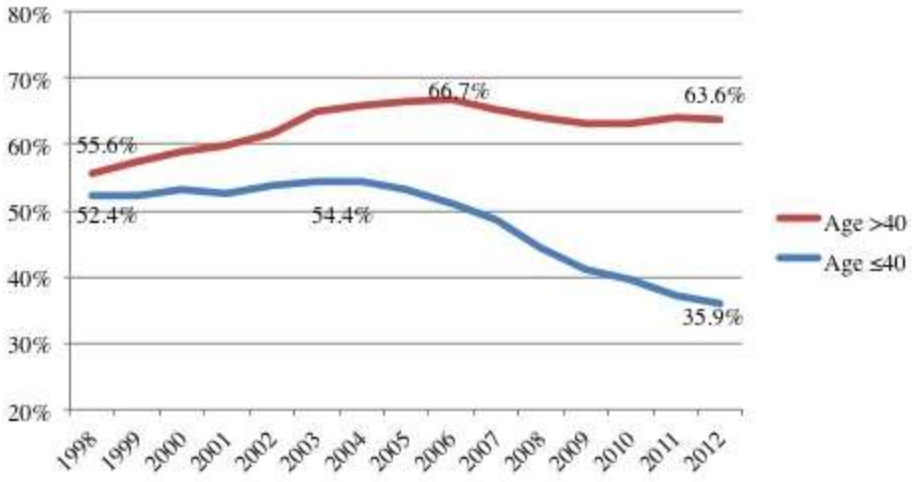

Figure 1. Rates of BCS stratified by age

Conclusion: BCS rates have dropped over the past decade particularly among younger women. There remains substantial geographical variation in BCS across the United States, despite adjusting for tumor and patient factors. Interestingly, regions with high BCS rates in 1998 continue to have high BCS rates in 2012. Future studies are needed to determine what factors influence this geographical variation besides factors analyzed in this dataset.

0394 - Rational Use of MRI in Clinical Stage 2 Breast Cancer

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Objective: Patients with clinical stage 2 breast cancer present management challenges regarding sequencing of treatments, and the option of breast-conserving surgery (BCS). Patients may be offered neoadjuvant therapy, or proceed directly to surgery. MRI is often added to the diagnostic workup, presumably to look for extent of ipsilateral disease, as well as for any contralateral disease. We postulated that if MRI is beneficial in this subgroup, we should see (1) an increase in the use of BCS in patients who undergo MRI after diagnosis, (2) a decrease in recurrence, and (3) a high positive predictive value (PPV) for any occult contralateral disease.

Methods: This retrospective analysis identified all clinical stage 2 breast cancer patients treated at our institution from 2008-2010, stratified by MRI use after diagnosis, and by use of neoadjuvant therapy, excluding certain subgroups (age > 70, BRCA, males, prior breast cancer diagnosis, LCIS, nonsurgical). Groups were compared for BCS vs mastectomy, and locoregional recurrence. In patients with MRI, additional suspicious findings were noted, and pathology results analyzed.

Results: Results are tabulated. The groups were similar in age, average cT, average tumor grade, and average follow-up. Whereas in the non-MRI group, BCS was used more often after neoadjuvant therapy, the BCS rate was only 26% in the MRI group, whether neoadjuvant treatment or not. Locoregional recurrence was similarly low for both groups. In patients with MRI only before neoadjuvant therapy, only 3 of 26 (8%) had BCS. In patients with MRI after neoadjuvant therapy 7 of 12 (58%) had BCS. The PPV for MRI identifying contralateral cancer was 21%.

	Non-MRI	MRI	Total	p Value
Average age	52.5	50.6	51.9	0.19
Average cT	2.01	1.94	1.99	0.28
Average tumor grade	2.6	2.48	2.56	0.02
Average follow-up	4.5	4.6	4.5	0.31
BCS	57%	26%	46%	<0.0002
BCS in non-neoadj patients	50%	26%	42%	0.01
BCS in neoadj patients	68%	26%	54%	<0.0002
Unilateral mastectomy	34%	62%	44%	<0.0002
Bilateral mastectomy	9%	12%	10%	0.48
Locoregional recurrence	3.9%	1.4%	3.0%	N/A

Conclusion: In the current context of multidisciplinary prospective management of the clinical stage 2 breast cancer patients, the surgeon has a primary priority to ensure locoregional control in a cosmetically acceptable BCS procedure whenever feasible or recommend mastectomy instead. Our study demonstrates that MRI actually is associated with a much lower BCS rate, unless it was done in the setting of neoadjuvant therapy, specifically after completion of treatment. Furthermore, with such a low PPV for the contralateral breast, MRI delivered unfounded anxiety and added procedures more often than true positive results. We recommend that surgeons decide early on whether BCS can be an option for a clinical stage 2 breast cancer patient. If not, then MRI has little benefit as a routine test, since mastectomy will be the outcome regardless, and historical data establishes a very low likelihood of contralateral disease. If BCS is an option, or could be after neoadjuvant therapy, MRI may play a role in assessing response to treatment, before a final recommendation for BCS or mastectomy.

0395 - Does MRI Deliver the Goods in Women With DCIS?

John Kennedy[1], Patrick Robbins[2]

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Objective: MRI is being used more frequently when a breast cancer in diagnosed, including DCIS. Although prognosis for DCIS is excellent, many women require re-excisions for positive margins, or undergo mastectomy. If MRI could decrease the re-excision rate and identify the few who should be offered mastectomy initially, its more routine use might be justified. However, if MRI raises too many suspicions with false-positive findings, leading to an increase in mastectomies, it should be avoided. We hypothesized that MRI after diagnosis of DCIS is associated with an equal or higher re-excision and mastectomy rate, and a low positive predictive value (PPV) for identifying additional breast cancer

Methods: Women newly diagnosed with DCIS from 2008–2010 at our institution were stratified according to whether MRI was ordered after the diagnosis. Exclusions included previous breast cancer diagnosis, age > 70, male, BRCA +. We analyzed for re-excision, ultimate use of mastectomy, local recurrence, and pathologic upstaging. For those with MRI, findings of recommended biopsies were analyzed.

Results: Patients in the 2 groups were similar in age and length of follow-up. Re-excision and mastectomy rates were higher in the MRI group. Re-excision rate for all patients combined was 24%. There were no contralateral mastectomies in either group. Local recurrence was similarly low in the 2 groups. MRI led to additional biopsies in 14 (67%) patients, unilateral in 7, bilateral in 5, and contralateral in 2. Of 19 recommended biopsies, DCIS was found in only 3, for a PPV of 16%. Of these 3, all were unilateral; 1 was multifocal, treated with BCS. No invasive disease was found on any MRI biopsy. Two patients with MRI-directed benign biopsies still underwent mastectomy. Seven patients had no MRI findings other than the

known focus of DCIS, but 5 of them underwent mastectomy anyway. None was pathologically upstaged. Two patients who had MRI-recommended biopsies that were benign were upstaged pathologically.

Conclusion: There is little to be gained from MRI in patients with DCIS. Patients treated based on mammography alone have an excellent prognosis with reasonably low rates of re-excision, mastectomy, and local recurrence. The use of MRI, even when negative, was associated with a high mastectomy rate. Although efforts should continue to decrease positive margins and re-excisions, MRI is not the solution.

	MRI	Non-MRI	p Value
Total patients	20	85	
Average age	52.5	54.7	0.27
Average follow-up (yr)	4.6	4.7	0.74
Procedures			
Total BCS rate	65%	88%	0.01
Single BCS	60%	72%	
Re-excision BCS	5%	16%	
Total mastectomy rate	35%	12%	
Initial mastectomy	15%	7%	
Re-excision mastectomy	20%	5%	
Contralateral mastectomy	0%	0%	
Re-excision rate	25%	21%	0.7
Local recurrence	5%	1%	N/A
Pathologic upstaging	10%	8%	N/A

0214 - Do Women Aim to Please? Partner Satisfaction As a Driver of Surgical Decision-Making in Breast Cancer Treatment

Rebecca Kwait[1], Sarah Pesek[2], Michaela Onstad[3], David Edmonson[4], Christy Gandhi[5], Melissa Clark[6], Christina Raker[6], Ashley Stuckey[1], Jennifer Gass[7]

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Objective: Partner input and desire for partner sexual satisfaction may affect surgical decision-making in breast cancer patients when choosing breast-conserving therapy vs mastectomy. We analyze whether partner opinion influences surgical choice and how choice of operation affects comfort level with one's partner postoperatively.

Methods: A prospective anonymous survey was administered to breast cancer patients >18 years old who underwent breast surgery between 2000 and 2014. Eligible patients were identified at follow-up visits. Categorical variables were compared by chi-square or Fisher exact test.

Results: Four hundred four patients completed the survey. The majority of patients were in a relationship (77.5%) and 73.9% had their partner present at surgical consultation. Patients who chose mastectomy with reconstruction (MR) were younger (72.1% in the 40–59 age group, $p < 0.0001$) and there was a trend toward increased sexual activity, compared to patients who chose lumpectomy (L) or mastectomy without reconstruction (M) (71.4% L vs 70.6% M vs 80.6% MR, $p = 0.09$). Women who elected MR placed greater emphasis on their own decision-making rather than seeking input from their partner, surgeon, or others (55.9% vs 5.4% vs 16.1% vs 15.1%, respectively) while those who chose L placed equal weight on surgeon and self-

input (39.0% vs 36.7%, p = 0.0008). Overall, only 3.6% of patients identified their partner as the biggest influence on surgical decision-making. Preoperatively, the L group was most comfortable with their partner seeing their chest (91.9% L vs 75.9% M vs 83.9% MR, p = 0.01) and this distribution did not change postoperatively; however, comfort levels were remarkably decreased (79.2% L vs 53.8% M vs 66.7% MR, p = 0.01). Furthermore, if the patient was a candidate for L but chose MR, the role her chest played in intimacy dropped to a greater degree compared to the L group (83.7% L vs 89.2% MR, p = 0.5 preoperatively to 64.8% L vs 44.4% MR, p = 0.03 postoperatively). Limited to this subgroup, pleasurable caressing of the breasts was reported preoperatively at similar rates (90.0% L vs 94.6% MR, p = 0.8), yet after surgery pleasure dropped considerably (68.3% L vs 24.2% MR, p < 0.0001). Overall, compared to those who underwent L, pleasurable caressing dropped the most in women after MR (90.3% L vs 92.3% MR, p = 0.3 pre-op to 70.6% L vs 15.3% MR, p < 0.0001 post-op).

Conclusion: When making surgical decisions, most patients value their own opinion more than that of their partner. Mastectomy, regardless of reconstruction, leads to a significant reduction in comfort with one's partner postoperatively, compared to lumpectomy. This information may be helpful in counseling couples at the time of surgical decision-making for breast cancer treatment.

0324 - Preserving Sexual Function in Breast Cancer Survivorship: Does Surgical Modality Matter?

Rebecca Kwait[1], Sarah Pesek[2], Michaela Onstad[3], David Edmonson[4], Christy Gandhi[5], Melissa Clark[6], Christina Raker[6], Ashley Stuckey[1], Jennifer Gass[7]

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Objective: Surgery for breast cancer may affect the role of the breasts in intimacy, manifesting as sexual dysfunction. We analyze whether there are associations between surgery type, postoperative comfort with one's appearance and partner, and the impact on sexual function. This is an updated study with a larger cohort, based on previous analysis.

Methods: A prospective anonymous survey was administered to English-speaking breast cancer patients >18 years old who underwent breast surgery between 2000 and 2014. Eligible patients were identified at follow-up visits. Sexual dysfunction was assessed using the Female Sexual Function Index (FSFI) scoring tool (sexual dysfunction < 26.55). Categorical variables were compared by chi-square, and continuous variables were compared by Wilcoxon rank-sum test.

Results: Four hundred four completed the survey. Overall 77.5% were in a relationship and 73.5% were sexually active. 45.4% reported postoperative sexual dysfunction with nonsignificantly lower FSFI scores in the mastectomy without reconstruction (M) group, compared to the mastectomy with reconstruction (MR) and lumpectomy (L) groups (median score 24.6 M vs 29.1 MR vs 26.5 L, p = 0.4). Postoperatively, women undergoing L were more satisfied with their appearance (74.9% L vs 36.4% M vs 69.9% MR, p = 0.0002), were more comfortable with their partner (79.2% L vs 53.8% M vs 66.7% MR, p = 0.01), considered the treated chest important in intimacy (64.8% L vs 48.5% M vs 43.3% MR, p = 0.001) and had more pleasure with caress of the breast (70.6% L vs 15.3% MR, p > 0.0001). Overall, satisfaction with appearance postoperatively trended toward better FSFI scores (median score, 27.7 vs 23.0, p = 0.05) and patients who reported comfort (C) with their partner scored better compared to those who were uncomfortable (U) (median score, 27.8 [C] vs. 25.0 [U], p = 0.004). This was consistent across domains of sexual desire (median score, 3.6 C vs 3.0 U, p = 0.01), arousal (4.7 C vs 4.2 U, p = 0.003), lubrication (4.8 C vs 4.5 U, p = 0.003), orgasm (5.2 C vs 4.8 U, p = 0.003), and sexual satisfaction (5.6 C vs 4.6 U, p = 0.0005). Those who found the chest important for intimacy postoperatively had higher scores (median score, 27.9 vs 23.5, p = 0.004) and those who did not enjoy caress scored lower (median score, 19.1 vs 27.8, p = 0.002).

Conclusion: Sexual dysfunction is common after breast cancer treatment and seemingly not associated with type of surgery. Overall patients who are comfortable with their partner and continue to value the treated breast for intimacy experience less sexual dysfunction. Though lumpectomy leads to increased patient comfort compared to mastectomy, this operation may not necessarily produce higher FSFI scores. Counseling patients on these outcomes may be important in the preoperative setting.

0372 - Toxicity Symptoms and Local Recurrence Are Low in Breast Cancer Patients Treated With External Beam Accelerated Partial Breast Irradiation

Alexandra Kyrillos[1], Arif Shaikh[1], William Bloomer[1], Hussain Habib[1], Megan Tobias[1], Katharine Yao[1]

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Objective: Most regimens of partial breast irradiation involve brachytherapy or 3D conformal treatments administered over a 5-day period. We adopted a 3-week regimen of external beam partial breast irradiation administered in 16 fractions of 2.7 Gy, resulting in a total dose of 43.2 Gy. We report our experience with this new regimen, specifically regarding recurrence and acute toxicity symptoms.

Methods: In this retrospective single-institution study, patient and tumor variables were collected for 327 breast cancer patients treated with external beam accelerated partial breast irradiation at the NorthShore University HealthSystem from 2002 to 2010.

Results: The median age in the patient population was 71 (range, 42–92), with median follow-up time of 7.9 years. Of the 327 patients assessed, 290 (88.7%) were white. Two hundred and twelve patients (64.8%) presented with IDC histology; however, 36 (11.0%) patients presented with ILC and 79 (24.2%) with DCIS. Of the 321 patients with known acute toxicity information, 282 (87.9%) experienced toxicity symptoms between 0 and 1 (0 indicated no symptoms), while 39 (12.1%) experienced symptoms of 2 or 3. Of the patients who experienced symptoms of 2 or 3, 10 (25.6%) experienced erythema only, 10 (25.6%) experienced fatigue only, and 19 (48.7%) experienced both. Of the patients who experienced toxicity symptoms, the frequency of these symptoms was low; of the fatigue patients, 100 (82.0%) experienced fatigue during just 1–2 visits, and of the erythema patients, 122 (72.5%) experienced their symptoms at 1–2 visits. Three patients (0.01%) developed a contralateral recurrence and 22 (6.7%) developed an ipsilateral recurrence. Ten of these ipsilateral recurrences were at the lumpectomy bed and 12 were in a different quadrant from the lumpectomy bed. The median age for these local recurrence patients was 73.5 (range, 50–87). Seventy percent of local recurrence patients had a tumor size less than or equal to 1 cm, 90% had grade 1 or 2 disease, and 80% had ER-positive tumors.

Conclusion: The frequency and severity of toxicity is low with this partial breast regimen. Local recurrence rates are likewise low given the long follow-up period. Future studies that compare this new regimen to standard whole-breast radiation are needed.

0269 - Implementing the Prospective Surveillance Model of Rehabilitation (PSM) for Breast Cancer Patients With 1-Year Postoperative Follow-Up—A Prospective Observational Study

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Objective: The Prospective Surveillance Model (PSM) of rehabilitation in breast cancer (BC) aims for early identification and treatment of physical impairments in the postoperative patient. The purposes of this prospective observational study were to identify postoperative patients with upper extremity impairments, define the clinical factors contributing to upper extremity impairments, and assess the impact of intervention.

Methods: One hundred twenty patients with stage 0–III BC were enrolled at a public hospital. Subjective data were collected via the Upper Extremity Functional Index (UEFI) and objective functional assessments were performed by a physical therapist preoperatively and postoperatively at 2–4 weeks; 6 weeks; and 3-, 6-, 9- and 12 months. All patients were provided with a patient navigator, were educated about lymphedema, and received an early postoperative exercise program. Upper extremity impairments triggering individualized rehabilitation intervention were defined as lymphedema >3%, increase in arm circumference by >1 cm from baseline, range of motion decreased by 20 degrees, presence of pain or axillary cording. Clinical factors associated with need for intervention were determined using multivariate analysis.

Results: One hundred eleven of 120 patients were eligible for study. One third of patients required intervention for upper extremity impairments (33%, n = 37), most commonly due to lymphedema (43%, n = 16). Of those needing intervention, 16% were identified at 6 weeks, 24% at 3 months, 35% at 6 months, 19% at 9 months, and 6% at 12 months. There was no statistically significant difference in age, BMI, type of breast surgery, radiotherapy or chemotherapy between the intervention (I) and no-intervention (NI) groups. A statistically significant difference was found between groups in number of lymph nodes removed, 9.3 (I) vs 5.9 (NI) ($p = 0.0069$), and between I and NI groups in patient-reported UEFI in the early postoperative period of 2–4 weeks ($p = 0.002$).

Conclusion: This study confirms that greater axillary surgery leads to higher lymphedema rates and upper extremity impairment. Other studies have shown risk of lymphedema is associated with older age, higher BMI, mastectomy, radiotherapy, and chemotherapy, which are not demonstrated in this study. The UEFI accurately identified patients with upper extremity impairments and could be studied as a prospective screening tool for use in surgical practices pre- and post-operatively. For those patients who required rehabilitation intervention, 75% were identified by the 6-month follow-up. Future studies could focus on implementing a screening tool in surgeon practices or in survivorship clinics at a 6-month time interval to identify patients with functional limitations in need of rehabilitation intervention.

0302 - When, Where, and How: Timing, Pattern, and Diagnosis of Metastatic Recurrence in Young Women <40 Years With Breast Cancer

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Objective: Young women (< 40 years old) with breast cancer (BC) are known to present with more aggressive cancer compared to older women. Prior publications have characterized local regional recurrence (LRR) in this population. However, only a few reports have detailed the metastatic recurrence of these individuals. In this study, the timing and pattern of metastatic recurrence in young women with BC were analyzed.

Methods: A retrospective chart review was conducted for all women 40 years of age or younger diagnosed with BC from 2006–2013 at our institution. Patients with stage 4 disease at time of initial diagnosis or inflammatory BC were excluded. Demographics, tumor characteristics, treatment type, LRR, metastatic recurrence, and survival data were collected and analyzed.

Results: A total of 322 women were identified, with an average age 35.3 years (range, 20–40 years) and mean follow-up of 4.2 years. Tumor characteristics included 70% estrogen receptor positive, 19% triple negative, and 26% HER2 positive. There were 42% T1, 41% T2, and 14% T3 tumors, with 47% of women presenting with lymph node–positive disease. A total of 24% women had breast conservation, and 76% had mastectomy (30% unilateral and 46% bilateral). All women had chemotherapy (30% neoadjuvant only, 12% both neoadjuvant and adjuvant, and 57% adjuvant only). Overall, 26 patients (8.0%) had mortality within the study time at an average of 2.8 years after diagnosis. LRR alone was uncommon, occurring in 8 patients (2.4%). Distant metastatic disease occurred in 49 patients (15.2%), of which 10 had both LRR and metastatic recurrence. Women who developed a metastatic recurrence tended to do so within the first 2 years of their diagnosis with mean time of 1.9 years. (figure). In patients with early metastasis (<2 years after BC diagnosis, n = 30), brain was the most common metastatic site (33%). In patients with later metastasis (>2 years after BC diagnosis, n = 19), bone was the most common site (37%). The early and late metastatic recurrence groups did not differ with respect to age, biologic subtype, nodal status, or type of operation. The early group had more T3 tumors (40.0%) whereas the late group had more T1 (32.0%) and T2 (63.0%) tumors. The average time from diagnosis of metastasis to mortality was similar in both the early and late groups (8.2 months vs 7.2 months). The majority of patients in both groups had metastasis discovered as part of work-up for symptoms rather than as part of routine screening.

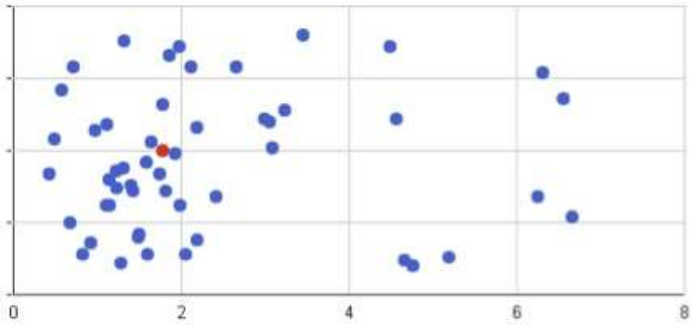

Figure 1: Scatter plot demonstrating time from initial diagnosis to diagnosis of metastatic recurrence in years (x-axis).

Conclusion: Metastatic recurrence in young women appears to occur earlier in the brain and later in the bone. T stage, rather than biologic subtype, appears to correlate with earlier risk of metastasis. This information highlights the importance of educating patients on the symptoms of metastatic disease as well as maintaining close follow-up with attention to symptoms of metastatic recurrence in this population.

0211 - Intraoperative Margin Assessment in Wire-Localized Breast-Conserving Surgery for Nonpalpable Cancers: A Population-Level Comparison of Techniques

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Objective: Positive margins occur in up to 40% of wire-localized breast-conserving surgeries (BCS) for nonpalpable cancers. Various methods of intraoperative margin assessment have been shown to improve margin status, but few studies directly compare multiple techniques in a single population. Therefore optimal

intraoperative modalities remain unclear. Our study aims to determine the effect of intraoperative margin assessment techniques on final margin status.

Methods: All patients who underwent wire-localized BCS for nonpalpable, biopsy-proven invasive breast cancer from June 2009 to December 2014 in Alberta were identified using WebSMR, a provincial synoptic OR reporting database. Demographic, tumor, and perioperative variables were obtained from WebSMR. Margin assessment techniques included specimen mammography, intraoperative ultrasound, gross pathological assessment, and frozen section. Final margin status was obtained by primary chart review. A negative margin was defined as "no tumor on ink" for invasive cancer, and ≥2 mm for DCIS. Multivariable logistic regression was used to assess the effect of any margin assessment technique on the risk of a positive margin, using generalized estimating equations to account for the clustering by surgeon, and adjusting for a priori identified confounders. In addition, an interaction test was performed, followed by a secondary analysis comparing individual modalities of margin assessment using this model.

Results: To date, data collection is complete for 1000 patients who met inclusion criteria and underwent statistical analysis. Some form of margin assessment technique was used in 711 (71.1%) cases. Of those, 332 (46.7%) had gross pathological assessment, 251 (35.3%) had specimen mammography, 35 (4.9%) had frozen section, 7 (1%) had intraoperative ultrasound, and the remaining 86 (12.1%) had some combination of the above. Patient characteristics of those who had any margin assessment vs none are compared in the table.

	No Margin Assessment (N = 289)	**Any Margin Assessment Technique (N = 711)**	**P value**
Age (y)	62 (36–92)	62 (35–93)	0.988
Bra size			0.258
Small (A)	19 (6.57%)	34 (4.78%)	
Medium (B)	134 (46.37%)	298 (41.91%)	
Large (C)	102 (35.29%)	293 (41.21%)	
Very Large (D+)	34 (11.76%)	86 (12.10%)	
Pre-op size (cm)			0.145
0.1–0.5	22 (7.61%)	42 (5.91%)	
>0.5–1	124 (42.91%)	435 (43.50%)	
>1 </= 2	114 (39.45%)	426 (42.60%)	
>2.0	29 (10.03%)	75 (7.50%)	
Pre-op focality			0.779
Unifocal	18 (6.23%)	41 (5.77%)	
Multifocal	271 (93.77%)	670 (94.23%)	
Invasive histology			0.561
Any lobular component	32 (11.07%)	70 (9.85%)	
All other	257 (88.93%)	641 (90.15%)	
Presence of DCIS			0.068
No	79 (27.34%)	156 (21.94%)	
Yes	210 (72.66%)	555 (78.06%)	
Type of wire localization			0.86
Ultrasound	254 (87.89%)	622 (87.48%)	
Stereotactic	35 (12.11%)	89 (12.52%)	
Final margin status			0.033
Negative	214 (74.05%)	570 (80.17%)	
Positive	75 (25.95%)	141 (19.83%)	

Controlling for known confounders, the use of any margin assessment technique was associated with a lower risk of a positive margin (OR, 0.68; 95% CI, 0.46–0.99, p = 0.049). There was strong evidence (p = 0.0006) that the odds of a positive margin varied by technique. On secondary analysis, gross pathological assessment was associated with a lower risk of a positive margin (OR, 0.51; 95% CI, 0.34–0.75, p = 0.001), whereas all other modalities did not demonstrate an effect on the risk of positive margins.

Conclusion: We found that the use of any intraoperative margin assessment technique decreases the odds of a positive margin compared to simple excision alone after wire localization. The use of gross pathological assessment significantly reduces the odds of a positive margin, as opposed to other modalities which did not demonstrate an effect. Efforts to employ a margin assessment technique should be made to improve negative margin rates.

0309 - Evaluation and Risk Assessment for Breast Cancer: An Integrated Health System Approach

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Objective: There is considerable variation in adherence to available evidence-based recommendations for risk assessment, genetic counseling and testing, surveillance, and preventive care for women at risk for breast cancer. Typically, women overestimate risk and do not understand the limitations of genetic testing. Many women are at increased risk for breast cancer but not at risk for hereditary breast cancer syndromes, making genetic testing a less informative first-line risk assessment for moderate-risk women. Recent legislation in Pennsylvania has further complicated the issue by mandating disclosure of breast density to patients without evidence-based guidelines for management. A new care model was introduced in June 2014 to systematically and efficiently deliver appropriate risk assessment and management services using mid-level providers. This "High Risk Breast Clinic" provides any interested woman with a personal risk assessment and care plan. Validated risk assessment approaches are used and women are provided with evidence-based recommendations, including enhanced surveillance or risk reduction with chemoprevention or surgery, and referral to genetic services as appropriate.

Methods: All interested women were allowed to participate and completed a detailed questionnaire of medical and family history using the Hughes Risk Application program. Women with active breast problems were excluded and referred for further evaluation. Women with a known genetic mutation were sent for management by a multidisciplinary team of genetic counselors and other clinical specialists.

Results: From June 2014 through October 2015, 149 women were evaluated. Median age was 48 (range, 18–79). Average lifetime Gail risk was 16.42%. Risk factors included family history (88%), abnormal biopsy results (11%), and dense breasts (65%), with over half the women having multiple risk factors. Thirty-nine percent of women were offered screening breast MRI. Over 42% of women were offered chemoprevention and over 10% accepted, compared to a national average of only 0.24%. Over 30% of women were referred to genetic counselors and in another 30 % more informative family members were identified for genetic testing.

Conclusion: Specially trained mid-level providers offer a cost-effective way to assess breast cancer risk in women. This new clinic model provides the most efficient process for management and identification of a large group of women with a moderate increased risk of breast cancer, who may not be recognized if a genetics evaluation is done first. This allows women to understand breast cancer risk and management guidelines, while facilitating appropriate use of genetic counseling and testing. Creating a dedicated clinic to offer risk assessment and management for breast cancer resulted in vastly improved acceptance of chemoprevention. Preliminary patient-reported outcome data suggest that this model is greatly appreciated.

0215 - Prediction of Surgical Upgrade Rate of Breast Atypia to Malignancy: An Academic Center's Experience and Validation of a Predictive Model

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Objective: Atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), and lobular carcinoma in situ (LCIS) are common diagnoses seen on breast core needle biopsy (CNB). Many institutions recommend surgical excision of these high-risk lesions to exclude underlying malignancy. Our study objectives were to: (1) determine our upgrade rate of atypia on CNB to malignancy at surgical excision, (2) identify potential predictors of upgrade for patient counseling and management and develop a predictive model, (3) validate a recently published predictive model in our study population.

Methods: An IRB-approved, retrospective chart review was performed on all patients at our institution who had ADH, ALH, or LCIS on breast CNB performed from 1/1/08–12/31/10 and who subsequently had surgical excision of the biopsy site. Patients with concurrent malignancy on CNB were excluded. Age, ethnicity, family and personal history of breast cancer (BC), surgical pathology, and subsequent treatment was recorded. Imaging was reviewed for needle gauge and passes, mode of biopsy, and visible residual lesion after biopsy. We calculated the upgrade rate to malignancy and identified predictors to upgrade. We compared our dataset to a recently published nomogram developed to predict which patients with atypia would benefit from surgery. To identify predictors, *t* test and chi-square test were used. Classification tree was used to predict upgrade.

Results: The 151 patients in our study population had mean age of 53 years (range, 29–81 years). The mean maximum lesion size on imaging was 11 mm (range, 2–60 mm). The primary atypia seen on CNB was ADH in 63.6%, ALH in 27.8%, and LCIS in 8.6%. 71.1% were calcifications, and 28.9% without calcifications (mass, asymmetry, distortion, non-mass enhancement). Eighteen percent had a first-degree relative and 13% had a personal history of BC. 16.6% had upgrade to malignancy at time of excision: 72% were DCIS and 28% invasive carcinoma. Risk factors in our population for upgrade to malignancy at surgical excision included maximum lesion size at the time of initial imaging ($p = 0.002$) and radiographic presence of residual lesion after CNB ($p = 0.001$). A predictive model based on these factors had sensitivity, 78%; specificity, 80%; and AUC = 0.75. Validating a published nomogram on our data produced accuracy figures (AUC = 0.65) within published CI of 0.63–0.82.

Conclusion: In CNB specimens containing ADH, ALH, or LCIS, initial lesion size and the presence of residual lesion after CNB are predictors of surgical upgrade to malignancy. A validated model based on these predictors may be helpful in developing patient management strategies.

0154 - The Cost of Accuracy: A Budget Impact Analysis of Whole-Mount Histopathology Processing for Patients With Breast Cancer Undergoing Breast Conservation

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Objective: Obtaining accurate histopathologic detail for breast lumpectomy specimens is challenging due to sampling procedures and loss of 3-dimensional conformational features with conventional processing. The whole-mount (WM) technique is a novel method of serial pathologic sectioning designed to maximize cross-sectional visualization of the resected specimen, and optimize determination of margin status. The economic impact of WM processing is yet unknown, but is expected to have tradeoffs for repeated surgeries and for histopathologic efficiency.

Methods: A budget impact analysis was performed comparing conventional processing with the WM technique for breast lumpectomy specimens. A decision analytic model was created to compare the costs and

outcomes involved in processing of specimens. Outcome measures included the proportion of patients undergoing repeat operation, the time required for processing and pathology interpretation, and the number of slides produced. Cost-effectiveness was compared using incremental cost-effectiveness ratios, and a 3-year cost forecast was generated to estimate institutional expenditures involved in the adoption of the WM process. Deterministic and probabilistic sensitivity analyses were used to test the robustness of the model. All costs are reported as adjusted, undiscounted Canadian dollars and are 2014 appraisals.

Results: The WM technique had a higher mean cost per patient ($3,218) compared to conventional processing ($1,414) and generated 19% more operations due to detection of more positive margins. The number of pathology slides produced and pathologist hours required for interpretation were fewer with WM technique. WM costs an additional $9,495 per extra operation completed and is forecasted to save approximately 1200 Canadian pathologist work hours over the course of 3 years. The model was robust to tested ranges in all included variables and most sensitive to changes in the prevalence of positive margins.

Conclusion: The initiation and conduct of routine WM processing for breast lumpectomy specimens is a costly endeavor. However, there are favorable tradeoffs in diagnostic accuracy and histopathologic efficiency. Consideration of these competing priorities, along with critical analysis of local thresholds for willingness-to-pay, ought to be deliberated within institutions wishing to adopt the WM technique.

0246 - Mammogram Detection Is a Surrogate for Favorable Tumor Biology--Analysis and Outcomes of Mammogram-Detected Breast Cancer in a Community Setting

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Objective: We sought to prospectively evaluate tumor biology and outcomes related to method of detection of breast cancer in a high-resource community practice. We believe that tumor biology is primarily responsible for improved survival of mammogram-detected breast cancer and differences in outcome are minimized or eliminated by contemporary adjuvant therapy.

Methods: Eight hundred twenty-seven women who were diagnosed with breast cancer between 2007 and June 2015 from a community breast surgical practice were included in the analysis. Individual patient data were prospectively collected in a dedicated breast cancer database, including method of cancer detection, age, race, payor, AJCC stage, T, N, ER, PR, Her2, neoadjuvant and adjuvant therapy, systemic recurrence, and breast cancer–specific mortality. The effect of mammogram detection was compared with symptomatic diagnosis on all the above factors.

Results: Of 827 total breast cancer diagnoses stages 0–IV, 413 (50%) were detected by mammogram. We excluded cancers detected incidentally, 13 (2%); with MRI, 7 (1%); and those not recorded, 14 (2%), leaving 793 people for analysis. Women with DCIS, 126 (16%), were excluded from the analysis of prognostic factors and outcomes. The analysis of age, payor, and race did not reveal significant or unexpected differences. Our analysis of AJCC stage, T, and N demonstrated findings consistent with previously published literature. Mammographic detection of breast cancer consistently showed earlier stage, smaller tumor size, and lower incidence of nodal metastases. We identified significant differences in prognostic factors between the mammogram-detected and symptomatic women. Mammogram-detected cancers were more frequently ER+, 85% vs 75%, and less frequently HER-2 positive, 12% vs 18%. We identified 78 (12%) triple-negative malignancies overall, 60 (76%) of which were in the symptomatic group. Mammogram detection was associated with a significantly lower frequency of chemotherapy treatment, 70% vs 30%, and neoadjuvant treatment, 44% vs 10%, compared with symptomatic detection. The use of hormone therapy was equal between the 2 groups. At an average follow-up of approximately 31 months, our outcome analysis showed small differences in systemic recurrence and breast cancer–specific mortality favoring mammogram detection.

Conclusion: In our high-resource community practice, we demonstrated that mammogram-detected breast cancer is associated with more favorable tumor biology, consistent with other published data. Although we did demonstrate differences in treatment between mammogram-detected and symptomatic breast cancer, resulting

from the differential tumor biology, we could not show that adjuvant treatment resulted in equivalent survival. Longer-term follow-up will be necessary to better evaluate the outcome data, particularly given the longer hazard of recurrence for ER+, Her2– breast cancer.

New Breast Cancer Dx 2007–June 1, 2015 N = 667 (DCIS excluded)

	Total		Mammo		Non-Mammo	
Prognostic factors						
ER+	528	79%	254	84%	274	75%
Her2+	101	15%	36	12%	65	18%
Triple negative	78	12%	18	6%	60	16%
Treatment						
Chemotherapy						
Yes	359	54%	100	33%	259	71%
No	308	46%	202	67%	106	29%
Hormone therapy						
Yes	431	65%	196	65%	235	64%
No	236	35%	106	35%	130	36%
Neoadjuvant therapy						
Yes	191	29%	29	10%	162	44%
No	476	71%	273	90%	203	56%
Outcomes						
NED	610	91%	287	95%	323	88%
Systemic recurrence	17	3%	2	1%	15	4%
Death- BrCA	29	4%	6	2%	23	6%
Death - other	11	2%	7	2%	4	1%

0174 - Early-Stage Breast Cancer in the Octogenarian: Tumor Characteristics, Treatment Choices, and Clinical Outcomes

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Objective: Axillary staging with sentinel lymph node biopsy (SLNB), post-lumpectomy radiation therapy (RT), and endocrine therapy (ET) for ER-positive (ER+) tumors are valuable elements in the treatment of early-stage (I or II) breast cancer, but we hypothesize these may not be used as often in elderly women. We sought to compare institutional treatment patterns and subsequent outcomes between women ages 80–89 and ages 50–59.

Methods: This was a retrospective cohort study of women referred for surgical evaluation of biopsy-proven, early-stage invasive breast cancer from January 2001 to December 2010. We excluded women with incomplete

records, or prior or bilateral cancers. We compared clinicopathologic features, surgeries, adjuvant therapies, and outcomes.

Results: We identified 178 eligible women ages 80–89 and 169 women ages 50–59. The table summarizes clinicopathologic features and treatment. Elderly women more often had grade 1–2 ($p = 0.001$) and ER+ tumors ($p = 0.007$), and less frequently had adjuvant therapies (all $p \leq 0.0001$). Lumpectomy was more common in the elderly (91% vs 83%, $p = 0.02$). While axillary staging was done less often in the elderly (46% vs 96%, $p < 0.0001$), when done, use of SLNB was similar (58% vs 57%, $p = 0.9$). Fewer elderly women had postlumpectomy RT (42% vs 89%, $p < 0.0001$) and ET for ER+ tumors (72% vs 95%, $p < 0.0001$). At median follow-up of 56 and 98 months in age 80–89 vs 50–59 groups, death from breast cancer was similar (4% vs 5%, $p = 0.5$); there were 3 (2%) vs 4 (2%) locoregional (LR), 7 (4%) vs 11 (7%) distant, and 4 (2%) vs 2 (1%) combined LR/distant recurrences, respectively. Of 14 elderly women with recurrence, 1 did not have axillary staging, 7 did not have postlumpectomy RT, and 4 did not have ET for ER+ tumors.

Clinicopathologic Characteristics and Treatment Modalities

Characteristic	Ages 80-89 n = 178	Ages 50-59 n = 169	P
Palpable tumor—n (%)	63 (35.4)	67 (39.6)	0.41
Surgical *P*athology			
Tumor size (mm)—median (interquartile range)	14 (9-23)	14 (9-20)	0.58
Histology*—n (%) Ductal Lobular Mixed/other	 137 (78.3) 29 (16.6) 9 (5.1)	 132 (78.1) 16 (9.5) 21 (12.4)	0.01
Grade* —n (%) 1 or 2 3 Unknown	 147 (84.5) 27 (15.5) 1 (0.6)	 118 (69.8) 51 (30.2) 0 (0.0)	0.001
Subtype*§—n (%) ER+/HER2+ ER-/HER2+ ER+/HER2- ER-/HER2-	 10 (5.8) 6 (3.5) 150 (86.2) 8 (4.6)	 23 (13.6) 10 (5.6) 116 (68.6) 20 (11.8)	0.001
Treatment Modality			
Treatment offered—n (%) Surgery Radiation therapy Chemotherapy Endocrine therapy (if ER+)	 176 (98.9) 91 (51.1) 9 (5.1) 122 (68.5)	 169 (100.0) 136 (80.5) 111 (65.7) 138 (81.7)	 0.50 <0.0001 <0.0001 0.005
Treatment received—n (%) Surgery Radiation therapy Chemotherapy Endocrine therapy (if ER+)	 175 (98.3) 72 (40.5) 4 (2.3) 105 (59.0)	 169 (100.0) 131 (77.5) 102 (60.4) 132 (78.1)	 0.25 <0.0001 <0.0001 0.0001
Operative Details			
Type of breast surgery performed—n (%) Lumpectomy Mastectomy	 161 (90.5) 14 (7.9)	 141 (83.4) 28 (6.6)	0.02
Axillary surgery performed—n (%)	81 (45.5)	162 (95.9)	<0.0001
Type of axillary surgery performed—n (%) Sentinel lymph node biopsy Axillary lymph node dissection	 47 (58.0) 34 (42.0)	 92 (56.8) 70 (43.2)	0.90

*Surgery was not performed in 3 women age 80-89; thus, n = 175.
§One patient in the ages 80-89 group was ER+ but had unknown HER2 receptor status.

Conclusion: Octogenarian women had similar breast cancer survivorship as younger women, despite less frequent use of adjuvant therapies. This may reflect their lower risk disease features. Whether increased use of axillary staging, postlumpectomy RT, and ET for ER+ tumors would further improve outcomes in elderly women is an important area of further study, but these should not be deferred solely on the basis of age.

0266 - Early Complications After Oncoplastic Reduction

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Objective: Breast-conserving surgery (BCS) has been established as oncologically safe. Oncoplastic breast surgery uses both oncologic and plastic surgical techniques for breast conservation in an effort to improve cosmetic outcomes. We sought to evaluate risk factors associated with complications after oncoplastic reduction.

Methods: A single-institution, IRB-approved retrospective review collected electronic medical records (EMR) of female breast cancer patients who underwent BCS with concomitant oncoplastic breast reduction from 2008–2014. Review of EMR collected patient age, BMI, history of prior breast surgery, medical history, intraoperative weight of breast tissue removed, and postoperative complications. Complications within the first 6 months postop noted in the EMR were stratified into major or minor. Major complications required a procedure or hospitalization. Examples include seroma or hematoma requiring aspiration/percutaneous drain placement, operative debridement, or cosmesis requiring operative revision. Minor complications included all others, ie, minor wound breakdown, and mild asymmetry not requiring revision. Categorical variables were analyzed with chi-square exact method; continuous variables were analyzed with Wilcoxon rank-sum test exact method.

Results: Fifty-nine patients were identified; 7 had unilateral oncoplastic reduction while 51 had oncoplastic breast reduction with simultaneous contralateral reduction mammoplasty. One patient had planned delayed contralateral reduction mammoplasty. Four patients required re-excision after oncoplastic reduction for positive margins; 1 of the 4 had completion mastectomy for persistently positive margins. Twenty patients experienced a complication (33.9%), 12 major (20.3%) and 8 minor (13.6%). The table summarizes complications, major and minor. Of continuous variables (age, BMI, and weight of tissue removed), increased age was significantly associated with minor complications ($p = 0.02$). No other variables reached statistical significance. Of the categorical variables (stratified BMI, prior breast surgery, hypertension, diabetes mellitius, hyperlipidemia, vascular disease, pulmonary disease, and stratified weight of tissue removed), none were associated with overall or major complications. Pulmonary disease (including emphysema and obstructive sleep apnea) was associated with minor complications but not with complications overall ($p = 0.03$).

continues

Summary of Complications After Oncoplastic Reduction

	N	(%)
Total	20	(33.9)
Major	12	(20.3)
Abscess requiring wound drainage	1	(1.7)
Hematoma/Seroma requiring aspiration	4	(6.7)
Seroma Requiring IR drain	1	(1.7)
Wound breakdown requiring operative debridement	2	(3.4)
Cosmesis requiring revision	3	(5.1)
TIA/CVA requiring hospitalization	1	(1.7)
Minor	8	(13.6)
Mild asymmetry without revision	2	(3.4)
Nipple necrosis, minor	1	(1.7)
Wound breakdown requiring follow-up	2	(3.4)
Lymphedema, arm	1	(1.7)
Breast lymphedema/erythema requiring antibiotics	1	(1.7)
Mild wound breakdown requiring debridement in clinic	1	(1.7)

Conclusion: Overall complication rate after oncoplastic reduction is markedly higher than BCS (< 5% based on national data), and oncoplastic reduction for benign disease (5%–20%); selection bias is suspected in this limited dataset; however, no significant predictable factors were identified. No variables analyzed were associated with major or overall complications. Age and pulmonary disease were risk factors associated with minor complications after BCS with oncoplastic reduction.

0369 - Understanding Current Practices and Barriers to the Integration of Oncoplastic Breast Surgery: A Canadian Perspective

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Objective: Despite the safety and popularity of oncoplastic breast surgery, there is limited data examining practice patterns and barriers associated with its incorporation into practice. This study was designed to characterize the use of oncoplastic techniques in breast-conserving surgery and to determine the barriers associated with their implementation.

Methods: A 13-item survey was sent to all general surgeons registered with the College of Physicians and Surgeons of Ontario, Canada. The survey assessed surgeon demographics, utilization of specific oncoplastic techniques, and perceived barriers to the use of oncoplastic techniques.

Results: A total of 234 survey responses were received with a response rate of 32.2% (234/725), and 166 (70.9%) surgeons reported a practice volume of at least 25% breast surgery. Comparison was made between general surgeons performing oncoplastic breast surgery (N = 79) and those who did not use these techniques (N = 87). There was no difference between groups with respect to surgeon gender, years in practice, fellowship training, and access to plastic surgery. Both groups rated the importance of breast cosmesis similarly. However, general surgeons with a practice volume involving >50% breast surgery were more likely to use oncoplastic techniques (OR = 8.82, $p < 0.001$) and involve plastic surgeons in breast-conserving surgery (OR = 2.21, $p = 0.02$). There were several barriers to the use of oncoplastic surgery identified (table). For surgeons not performing oncoplastic surgery, a lack of training and support from plastic surgery were identified as significant barriers. For those using oncoplastic techniques, the absence of specific billing codes was identified as a limiting factor.

Barriers to Integration of Oncoplastic Techniques in Breast Surgery

Barriers Identified by Oncoplastic Non-Users As Compared to Those Who Use Oncoplastic Techniques	Adjusted OR (95% CI)	P value
I am unfamiliar with these techniques.	0.16 (0.07–0.39)	<0.001
I am concerned about delay of adjuvant treatment.	0.54 (0.21–1.38)	0.20
I am concerned about the need for re-operation for positive margins.	0.99 (0.43–2.26)	0.97
I do not have support from plastic surgery.	0.41 (0.18–0.97)	0.04
I do not have support from radiation oncology.	0.87 (0.25–3.09)	0.83
I am concerned about increased operating room time.	1.24 (0.54–2.86)	0.62
I am concerned about the lack of specific billing codes.	4.06 (1.67–9.9)	0.002
I am concerned about poor cosmesis.	1.02 (0.41–2.52)	0.66
My patients are not interested.	1.24 (0.48–3.23)	0.45
I am concerned about the rate of postoperative complications.	1.62 (0.46–5.71)	0.79
I am concerned about managing postoperative complications.	0.85 (0.25–2.86)	0.41

Conclusion: This study provides the first North American data regarding general surgeons' attitudes and practice patterns toward oncoplastic breast surgery. The results indicate that lack of familiarity with techniques, lack of support from plastic surgery, and absence of appropriate reimbursement for these cases are significant barriers to the adoption of these techniques. Our data support the need for increased teaching of oncoplastic techniques during general and subspecialty surgery training, as well as the need to advocate for more appropriate financial remuneration for these cases. Future studies investigating the opinions of plastic surgeons regarding their involvement in oncoplastic surgery may improve collaboration and further decrease barriers to full integration of these techniques.

0430 - Does Body Mass Index Affect the Accuracy of Preoperative Clinical Axillary Nodal Assessment in Breast Cancer Patients?

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Objective: Over one third of American adults are obese, defined as a body mass index (BMI) of >30 kg/m^2. An elevated BMI has been postulated to reduce the sensitivity for certain clinical examinations, such as that for abdominal aortic aneurysm. Clinical nodal exam is important in allocating breast cancer patients to appropriate axillary management. We therefore sought to determine whether BMI influences the rate of nodal positivity in women designating as clinically node negative (cN0) based on physical examination.

Methods: Breast cancer patients deemed clinically node negative by physical examination who underwent sentinel lymph node biopsy (SLNB) from 2/2006 to 12/2011 were identified from a prospectively maintained database. Clinicopathologic features, including BMI at the time of surgical treatment and axillary surgery results, were recorded and compared among pathologically node-negative and node-positive patients.

Results: Overall, 5,142 cN0 patients underwent 5,262 SLNB procedures during the study period. The median age of the study population was 58 years. A sentinel lymph node (SLN) was identified in 99.1% of cases. The table outlines clinicopathologic features for the entire cohort and by pathologic nodal status. Nearly one-third (28%) of patients were classified as obese with a BMI >30 kg/m^2. A positive SLN was identified in 25% of patients and 84% of these patients proceeded to a completion axillary lymph node dissection. Predictors of

SLN positivity included younger age, larger tumor size, high nuclear grade, multifocality, and the presence of lymphovascular invasion. An increased BMI did not correlate with a higher likelihood of SLN positivity when evaluated as either a continuous (p = 0.314) or categorical variable (p = 0.576). The likelihood of clinically node-negative patients having a high burden of axillary metastases (>3 positive nodes) was 4% overall and, similarly, did not differ according to BMI (p = 0.374).

	Overall (n = 5262)	pN+ (n = 1314)	pN0 (n = 3948)	P value
Age, yr, median (range)	57.6 (20.7, 92.4)	54.3 (22.3, 92.4)	58.6 (20.7, 91.6)	<0.001
BMI, median (range)	26.2 (15.5, 60.8)	26.0 (16.5, 59.6)	26.2 (15.5, 60.8)	0.314
BMI category				0.576
(0,25)	2165 (41.1%)	556 (42.3%)	1609 (40.8%)	
(25,30)	1606 (30.5%)	389 (29.6%)	1217 (30.8%)	
(30,100)	1491 (28.3%)	369 (28.1%)	1122 (28.4%)	
Tumor size, cm, median (range)	1.3 (0.05, 12.4)	1.8 (0.1, 12.4)	1.2 (0.1, 9.0)	<0.001
Postmenopausal (n = 5168)	3363 (65.1%)	763 (59.1%)	2600 (67.0%)	<0.001
Nuclear grade (n = 3977)				<0.001
High	1492 (37.5%)	466 (47.4%)	1026 (34.3%)	
Intermediate	2266 (57%)	500 (50.8%)	1766 (59%)	
low	219 (5.5%)	18 (1.8%)	201 (6.7%)	
LVI present (n = 4718)	1460 (29.2%)	719 (56.4%)	741 (19.9%)	<0.001
Multifocal tumor	1312 (24.9%)	482 (36.7%)	830 (21.0%)	<0.001
ER positive (n = 5221)	4443 (85.1%)	1131 (86.3%)	3312 (84.7%)	0.159
PR positive (n = 5220)	3846 (73.7%)	982 (75%)	2864 (73.3%)	0.259
HER2neu overexpressing (n = 5106)	559 (10.8%)	157 (12%)	402 (10.4%)	0.102

Conclusion: Elevated BMI was not associated with a higher likelihood of SLN positivity or heavy nodal disease burden among women staged as cN0. These findings indicate that physical examination is appropriate for the evaluation of the axilla regardless of patient BMI.

0334 - Preoperative Breast MRI Utilization After Implementation of a Care Path: Progressing Toward Value-Based Care

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Objective: MRI is commonly used in the diagnostic workup of breast cancer (BC). However, evidence for routine use of preoperative MRI is lacking, and MRI is very costly. Clinical care paths are value-based guidelines which define value-based health care derived by expert consensus. Included in the BC Care Path outlines are clinical scenarios where preoperative MRI might be most useful (eg, increased breast density). We evaluated the number of preoperative MRIs ordered before and after implementing an institution-wide BC Care Path.

Methods: We performed a retrospective IRB-approved study looking at a total of 1804 patients diagnosed with breast cancer at our institution during the years 2012, 2014, and part of 2015. The BC Care Path was implemented in April 2014. Patient demographics, tumor characteristics, and mammographic density were

collected. Dense breast was defined as heterogeneously dense or extremely dense on mammogram. We used a logistic generalized linear mixed model that accounts for surgeon-to-surgeon and location-to-location variability.

Results: We identified 1804 patients diagnosed with breast cancer in the years 2012, 2014, and 2015. There were 1791 (99%) females and 13 (1%) males. Seven hundred and eighty-four (43%) patients were diagnosed in 2012, 764 (42%) were diagnosed in 2014, and 256 (14%) were diagnosed in 2015. The median age was 60.3 (interquartile range [IQR], 49.9 to 68.1) in 2012, 60.6 (IQR, 52.1 to 69.4) in 2014, and 62.3 (IQR, 55.7 to 69.4) in 2015. By year of diagnosis, 597/784 (76%) patients in 2012, 465/764 (61%) patients in 2014, and 135/256 (53%) in 2015 underwent a preoperative MRI. Patients were more likely to undergo preoperative MRI in 2012 than in 2014 (OR, 1.47; 95% CI, 0.82–2.63) or 2015 (OR, 1.65; 95% CI, 0.70–3.91). Of patients who underwent a preoperative MRI and had a mammographic density documented, 276/587 (47%) in 2012, 267/455 (58%) in 2014, and 90/135 (67%) in 2015 were dense.

Conclusion: Implementation of an online BC Care Path was associated with decreased use of preoperative MRI and higher percentage of patients who had an appropriate indication for preoperative breast MRI (ie, increased density). BC Care Path implementation is an effective way to drive value-based BC care.

0347 - Are the Current Screening Guidelines Appropriate for All Populations? A Review of Breast Cancer Incidence in an Urban Minority Population

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Objective: Current national data state that approximately 10% of new breast cancer cases occur in women under the age of 45. Current American Cancer Society (ACS) guidelines recommend starting yearly screening at age 45, with biannual exams at age 55 for the average risk woman. We propose that there is a disproportionately higher rate of breast cancer in minority women under the age of 45, thus screening guidelines may need to be adjusted for this population.

Methods: This is an Institutional Review Board (IRB)-approved retrospective review of the breast cancer tumor registry from an urban tertiary care cancer center. Cases between January 2000 and May 2015 were analyzed. Age and American Joint Committee on Cancer (AJCC) stage at diagnosis were documented. Patients were stratified by age: at or below 44, and 45 years or above. Demographics on the patient population served at our institution were abstracted from the annual Health Needs Assessment Report generated by the hospital.

Results: The population served at our institution is 52% African American, 34% Hispanic/Latino, 11% white, 2% nondesignated ethnicity, and 1% Asian. A total of 1472 patients were identified from the registry. Average age of the cohort was 55, with a range from 15 to 95 years. Twenty-one percent of patients diagnosed with breast cancer were under the age of 45, with 9% being under the age of 40. When comparing the groups by clinical stage at presentation, 54% of women under 45 presented with stage II or higher vs 42% in women over the age of 45 ($p = .0003$) (figure).

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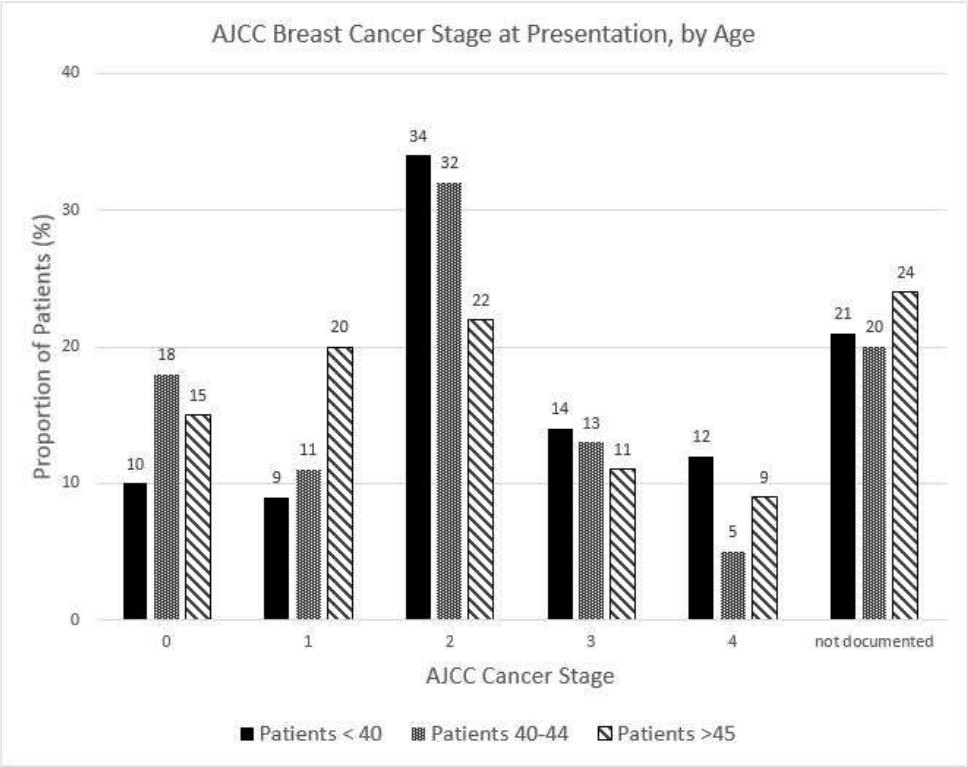

Conclusion: Our data show that 20% of minority women with breast cancer present under the age of 45, which is twice the national average. Minority women are also more likely to present with an advanced stage of cancer, particularly if they are younger than 45. The current recommendations for mammography screening may miss a significant proportion of patients with both early and advanced cancer. Consideration into adjusting the screening parameters by race/ethnicity may be required.

0288 - Outcomes Disparities for Invasive Breast Cancer in Southeast Rural Communities May Be Related to Delays in Treatment

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Objective: Rural communities in the Southeast, defined as counties with an urban population of 2,500 or less, are often in disparate regions based on socioeconomic status and cancer outcomes. National data were analyzed to determine demographic factors associated with poorer cancer outcomes in these rural counties.

Methods: The NCDB (National Cancer DataBase) was analyzed for breast cancer outcomes from 1998–2012. The analysis was primarily focused on rural counties in the South Atlantic and East South Central Regions, which include the majority of the counties in Appalachia. Multivariate analyses were performed to evaluate the clinical and economic factors in breast cancer outcomes in these regions.

Results: From 1998–2012, over 2.8 million patients with invasive breast cancer were evaluated with 581,514 in the South Atlantic and East South Central regions. Of those, 12,515 (2.2%) were from rural counties. Those in metro counties (greater than 50,000 population) were 15% less likely to die than those in rural counties. The median survival for rural counties was 162 months (95% CI, 156–168) vs metro counties, which was 178.5 months (95% CI, 177–179). When comparing the time of diagnosis to the time treatment began and was completed, there were more delays in initiating and completing treatment in those from rural counties and the delays resulted in a 0.1% increase in dying per day of delay. In other words, for every 100 days of delay, there

is a 10% increase in the chance of dying. Additional impacts on mortality included socioeconomic factors, including median household income and highest education level achieved (see table).

	Median Survival (months)	95% Confidence Interval	P Value
Median Household Income			
<$30,000	147.98	(145.9–150.4)	Referent
30,000–$35,999	159.9	(157.9–161.9)	
$36,000–$45,999	172.0	(169.8–174.2)	
>$46,000	176.1	(175.0–177.3)	<.001
ZIP Code Percent With No High School Degree			
>29%	154.9	(152.9–156.7)	Referent
20%–28.9%	165.9	(163.9–167.8)	
14%–19.9%	175.5	(172.8–178.1)	
<14%	176.3	(175.1–177.5)	<.001

Conclusion: In the South Atlantic and East South Central Regions, significant delays in initiating and completing treatment for invasive breast cancer patients in rural counties demonstrated evidence of being associated with disparate outcomes. A lack of resources both for the individual patient and communities as well as the regional education status appears to contribute to these delays. Improvements in breast cancer outcomes in these rural counties may be best focused on creating and supporting satellite clinics, community outreach, and mobile cancer screenings.

0262 - Overutilization of Axillary Surgery for Patients With Ductal Carcinoma In Situ

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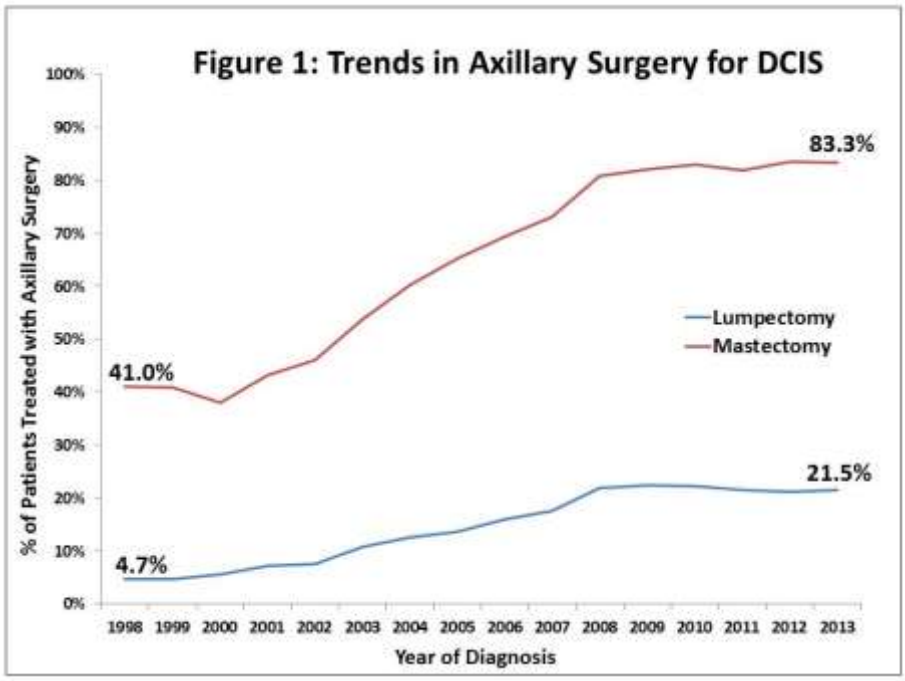
Objective: National Comprehensive Cancer Center (NCCN) guidelines state that axillary lymph node surgery should only be performed for pure ductal carcinoma in situ (DCIS) for those undergoing mastectomy or if the DCIS is in a location that would compromise future sentinel node biopsy. We evaluated axillary surgery (AS) rates and factors associated with its overutilization for patients with DCIS undergoing lumpectomy and mastectomy.

Methods: The National Cancer Data Base was utilized to identify 192,850 patients with American Joint Committee on Cancer (AJCC) clinical stage 0 breast cancer treated with lumpectomy or mastectomy with or without AS from 1998–2013. Chi-square tests and logistic regression were used to examine patient, tumor, and facility features associated with the use of AS.

Results: 145,462 (75.4%) of patients underwent lumpectomy and 47,388 (24.6%) underwent mastectomy. AS rates were 21.5% and 83.3%, respectively, for lumpectomy and mastectomy in 2013. AS increased 5-fold for patients undergoing lumpectomy and doubled for patients undergoing mastectomy (figure). For those treated from 1998–2012, the final pathologic stage remained stage 0 for 90.4% of lumpectomy and 91.3% of mastectomy patients after AS. The number of nodes removed for lumpectomy and mastectomy patients undergoing AS, respectively, was 1–4 in 85.4% and 72.8%, 5–9 in 10.7% and 18.1%, and 10 or greater in 3.9% and 9.1%. On multivariate analysis for years 2011–2012, treatment at an academic or comprehensive community cancer program was associated with lower rates of AS for lumpectomy patients (RR, 0.6; 95% CI, 0.54–0.67, and RR, 0.9; 95% CI, 0.81–0.98). AS with lumpectomy was more common in East South Central (RR, 3.5; 95% CI, 2.9–4.3), West South Central (RR 3.0; 95% CI, 2.5–3.6), and Mountain (RR, 2.9; 95% CI,

2.4–3.5) regions. Tumor size greater than 1 cm (RR 1.6; 95% CI, 1.5–1.7), estrogen receptor negative status (RR, 1.7; 95% CI, 1.6–1.9), and grade 2 or 3 (RR, 2.1; 95% CI, 1.9–2.4) were significantly associated with increased likelihood of AS in lumpectomy patients, with poorly or undifferentiated tumors most likely to undergo AS (RR, 2.9; 95% CI, 2.5–3.2, and RR, 2.9; 95% CI, 2.3–3.6, respectively).



Conclusion: Approximately one fifth of DCIS patients undergoing lumpectomy are being overtreated with AS. Facility location and tumor grade were most strongly associated with higher AS rates. The inappropriate use of AS for DCIS highlights an opportunity to further educate surgeons managing patients with DCIS.

0356 - American Society of Breast Surgeons Nipple-Sparing Mastectomy Registry Preliminary Oncologic Outcome

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Objective: The American Society of Breast Surgeons (ASBrS) Nipple-Sparing Mastectomy Registry (NSMR) is an ongoing, prospective, IRB-approved, nonrandomized, multi-institutional registry housed within the

Mastery of Surgery (ASBrS). The ASBrS NSMR was designed to assess metrics utilized, surgical techniques, aesthetic outcome, and oncologic outcome of nipple-sparing mastectomies (NSMs).

Methods: This analysis assesses recurrence rate in therapeutic NSMs and occurrence rate in prophylactic mastectomies. Recurrence parameters include: local/regional, distant, contralateral, location within reconstructed breast (NAC vs elsewhere).

Results: This analysis, performed at 58.6 months into accrual, represents a total of 2129 NSMs performed on 1291 patients. Mean follow-up is 24.4 months, Median follow-up is 23.3 months (range, 0.2 to 58.6 months). Indications for the 2129 NSMs performed include cancer n = 852 (invasive carcinoma, 567, and DCIS, 285) and prophylaxis (n = 1262). Unilateral NSMs were performed on 453 patients (cancer indication: n = 302 and prophylactic n = 144). Bilateral NSMs were performed on 838 patients (1676 total NSMs; 550, indication of cancer; 1118, indication prophylactic). Of the 852 NSMs performed for cancer, there were 9 recurrences (1 local and 7 distant) performed for invasive carcinoma (8) and DCIS (1) for a recurrence rate of 1%. Tumor size measured via clinical, mammogram, ultrasound, and/or MRI ranged from 0.1 cm–9 cm. There were 2 occurrences in the prophylaxis group of 1252 NSMs (0.2%).

Indication	Total NSMs Performed	Recurrence	Recurrence Site
Cancer Invasive carcinoma DCIS	852 567 285	9 (1%) 8 1	 Distant: 7 Ipsilateral breast: 1 Ipsilateral breast: 1
		Occurrence	
Prophylactic	1252	2 (0.2%)	Distant: 2

NOTE: Surgsum.sas run date 28Oct15:13:03:32; based on months from surgery to file date Oct.22.2015.
*No recurrences noted at the nipple or NAC.

Conclusion: NSM is a safe technique for reducing short-term risk in a prophylactic setting although the follow-up is very short. In addition, NSM has an acceptable in breast recurrence rate again with a very short follow-up. No occurrences/recurrences occurred at the nipple and/or nipple areola complex. Incidence of recurrence or occurrence is too low to associate with any preoperative or postoperative pathology conclusions.

0345 - Oncologic Outcomes Following Nipple-Sparing Mastectomy

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Objective: Nipple-sparing mastectomy (NSM) is increasingly used as an alternative to traditional mastectomy as it provides improved aesthetic results. There are limited data on its oncologic safety. Our institution has performed nipple-sparing mastectomy over the past 10 years for both oncologic and prophylactic indications. The purpose of this study was to examine oncologic outcomes after nipple-sparing mastectomy for breast cancer.

Methods: We retrospectively examined all NSM cases performed between July 2007 and July 2013. Descriptive statistics were used to characterize the study cohort. Kaplan-Meier survival analysis was performed to estimate recurrence-free survival (RFS), specifically the 36-month recurrence-free survival proportion.

Results: A total of 721 nipple-sparing mastectomies were performed in 413 patients: 45 were risk-reducing (10.9%) and 368 (89.1%) were performed for breast cancer. Within the breast cancer group, 29.3% of patients had ductal carcinoma in situ and 69.3% had invasive cancer. Twenty-five patients (6.2%) had a positive nipple

margin on frozen or permanent section resulting in excision of the nipple areolar complex (NAC). Mean follow-up time was 32 months (range, 0.01–90.2 months). In the breast cancer group, the Kaplan-Meier 3-yr recurrence-free survival rate was 93.6% (95% confidence interval = 89.9%, 96.0%). Seven patients (1.9%) had ipsilateral breast recurrences, none of which were in the NAC; 9 patients (2.4%) had distant recurrence and 6 patients (1.6%) were diagnosed with both local and distant recurrence.

Conclusion: We found an overall recurrence rate of 6.0% for patients undergoing NSM for the treatment of breast cancer. The majority of these recurrences were distant, with an ipsilateral breast cancer recurrence rate of 1.9%. These results are promising; however, a longer follow-up of this cohort is necessary.

0221 - Improved Survival with Postmastectomy Radiation Therapy in Premenopausal Patients With T1-T2 Breast Cancer and 1–3 Positive Lymph Nodes

Yijia Mu[1], Emilia Diego[2], Priscilla McAuliffe[2], Kandace McGuire[3], Atilla Soran[2], Marguerite Bonaventura[2], Ronald Johnson[2], Sushil Beriwal[2], Gretchen Ahrendt[2]

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Objective: Definitive indications for postmastectomy radiation therapy (PMRT) include patients (pts) with breast cancer (BC) >5 cm or more than 4 positive axillary lymph nodes (LNs). Recent evidence suggests that PMRT also reduces recurrence risk and improves overall survival (OS) in all pts with tumors <5 cm and 1–3 positive LNs. The aim of this study was to evaluate recurrence and OS of premenopausal patients with T1-2 BC and 1–3 positive LNs who underwent a total mastectomy (TM) with or without PMRT at a single institution.

Methods: Following IRB approval, a single-institution cancer registry was retrospectively searched for premenopausal pts with T1-T2 BC, and 1–3 positive LNs who underwent a TM between January 2004 and December 2012. Pt demographic and clinicopathologic information were collected. Statistical analysis was performed using SPSS (version 22). Univariate (chi-square, *t* test, log-rank) and multivariable (Cox proportional hazards) analyses were completed using p values of <0.05 to deem significance.

Results: A total of 84 premenopausal pts were treated with TM in the specified time period: 36 had PMRT and 48 did not have PMRT. Mean age was 43 years for both groups (p = 0.80). Mean tumor size (2.8 vs 1.9 cm, p = 0.0004), Nottingham grade (p = 0.01), and mean number of positive LNs (1.8 vs 1.3, p = 0.0039) were higher in the PMRT arm. There was no significant difference between the 2 groups in terms of histology, phenotype, presence of lymphovascular space invasion, nodal extracapsular extension, receipt of endocrine therapy, or systemic chemotherapy. Mean follow-up was 55 and 66 months in the PMRT and no-PMRT groups, respectively. Five-year loco-regional recurrence rates with and without PMRT were 7 (95% CI, 0.0–16.4) and 13% (95% CI, 3.3–23.3, p = 0.25), respectively. Five-year overall survival rates with and without PMRT were 100 and 94% (95% CI, 86.8–100.0%, p = 0.069). On multivariable Cox analysis, only LVSI trended toward predicting for a higher risk of loco-regional relapse (HR, 7.02; 95% CI, 0.84–58.72, p = 0.072).

continues

	PMRT	No PMRT	p value
N (%)	36 (43%)	48 (57%)	
Age (mean ± SEM)	43 ± 0.8	43 ± 0.7	0.8
Tumor size, cm (mean ± SEM)	2.8 ± 0.2	1.9 ± 0.1	0.0004
Positive lymph nodes (mean ± SEM)	1.8 ± 0.1	1.3 ± 0.1	0.0039
Histology			0.13
Invasive ductal carcinoma	28 (78%)	38 (80%)	
Invasive lobular carcinoma	8 (22%)	5 (10%)	
Other	0	5 (10%)	
Nottingham grade			0.01
1	1 (3%)	9 (18%)	
2	24 (67%)	19 (40%)	
3	9 (25%)	20 (42%)	
Unknown	2 (6%)	0	
Tumor phenotype			0.55
ER positive/ HER2 negative	24 (67%)	29 (60%)	
HER2 positive	11 (30%)	15 (32%)	
Triple negative	1 (3%)	4 (8%)	
LVSI[1]			0.46
Present	15 (42%)	23 (48%)	
Absent	21 (58%)	25 (52%)	
ECE[2]			0.59
Present	10 (67%)	13 (28%)	
Absent	20 (33%)	34 (72%)	
Endocrine therapy			0.07
Yes	34 (95%)	37 (77%)	
No	2 (5%)	11 (23%)	
Systemic chemotherapy			0.76
Yes	28 (78%)	37 (77%)	
No	8 (22%)	11 (23%)	
Follow-up, months (mean ± SEM)	56 ± 4	66 ± 4	0.07
Loco-regional recurrence	3 (8%)	7 (15%)	0.50
Chest wall	3	3	
Regional lymph nodes	0	4	
Five-year loco-regional recurrence risk	7%	13%	0.25
Five-year overall survival	100%	94%	0.06

1Lymphovascular space invasion
2Extracapsular extension

Conclusion: In this cohort of premenopausal patients with T1-T2 breast cancer with 1–3 positive LNs, those who received PMRT had larger, higher grade tumors and greater axillary involvement. Although no statistical difference was identified in loco-regional recurrence in these premenopausal pts, there was a higher likelihood of survival in those who received PMRT. A larger sample size is needed to confirm these findings.

0229 - Use of Intraoperative Frozen-Section Analysis in Ductal Carcinoma In Situ for Detecting Upstaging to Invasive Disease

Brittany Murphy[1], Alexandra Gonzalez Juarrero[1], Amy Degnim[1], Tashinga Musonza[1], William Harmsen[1], Judy Boughey[1], Tina Hieken[1], Elizabeth Habermann[1], Beiyun Chen[1], Amy Conners[1], James Jakub[1]

[1]*Mayo Clinic, Rochester, MN*

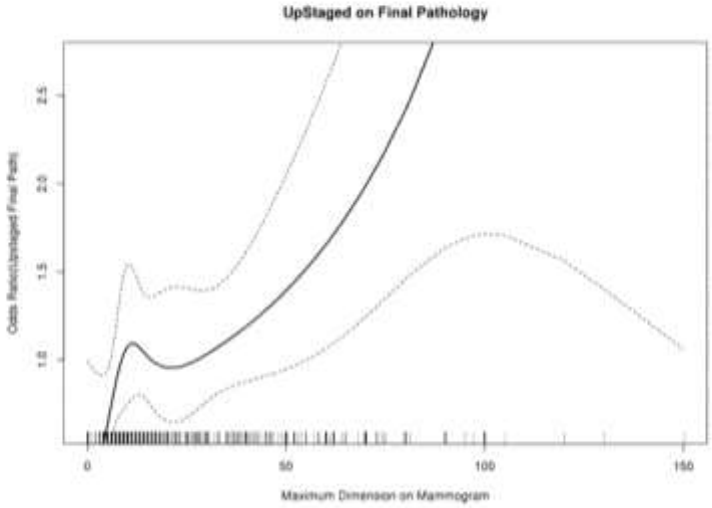
Objective: For patients with a core needle biopsy of ductal carcinoma in situ (DCIS), it is generally recommended that sentinel lymph node (SLN) surgery be reserved for patients who are at high risk of being

upstaged to invasive disease. The use of intraoperative frozen-section (FS) pathologic analysis of the primary tumor at the time of definitive surgical resection may allow for more selective surgical nodal staging within 1 procedure. We sought to evaluate risk factors for upstaging to invasive cancer for patients with DCIS and to define the reliability of intraoperative FS analysis in this setting.

Methods: After IRB approval, a total of 845 patients with DCIS on core needle biopsy (CNB) underwent 852 operations at our institution between 1/2004 and 10/2014. FS pathologic analysis is a standard part of intraoperative evaluation for patients undergoing breast operations for DCIS at our institution. We evaluated method of detection and tumor characteristics on CNB, with both univariate and multivariable analysis, to determine the rate of upstage from DCIS to invasive cancer on both intraoperative FS and final pathology.

Results: Our upstage rate on final pathology was 126/852 (14.8%). Intraoperative pathology identified 91/126 (72.2%) of the upgrades. Specificity was 99.7%. Preoperative factors associated with an increased risk of upstage include: palpable mass, BIRADS score 5, breast density of 4, mass lesion seen on ultrasound, multifocal/multicentric disease, small-gauge needle biopsy (>12), high-grade DCIS, radiographic size of lesion and comedo-type histology. For every 1 cm increase in largest linear dimension on preoperative imaging, the rate of pathologic upstage increased by 16% (p = 0.0002, figure). On multivariable analysis, palpable mass, multiple biopsy sites, and high grade remained statistically significant. Patients undergoing mastectomy also had a higher risk of upgrade. Nineteen patients were found to be node positive; 7 of those with final diagnosis of DCIS and 12 of those upstaged to invasive disease.

Figure 1: Risk of Upstage on Final Pathology Based on Maximum Linear Dimension on Mammogram



Conclusion: Of patients with a CNB of DCIS, intraoperative FS analysis had a sensitivity of 72.2% and a specificity of 99.7% for detecting invasive disease. FS analysis of the primary tumor may be utilized to selectively perform a SLN biopsy based on intraoperative findings and avoid an unnecessary SLN procedure while decreasing the need for second operations. Patients with a palpable mass, high-grade lesion, large radiographic size, multiple sites biopsied, or undergoing a mastectomy are at highest risk of being upstaged.

0271 - Contralateral Prophylactic Mastectomy in Women With T4 Locally Advanced Breast Cancer

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[1]*Mayo Clinic, Rochester, MN*

Objective: The performance of contralateral prophylactic mastectomy (CPM) in women with unilateral breast cancer has increased substantially over the last 15 years, most notably in women undergoing immediate breast

reconstruction (IBR). We were interested in whether this trend extended to patients with T4 breast cancer for whom guidelines advise modified radical mastectomy without IBR following neoadjuvant systemic therapy (NST) and who have a significant risk of 5-year breast cancer mortality.

Methods: We identified 92 patients in our prospective breast surgery registry with unilateral clinical T4 M0 disease, and no prior breast cancer, undergoing mastectomy at our institution 10/08–7/15. We compared patients having CPM and those who did not with respect to patient, tumor, and treatment variables and ascertained the reason for CPM from record review.

Results: Thirty-one of 92 patients (34%) undergoing mastectomy had a CPM (29 at the time of initial operation and 2 in a delayed fashion), including 24 of 55 patients (44%) with inflammatory breast cancer. Nine of the 92 patients (10%) underwent IBR, including 4 of 31 CPM patients (13%), while 3 CPM patients had delayed reconstruction. Pathology revealed benign findings in the CPM tissue in all cases with atypical hyperplasia in 3 (10%). The patient-reported primary reason for selection of CPM included fear of occult current and/or future breast cancer in 11 (35%), symmetry in 10 (32%), avoidance of future chemotherapy in 5 (16%), deleterious BRCA mutation in 2 (6%), contralateral benign breast disease in 2 (6%), and medical oncologist recommendation in 1 (3%). Twenty-eight of 74 neoadjuvant chemotherapy patients (38%) vs 3 of 18 (17%) not receiving neoadjuvant chemotherapy selected CPM, $p = 0.07$. As shown in the table, the strongest factor associated with CPM was BRCA testing, $p < 0.0001$. Patients selecting CPM were significantly younger than those treated with unilateral mastectomy, $p = 0.007$. Surgeon gender, year of diagnosis, clinical N stage, and treatment response were not associated with the choice for CPM.

	CPM (N = 31)	**No CPM (N = 61)**	**p Value**
Age, median (IQR)	52 (48–60)	61 (50–68)	0.007
BRCA testing Yes No	 19/32 (61%) 12/31 (29%)	 11/61 (18%) 50/61 (82%)	<0.0001
BRCA testing None Negative Positive VUS	 19/31 (61%) 10/31 (32%) 2/31 (6%) 0	 50/61 (82%) 9/61 (15%) 0 2/61 (3%)	0.03
Year of diagnosis 2008-2011 2012-2015	 15/31 (48%) 16/31 (52%)	 29/61 (48%) 32/61 (52%)	0.94
Surgeon gender Female Male	 26/31 (84%) 5/31 (16%)	 44/61 (72%) 17/61 (28%)	0.21
Clinical T stage cT4a/b/c cT4d	 7/31 (23%) 24/31 (77%)	 30/61 (44%) 31/61 (56%)	0.03
Clinical N stage cN0 cN+ (FNA+)	 7/31 (23%) 24/31 (77%)	 23/61 (38%) 38/61 (61%)	0.14
Neoadjuvant systemic therapy (NST) None Endocrine Chemotherapy	 3/31 (10%) 0 28/31 (90%)	 8/61 (13%) 7/61 (11%) 46/61 (75%)	0.04
Pathologic stage* No residual disease (ypTis/T0, ypN0) Residual disease	 17/28 (61%) 11/29 (39%)	 39/53 (74%) 14/53 (26%)	0.24

*For 81 patients having NST.

Conclusion: We observed a substantial rate of CPM among women with unilateral T4 breast cancer undergoing mastectomy. Reasons for selection of CPM paralleled trends seen for patients with early breast

cancer and additionally included the desire to avoid further chemotherapy. Risk reduction remained the most common primary reason for CPM among women with locally advanced disease despite their high risk of mortality from their index cancer.

0182 - Locoregional Recurrence and Adverse Events in Single-Lumen vs Multi-Lumen Catheter: A Single-Center Experience Using MammoSite Balloon Catheter 5-Day Targeted Radiation Therapy

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Objective: The MammoSite brachytherapy applicator was approved by the FDA in May of 2002 and is a delivery modality for accelerated partial breast irradiation (APBI) in early-stage breast cancer patients. The objective of this study was to assess clinical outcomes in patients who underwent APBI using MammoSite Balloon Catheter 5-Day Targeted Radiation Therapy (MBC5-DTRT), with a specific focus on loco-regional reoccurrence (LRR) and adverse events in the single-lumen catheter (SLC) vs the multi-lumen catheter (MLC).

Methods: A retrospective chart review was conducted for patients with stage 0–2 breast cancer, who were treated with breast conservation therapy, followed by APBI using the MammoSite balloon catheter device from 2004–2012. Clinical outcomes, including LRR and adverse events, were compared between the MammoSite SLC and the MammoSite MLC. In accordance with the American Society for Radiation Oncology (ASTRO) guidelines, comparisons were also made between SLC and MLC for lymphovascular invasion (LVI), tumor size, margins, age, extensive intraductal component (EIC)/high-grade DCIS (HGDCIS), lymph node status, and estrogen receptor (ER) status. Categorical data were analyzed using chi-square and Fisher exact tests and continuous data with Mann-Whitney *U* and independent samples *t* tests.

Results: A total of 103 patients were included in this study. Cancer types included ductal carcinoma in situ (DCIS), 28.2%; invasive ductal carcinoma, 67%; and invasive lobular carcinoma, 4.8%. Of the 103 patients who completed APBI using MBC5-DTRT, 54% had SLC, and 46% had MLC. There was no significant differences in age ($p = 0.65$), tumor size ($p = .437$), or margins ($p = .113$) between SLC and MLC. Also, there were no associations between SLC and MLC with regard to LVI ($p = .094$), EIC/HGDCIS ($p = .132$), lymph node status ($p = .623$), and ER status ($p = .241$). However, there was a significant association between SLC and MLC in cancer reoccurrence ($p = .022$). Only 1.8% of the SLC patients experienced reoccurrence (all distal), while 14.9% of MLC patients experienced reoccurrence (86% for in breast tumor reoccurrence and 14% distal reoccurrence). Further, more than half of the number of patients (59.6%) who used MLC suffered adverse advents, while only 37.5% of those with SLC suffered adverse events ($p = .025$).

Conclusion: The MammoSite MLC has a significantly greater cumulative incidence of in-breast tumor reoccurrence and adverse events than SLC. Further study is warranted regarding the safety and efficacy of utilizing MammoSite MLC instead of MammoSite SLC for APBI.

0377 - Does the High Axillary False-Negative Sentinel Lymph Node Rate Reported in the Neoadjuvant Clinical Trials Translate Into a High Axillary Local Recurrence Rate?

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Objective: Recent prospective trials demonstrate that patients having neoadjuvant chemotherapy (NAC) who undergo subsequent sentinel lymphadenectomy (SL) have unacceptably high false-negative rates if only 1 or 2 negative sentinel lymph nodes are found and examined. However, these studies have not yet evaluated whether the high axillary false-negative rates result in high axillary recurrence rates, and outcomes data remain lacking.

Methods: Tumor registry data at an NCI-designated Comprehensive Cancer Center were reviewed back to 2005 to evaluate operative and SL data in patients receiving NAC with attention to axillary lymph node recurrences.

Results: Among 118 patients having NAC prior to SL and histologically negative sentinel nodes, 39 patients had a clinically positive axilla before NAC initiation. Mean tumor size was 4.3 cm overall, and 76.3% of patients had whole-breast or postmastectomy radiotherapy. Thirty-eight patients underwent excision of 1, 46 had excision of 2, and 34 had excision of ≥3 negative sentinel lymph nodes, with mean primary tumor sizes of 3.8, 4.6, and 4.6 cm, respectively. Axillary recurrences occurred in 5.3%, 2.2%, and 0% of patients having 1, 2, and ≥3 sentinel lymph nodes ($p = 0.50$). Distant recurrences occurred in 13.2%, 6.5%, and 5.8% ($p = 0.54$) of those groups, while their overall survival was 92.1%, 93.5%, and 94.1%, respectively ($p = 0.24$). Mean follow-up was 39 months.

Conclusion: Although prospective trials demonstrate a high false-negative rate when SL removes 1 or 2 negative sentinel lymph nodes after NAC, axillary recurrences remain low, suggesting that excision of fewer than 3 sentinel lymph nodes is safe. Prospective data with longer follow-up are needed to definitively determine whether the elevated false-negative rates found in recent prospective trials become clinically significant and vary by the number of post-neoadjuvant sentinel nodes resected.

0255 - Utility of Clinical Breast Exams in Detecting Local-Regional Recurrence in Women With a Personal History of High-Risk Breast Cancer

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Objective: Clinical breast exams are a core component of follow-up for breast cancer survivors. Recent American Cancer Society guidelines suggest a low clinical utility of clinical breast examinations for women of average risk (without personal history of breast cancer, genetic mutation, or history of chest wall radiation). We sought to determine the additive value of clinical breast exams over screening breast imaging alone in a cohort of women at high risk of breast events, specifically those with a personal history of high risk breast cancer treated with breast-conserving surgery (BCS).

Methods: Through the National Cancer Database special study mechanism, medical records from stage-stratified sample of 10 patients diagnosed with stage 2 or 3 breast cancer in 2006–2007 were selected at random from 1,200 facilities for abstraction. We included women treated with BCS. Information regarding ipsilateral and contralateral local-regional breast events in the first 5 years was abstracted starting at 90 days post-surgery, including method of detection of the event and receipt of breast imaging prior to a second breast event. Summary statistics were generated. Factors associated with development of a breast event were assessed using logistic regression.

Results: The majority of the 4,988 patients included were stage 2 (71%), with 62% having tumors >2 cm and 68% having positive nodes. A local-regional breast event was detected in 5.8% at a median 2.8 years. Of these, 4.1% were ipsilateral to the prior cancer; 25% of ipsilateral events occurred in the regional lymph node basin. Ipsilateral events were more common in women with ER/PR-negative tumors (OR, 2.0; $p < 0.001$), ≥4 positive nodes (OR, 1.9; $p = 0.01$), and larger tumors (OR, 1.8; $p = 0.02$). Receipt of radiation (OR, 0.6; $p = 0.02$) or systemic therapy (chemotherapy: OR, 0.7; $p = 0.04$; endocrine therapy: OR, 0.6; $p = 0.01$) was associated with fewer events. Ipsilateral events were most frequently detected by screening breast imaging (43%) and by patient detection (32%). A minority were detected by physician clinical exam (11%). Of the ipsilateral events detected by physician exam, 9/22 were lymph node recurrences. Of the 22 physician-detected recurrences, 7 had not had imaging in the preceding 12 months.

	Ipsilateral Breast Event	Contralateral Breast Event
% with breast event	4.1% (n = 202)	1.7% (n = 83)
Median time to detection	2.6 years	3.2 years
How breast event detected		
By physician	11% (n = 22)	10% (n = 8)
By patient	32% (n = 64)	22% (n = 18)
By screening breast imaging	43% (n = 86)	55% (n = 46)
Incidental on other imaging	2% (n = 4)	2% (n = 2)
Other	13% (n = 26)	11% (n = 9)

Conclusion: In this cohort of women with high-risk stage 2 and 3 breast cancer treated with BCS, the physician clinical exam detected a local-regional recurrence in <1% of patients (30/4,988 = 0.6%) over the first 5 years. Although physician clinic visits may have other value, such as assessing for symptoms of distant metastasis or treatment side effects, our data suggest that routine physician visits for the purpose of assessing for local-regional recurrence may not add significant value over routine imaging after BCS.

0335 - Routine Overnight Admissions for Mastectomy Patients Are Unnecessary: Contemporary Insights From a Patient-Centered Outcome Study

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Objective: Mastectomy patients are often routinely admitted overnight after surgery for pain control and drain care. Previous studies have shown some success with same-day discharge for certain mastectomy patients. In this study, we aim to determine the outcomes and satisfaction of patients who were discharged the same day of their mastectomy surgeries.

Methods: From January 2013 to October 2015, 180 consecutive patients undergoing a single or bilateral mastectomy with and without reconstruction with tissue expanders by a single surgeon were retrospectively surveyed. These patients were surveyed regarding their discharge experiences, including outcomes and satisfaction.

Results: Of the 180 patients surveyed, 175 patients were discharged from the recovery room. These same-day discharged patients experienced no significant adverse events or required readmission. Retrospective surveys showed that most of these same-day-discharged patients were either satisfied or very satisfied with their discharge experiences and would recommend same-day discharges for future patients undergoing a mastectomy operation who meet discharge criteria in the recovery room.

Conclusion: Despite many reservations and controversies regarding ambulatory or same-day surgery mastectomies, these practices are safe, feasible, and can lead to positive patient experiences if patients are counseled adequately in the preoperative setting and meet certain discharge criteria in the recovery room.

0378 - A Comparison of Selective Shaved Margins With Intraoperative Specimen Radiography and Routine Shaved Margins to Decrease Re-Excision Rates in Patients With Clinically Occult Breast Cancer

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Objective: While breast conservation has become the accepted treatment option for most patients, studies have shown approximately 20–30 percent of patients undergoing breast conservation surgery require re-excision for

positive margins. Routinely shaving cavity margins (RSM) has been shown in some studies to reduce the rates of positive margins and need for re-excision by almost 50%. This approach can be time consuming and may result in excessive removal of tissue. We compared the use of selectively shaved margins (SSM) plus intraoperative specimen radiography (IOR) to RSM to evaluate patients being returned to the operating room for re-excision.

Methods: IRB-approved study from 5/2014–10/2015 in which RSM were completed on 27 consecutive patients and compared with 30 patients who received SSM + IOR with clinically occult stage 0, I, and II breast cancers. Thirty patients received a wide segmental resection using an I-125 seed localization technique. Upon completion of the segmental resection, the specimens were oriented and assessed clinically (visualization and palpation) and radiographically (Kubtec XPERT 40 Digital Specimen Radiography System) in the operating room. The surgeon made his assessment of the margins, and any margin deemed to be suspicious by the surgeon was excised (unless the anterior margin was skin or the posterior margin was the pectoral muscle fascia). Twenty-seven patients received a wide segmental resection with I-125 seed localization and upon completion of segmental resection additional margins were routinely excised (unless the anterior margin was skin or the posterior margin was the pectoral muscle). Final margin status for both groups was compared. Positive margins included any margin with tumor on ink that required re-excision.

Results: One hundred seventy-seven additional margins were excised from 57 patients; 141 margins (routinely) and 36 margins (selectively). Of the 177, 10 margins were found to be positive (tumor on ink). Five margins (5/141, 3.5%) were positive in the RSM group and 2 patients required re-excision. Five margins (5/36, 13.8%) were positive in the SSM + IOR group, and 3 patients required further re-excision. The average volume resected from the RSM averaged 115.77cm^3. The average volume of the SSM + IOR averaged 68.6 cm^3.

Conclusion: In this study, RSM did not significantly decrease the need for return to operating room and was found to increase the tissue volume that was removed. SSM + IOR required excision of less tissue to yield equal positive margins. In the hands of an experienced breast surgeon SSM + IOR remains our approach of choice in breast conservation therapy for clinically occult tumors.

0256 - Intraoperative Radiation Therapy (IORT) in Patients With Breast Augmentation

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Objective: Patients with prior breast augmentation who develop breast cancer generally prefer breast conservation. Capsular contracture is a well-recognized complication in up to 50% of augmented patients following whole-breast irradiation. This generally leads to significant patient dissatisfaction with their cosmetic outcome and the potential for severe pain, potentially requiring multiple operative revisions. We sought to determine whether IORT would be a better approach for these patients and present the first known case series of IORT in patients with breast augmentation.

Methods: From June 2010 to June 2015 we performed IORT on 640 patients, 57 of whom had undergone breast augmentation prior to developing breast cancer. We followed these patients for an average of 20 months to determine the complication and success rate. Our institution's IORT protocol requires patients to have margins greater than 2 mm, tumors 30 mm or less, absence of extensive lymphovascular invasion, and negative lymph nodes. If a patient failed any of these criteria on final pathologic analysis, they were advised to undergo re-excision and/or whole-breast radiation with IORT as the boost. We used the Xoft® Axxent Electronic Brachytherapy (eBx®) System.

Results: Of our 57 augmented patients who underwent IORT, 24/47 (42%) violated 1 or more components of our institutional IORT criteria. The most common violation was margin width less than 2 mm. If the definition of "no tumor on ink" had been used, only 7 patients would have failed the margin width criterion. No patients had significant complications with seroma or hematoma. One patient had skin infection requiring postoperative antibiotics (2%). There were no capsular contractions in any patients who received IORT as their entire course of radiation therapy. There was a single local recurrence at 31 months, which was treated with conversion to mastectomy. There have been no distant recurrences or breast cancer deaths to date.

Patient characteristics	
N	57
Average age (years)	56
Average follow-up (months)	20
Tumor characteristics	
Average size (mm)	12.3
Clinically palpable	24/57 (42%)
Average nuclear grade	2.09
Necrosis	21/57 (37%)
ER positive	54/57 (95%)
HER2/neu positive	0/51 (0%)
Invasive carcinoma	51/57 (89.5%)
Node positive	3/51 (6%)
Protocol violations*	24/57 (42%)
Extensive lymphovascular invasion	1/24 (4%)
Margin width <2 mm	17/24 (71%)
Positive lymph node	5/24 (21%)
Tumor size >30 mm	8/24 (33%)
Treatment after protocol violation	
Mastectomy	3/24 (12.5%)
None	13/24 (54%)
Re-excision	3/24 (12.5%)
Whole-breast radiation	5/24 (21%)
Complications	1/57 (2%)
Acute hematoma requiring drainage	0/57 (0%)
Acute seroma requiring drainage 3 or more times	0/57 (0%)
Skin breakdown or infection requiring antibiotic	1/57 (2%)
Capsular contracture	0/49** (0%)

*Five patients had 2 violations, 1 patient had 3 violations. The remaining 18 patients had a single violation.

**Three patients had mastectomy, 5 patients had whole-breast radiation. Of the remaining 49 who underwent IORT, none developed capsular contracture.

Conclusion: We have shown that IORT is a viable treatment option for patients with breast augmentation. Based on our existing protocol, there is a high risk (42%) for protocol violations. However, as established in the TARGIT trial, larger size and narrower margins may be included in IORT protocols without diminishing outcomes. Of note, the anterior and posterior margins are particularly difficult in augmented patients due to the fact that the skin-to-muscle thickness is often quite narrow. IORT has never before been studied in these patients, and we have shown that it can be a particularly good approach for the augmented patient with breast

cancer. Long-term data on recurrence rates will be critical to establishing the durability of this therapy in breast-augmented patients and determining the ideal protocols for institutional IORT use.

0441 - A New Era of Neoadjuvant Treatment With Pertuzumab: Should the 10-Lymph Node Guideline for Axillary Lymph Node Dissection in Breast Cancer Be Revised?

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Objective: Pertuzumab is a humanized monoclonal antibody that inhibits dimerization of human epidermal growth factor receptor 2 (HER2). It is FDA-approved for neoadjuvant use in HER2-positive breast cancer, based on improved pathologic complete response rates. Current performance practice guidelines recommend that an adequate axillary lymph node dissection (ALND) should, on average, contain at least 10 nodes in the specimen. The impact of neoadjuvant pertuzumab on ALND is currently under investigation. The purpose of this study is to determine if the rate of axillary lymph node dissections (ALND) yielding at least 10 lymph nodes is lower in patients who received pertuzumab as part of their neoadjuvant regimen.

Methods: All patients presenting to our institution over a 3-year period who underwent an axillary lymph node dissection as part of their oncologic resection for breast cancer were included. The number of axillary lymph nodes after each surgery was retrospectively collected. The rates of an inadequate number of axillary nodes (less than 10) were measured in the following groups: those who received neoadjuvant therapy with pertuzumab, those who received neoadjuvant therapy without pertuzumab, and those who did not receive any neoadjuvant therapy. The rates of inadequate total number of lymph nodes for patients who received neoadjuvant therapy were compared with that of patients who did not receive any neoadjuvant therapy using Fisher exact test.

Results: One hundred and forty-four patients underwent axillary lymph node dissection as part of their oncologic resection for breast cancer. The mean age was 52.8 years; all patients were female. Less than 10 axillary lymph nodes were found in 33.3 percent (5 of 15) of patients who received neoadjuvant pertuzumab, compared to 2.4 percent (1 of 41) of those who did not receive any neoadjuvant chemotherapy (P = 0.004). Eighteen of 88 (20.5%) of patients who received neoadjuvant therapy without pertuzumab had inadequate lymph nodes, which was also significantly different compared to patients who did not receive neoadjuvant treatment (P = 0.007).

Neoadjuvant Therapy	Inadequate Axillary Lymph Nodes (%)	Adequate Axillary Lymph Nodes (%)	P Value
None (N = 41)	1 (2.4%)	40 (97.6%)	**
Neoadjuvant without pertuzumab (N = 88)	18 (20.5%)	70 (79.5%)	0.007
Neoadjuvant with pertuzumab (N = 15)	5 (33.3%)	10 (66.6%)	0.004

Conclusion: Neoadjuvant therapy overall, when compared to no neoadjuvant therapy, is associated with a lower rate of adequate axillary lymph nodes in surgical specimens. Our findings suggest that neoadjuvant therapy may lead to obliteration of regional lymph nodes and decreased axillary lymph nodes in the pathologic specimen, and suggest that a quality measure requiring 10 lymph nodes for axillary lymph node dissection may require revision for patients who receive neoadjuvant chemotherapy. Although further studies are needed, our data suggest that this revision may be particularly relevant to patients who receive pertuzumab in their neoadjuvant regimen.

0267 - The Impact of the Affordable Care Act on North Carolinian Breast Cancer Patients Seeking Financial Support for Treatment

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Objective: The impetus behind the creation and implementation of the Patient Protection and Affordable Care Act (PPCA) and the Healthcare and Education Reconciliation Act, also known collectively as the Affordable Care Act (ACA), is to improve healthcare quality, reduce costs, and increase patient access. Pretty In Pink Foundation (PIPF), a nonprofit 501K in North Carolina, provides financial assistance and in-kind support to individuals seeking help with breast cancer care. The objective of this study is to conduct a retrospective review of a prospectively collected database on breast cancer patients receiving financial support from PIPF. Specifically, we are interested in examining if sociodemographic variables, clinical variables, insurance type, and reasons for requesting financial assistance have changed since enactment the of the ACA.

Methods: All North Carolinians who received financial assistance from PIPF between 01/01/13 and 12/31/14 were included in the study. Health benefits from enrollment in the ACA took effect on 01/1/2014. As a result, the cohort was divided into 2 groups: the subjects in the 2013 group were assisted before ACA enactment and those in the 2014 group were assisted after ACA enactment. Descriptive statistics were tabulated as frequencies. Comparative univariate analysis between both groups was conducted with chi-square and Mann-Whitney *U* test. All test were 2-sided and a p value of $<.05$ was considered statistically significant. All analyses were conducted in STATA.

Results: One thousand sixteen individuals fulfilled the inclusion criteria. There was a 17% reduction in the number of subjects receiving financial assistance in 2014 (n = 462), compared to 2013 (n = 554). The average age of the sample was 50.1 (95% CI, 49.6, 50.5). The 2013 and 2014 groups did not differ significantly by age, race, gender, and insurance status (uninsured, insured). The average income was \$25,529 (± 9270) for the 2013 group and \$27,334 (± 10306) for the 2014 group (P = .008). Employment was lower among subjects in 2013 (14%) compared to 2014 (34%) (p = .0001). Ten percent of subjects receiving assistance in 2013 had a clinical stage ≥ 3 as opposed to 14% among subjects in 2014 (p = 0.0001). Fifty-nine percent of subjects in 2013 requested financial assistance for surgery, compared to 66% in 2014 (p = 0.015). The request for assistance for radiation therapy was 79% in 2013 vs 87% in 2014 (p = .0001). For chemotherapy, 26% of individuals requested financial assistance in 2013 and 29% in 2014 (p = 0.002).

Conclusion: Since the enactment of the health insurance market component of the ACA, there has been no change in the insurance status of North Carolinians receiving financial assistance from PIPF. However, individuals who received financial assistance in 2014 are more likely to be employed, unmarried, have a higher income, and advanced clinical stage of breast cancer compared to 2013. The majority of the subjects requested financial assistance for surgical and radiation therapy cost.

0362 - Criteria for the Clinical Use of MarginProbe in Breast-Conserving Surgery

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Objective: Reoperation is recommended when margins are involved after breast-conserving surgery (BCS). MarginProbe (Dune Medical Devices Ltd, Caesarea, Israel) reduces involved margin and re-lumpectomy rates in nonpalpable intraductal and invasive breast cancers. It generates local radiofrequency fields a few mm deep and captures the reflected signal to detect bioelectric differences between normal tissue and cancer cells. This study investigated the indications for use and clinical outcome in patients having BCS since introduction of MarginProbe into routine clinical practice.

Methods: Files of patients having BCS using MarginProbe were examined retrospectively. The instrument was used at the discretion of the surgeon. Involved margins were tumor <1 mm from or involving the inked

margin. Malignant final pathology was invasive ductal carcinoma (IDC), invasive lobular carcinoma (ILC), and ductal carcinoma in situ (DCIS).

Results: Twenty-five patients of mean age 58 (median, 60; range, 32–82) had BCS using MarginProbe from September 2014 to September 2015. Fifteen (60%) had breast magnetic resonance imaging preoperatively. Preoperative and final pathology are shown in the table. MarginProbe indicated 1 involved margin requiring re-excision in 4 specimens, 2 margins in 7 specimens, 3 margins in 5 specimens, and 4 margins in 9 specimens. Three of 22 patients with malignancy at final pathology had involved margins, 2 (9%) of whom had more surgery to obtain clear margins. The third patient had a single duct with DCIS at the margin and had no further surgery.

Preoperative Diagnosis	Number	Final Diagnosis	Number
IDC	5 (3 with DCIS, 1 with microcalcifications, 1 with lobular features)	IDC	6 (3 upstaged from DCIS)
ILC	4	ILC	7
DCIS	15	DCIS	9
LCIS	1	Benign	3 (2 ADH, 1 ALH)

Conclusion: After introduction into clinical use, MarginProbe was used exclusively in patients with lesions that confer a risk of margin involvement or whose margins are difficult to detect clinically (lobular or ductal in situ components). The reoperation rate was acceptably low for these lesions.

0254 - Re-excision Rates for Breast-Conserving Surgery Less Than 5%—How We Do It

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Objective: Positive margins in breast-conserving surgery (BCS) are associated with increased local recurrence and re-excision rates up to 72%, according to the literature. In our institution, the surgical margins are evaluated intraoperatively by macroscopic tissue inspection and specimen radiography, performed by a pathologist at the operation room. The purpose of this study was to assess the rate of re-excision with positive margins in BCS. As secondary endpoints we intended to evaluate the cases in which the intraoperative assessment prevented the reoperations and determine factors for inadequate margins.

Methods: Retrospective observational study of breast cancer (BC) patients submitted to BCS from Jan to Dec 2013. Intraoperative margin assessment included macroscopic tissue inspection by a pathologist at the operation room and specimen radiography when the lesion was not palpable. The margin was considered positive when <1 mm in the invasive BC and <2 mm in the ductal carcinoma in situ (DCIS).

Results: From a total of 817 patients operated on during the study period, 346 (42%) underwent BCS due to BC (231 were subjected to a preoperative wire-guided localization, and in 259 type II Clough oncoplastic techniques were employed). The mean tumor size was 16,8 mm (10,3 SD). Final margins on permanent pathology were positive/close in 12 patients (3,5%) who underwent a second operation to achieve widely negative margins. One hundred thirty-two (38%) patients had immediate re-excision after intraoperative analysis. Of these, 46 (13,3%) would have positive margins in the absence of intraoperative assessment of margin status and would require a second operation. By multivariate analysis, DCIS and multifocality were associated with final positive/close margins.

Conclusion: Aside from the ongoing international debate about how a negative surgical margin is defined, it is essential to get an intraoperative margin assessment, which can avoid subsequent reoperations. In our practice,

intraoperative assessment with macroscopic tissue inspection and specimen radiography allows re-excision rates lower rates than 5%. This rate is lower than those reported in the most literature.

0251 - Impact of ACOSOG Z0011 Study—How Many Axillary Lymph Node Dissection Can We Avoid?

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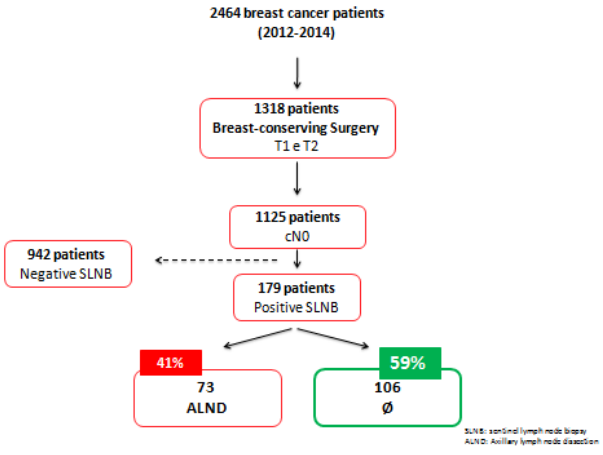
Objective: Initial breast tumors (T1-T2) have a low rate of axillary lymph node metastasis. The validation of the sentinel lymph node biopsy (SLNB) has saved the large majority of these patients from axillary lymph node dissection (ALND) and related morbidity. The application of ACOSOG Z0011 study criteria to the clinical practice further enlarged the group of patients who avoid ALND, even when 1 or 2 axillary lymph nodes showed tumor involvement. The ACOSOG Z0011 criteria were included in the breast cancer (BC) treatment protocol of our institution in 2012. This aim of this study was to determine the proportion of patients who avoid ALND due to ACOSOG Z0011 criteria. Secondary endpoints were to assess the locoregional relapse, systemic progression, and disease-related mortality in these patients.

Methods: Observational study of a prospective database of BC patients treated at our institution between Jan 2012 and Dec 2014. The inclusion criteria were: tumors T1-T2, clinically negative axilla (physical and imaging), breast-conserving surgery (BCS), planning for adjuvant radiation and systemic therapy (hormonal or chemotherapy), and SLNB. SLNB was considered positive when micrometastases or macrometastases were identified by H & E.

Results: Over the period of study, 1318 BCS were performed and 1125 underwent SLNB. Of these, 166 (14,7%) cases had positive SLNB: 73 patients underwent ALND and 93 (56%) had no more axillary surgery (figure). This group of 93 women, median age 62 Y (54–67), 77,4% were invasive carcinoma NOS and 82,7% luminal A tumors. The median SLN removed were 2 (1–2), with a median of positive SLN of 1 (1–1). Over a median follow-up of 27 months (20–35), there was 1 case of local recurrence and 1 case of systemic progression. No mortality was recorded.



Conclusion: The incorporation of ACOSOG Z0011 criteria saved 56% of patients from ALND previously recommended. As in the original study, the follow-up of these patients supports the oncological safety of this strategy. Results analysis of patients with T1-2 tumors and its axillary lymph nodes involvement (<15%) exposes that these criteria may be extended to a greater number of patients regardless of the surgical and adjuvant treatments.

0152 - Hormone Receptor Profile Cannot Predict Upstage Risk of Atypical Ductal Hyperplasia

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Objective: Accurate determination of cancer on core needle biopsies containing atypical ductal hyperplasia (ADH) remains a challenging task. Methods of improving the accuracy of core needle biopsy focus on radiographic factors and/or core biopsy techniques. The goal of our study was to determine whether hormone receptor profile and proliferation index combined with mammographic density could be used to predict the risk of upstage of ADH seen on core needle biopsy.

Methods: Archived specimens from women who had a core needle biopsy with ADH followed by an excisional biopsy at our institution from 2004–2013 were reviewed. Original H&E stained slides were reviewed along with additional slides cut from formalin-fixed, paraffin-embedded (FFPE) tissue. All lesions were evaluated by immunohistochemical stains for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor 2 (HER2) receptor, and Ki-67 (MIB1). ER and PR were scored as positive if nuclear staining was present in more than 1% of tumor cells and were graded as weak, moderate, or strong with a percentage of tumor nuclei staining. Ki-67 was scored as a percentage of nuclei staining, based on manual count. Scoring of HER2 immunoreactivity followed the American Society of Clinical Oncology/College of American Pathologists. Immunohistochemical expression was then correlated between the needle biopsies and subsequent excision specimens.

Results: One hundred twelve women were treated at our facility in the study timeframe. Seventy had archived tissue that confirmed the original focus of ADH. Of these, 15 were upstaged resulting in an upstage rate of 21%. Of the 70 specimens with residual ADH, 13 and 49 of the upstaged and non-upstaged group, respectively, had enough tissue for IHC analysis. The mean age of the upstaged cohort was 60, compared to 53 in the non-upstaged cohort. There was no statistically significant difference in the ER, PR, HER2, Ki67 expression among the upstaged and non-upstaged cohorts. ER expression appears constant in all patients with ADH, having 100% ER expression. PR expression was more variable but >70% were PR positive. The expression of HER2 was overwhelmingly negative. In the upstaged cohort, 13 were upstaged to ductal carcinoma in situ (DCIS) and 2 to invasive ductal adenocarcinoma (IDC). Of these, 13 had similar biomarker expression as the ADH lesion found on core needle biopsy.

Patient Characteristics

Characteristic	Upstaged, n (%)	Not Upstaged, n (%)
Number of patients	15 (21)	55 (79)
Age mean (range)	60 (50–78)	53 (29–79)
Body mass index, mean (range)	28 (20.4–33.4)	27 (19.1–38.9)
Mammographic density		
0	2 (13)	2 (4)
1	5 (33)	12 (22)
2	6 (40)	36 (65)
3	2 (13)	5 (9)
Indication for biopsy		
Calcifications	11 (73)	42 (76)
Asymmetry	0	4 (7)
Mass	4 (27)	6 (11)
Other	0	3 (5)

Receptor expression		
Estrogen receptor (ER)		
<10	0	0
11–50	2 (15)	9 (18)
>51	11 (85)	49 (82)
Progesterone receptor (PR)		
<10	3 (23)	8 (16)
11–50	4 (31)	17 (35)
>51	6 (46)	24 (49)
Human epidermal growth factor (HER2)		
0	2 (15)	20 (41)
1	6 (46)	19 (39)
2	5 (38)	8 (16)
3	0	2 (4)
Ki67		
0–2.7	8 (62)	35 (71)
2.7–7.3	5 (38)	13 (27)
7.3–19.7	0	1 (2)

Conclusion: Expression of hormone receptors and proliferation markers with IHC cannot be used to predict the risk of upstage ADH on core needle biopsy. However, the constancy of receptor markers across both groups lends credence to the stepwise progression of proliferative breast lesions from ADH to well-differentiated DCIS or low-grade IDC. Molecular analysis of ADH lesions may be more useful in predicting risk of upstage.

0453 - Shifting Paradigms in Breast Cancer Screening for Women Younger Than 45 Years

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Objective: In October 2015, the American Cancer Society (ACS) updated its breast cancer screening guidelines, recommending that women at average risk for breast cancer begin annual mammography at age 45 and recommending against routine clinical breast exam (CBE) as a screening method. The 2003 ACS screening guidelines eliminated a recommendation for routine self-breast examination (SBE). Following current ACS guidelines, there are no routine breast cancer screening recommendations for women under age 45. We sought to examine the method of detection of breast cancer in patients under age 45.

Methods: We performed a retrospective review of a prospectively maintained database at a single tertiary care institution from January 2011 to December 2014 to compare those diagnosed with breast cancer under age 45 to those diagnosed at ages 45 and older by method of detection (screening mammogram, routine CBE, or SBE), patient demographics, and tumor characteristics.

Results: We identified 870 patients diagnosed with breast cancer during the study period. Results of univariate and multivariable analyses for factors associated with breast cancer diagnoses in patients younger than 45 years compared with those 45 and older as reference are listed in the table.

Demographic Characteristics and Odds Ratios for Factors Associated With Breast Cancer Diagnoses in Patients Younger Than 45 Years, Compared With 45 Years and Older (Reference)

		Univariate Analysis			Multivariable Analysis
		Age <45 (%) N = 105	Age ≥ 45 (%) N = 765	p value	OR for <45 vs ≥45 (95 % CI)
Mean age (years)		38.4 (SD, 5.1)	62.7 (SD, 10.7)	<0.0001	-
Mean tumor size (mm)		41.3 (SD, 100.5)	21.9 (SD, 20.2)	<0.0001	-
Histology	IDC	85.7	73.5	0.02	0.53 (0.23–1.23)
	ILC	3.8	8.8		0.29 (0.08–1.10)
	DCIS	10.5	17.8		1
Grade	1	22.8	27.7	0.37	-
	2	39.1	41.1		-
	3	38.1	31.2		-
Method of detection	CBE	5.3	2.2	<0.0001	9.34 (2.73–31.8)
	SBE	73.7	37.4		5.03 (2.71–9.30)
	Screening mammogram	21.1	60.4		1
T size	2 cm or less	44.4	65.5	<0.0001	1
	>2 cm	55.6	34.5		1.84 (1.11–3.04)
Race/ethnicity	Asian/PI	7.8	7.8	<0.0001	1.08 (0.41–2.85)
	Hispanic	47.6	19.9		3.23 (1.91–5.48)
	Black	5.8	9.0		0.83 (0.32–2.15)
	White	38.8	63.3		1
Triple negative	TN	8.9	7.9	0.73	-
	Not TN	91.1	92.1		-
HER-2 status	HER2+	23.8	10.7	0.0001	2.24 (1.2–4.17)
	HER2-	76.2	89.3		1

Conclusion: In our setting, patients younger than 45 are more likely than older patients to be Hispanic, have larger or HER-2+ tumors, and be diagnosed by routine CBE or SBE. A significant proportion of women under 45 are diagnosed with breast cancer by screening mammography. Omission of routine breast cancer screening with SBE, CBE, and mammography in women under 45 may disproportionately affect Hispanic women, potentially leading to later stage at diagnosis in this population. Consideration should be given for tailoring breast cancer screening modalities to patient populations with disparate clinical presentations and breast cancer risk.

0455 - Percutaneous Sentinel Node Biopsy in Breast Cancer: Results of a Phase I Study

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Objective: In patients with clinically negative axilla, sentinel lymph node dissection (SLND) is the standard of care for axillary staging in breast cancer. While the morbidity of SLND is less than that of complete axillary lymph node dissection, SLND still carries small risks of lymphedema, seroma, nerve injury, and pain. Furthermore, the majority of sentinel lymph nodes are negative for tumor, and even when the sentinel node is positive, in more than half of cases, there is no additional axillary disease. Results from the ACOSOG Z11 and AMAROS trials question the necessity of removing positive non-sentinel axillary lymph nodes in the setting of current systemic therapy. For patients with clinically suspicious axillary lymphadenopathy, tissue diagnosis to

confirm axillary disease by axillary ultrasound-guided percutaneous core needle biopsy (PNB) often leads to primary systemic therapy. Axillary ultrasound-guided PNB is being increasingly utilized for assessment of clinically suspicious lymphadenopathy. We hypothesized that using standard techniques of radioisotope and blue dye injection for identification of sentinel lymph nodes combined with ultrasound guidance, the sentinel lymph node can be identified and biopsied percutaneously. We sought to determine the technical feasibility of percutaneous core needle biopsy (PNB) of axillary sentinel lymph nodes (SLN).

Methods: For this phase 1 clinic trial, clinically node-negative breast cancer patients eligible for SLND were enrolled. Patients were excluded if they received neoadjuvant therapy, had prior axillary intervention, or were pregnant. After dual tracer injection, patients underwent intraoperative axillary ultrasound and ultrasound-guided PNB of the axillary LN at the site of radiotracer uptake, followed by standard SLND. The primary outcome measure was correlation of PNB with SLN defined as: (1) similar final pathology in core and SLN and (2) presence of blue staining and/or radiotracer in the core or gross evidence of PNB at the SLN (eg, transected SLN).

Results: Twenty patients were enrolled in the study. Pre-incision axillary ultrasound identified an LN (mean size, 1.12 +/– 0.62 cm) at the site of radioactive tracer in 95% (19/20) of cases. Gross evidence of PNB at the SLN was found in 90% (18/20) of cases. Blue staining, radioisotope, and pathology matched in core and SLN specimens in 55% (11/20), 65% (13/20), and 75% (15/20) of cases, respectively. All SLN were pathologically negative. Overall, successful correlation of PNB with SLN occurred in 75% (15/20) of cases, with all failures present in the first half of study.

Conclusion: Results of this phase I study demonstrate that PNB is technically feasible, but further refinement of technique is warranted to improve correlation of PNB to SLND.

0437 - Racial Disparities in Lumpectomy and Mastectomy Rates—Narrowing the Gap?

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Objective: Historically, white women have had a higher incidence of breast cancer compared to women in other racial groups; however, recent analyses show the rates are slowly starting to converge. Women in other racial groups are more likely to be diagnosed with advanced stage breast cancer and continue to have higher mortality rates than white women. We investigated differences in lumpectomy and mastectomy rates between women of different races over time and by T-classification in the AJCC staging system for breast cancer.

Methods: A retrospective review was conducted utilizing data from the 18 registries of the Surveillance, Epidemiology, and End Results (SEER) database to investigate differences in breast cancer surgical interventions among races. The cohort was comprised of 687,276 women over the age of 20 with breast cancer from 1998–2012. Chi-square tests were used to investigate associations between surgery type (lumpectomy vs mastectomy) and race over time, as well as between surgery type and race by T-classification.

Results: All chi-square analyses with the exception of T4 tumors showed significant differences among races. Comparing the white, black, and "other," defined as American Indian/Alaska Native and Asian/Pacific Islander, groups within the SEER database, white women continue to have fewer mastectomies over time. Interestingly, we found that mastectomy rates were highest among women in the "other" group, followed by black women, and lowest in white women. Over time, the difference in mastectomy rates between the white women and black/"other" groups are slowly narrowing. Mastectomies in white women have decreased from 41.7% to 39.5% from 1998 to 2012. Similarly, rates have fallen from 43.5% to 41.8% and from 47.6% to 44.2% in the black and "other" groups, respectively. When comparing the same cohort by T-classification, the "other" group had the highest number of mastectomies. For Tis and T1a-c tumors, black women had more mastectomies than white women; however, for T2-T4 tumors, white women had more mastectomies than black women.

T-Classification	Race	Lumpectomy, N (%)	Mastectomy, N (%)	P value
Tis	White	73352 (72%)	29022 (28%)	<.0001
	Black	9296 (70%)	4065 (30%)	
	Other	9648 (69%)	4277 (31%)	
T1a	White	25677 (66%)	13112 (34%)	<.0001
	Black	2347 (59%)	1664 (41%)	
	Other	2684 (59%)	1895 (41%)	
T1b	White	63026 (75%)	21385 (25%)	<.0001
	Black	4949 (72%)	1956 (28%)	
	Other	4887 (67%)	2354 (33%)	
T1c	White	112984 (67%)	56813 (33%)	<.0001
	Black	11550 (66%)	5957 (34%)	
	Other	10154 (61%)	6572 (39%)	
T2	White	58643 (45%)	71261 (55%)	<.0001
	Black	9513 (49%)	9926 (51%)	
	Other	6158 (41%)	8980 (59%)	
T3	White	3592 (17%)	17626 (83%)	<.0001
	Black	852 (21%)	3147 (79%)	
	Other	357 (15%)	1995 (85%)	
T4	White	1515 (13%)	10543 (87%)	0.0631
	Black	322 (14%)	2057 (86%)	
	Other	125 (11%)	1038 (89%)	

Conclusion: There continue to be racial disparities between lumpectomy and mastectomy rates. These disparities in surgical interventions are slowly narrowing over time; however, multiple factors contribute to the differences in surgical interventions, including access to screening for earlier diagnosis and access to care/breast programs. Additional studies need to be done to address these issues.

0208 - The Effect of MarginProbe in the Era of "No Ink on Tumor" Clear Margin Definition

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Objective: As of March 2014, the SSO/ASTRO guidelines of clear margins for invasive cancer have been "no ink on tumor." MarginProbe (MP) is a device for intraoperative margin assessment, which is routinely used in our institution. This is a retrospective, observational chart review from sets of consecutive patients, before and after we started using the device. For both these sets, we have been using the no ink on tumor criterion. We looked at the effect use of MP had on the rate of re-excision.

Methods: Lesion localization, specimen excision, and orientation were performed according routine lumpectomy procedures. Following specimen excision, MP was used on all faces (margins) of the main specimen, but not on additional shavings. Additional shavings were taken when MP indicated positive. Intraoperative imaging of the specimens was performed. Additional shavings were also taken based on clinical assessment. Historical reexcision rate was collected from a consecutive set of patients in the period before the device was put into use.

Results: From November 2014 to August 2015, the device was used in 91 consecutive lumpectomy procedures. The re-excision rate was 3.3% (3/91). One reexcision was for DCIS with close but negative margins. In 5 additional cases, permanent pathology found cancer in shavings taken (based on positive MP readings), even though the main specimen was clear. The comparison historical set consisted of 99

lumpectomy cases performed between April 2014 and November 2014. The re-excision procedure rate for this set was 16.2% (16/99). The re-excision rate reduction was a statistically significant 79% ($P < 0.01$). With use of MP, there were, on average, 1.8 shavings per patient taken with no clinical benefit, compared to 0.9 shavings per patient taken with no clinical benefit prior to MP utilization. The difference is 0.9 shavings per patient.

Conclusion: Even in the era of no-ink-on-tumor margin assessment, where some reports suggest re-excision rates are falling, utilization of MP significantly reduced re-excision rate in a group of 91 consecutive patients undergoing breast conservation surgery compared to historical controls of the previous 99 patients prior to MP utilization, without significantly increasing the number of cavity shavings taken. In 5 patients, there is a suggestion that MP may be more accurate in margin assessment as evidenced by positive shavings when the lumpectomy specimen was pathologically negative. Future utilization studies should focus on volume of tissue excised, incidence of positive shavings, patient assessment of cosmetic outcomes, and cost analysis.

0338 - Impact of Salvage Surgery on Survival in Stage IV Breast Cancer Patients

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Objective: The objective of this study is to evaluate the impact of breast tumor surgery on survival of stage IV breast cancer patients

Methods: Retrospective review of data of patients presented with stage IV at presentation. A total of 61 patients were included; demographics, type and grade of tumor, size and nodal status, laterality, receptor status, palliative chemotherapy, family history, and survival in months were outcome variables. Overall survival was calculated using Kaplan-Meier. Cox regression model was used for multivariate analysis.

Results: Of total 61 patients, 36 (59%) had right-sided tumor and 22 (36%) left sided, with 3 (5%) patients having bilateral tumor. IDC G II was the most frequent (59%) histopathology, followed by IDC G III (24.6%) and ILC was found in 8 patients (13.1%). Bones were the most frequently involved site (65.6%), followed by lungs (25.4%). Palliative chemotherapy before surgery was given to 57 patients (93.4%). Her2Nu was +ve in 31.1% patients, ER in 75.4%, and PR in 57.4% patients. A total of 24 patients (39.2%) are alive and on regular follow-up, 16 (26.2%) died, and 21 (34.4%) are lost to follow-up, with a median survival of 49 months.

Variables	HR (95% CI)	p Value
Age (<50 vs >50 yr)	0.90 (0.83–0.99)	0.03
Family history	0.32 (0.06–1.49)	0.14
T stage	1.09 (0.50–2.35)	0.81
N stage	1.65 (0.42–6.49)	0.47
Lung mets	3.92 (0.87–17.58)	0.74
Liver mets	1.41 (0.22–9.04)	0.71
Bone mets	1.23 (0.20–7.44)	0.82
Brain mets	0.36 (0.02–5.91)	0.47
ER	1.53 (0.27–8.49)	0.62
PR	3.08 (0.78–12.08)	0.10
H2N	0.07 (0.01–428)	0.00
Palliative chemotherapy before surgery	101 (21.9–481)	0.00

Conclusion: Patients with metastatic breast cancer have a longer survival advantage with locoregional therapy (breast tumor surgery [with/without axilla]) as can be seen by improved survival. We recommend to evaluate the results on a larger study through randomized, controlled trials to get more statistically significant results.

0233 - Factors Associated With the Decision to Pursue Elective Surgery Among Women Enrolled in TBCRC013: A Prospective Registry of Surgery in Patients Presenting With Stage IV Breast Cancer

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Objective: The role of primary breast surgery in patients with de novo stage IV breast cancer is controversial and prospective data are limited. In addition, there is no patient-reported information on the surgical decision-making process.

Methods: TBCRC013 is a multicenter prospective registry study evaluating the role of surgery for the primary tumor in de novo stage IV breast cancer. From 7/09–4/12, 112 pts with an intact primary tumor were enrolled and are the focus of this study. All patients received first-line systemic therapy per standard guidelines. Responders (stable, partial, complete) were offered the opportunity to discuss elective surgery. Patient-reported surgical decision-making questionnaires were completed once the final decision regarding surgery had been made. Patient demographics, tumor characteristics, and decision-making responses were compared by receipt of surgery.

Results: Of 112 patients, 94 (85%) responded to first-line therapy and, of these, 39 (41%) proceeded with elective surgery. Demographics (race, marital status, employment status, income, education) and comorbidities did not differ by receipt of surgery. Patients undergoing surgery had larger tumors (3.8 cm vs 3.2 cm, p = 0.01), were more likely to present with a single site (vs multiple sites) of metastatic disease (77% vs 41%, p = 0.001), and were more likely to receive first-line chemotherapy (vs endocrine therapy). Among the 94 responders, 78 completed the decision-making survey (table). Satisfaction with the information provided did not differ by receipt of surgery. Nevertheless, patients who did not have surgery were more likely to want more information about treatment options (19.5% vs 8.1%, p = 0.03). All patients who underwent surgery felt discussions with the surgeon were important, compared to 58.6% of those not having surgery. For those having surgery, the surgery decision was most commonly made by the patient with MD input (40.5%) or together (35.1%); decisions among those not having surgery were also made together (34.1%), but more patients felt the decision was made by the MD (34.1% vs 2.7%, p = 0.003). Of those not undergoing surgery, 82.9% reported that they did not have surgery because the MD did not think it would help, while only 17.1% reported they themselves did not think it would help. In contrast, those having surgery proceeded to surgery because both they and the MD thought it would help (73%).

continues

Patient Response to Surgical Decision-Making Questionnaire

		Surgery N = 37 (%)	No Surgery N = 41 (%)	P Values
I am satisfied that I was adequately informed about the issues important to my decision.	Strongly agree	23 (62.2%)	20 (48.8%)	0.145
	Agree	13 (35.1%)	13 (31.7%)	
	Neutral	1 (2.7%)	5 (12.2%)	
	Disagree	0 (0%)	3 (7.3%)	
I wish I would have given more consideration to other treatment options.	Strongly agree	1 (2.7%)	2 (4.9%)	0.180
	Agree	2 (5.4%)	2 (4.9%)	
	Neutral	4 (10.8%)	12 (29.3%)	
	Disagree	30 (81.0%)	25 (61.0%)	
I would have liked to have had more information about my treatment options. *1 (2.7%) did not answer from surgery group	Strongly agree	1 (2.7%)	5 (12.2%)	0.029
	Agree	2 (5.4%)	3 (7.3%)	
	Neutral	5 (13.5%)	14 (34.1%)	
	Disagree	28 (75.6%)	19 (46.4%)	
I would have liked to have been more active in the decision-making process.	Strongly agree	1 (2.7%)	3 (7.3%)	0.059
	Agree	1 (2.7%)	3 (7.3%)	
	Neutral	4 (10.8%)	12 (29.3%)	
	Disagree	31 (83.7%)	23 (56.1%)	
I did not have as much say as I would have liked in my surgery decision.	Strongly agree	2 (5.4%)	2 (4.9%)	0.046
	Agree	1 (2.7%)	2 (4.9%)	
	Neutral	1 (2.7%)	9 (22.0%)	
	Disagree	33 (89.2%)	29 (70.7%)	
How important were discussions with my surgeon? *2 (4.9%) did not answer from no-surgery group	Extremely important	35 (94.6%)	17 (41.5%)	<0.001
	Important	2 (5.4%)	7 (17.1%)	
	Not important	0 (0%)	3 (7.3%)	
	Did not use	0 (0%)	12 (29.3%)	
How important were discussions with other MDs? *1 (2.4%) did not answer from no-surgery group	Extremely important	28 (75.7%)	20 (48.8%)	0.103
	Important	4 (10.8%)	7 (17.1%)	
	Not important	0 (0%)	2 (4.9%)	
	Did not use	5 (13.5%)	11 (26.8%)	
How important were discussions with friends or family?	Extremely important	15 (40.5%)	15 (36.6%)	0.795
	Important	15 (40.5%)	14 (34.1%)	
	Not important	3 (8.1%)	5 (12.2%)	
	Did not use	4 (10.8%)	7 (17.1%)	
How important was written information I received from my MD? *1 (2.4%) did not answer from no-surgery group	Extremely important	9 (24.3%)	12 (29.3%)	0.308
	Important	13 (35.1%)	7 (17.1%)	
	Not important	3 (8.1%)	6 (14.6%)	
	Did not use	11 (29.7%)	15 (36.6%)	
How important was information I found searching the web? *2 (4.9%) did not answer from no-surgery group	Extremely important	5 (13.5%)	1 (2.4%)	0.158
	Important	16 (43.2%)	12 (29.3%)	
	Not important	7 (18.9%)	10 (24.4%)	
	Did not use	9 (24.3%)	16 (39%)	
How important were other sources of information? *9 (24.3%) did not answer from surgery group *3 (7.3%) did not answer from no-surgery group	Extremely important	8 (21.6%)	5 (12.2%)	0.285
	Important	4 (10.8%)	3 (7.3%)	
	Not important	2 (5.4%)	4 (9.8%)	
	Did not use	14 (37.8%)	26 (63.4%)	

Which of the following statements describes best how the surgery decision was made for your breast cancer?	MDs made decision.	1 (2.7%)	14 (34.1%)	0.003
	MDs made decision with my input.	6 (16.2%)	5 (12.2%)	
	We made decision together.	13 (35.1%)	14 (34.1%)	
	I made decision with MD input.	15 (40.5%)	7 (17.1%)	
	I made decision.	2 (5.4%)	2 (4.9%)	
Why didn't you have surgery? *1 (2.4%) did not answer	MDs did not think would help.	-	34 (82.9%)	NA
	You did not think would help.	-	7 (17.1%)	
	Worried about side effects.	-	2 (4.9%)	
	Influenced by friend or relative.	-	2 (4.9%)	
	Other	-	6 (14.6%)	
Why did you have surgery? *1 (2.7%) did not answer	MDs thought would help.	27 (73.0%)	-	NA
	You thought would help.	27 (73.0%)	-	
	Spouse/partner/family thought would help.	15 (40.5%)	-	
	Influenced by friend or relative.	8 (21.6%)	-	
	Other	9 (24.3%)	-	

Conclusion: For women with de novo stage IV breast cancer and an intact primary tumor, communication regarding the risks and benefits associated with surgery for the primary tumor are vital to the decision-making process. In the absence of a proven survival benefit, physicians should be aware of the importance of their input in this decision.

0278 - DCIS Among Males and Females: Are There Outcome Differences?

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Objective: Evidence-based consensus guidelines exist for the management of DCIS in female patients; however, male DCIS is a rare occurrence and lacks standardized treatment regimens. As such, most clinicians extrapolate care for the male patient from treatment guidelines established for female DCIS. We sought to examine current practice patterns and outcomes for males with DCIS.

Methods: The California Cancer Registry 2000–2011 was used to identify the first occurrence of all in situ patients. Histologies common to both males and females were used. Lobular carcinoma cases were excluded. Autopsy cases and patients diagnosed at less than 18 years were eliminated. The first of month or year for incomplete dates of diagnosis and last of month or year for incomplete treatment dates were imputed. Chi-square tests were used to analyze differences in patient and clinical characteristics. Kaplan-Meier curves with log-rank tests were used to evaluate and differences in estimated time to initiation of treatment and overall survival.

Results: Of the 53,309 unique patients identified, 206 (0.4%) were male. There were no significant differences in age, payer, or receipt of treatment between the sexes. The proportion of males with DCIS who were African-American was greater when compared to females (9.2% vs 5.9%); however, there were fewer Hispanic (9.7% vs 14.5%) and Asian/Pacific Islander (11.6% vs 14.3%, $p < .0001$) males, when compared to females. The proportion of non-Hispanic whites was similar among males and females (61.2% vs 62.3%). Males were more likely to have mastectomies (66.5% vs 30.0%) and less likely to have lumpectomies than females (30.6% vs 60.1%, $p < .0001$). In the subset of patients who underwent lumpectomy, males had radiation less frequently

than females (31.8% vs 55.4%, p = .0008). Rates of bilateral surgery were also similar in males and females (5.3% vs 6.0%, p = 0.7074). Time to initiation of treatment was different in males than females; for those undergoing surgery, the majority of males had same date of diagnosis as surgery (60.5%) in contrast to females (30.7%, p < .0001). DCIS in males was more often estrogen receptor (ER) positive (96.8% vs 83.8%, p = .0006) and progesterone receptor (PR) positive than in females (87.4% vs 72.3%, p = .0017); however, males were less likely to take endocrine therapy than females (10.2% vs 20.7%, p = 0.0002). Overall and disease-specific survival was statistically similar between the 2 groups (p = 0.205 and p = 0.275).

Conclusion: Male DCIS patients are more likely to undergo aggressive surgical therapy, but less likely to receive adjuvant radiation or hormonal therapy. Regardless, both overall and disease-specific survival is excellent and there are no differences in survival between the sexes. Both host and disease-specific factors may account for similar outcomes despite differing treatment patterns.

0366 - Patient Satisfaction, Oncologic Outcomes, and Complications Following Nipple-Sparing Mastectomy in the Radiated Patient

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Objective: As selection criteria for patients to undergo nipple-sparing mastectomy (NSM) widen, patients who have previously undergone radiation therapy (RT) as part of breast conservation therapy or who will receive postmastectomy radiation (PMRT) are increasingly being considered for NSM. Recent studies have reported on complications associated with these surgeries; however, the literature on patient satisfaction in this population is lacking. The aims of this study are to assess not only complications and oncologic outcomes, but also patient-reported satisfaction for patients who are treated with both RT and NSM with immediate reconstruction.

Methods: All patients from 2002 through 2014 who had either a history of breast RT prior to NSM or who received PMRT after NSM were identified via database search. Retrospective chart review was done to assess incidence of any complications, as well as oncologic outcomes. These patients were then evaluated for level of satisfaction by administration of questions from the BREAST-Q survey.

Results: We identified 37 patients (mean age = 44.9 yr) at our institution who fit our criteria out of 743 patients who underwent NSM, with 45.9% having prior RT and 54% who received PMRT. Thirty-five percent of these patients experienced either major or minor complications, which included nipple-areolar complex (NAC) necrosis (2.7%), NAC malposition (10.8%), skin flap necrosis (5.4%), infection (16.2%), hematoma (5.4%), and wound breakdown (2.7%). One patient experienced metastatic recurrence and ultimate death, and 3 patients (8%) had NAC removal for oncologic concerns (ie, DCIS at nipple margin). 45.9% of patients required some form of operative revision for complications, margin re-excision, or cosmesis. Despite this, the majority of patients (70.3%) reported an overall high level of satisfaction.

Conclusion: Despite a relatively high rate of complications and operative revisions compared to the literature on patients who have had NSM without RT, this study demonstrates that patients who undergo NSM after prior RT or with subsequent PMRT still have a high level of satisfaction with their overall results, comparable to patients who have had NSM without RT. Patients who are facing these treatment possibilities should be counseled extensively about expectations with respect to complications, however should be encouraged by the prospect of an ultimately satisfactory outcome.

0296 - Feasibility of the LUM Imaging System for Real-Time, Intraoperative Detection of Residual Breast Cancer in Lumpectomy Cavity Margins

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Objective: Tumor-free margins are critical for local control in breast-conserving surgery. Currently, 20%–40% of lumpectomy patients have positive margins that require surgical re-excision. We assessed the LUM 015/LUM 2.6 imaging system for real-time, intraoperative detection of residual tumor in breast cancer patients.

Methods: Lumpectomy cavity walls and shaved cavity margins (SCM) of patients undergoing lumpectomy for breast cancer, invasive cancer, or ductal carcinoma in situ (DCIS) were assessed intraoperatively using the LUM 015/LUM 2.6 imaging system (Lumicell, Inc., Wellesley, MA). LUM015, a cathepsin-activatable fluorescent agent, was injected intravenously prior to surgery. Fluorescence generated at potential sites of residual tumor in lumpectomy cavities and SCM was evaluated with a sterile hand-held device and displayed on a monitor. Sites of fluorescence were correlated with histopathology findings.

Results: In vivo lumpectomy cavities and excised specimens were imaged with the LUM system in 39 women undergoing breast surgery. Seven benign and 23 malignant specimens, from patients who did not receive preoperative injection of LUM015, were assessed for auto-fluorescence; no significant background fluorescence was identified. Image acquisition for each margin required approximately 1 second. Nine patients undergoing lumpectomy surgery received LUM015 dye preoperatively and were scanned intraoperatively. Among these patients, median age was 64 years (range, 48–78), 66% percent had invasive ductal carcinoma (IDC) with DCIS, 11% invasive carcinoma with ductal and lobular features and DCIS, and 22% pure DCIS. Median tumor size was 1.8 cm (range, 0.4–2.5). A total of 92 margin surfaces were assessed intraoperatively (figure). The LUM system showed 100% sensitivity, 82% specificity, 52% positive predictive value, and 100% negative predictive value for detection of tumor at or near the margin (<2 mm). There were no false-negative results, but false-positive readings were observed in 15% of margins. Two of the 9 lumpectomy patients injected with LUM015 (22%) had positive margins on standard histopathology and underwent re-excision surgery. In both cases, the LUM system correctly identified residual tumor in the lumpectomy cavity walls during the initial surgery.

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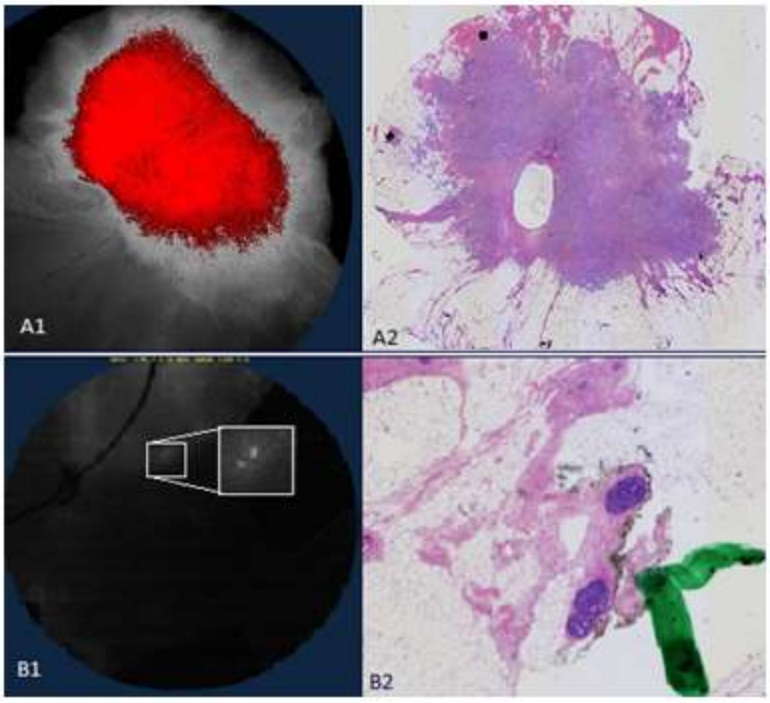

Figure: Comparison of LUM system images with histopathology

A1: LUM system image of a lumpectomy specimen cross-section displaying successful uptake of LUM015 dye.

A2: Pathology slide image corresponding to A1. Pathology showed IDC with DCIS of similar size (1.9cm) and shape to the LUM system image.

B1: LUM system image of an SCM showing two bright spots, in total spanning approximately 0.3cm.

B2: Pathology slide image of the corresponding margin showing 2 foci of DCIS each less than 1mm, and 1mm apart, located less than 0.05cm from the final inked margin highlighted by the green mark.

Conclusion: The LUM2.6/015 imaging system allows nearly instantaneous real-time identification of residual tumor in the lumpectomy cavity of breast cancer patients and may reduce rates of positive margins. Additional studies are underway to optimize this approach.

0193 - Margins in Lumpectomy. Transition From a Full Cavity Shave Approach to a Targeted Shaving Approach Using MarginProbe

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Objective: Breast-conserving surgery frequently fails to achieve clear margins, leading to re-excision procedures. Full cavity shaving has been used as an approach to reduce positive margins, at an expense of increase in the volume of tissue removed. We report on our initial experience after switching from a full cavity shave approach to a targeted shaving approach using MarginProbe, an intraoperative margin assessment tool.

Methods: Lumpectomy was performed according to routine practice. The device was used on each specimen margin and positive readings guided additional resections from the cavity. All specimens were examined to

verify excision of the target lesion intraoperatively. Historical data were used from a consecutive set of patients in a period proximal to when we started using MarginProbe.

Results: We analyzed 54 consecutive MarginProbe lumpectomy cases between JAN and DEC 2014. Six cases (11%, 6/54) had positive margins (tumor on ink) on the main lumpectomy specimen. The device identified the margins in 83% (5/6) of the cases. There were 2 (3.7%, 2/54) re-excision procedures: one (1.8%, 1/54) due to failed detection of the device; the second due to a shavings remaining persistently positive. In 3 additional cases, cancer was found in the shavings, even though the main specimen was clear. Overall, the device provided clinical benefit in 15% (8/54) of the cases. Prior to using the device, our practice was to perform routine cavity shaves. The re-excision rate from a year's time (2013) before we started using the device was 15.1% (19/119). With use of the device, the re-excision rate was significantly reduced by 75%, P = 0.038. Compared to taking full cavity shavings, the average volume removed was 20 cc smaller, a 37% decrease in volume, relative to the main specimen volume.

Conclusion: The availability of MarginProbe, a tool for intraoperative assessment, enabled a change in the lumpectomy technique from full cavity shavings to directed shavings guided by the device. There was a significant 75% reduction in the rate of re-excision procedures and a reduction in the volume of tissue removed during the lumpectomy. The lower amount of shavings also contributed to a reduction in pathology work.

0340 - Factors Associated With Unplanned Reoperations Following Postmastectomy Breast Reconstruction: A Population-Based Study

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Objective: Surgical quality improvement programs aim to deliver optimized outcomes to patients while minimizing unnecessary utilization and costs for the healthcare system. Reducing unplanned re-operations can accomplish both of these goals. The primary objective of this study was to examine factors that influence unplanned re-operations after postmastectomy breast reconstruction (PMBR).

Methods: A population-based retrospective cohort study was completed using provincial administrative and cancer registry databases in Ontario, Canada. The main cohort included women between the ages of 18 and 65 years who underwent a mastectomy between April 1, 2002, and March 31, 2008, followed by an immediate or delayed PMBR (within 3 years of primary mastectomy). Re-operations following PMBR were identified through provincial billing codes. Unanticipated procedures were related to emergency operations or those requiring revision of the PMBR. Patients were followed from the date of their reconstruction surgery to their first unplanned re-operation; March 31, 2013; or death, whichever was earliest. The outcome was time from PMBR to first unplanned re-operation. The Kaplan-Meier method was used to estimate the survival function. Univariate and multivariate Cox proportional hazards models were implemented to examine the association between covariates and the hazard of the first unanticipated re-operation.

Results: A total of 3972 women underwent PMBR and 2047 had at least 1 unplanned re-operation (52%). The average time to first unplanned re-operation was 11 months (range, 1 day to 10 years). An increased rate of unplanned re-operations was significantly associated with patient risk factors (diabetes, comorbidity score), procedure factors (bilateral, immediate, autologous reconstructions, prior breast procedures), and institutional factors (nonteaching hospitals) (table). Physician factors, such as surgeon gender or years in practice, and disease factors, such as invasive breast cancer diagnosis, receipt of chemotherapy, or radiation, did not influence rate of unplanned re-operations (table).

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Factors Influencing PMBR Unplanned Reoperations

	Adjusted HR	HR 95% CI	p value
Patient Factors			
Patient age at PMBR (per 10 years)	1.04	0.99–1.10	0.12
Johns Hopkins comorbidity score	1.03	1.02–1.05	<0.0001*
Diabetes within 1 year of PMBR	1.33	1.03–1.71	0.03*
Procedure Factors			
Bilateral (ref: unilateral)	1.16	1.03–1.31	0.03*
Delayed PMBR (ref: immediate)	0.76	0.67–0.86	<0.0001*
Type of PMBR (ref: implant-based)	1.00	-	-
- Implant with pedicled flap	1.08	0.90–1.31	0.39
- Microsurgical autologous	2.00	1.76–2.28	<0.0001*
- Pedicled autologous	1.38	1.18–1.61	<0.0001*
Prior anticipated or oncologic reoperations	1.99	1.82–2.18	<0.0001*
Disease Factors			
Invasive breast cancer diagnosis	0.90	0.79–1.02	0.08
Chemotherapy (ref: none)			
Postmastectomy and PMBR	0.95	0.82–1.11	0.53
Postmastectomy, pre-PMBR	1.07	0.91–1.25	0.43
Pre-mastectomy and PMBR	0.97	0.83–1.14	0.71
Radiation (ref: none)			
Post-PMBR	1.07	0.92–1.24	0.38
Pre-PMBR	1.11	0.98–1.26	0.09
Physician Factors			
Female plastic surgeon	0.96	0.87–1.06	0.39
Physician years in practice (per 10 years)	0.98	0.92–1.05	0.60
Average volume of breast reconstructions per year (per 1 procedure)	1.00	1.00–1.00	0.01*
Institutional Factors			
Non-teaching hospital	1.39	1.24–1.55	<0.0001*
Average volume of breast cancer related procedures per year (per 10 procedures)	1.00	1.00–1.00	0.0002*

PMBR indicates postmastectomy breast reconstruction; HR, hazard ratio; CI, confidence interval
*p < 0.05 = significant.

Conclusion: This study provides important population-level data regarding factors influencing unplanned re-operations following both implant-based and autologous methods of PMBR. These results can lead to quality improvement initiatives targeting modifiable risk factors, as well as enhance physician communication of patient expectations regarding the PMBR surgical journey.

0237 - The Impact of Body Mass Index (BMI) on Satisfaction With Appearance and Preservation of the Breast's Role in Intimacy Before and After Breast Cancer Surgery

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Objective: Relatively little is known about the differences in self-image among women after breast cancer surgery with respect to body mass index (BMI). In this study, we sought to explore the impact of BMI on satisfaction with appearance and the preservation of the breast's role during intimacy after breast cancer surgery.

Methods: A cross-sectional survey with a retrospective chart review included patients at least 1 year from primary breast cancer surgery. BMI categories were defined as normal (18.5–24.9), overweight (25–29.9), and

obese (>/=30). The survey included the FSFI, 7 investigator-generated questions regarding the operated breast in intimacy, and 7 demographic questions. Answers were compared using Student *t* tests. Demographics, tumor type, treatment course, and survey responses were compared between 3 surgical groups: lumpectomy (L), mastectomy (M), and mastectomy with reconstruction (MR). Descriptive statistics were compared using the chi-square test.

Results: Two hundred sixty-eight patients completed the survey. Median age and BMI were 57 (range, 30–93) and 28 (range, 19–45) respectively; 77.2% were postmenopausal. Patients underwent L (n = 186), M (n = 23), or MR (n = 59); and BMI was distributed as: normal weight, 28.6%; overweight, 30.2%; and obese, 41.2%. Prior to breast cancer surgery, a significantly greater proportion of overweight women (94.7%) reported their chest played an important role in intimacy, compared to normal weight (80.6%) and obese (79.6%) women (p = 0.009). This did not significantly change after surgery (overweight, 86.1%; normal weight, 62.5%; obese, 68%; p = 0.003). Obese and overweight women were more dissatisfied with the appearance of their chest after surgery (18.1% and 13.0%), compared to normal-weight patients (4.1%) (p = 0.01). Postoperatively, comfort with the partner seeing their chest was similar across BMI groups. Type of surgery did not appear to affect satisfaction with appearance or role of the breast in sex and intimacy between BMI groups.

Conclusion: Overweight and obese women were found to be more dissatisfied with the appearance of their chest after surgery when compared to normal-weight women. The role of the chest in intimacy before and after surgery was greatest in overweight women. Therefore, both groups of women are at greater risk for changes in self-image related to the postoperative breast. Counseling all patients regarding outcome, particularly overweight and obese women, is essential to setting appropriate expectations after surgery and thus improving patient satisfaction. As BMI does not always correlate with breast size, further analysis of the relationship between breast size, BMI, and outcome is warranted.

0382 - Early Adoption of the SSO-ASTRO Consensus Guidelines on Margins for Breast-Conserving Surgery with Whole-Breast Irradiation in Stages I and II Invasive Breast Cancer: Initial Experience

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Objective: Re-excision rates in patients undergoing breast-conserving surgery (BCS) for early-stage invasive cancer are highly variable. The Society of Surgical Oncology (SSO) and the American Society for Radiation Oncology (ASTRO) published consensus guidelines in March 2014 to help standardize practice. Our institution was an early adopter in January 2014.

Methods: A retrospective review of prospective institutional databases identified patients with stage I or II invasive cancer initially treated with BCS between June 1, 2013, and October 31, 2014. Rates of re-excision were quantified before and after the guideline adoption on January 1, 2014. Margins were defined as "positive" (tumor present on ink), "close" (≤1 mm), or "negative" (>1 mm) and were recorded for invasive cancer and DCIS separately. Clinicopathologic characteristics were compared between groups and multivariable logistic regression was used to identify factors independently associated with re-excision, with interaction terms to evaluate whether the effect of margins on re-excision changed at the time of guideline adoption.

Results: One thousand two hundred seventeen eligible patients were identified (510 pre- and 707 post-guideline adoption). The majority of clinicopathologic characteristics were similar between time periods. Re-excision rates declined from 21.4% to 15.1% (p = 0.006) after guideline adoption. The table shows factors associated with re-excision on univariate analysis. A multivariable model identified EIC (odds ratio = 2.4), multifocality (2.0), positive (844.7) and close (38.9) DCIS margin, positive (191.6) and close (6.4) invasive margin, and time period (0.5 for post- vs pre-1/1/2014) as independently associated with re-excision (p values in table). In the model run with interaction terms, close invasive margin was associated with 13.2 times the odds (71.0 for DCIS) of re-excision prior to guideline adoption; this decreased to 4.3 after adoption (24.4 for

DCIS); however, this difference did not reach significance (p = 0.1409, 0.0675), and therefore interaction terms were omitted in the final model for simplicity.

Clinical and Pathologic Factors Associated With Re-excision on Univariate Analysis.

	Univariate Results			Multivariable
Factor	No Re-excision	Yes Re-excision	p value	p value
Time Period			0.00611	0.0123
- Before 1/1/14	401 (78.6)	109 (21.4)		
- After 1/1/14	600 (84.9)	107 (15.1)		
Age	**59.3 (29.0, 90.4)**	**55.5 (30.1, 80.0)**	0.00177	**0.7192**
Invasive Margin			<0.001	
- Positive	7 (11.5)	54 (88.5)		<0.001
- Close	46 (55.4)	37 (44.6)		<0.001
- Negative	948 (88.4)	125 (11.6)		Reference
DCIS Margin			<0.001	
- Positive	2 (3.8)	51 (96.2)		<0.001
- Close	89 (44.9)	109 (55.1)		<0.001
- Negative	908 (94.2)	56 (5.8)		Reference
Tumor Subtype			0.00958	
- ER/PR+, Her2–	826 (83.3)	166 (16.7)		Reference
- Her 2+	71 (71.0)	29 (29.0)		0.0902
- Triple–	82 (85.4)	14 (14.6)		0.5225
Extensive Intraductal Component			<0.001	0.0214
- Present	60 (60.6)	39 (39.4)		
- Absent	941 (84.2)	177 (15.8)		
Lymphovascular Invasion			0.0328	0.7104
- Present	288 (78.5)	79 (21.5)		
- Absent	674 (83.7)	131 (16.3)		
Multifocality			<0.001	0.0163
- Present	146 (63.8)	83 (22.6)		
- Absent	852 (86.5)	133 (13.5)		
Presence of DCIS			<0.001	0.1399
- Present	786 (80.4)	192 (19.6)		
- Absent	214 (89.9)	24 (10.1)		

Conclusion: We noted a significant decline in overall re-excision rates after guideline adoption. However, adherence was voluntary and allowed for clinical judgment. We noted a close invasive margin was associated with a higher re-excision rate than a negative invasive margin; however, the effect of close vs negative was smaller in the post-guideline adoption period. Thus we expect this change to become significant as adherence to guidelines becomes more uniform. The greater decline in re-excision for close invasive margins suggests uncertainty about the optimal margin for DCIS, which may be addressed by the planned DCIS margins consensus.

0359 - Calculation of Breast Volumes from Mammogram: Comparison of 4 Separate Equations Relative to Mastectomy Specimen Volumes

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Objective: Cosmetic outcomes and patient satisfaction after partial mastectomy are influenced, in part, by breast size and amount of breast tissue removed. Assessing the patient's breast volume relative to the volume of breast tissue to be removed could help objectively determine optimal candidates for surgical intervention based on size criteria. We hypothesize that breast volumes can be estimated reliably from standard preoperative imaging.

Methods: Data were queried from an IRB-approved, prospectively maintained database regarding patients who underwent mastectomy, with or without a contralateral prophylactic mastectomy, for breast cancer from 2005 to 2015. Using CC and MLO views, a height (H), width (W), radius (R), and compression thickness (C) of each breast were obtained from pre-operative mammograms. These parameters were used to calculate a breast volume (BV) using 4 previously published equations: (1) BV = 1/3πRccRmloHmlo, (2) BV = 1/3πR2ccHcc, (3) BV = 1/4πHccWccCcc, and (4) BV = 1/3 π R2mloHmlo. The results were compared to mastectomy specimen volumes (Pearson *R* correlation), as calculated from specimen weights and breast density (ρ) by the equation volume = mass/ρ. Breast densities were obtained from mammographic scores and divided into 4 categories based on percent dense tissue.

Results: Complete mammographic measurements were available for 65 breasts from 45 patients. Median age was 58 years (range, 19–82). Mammographic breast density scores were available on 62 patients (table). Unilateral mastectomy was performed in 25 patients (56%), and a bilateral mastectomy was performed in 20 patients (44%), 16 (25%) of which were simple mastectomies. Complete pathological characteristics were available for all patients with tumors (table). Among the entire cohort, equation 2 (BV = 1/3πR2ccHcc) closely correlated with breast specimen volumes ($r = 0.88$, $p < 0.0001$), and most closely correlated within the subgroup of prophylactic simple mastectomies ($r = 0.91$, $p < 0.0001$).

continues

Clinical Variables and Results	N = 45
Unilateral mastectomy, n (%)	25 (56%)
Bilateral mastectomy, n (%)	20 (44%)
Prophylactic simple mastectomy, n (%)	16 (25%)
Total mastectomy specimens	65
Median age, years (range)	58 (19–82)
ER positive, n (%)	40 (89%)
PR positive, n (%)	36 (80%)
Her-2 positive, n (%)	2 (4%)
Tumor grade, n (%)	
Grade I	7 (17%)
Grade II	23 (55%)
Grade III	12 (29%)
Node positive, n (%)	13/45 (29%)
Invasive ductal, n (%)	27 (60%)
Invasive lobular, n (%)	7 (16%)
DCIS, n (%)	6 (13%)
Mixed, n (%)	5 (11%)
Mammographic breast BIRAD density, n (%)	
A (<10% dense, ρ = 0.916 g/mL)	5 (8%)
B (11–50% dense, ρ = 0.944 g/mL)	33 (53%)
C (51–75% dense, ρ = 0.972 g/mL)	24 (39%)
D (>75% dense, ρ = 1.0 g/mL)	0 (0%)
Median calculated breast volume, cm3 (range)	
Specimen weight	693.9 (95.3–3538)
Mammography (1/3 π RccRmloHmlo)	1412 (91.7–3928)
Mammography (1/3 π R2ccHcc)	1156 (54.2–3378)
Mammography (1/4 π HccWccCcc)	1261 (28.4–3150)
Mammography (1/3 π R2mloHmlo)	1509 (115–3509)
Pearson R correlation to specimen weight	*P <0.0001
BV = 1/3 π RccRmloHmlo, entire cohort (prophylatic only)	0.88* (0.83*)
BV = 1/3 π R2ccHcc, entire cohort (prophylatic only)	0.88* (0.91*)
BV = 1/4 π HccWccCcc, entire cohort (prophylatic only)	0.86* (0.89*)
BV = 1/3 π R2mloHmlo, entire cohort (prophylatic only)	0.82* (0.73*)

Conclusion: Breast volumes can be reliably calculated utilizing 2 basic measurements from a routine CC view mammogram. This method avoids extra diagnostic studies or cost. A calculated breast volume, relative to the expected volume of resection, could help objectively assess candidates for surgical intervention based on size criteria. This study is the first to compare this unique set of previously published equations head-to-head. Furthermore, this study includes the largest series of simple mastectomies to date and utilizes individualized breast densities to approximate the reference specimen weight to breast parenchyma.

0328 - Clinical Utility of Axillary Ultrasound Before Surgery in Breast Cancer Patients With Biopsy-Proven Node-Positive Before Neoadjuvant Treatment

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Objective: Axillary ultrasound (AUS) allows for identification and histologically confirmation of positive axillary nodes before neoadjuvant treatment (NAT). Some studies have suggested that restaging the axilla after NAT in clinically node-positive patients prior to surgery could be of additional value. The aim of the study was to determine the performance of AUS before surgery and if it could improve patient's selection for the use of SLN after NAT in patients with clinically node-positive breast cancer

Methods: Between January 2011 and 2015, 287 patients with a diagnosis of invasive breast cancer T1-4 N0-2 who underwent NAT were included in the study. All patients had an AUS before NAT, and 185 (65%) of all patients had an AUS before surgery. AUS findings were correlated with pathologic axillary status.

Results: Median age was 51.76 (range, 24–87 years old). The majority of patients had a T2 (63.3%) tumor and 62% were classified as N1-N2. AUS pre-NAT was suspicious in 210 (73%) of the 287 patients. Of this, 168 (80%) were positive by fine needle aspiration (FNA) and classified as N1-2. Of these patients, 111 (66%) had an AUS before surgery. Twenty-two (88%) of 25 AUS-suspicious patients were node-positive at surgery, compared to 57 (66%) of 86 AUS-normal patients ($p = 0.03$). Axillary lymph node dissection was done in 123 (73%), while SLN + ALND were done in the rest. Of the 35 patients with N1 and a normal AUS before surgery who underwent an SLN, 27 (77%) had residual axillary disease and in 26 (96%) the SLN was positive, with an FNR of 3.6%. Molecular subtypes by immunohistochemistry were classified as luminal A in 39 patients (13.6%), luminal B Her2-negative in 118 (41.4%) patients, luminal B Her2-positive in 38 (13.3%), triple-negative in 74 (26%) patients, and Her2-positive in 16 (5.7%) patients. Her2-positive patients had statistically significant more axillary pathologic complete response than the other subtypes.

Conclusion: In breast cancer patients with pathologically proven axillary metastasis before NAT, AUS before surgery has a high specificity and can triage patients to ALND. In cases of a normal AUS before surgery, patients can benefit from an SLN as the FNR of the procedure is low. Improvement in AUS performance is needed to increase the sensitivity of AUS before surgery in patients with normal-appearing AUS after NAT.

0247 - Sentinel Lymph Node Mapping in Breast Cancer After Neoadjuvant Chemotherapy: A Single-Institution Experience

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Objective: Neoadjuvant chemotherapy(NCT) is the standard of care for patients with locally advanced breast cancer (LABC). Its use in operable breast cancer is gaining wider acceptance. Sentinel lymph node mapping (SLNM) is currently the most accurate staging procedure for the axilla. The aim of our study is to assess the accuracy of sentinel node biopsy after neoadjuvant chemotherapy both for operable and locally advanced breast cancer

Methods: Between August 2004 and September 2015, we performed 93 SLNMs after NCT. Patients received all chemotherapy cycles before surgery. The procedures were performed by a single surgeon, using dual technique (radioactive tracer and blue dye).

Results: All patients were diagnosed by core needle biopsy and had clip placement before NCT. Patients age: 23–67. Histology of the primary breast cancer: infiltrating ductal carcinoma (IDC), 59; infiltrating lobular carcinoma (ILC), 20; IDC and ILC, 6; others (papillary, colloid, tubular), 8. Molecular subtypes: luminal A and B, 51; HER-2 overexpression, 18; triple negative, 24. Patients were divided into 3 groups according to

axillary status: group1--histologically positive axillary nodes by fine needle aspiration (FNA), 25; group 2--clinically palpable and/or radiologically suspicious nodes, 30; group 3--unknown axillary status and NCT given for the primary breast cancer, 38. No patient progressed on chemotherapy. Identification rate: 94.7%. SLN negative, 47 (no axillary dissection); SLN positive, 41 (completion axillary dissection except for 1 patient); SLN not found, 5 (completion ALND). Group 1--SLN not found, 2/25; SLN negative, 9/23; SLN positive, 14/23; group 2--SLN not found, 1/30; SLN negative, 16/29; SLN positive, 13/29; group 3--SLN not found, 2/38; SLN negative, 22/36; SLN positive, 14/36. The number of sentinel nodes removed: 18 patients, 1 SLN; 25 patients, 2 SLN; 38 patients, 3 SLN; 7 patients, 4 SLN; 5 patients, SLN not found. Patients with SLN positive: macrometastases, 33; micrometastases, 8. Patients with completion axillary lymph node dissection--SLN positive, 40; no other disease, 13; SLN not found, 5; no other disease, 3. Of the patients with SLN negative, 26 patients had no residual disease in breast tissue remove. Follow-up: 3–136 months; no axillary recurrence as only site of disease.

Conclusion: Sentinel lymph node mapping is an accurate procedure after NCT. It provides an accurate staging and local control of the axilla, while preventing unnecessary complications of axillary node dissection.

0443 - Local Recurrence After Breast-Conserving Therapy: Single-Center Study of Population With High Percentage of Bad Prognostic Factors

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Objective: Breast-conserving therapy in respect to local recurrence depends on different patient- and tumor-related factors. The objective of our study is to evaluate the risk factors and frequency of local recurrence in our patients

Methods: A total of 1870 patients who underwent BCT from Jan 2006 to Dec 2013 were identified from the data base. Their registration numbers, size and grade of tumor, LN involvement, and receptors status was identified and analyzed to find out the different factors for local recurrence in our population.

Results: A total of 1870 patients underwent 1872 BCS, among these 1071 (57.2%) had lumpectomies with axillary dissections and 801 (42.8%) patients underwent lumpectomies only. Mean age was 47.27 years (range, 20–85), with the maximum number of 640 patients (34.2%) falling in the age range of 41–50 years. Local recurrence was seen in 106 patients (5.7%), with the younger age group (31–40 years) being affected more. Patients who had axillary clearance and showed positive nodal metastasis were also identified as the risk group with increased trend of recurrence. Estrogen receptor status had no significant effect on recurrence. Radiation therapy has least protective role in preventing the local recurrence, as out of 106 patients, 99 received radiation therapy who presented with recurrence.

Conclusion: Young age and nodal metastasis are the bad prognostic factors for local recurrence. Estrogen receptor status and radiation therapy has least protective role in preventing local recurrence as found in our study population.

0291 - Breast Density and Positive Lumpectomy Margins

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Objective: Current methods for intraoperative assessment of lumpectomy margins are limited, and a meaningful proportion of patients require re-excision to achieve acceptable margins. There is little available

information regarding the relationship of mammographic breast density (BD) and the rate of positive margins after lumpectomy surgery.

Methods: The Breast Cancer Database at NYU Langone Medical Center was queried for women who had breast-conserving surgery (BCS) for a newly diagnosed breast cancer from 1/2010–6/2015. Variables of interest included BD, patient and tumor characteristics, and the margin status of the lumpectomy specimen. For the purpose of this analysis, a positive margin was considered tumor on ink. Statistical analyses included Pearson chi-square tests and logistic regression.

Results: Out of a total of 1560 patients who had BCS in our study period, 1475 (95%) had preoperative mammographic BD documented. As expected, higher BD was associated with younger age ($p < 0.0001$) and lower BMI ($p < 0.0001$) and was also associated with increased use of preoperative MRI imaging ($p < 0.0001$). Positive margins were significantly associated with palpable masses ($p = 0.02$), later stage disease (III, IV) ($p = 0.002$), and re-excision procedures ($p < 0.0001$), and there was a trend toward an association with BD ($p = 0.06$). However, upon further analysis, the subset of patients with extremely dense breasts on mammography was significantly associated with positive margins ($p < 0.01$) (table).

Clinicopathologic Characteristics and Lumpectomy Margin Status

Variables	Total (N = 1475)	%	Negative Margins (N = 1340, 81%)	%	Positive Margins (N = 135, 9%)	%	P value
Palpability							
Negative	1113	75	1022	76	91	67	0.02
Positive	362	25	318	24	44	33	
Stage of BC							
0	363	25	331	25	32	24	0.002
I	801	54	737	55	64	47	
IIA, IIB	259	18	233	17	26	19	
IIIA, IIIB, IIIC	49	3	37	3	12	9	
IV	3	0.2	2	0.2	1	1	
Histology							
DCIS	378	26	345	26	33	24	0.17
IDC	892	60	817	61	75	56	
ILC	136	9	117	9	19	14	
Invasive other	69	5	61	4	8	6	
ER							
Negative	200	14	180	14	20	15	0.67
Positive	1247	86	1134	86	113	85	
Missing	28	-	26	-	2	-	
PR							
Negative	385	27	354	27	31	23	0.36
Positive	1058	73	956	73	102	77	
Missing	32	-	30	-	2	-	
Her2Neu							
Negative	959	88	872	88	87	84	0.50
Positive	112	10	98	10	14	14	
Equivocal	22	2	20	2	2	2	
Missing/NA	382	-	350	-	32	-	
Re-excision							
Negative	1105	75	1087	81	18	13	<0.0001
Positive	370	25	253	19	117	87	
Mammographic BD							
Almost entirely fatty	108	7	104	8	4	3	0.06
Scattered fibroglandular	620	42	562	42	58	43	
Heterogeneously dense	643	44	585	44	58	43	
Extremely dense	104	7	89	6	15	11	

Conclusion: Our data found that higher BD is a risk factor for positive margins in lumpectomy specimens, suggesting that adjunctive methods for intraoperative margin assessment may be particularly helpful in these patients.

0210 - Replacing Open Surgical Lumpectomy With a Percutaneous Approach for Small Breast Cancers

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Objective: To assess the feasibility of complete excision of breast cancer after initial biopsy by using the Intact breast lesion excision system (BLES).

Methods: Patients with suspicious mammographic findings of microcalcifications, solitary lesions with or without microcalcifications underwent diagnostic biopsies using BLES under stereotactic image guidance under local anesthesia from December 2010 to December 2011. The BLES devices used ranged in size from 12 to 20 mm in diameter and device selection was dependent on the size of the breast. All patients with cancer underwent further surgical excision. Surgical specimens were assessed for residual disease by board-certified pathologists. Residual disease was defined as the presence of carcinoma on examined slides following surgical excision. The rate of complete excision of disease was recorded.

Results: Forty initial BLES biopsies with the diagnosis of breast cancer were performed. At BLES biopsy, cancers were placed into 3 groups according to size. Group 1 (47% of cases) had cancers ranging between 1–12 mm in size. Group 2 (28%) had cancers ranging between 13–20 mm. Group 3 (27%) were cancers greater than 20 mm. Of the 17 patients in group 1 (tumor size ranging 1–12 mm), 88% had no residual disease at the time of surgical excision. Cancers excised included invasive ductal, invasive lobular, DCIS, IDC/DCIS, and tubular. Ten percent of patients in group 2 (tumor size ranging 13–20 mm) had no residual disease. All patients in group 3 (tumor size ranging greater than 20 mm) had residual disease.

Tumor Size	Complete Excision Rate
1–12 mm	88%
13–20 mm	10%
>20 mm	0%

Conclusion: In this series, the BLES excised small cancers up to 12 mm, with a broad range of pathologies, 88% of the time on initial biopsy. This demonstrates the feasibility of percutaneous cancer excision as a sole surgical treatment for small breast cancers. The next progression for treatment of small cancers could be to perform definitive treatment percutaneously at the time of initial biopsy or complete excision following diagnosis of a cancer with an alternative biopsy device. The BLES allows for inking of margins on any percutaneous lumpectomy specimen. This opens up the possibility of treatment that does not require an additional surgical procedure in the operating room with its associated morbidity, time and expense. This approach may also improve time to follow-up radiation (whole breast/APBI), improved cosmetic results, and reduced stress on patients.

0376 - Is Immunohistochemistry Necessary for Diagnosing Sentinel Lymph Node Metastasis in Invasive Lobular Breast Cancer?

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Objective: Identification of lymph node metastasis is needed for staging breast cancer, but micrometastatic lymph node (LN) disease and isolated tumor cells (ITCs), often identified with immunohistochemistry (IHC), are of little clinical relevance. Despite this, IHC is still frequently used in the setting of invasive lobular cancer (ILC), as these node metastases may be difficult to identify given their cytomorphology. The utility of using IHC for identifying clinically significant LN disease in this setting is uncertain.

Methods: A prospectively maintained institutional database was reviewed to identify women diagnosed with ILC and who underwent axillary surgery between 2000 and 2012. Patient demographics, tumor characteristics, and type of axillary surgery were recorded. The use of IHC and its yield were evaluated; descriptive statistics were used for the analysis.

Results: A total of 384 patients were included in the analysis. Median age was 60 ± 11.9 (range, 33–91) years. The vast majority of patients were low or intermediate grade (93%), ER-positive (94.7%), PR-positive (78.6%), and HER2-negative (95.4%). IHC was performed in 170 patients total (44.3%). Two hundred sixty-three patients of the entire cohort (68.5%) underwent sentinel lymph node (SLN) biopsy, either alone or followed by axillary dissection, with or without the use of IHC. Eighty-nine patients (20.6%) had positive SLNs, and SLN metastases were identified solely on IHC in 19 of these patients (21%); however, none of these were macrometastases. In 12 of the 19 patients (63.2%) in whom IHC was required to identify SLN disease, only ITCs were identified in SLNs. Three patients with SLN metastases already identified on routine stains had additional positive nodes identified with IHC; TNM stage was not affected by IHC findings in these patients. In 4 patients, IHC identified micrometastatic SLN disease; 1 of these patients, with significant ipsilateral axillary disease, had a contralateral micrometastasis identified with IHC.

Conclusion: Only a small proportion of ILC SLN metastases required IHC for identification, and none of these were macrometastases. The routine use of IHC for evaluation of SLNs, even in the setting of ILC, is likely unnecessary and should be reevaluated given the diminished clinical relevance of microscopic lymph node disease.

0241 - Diagnostic Performance of Molecular Breast Imaging in Women With Complex Mammographic Findings

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Objective: Molecular breast imaging (MBI) has been implemented in routine clinical practice at a large, community-based breast imaging center. We present the diagnostic performance of MBI in resolving complex mammographic findings.

Methods: Women who needed additional imaging follow-up post diagnostic mammography due to dense breast tissue or implants were selected for imaging with MBI. The women ranged in age from 25 to 86 years, with an average age of 51 years. All of the patients underwent bilateral MBI scanning after an intravenous injection of 300 MBq (8 mCi) 99mTc-sestamibi. Imaging commenced immediately post-injection, utilizing light breast compression in the mediolateral oblique (MLO) and craniocaudal (CC) views for 7 to 10 minutes per view.

Results: MBI imaging of 381 women resulted in the detection of 16 mammographically occult malignancies, of which 15 were invasive and 2 were node positive. The lesion size ranged from 0.6 cm to 5.4 cm, with a mean of 1.7 cm. MBI was able to resolve 330 (86.6%) cases as benign, had positive findings in 42 (11.0%) cases and was unable to resolve 9 (2.4%) cases. Therefore, the recall rate was 13.4% (95% CI, 10.3%–17.2%) and the biopsy rate was 11% (95% CI, 8.3%–14.6%). The positive predictive value for biopsy (PPV3) was 38.1% (95% CI, 25.0%–53.0%) and negative predictive value was estimated as 98.2% (95% CI, 96.1%–99.2%).

Conclusion: Due to its high positive predictive value and negative predictive value, MBI is an excellent diagnostic tool to resolve complex mammographic findings. This is particularly useful in cases where MRI is unavailable or with women contraindicated for MRI.

0165 - A Novel Form of Breast Intraoperative Radiation Therapy With CT-Guided HDR Brachytherapy: Results of a Phase I Trial

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Objective: Intraoperative radiation therapy (IORT) is an increasingly popular alternative to whole-breast irradiation in patients with early-stage breast cancer. Existing IORT techniques are criticized for the inability to confirm catheter placement, the lack of image-guided treatment planning, and poor dosimetry due to the use of low-energy photons. We pioneered a novel method of IORT (Precision Breast IORT) that incorporates true image-guided, customized CT-based treatment planning and high-dose-rate (HDR) brachytherapy, thus resulting in superior target volume coverage and a higher prescription dose to the lumpectomy bed.

Methods: We conducted a single-arm pilot study to demonstrate the safety and feasibility of Precision Breast IORT for the adjuvant treatment of early-stage breast cancer. Eligibility criteria included women age >50 with invasive or in situ breast cancer, tumor size <3 cm and N0 disease. Patients were eligible before or within 30 days of their breast-conserving surgery (BCS). BCS was performed in our integrated brachytherapy suite and then a multi-lumen catheter was placed. CT images were obtained, a customized HDR brachytherapy plan was created, and a dose of 12.5 Gy was delivered. The catheter was removed and the skin closed. Primary endpoints were IORT treatment interval (time from CT until end of IORT) as a measure of feasibility and acute toxicity. Secondary endpoints included dosimetry, cosmetic outcome, patient-reported quality of life, and late toxicity.

Results: Twenty-eight patients were enrolled, including 10 with DCIS, 16 with invasive ductal carcinoma, 1 with invasive lobular carcinoma, and 1 with invasive tubular carcinoma. Median age was 63 years. Median follow-up time is 5.6 months. Median IORT treatment interval was 67.2 minutes (range, 50-108 minutes). Precision Breast IORT treatment met feasibility criteria for time in 26 women (93%). Dosimetry goals were met in 22 patients (79%). There were no RTOG grade 3 or 4 toxicities. Six subjects (21%) experienced grade 2 events, which included pain, dermatitis, and seroma formation. Ninety-six percent of patients had good or excellent cosmetic results at 3 months.

Target Volumes and Dosimetric Goals Among All Patients (n = 28)

	Goal	Median	Range	Goal achieved in
Balloon volume (cc)	-	40	30.3–78.0	-
PTV volume (cc)	-	87.8	44.8–117.4	-
D90 (% of 12.5 Gy)	-	100.7	94.3–103.3	-
V100 (%)	≥90	91	81.8–94.1	21 of 28 (75%)
Max skin (% of 12.5 Gy)	<145	107.3	31.6–200.0	26 of 28 (93%)
Mean heart (% of 12.5 Gy)*	ALARA	6.9	2.4–11.0	17 of 17 (100%)
Max rib (% of 12.5 Gy)	<145	99.4	20.1–158.0	23 of 28 (82%)

PTV indicates planning target volume; D90, dose received by 90% of the PTV; V100, percentage of volume of the PTV receiving 100% of the prescription dose of 12.5 Gy; ALARA, as low as reasonably achievable; Max: maximum.

*For left-sided-tumors. Heart dose for right-sided tumors was 0.0 Gy.

Conclusion: Precision Breast IORT is a safe and feasible treatment for patients with early-stage breast cancer. This promising approach for more conformal, image-based breast IORT is currently being further evaluated in a Phase II trial.

0287 - Immediate Reconstruction in Inflammatory Breast Cancer: Challenging Current Care

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Objective: Inflammatory breast cancer (IBC) is an aggressive disease which is treated with tri-modality therapy, consisting of neoadjuvant chemotherapy, surgery, and postmastectomy radiation therapy (PMRT). Traditionally, modified radical mastectomy without reconstruction has been the operation of choice for patients with IBC due to fears of high rates of margin positivity, risk of local recurrence, and the need for PMRT. The purpose of this study is to evaluate patients with inflammatory breast cancer who have undergone immediate reconstruction.

Methods: A retrospective review was performed to evaluate women with IBC at our institution from 2006–2014 who completed tri-modality therapy. Patients were identified as undergoing reconstruction or no reconstruction (NR). Reconstruction was further classified as immediate (IR) if reconstruction occurred at the initial surgery, or delayed if initial reconstruction occurred after PMRT. Patient demographics, tumor characteristics, acute complications, treatment, and recurrences were analyzed. Patients were excluded if they presented with metastatic disease at initial diagnosis or did not complete tri-modality therapy.

Results: Sixty women with IBC were identified using inclusion criteria. The median follow-up was 2.3 years (1.4–4.6yrs). Twenty-one (35%) underwent some form of breast reconstruction, with 16 (46%) undergoing IR. Those with IR, 13 had tissue expanders placed and 3 had immediate autologous reconstruction. Five women had delayed autologous reconstruction and 39 women had no reconstruction (see table). There was no statistically significant difference ($p = 0.12$) in postoperative complication rates comparing patients with IR (18.8%) and non-IR group (10.3%). Two patients had positive skin margins on final pathology (1 IR, 1 NR), both eventually having local recurrence. Time to PMRT was 10 days delayed in patients with IR compared to those without IR with no statistically significant difference in recurrence (table) ($P = 0.86$). Of patients with immediate tissue expanders ($n = 13$), 7 (63.6%) completed stage 2 reconstruction in a median time of 16 months. Of the remaining patients without stage 2 reconstruction, 3 developed distant recurrence and died. The remaining 3 patients were living with expanders in place. Overall recurrence rate at one year was 30.9% (95% CI, 17.9%–41.8%). There were 4 locoregional recurrences and 22 distant recurrences, with no observable differences among groups. No difference in survival was observed between patients who had reconstruction and those without ($p = 0.91$).

	Immediate Reconstruction (n = 16)	Delayed Reconstruction (n = 5)	No Reconstruction (n = 39)
Time to radiation (days)	52.5	45	42
Complications	3 (18.8%)	1 (20%)	4 (10.3%)
Positive skin margin	1 (6.3%)	0	1 (2.6%)
Recurrence, locoregional	0	0	4 (10.3%)
Recurrence, distant	7 (43.8%)	1 (20%)	14 (35.9%)
Deaths	7 (43.8%)	1 (20%)	14 (35.9%)

Conclusion: Performing IR in women undergoing mastectomy for IBC may not negatively impact complications, recurrence, or survival. Performing IR in selected IBC patients can facilitate successful breast reconstruction.

0299 - Piloting of Psychosocial Distress Monitoring in a Multidisciplinary Breast Center

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Objective: Starting in 2015, all Commission on Cancer–accredited cancer programs must have developed and implemented a process to screen for psychosocial distress and provide appropriate psychosocial care, although the timing of this screening was not specified. At our institution we decided to provide the screening tool at the first new-patient visit at each clinic. New patients at the breast center are seen at various phases of their cancer care: shortly after diagnosis by the surgeon and after surgery by the medical and radiation oncologists. We reviewed the initial screening tools from our breast center to determine how psychosocial distress differs before and after surgery.

Methods: Each patient was given a distress thermometer and review of stressors to complete at her first new-patient visit in the breast center. The completed tools were reviewed at the patient visit and social work evaluated every patient with a distress score of 4/10 or higher. Tools were then scanned into the medical record and collected by the social worker. We reviewed the collected distress tools and compared the data based on the type of new patient visit (surgical oncology vs medical oncology or radiation oncology).

Results: Between May 1 and October 30, 224 distress tools were completed by patients being seen in our breast center for their initial visit, 119 (53.1%) before their surgical consultation, 94 (41.9%) before their medical consultation, and 11 (4.9%) before their radiation consultation. Of these, 39.4% (58.8% of surgical visits, 19.1% of medical visits, and 10% of radiation visits) showed distress levels of 4 or more triggering a social work intervention. The most common stressors were emotional (92.1%) and physical problems (77.5%), with treatment decisions (35.9%), practical matters (29.2%), and family issues (28.0%) being less common. Spiritual/religious issues were the least common stressor (12.3%). Mean stress levels were 4.7 for surgical patients and 2.7 for patients seeing medical and radiation oncology ($P < 0.05$), but the spectrum of stressors did not change significantly over continuum of care. (See table)

Stressors Reported on Distress Screening Tools Reporting ≥4/10 Distress

Stressor	Surgical New Patient (%)	Medical/Radiation New Patient (%)
Treatment decision	37.1%	33.3%
Practical issues	31.4%	22.2%
Family issues	24.3%	44.4%
Emotional issues	92.8%	94.4%
Spiritual/religious issues	12.8%	11.1%
Physical issues	75.7%	88.9%
# Tools	70	19

Conclusion: Patients are at their peak stress levels at the time of diagnosis. As they move along their treatment plan, their stress levels decrease, but the stressors seem to remain the same. Timing of the completion of the distress tools should be based on whether you want to capture peak stress (at time of diagnosis) or background stress levels.

0172 - Age Under 40 Is a Predictor of Poor Breast Cancer Outcome

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Objective: Breast cancer in younger women tends to be more aggressive and higher grade when compared with older women. Our primary aim was to compare tumor characteristics in women younger than 40 years with women older than 60 years and to determine 10-year probability of local recurrence, distance recurrence, and breast cancer death.

Methods: A prospective database containing women with DCIS or invasive cancer diagnosed between 1979 and 2015 was analyzed. Variables studied included tumor size, nuclear grade, and hormone receptor status, in all patients. HER2, the presence of lymphovascular invasion (LVI), node positivity, and molecular subtype was studied in patients with invasive cancer. Kaplan-Meier curves were generated to graphically show the difference between survival and recurrence distributions. The log-rank test was used to evaluate the difference between curves.

Results: The table compares 585 patients under the age of 40 with 2,189 patients over the age of 60. Virtually every variable studied was worse for younger patients and the differences were all statistically significant. Women under the age of 40 had a higher percentage of basal, HER2 positive, and luminal B cancers and a lower percentage of luminal A cancers. Younger women had larger, higher grade tumors with a greater percentage of lymphovascular invasion. The probability of local recurrence, distant recurrence, and breast cancer death was significantly higher for younger women.

Patients Under the Age of 40 Compared to Patients Over the Age of 60

	Age ≤ 39	Age ≥ 61	P Value
N	585	2189	
% Noninvasive % Invasive	146/585 (25%) 439/585 (75%)	546/2189 (25%) 1643/2189 (75%)	
Avg age (yr)	35 yr	70 yr	
Avg tumor size (mm)	29 mm	22 mm	< 0.001
Avg nuclear grade	2.49	2.16	< 0.001
% ER positive	238/395 (60%)	1396/1629 (86%)	< 0.001
% HER2 positive	56/178 (31%)	122/1104 (11%)	< 0.001
% Basal % HER2 % Luminal A % Luminal B	28/125 (22%) 30/125 (24%) 18/125 (14%) 49/125 (39%)	87/803 (11%) 38/803 (5%) 444/803 (55%) 234/803 (29%)	< 0.001 < 0.001 < 0.001 < 0.001
% LVI (invasive only)	125/404 (31%)	231/1494 (15%)	< 0.001
% Node positive (invasive only)	161/402 (40%)	357/1471 (24%)	< 0.001
Probability local rec @ 10 yr	19.6%	9.6%	< 0.001
Probability distant rec @ 10 yr	27.7%	11.4%	< 0.001
Probability BC death at 10 years	20.2%	10.2%	< 0.001

Conclusion: While younger and older women had an equal number of invasive and noninvasive cancers, all other factors studied favored older women. Since women less than 40 years of age are not routinely screened, we were surprised by an equal percentage of invasive cancers and DCIS cases in each age group. Poorer survival in young women is generally attributed to a higher percentage of more aggressive cancers and our study confirms that. The survival gap between younger and older women has likely been lessened with the

improvement of chemotherapy during the last 20 years and with the development of drugs, such as trastuzumab and pertuzumab, but is still statistically worse for younger women.

0274 - Diagnostic Dilemma of Preoperative Differentiation of Fibroepithelial Lesions of the Breast

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Objective: Accurate preoperative pathological diagnosis of phyllodes tumors allows correct surgical planning and avoidance of reoperation. This study aimed to evaluate accuracy of core biopsy for establishing a diagnosis and potential factors to augment the diagnosis.

Methods: Data from patients presenting with a breast mass at a single tertiary referral center with a core biopsy preoperative indeterminate diagnosis of a "fibroepithelial breast lesion" between 2010 and 2015 was collected and analyzed. Final pathology was reviewed along with patient demographics and tumor characteristics, including radiological features, age, size and location of lesions, type of surgery, histological type, and grade.

Results: Sixty patients had resection of a "fibroepithelial lesion"; on final pathology 33 had phyllodes tumors (24 low grade, 6 borderline, 2 high grade, 1 no grade), while 22 had fibroadenomas and 5 had indeterminate lesions. Of the 22 patients with fibroadenomas, preoperative biopsies indicated 26% fibroadenomas, 5% phyllodes, and 69% indeterminant. Of the 24 patients with low-grade phyllodes, preoperative biopsies indicated 26% fibroadenomas, 17% phyllodes, and 57% indeterminant. Six patients had borderline phyllodes with preoperative biopsies showing 1 fibroadenoma, 1 phyllodes, and 4 indeterminant. Two patients had high-grade phyllodes; preoperative biopsies suggested a low-grade phyllodes in one and indeterminant in the other. Phyllodes tumor patients were older than those with fibroadenomas (49.3 vs 37.3 years, $p < 0.001$). Patients with high-grade or borderline tumors were older than those with low-grade tumors (54.8 vs 47.3 years, $p < 0.02$). Patients with phyllodes tumors had larger tumors than patients with fibroadenomas (5.0 vs 3.2 cm, $p < 0.04$).

Conclusion: Correct pathologic diagnosis was established in only 26% and 17% on preoperative biopsies, suggesting fibroadenomas or phyllodes, respectively. Patient age and tumor size are significant predictors of the presence of phyllodes tumors and those with higher histological grade. Complementary clinical and radiological variables are needed to improve accuracy of diagnosis of fibro-epithelial lesions.

0355 - Nipple Changes During and After Pregnancy in Women Who Have Undergone Nipple-Sparing Mastectomy

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Objective: Nipple-sparing mastectomies (NSMs) are increasingly performed due to their cosmetic advantage. Some women undergo therapeutic or prophylactic mastectomy before they finish childbearing due to early onset of breast cancer, a risk gene mutation, or a strong family history of breast cancer. This is the first series to report nipple changes observed during pregnancy after NSM.

Methods: Retrospective chart review of all NSMs at our institution from 2010-2012 identified patients under age 45 at the time of surgery and subsequent pregnancies were documented. Standard surgical technique removed subareolar tissue so that the anterior margin of our NSM specimens was the underside of nipple and areola dermis. Patient demographics, operative, pathology, and treatment information was collected. A descriptive analysis of breast and nipple changes during pregnancy and the postpartum period was performed.

Results: During 2010–2012, there were 269 NSM procedures performed in 147 patients who were under age 45. Of these, 12 subsequent pregnancies were observed in 11 patients (7 with BRCA1 mutations, 1 with a BRCA2 mutation), with mean age of 32 (range, 26–41 years). These 11 patients had 21 NSM procedures (10 bilateral, 1 unilateral), 3 were therapeutic [2 for invasive ductal cancer (IDC), 1 for ductal carcinoma in situ (DCIS)], and the remaining 18 were prophylactic. One patient had a spontaneous abortion; another patient had an induced abortion for a fetal abnormality and a normal delivery 1 year later. The other 9 patients each had 1 uneventful pregnancy and delivery; 1 patient reported breast engorgement during pregnancy but no nipple discharge after delivery, and 2 patients experienced bilateral multi-duct nipple discharge after delivery (one milky and the other watery). Nipple discharge stopped spontaneously (one at 3 months and the other <10 months postpartum). At 35 months median follow-up after surgery (range, 17–61 months) 11 months (range, 1–20 months) after delivery no local-regional recurrences were observed.

Patient Characteristics

Patient ID	Age at Surgery (years)	BRCA Mutation	Laterality	NSM indication		Sling Material Used	Delivery (Months After Surgery)	Nipple Discharge and Duration	Follow-Up (Month After Surgery)
				L	R				
1	27	BRCA 1	BL	RR	RR	No	43	No	57
2	30	No	BL	RR	IDC	No	54	No	56
3	34	BRCA 1	BL	RR	RR	Acellular dermal matrix	50	Yes, BL watery, < 10 months	61
4	32	BRCA1	BL	RR	RR	Acellular dermal matrix	23	No	33
5*	36	BRCA 1	BL	RR	RR	No	No	No	30
6**	32	BRCA 1	BL	RR	RR	Acellular dermal matrix	25	Yes, BL milky, 3 months	35
7	32	No	BL	IDC	RR	Absorbable mesh	39	No	40
8	26	BRCA 2	BL	RR	RR	Acellular dermal matrix	17	No	37
9	28	BRCA 1	BL	RR	RR	Acellular dermal matrix	12	No	25
10	30	BRCA 1	BL	RR	RR	Acellular dermal matrix	22	No	34
11	41	No	Left	DCIS	\	Absorbable mesh	13	No	17

BL: bilateral; RR: risk reduction
* Spontaneous abortion
** Pregnancy with dilation and evacuation 13 months after surgery

Conclusion: Nipple discharge is possible after nipple-sparing mastectomy in the early postpartum period despite extensive nipple duct removal. The etiology of the discharge is uncertain but appears to be self-limited. To date, no patient has evidence of local recurrence or new breast cancer. Longer follow-up is planned.

0361 - Evaluation of Shaved Cavity Margins with Microcomputed Tomography—A Novel Method for Predicting Lumpectomy Margin Status Intraoperatively

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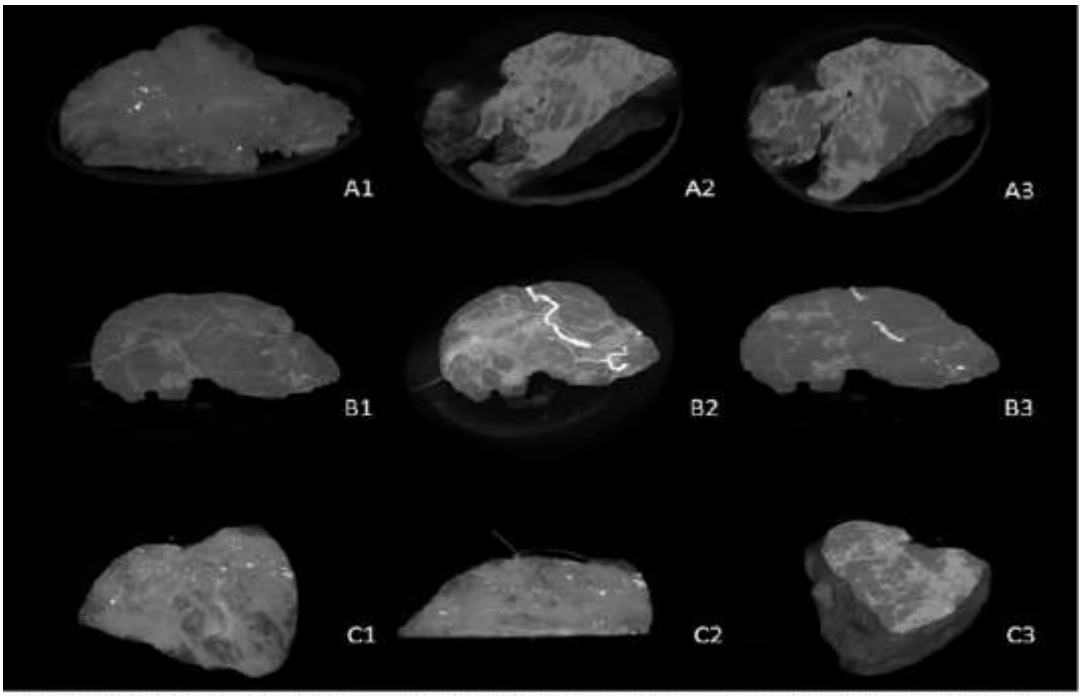
Objective: A recent prospective clinical trial found that taking shaved cavity margins (SCM) at the time of lumpectomy decreased re-excision rates from 36% to 19% in women with breast cancer. We assessed the ability of micro-computed tomography (micro-CT) to evaluate SCM intraoperatively to determine whether this technology could rapidly identify margin involvement by tumor and further reduce re-excision rates.

Methods: SCM were scanned with a Skyscan 1173 tabletop micro-CT scanner (Skyscan, Belgium) with a 5-minute scanning protocol, with up to 3 SCM scan simultaneous. Micro-CT images were evaluated by a surgeon familiar with micro-CT and blinded to histopathology results, looking for radiographic signs of breast cancer, including clustered microcalcifications and spiculated masses. Surgeon assessment of SCM status on micro-CT images was compared to histopathological results.

Results: We studied a total of 103 SCM from 26 lumpectomies. Lumpectomies were performed for 20 invasive ductal carcinomas (IDC) with ductal carcinoma in situ (DCIS), 1 pure IDC, 3 pure DCIS, and 2 invasive lobular carcinomas. Margin status by micro-CT was concordant with histopathology in 83% of SCM specimens (86/103). Micro-CT overestimated margin involvement in 13 SCM and underestimated margin involvement in 4 SCM. Micro-CT had 73% sensitivity, 85% specificity, 46% positive predictive value, and 95% negative predictive value for the presence of tumor in SCM. Nineteen percent of cases (5/26) required a re-excision based on the final margin status; micro-CT correctly identified margins as positive in 3 of these 5 cases.



A1-A3: 3 views of a true positive SCM micro-CT image with multiple clusters of pleomorphic calcifications and architectural distortion. Pathology showed invasive lobular cancer with DCIS throughout the SCM.
B1-B3: 3 views of a true negative SCM micro-CT image with a benign calcified vessel. Pathology showed fibrocystic changes with ductal hyperplasia and vascular calcifications.
C1-C3: 3 views of a false positive SCM micro-CT image with calcifications extending to the final margin, designated by a suture. Pathology showed flat epithelial atypia.

Conclusion: Evaluation of SCM by micro-CT is a promising method for intraoperative margin assessment in breast cancer patients. The scanning time required is short enough to permit real-time feedback to the operating surgeon, allowing immediate directed re-excision and further reducing rates of second surgical procedures.

0236 - Sentinel Lymph Node Biopsy (SLNB) in Low-Risk Settings

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Objective: It is commonly accepted that while the risk of having node-positive disease is low in the setting of DCIS, an SLNB should be performed if the patient is undergoing a mastectomy as this minimally invasive staging procedure is not possible afterwards if invasive disease is found on final pathology. Yet, the same logic is controversial in the setting of prophylactic mastectomy. We sought to determine current practice patterns for SLNB in these low-risk settings.

Methods: An online survey of surgeons was conducted using the American College of Surgeons Communities platform. Bivariate correlations were assessed with nonparametric statistical analyses using SPSS Ver. 21.

Results: Two hundred thirty-eight surgeons responded to the survey. The mode time in practice was 11–20 years; 33% of respondents had solely breast-related practices; 15.1% were academic, 40.8% in private practice, and 43.3% hospital employed. When asked how frequently they would perform an SLNB for pure DCIS (no microinvasion) in the setting of mastectomy, 71.8% stated they would always do so. However, 64.3% of respondents stated they never did an SLNB in the setting of prophylactic mastectomy. When asked about the probability of SLN positivity in the setting of pure DCIS and prophylactic mastectomy, respectively, 61.4% and 91.9% stated this was <2%. The distribution of probabilities quoted for these 2 scenarios was highly correlated ($p < 0.001$). While there was also a high degree of correlation between performing SLNB in both of these low-risk scenarios ($p = 0.048$), 61.8% of surgeons who reported always performing an SLNB in the setting of DCIS treated with mastectomy never performed an SLNB for prophylactic mastectomy. For both the setting of DCIS and prophylactic mastectomy, there was a correlation between the performance of SLNB and the rate surgeons quoted as the probability of having a positive SLN ($p = 0.037$ and $p = 0.014$, respectively). Factors correlating with performance of SLNB in these settings is shown in the table below.

	SLNB in Mastectomy for DCIS		SLNB in Prophylactic Mastectomy	
Factor	**Always** N (%)	**P value**	**Always** N (%)	**P value**
Surgeon age				
<30	1 (100)		0 (0)	
31–40	40 (87)		0 (0)	
41–50	56 (77.7)	0.125	8 (11)	0.171
51–60	44 (71)		5 (8.2)	
61–70	21 (58.3)		1 (1.9)	
>70	9 (56)		1 (6.7)	
Years in practice				
<5	23 (92)		0 (0)	
5–10	33 (82.5)		2 (5)	
11–20	48 (70.6)	0.046	9 (13.6)	0.111
21–30	41 (70.7)		3 (5.2)	
>30	26 (70.5)		1 (2.4)	

% Dedicated breast practice				
< 10%	14 (58.3)		3 (12.5)	
10%–25%	31 (57.4)		2 (3.7)	
26%–50%	23 (74.2)	0.010	2 (6.9)	0.082
51%–75%	18 (72)		1 (4)	
76%–99%	19 (86.4)		3 (15)	
100%	66 (84.6)		4 (5.3)	
Practice setting				
Private practice	70 (72.2)		5 (5.3)	
Hospital employed	70 (70.7)	0.642	6 (6.2)	0.316
Academic	3 (83.3)		4 (11.4)	
Practice location				
Rural	30 (62.5)		6 (12.2)	
Suburban	81 (75)	0.412	5 (4.9)	0.001
Urban	60 (77.9)		4 (5.3)	
Quoted probability of positive SLN				
<1%	46 (73)		10 (6.1)	
1%–2%	52 (68.4)		3 (8.3)	
2%–3%	33 (70.2)	0.037	2 (25)	0.014
3%–5%	28 (82.4)		0 (0)	
>5%	6 (85.7)		0 (0)	

Conclusion: It is generally agreed upon that the probability of finding a positive SLN in the setting of DCIS and in prophylactic mastectomy is low, yet practices for these 2 low-risk settings are disparate. Consensus regarding SLNB in these low-risk settings is required to rationalize these practices.

0428 - The Impact of Obesity on the Rate of Surgical Biopsy After Identification of a Mammographic Abnormality

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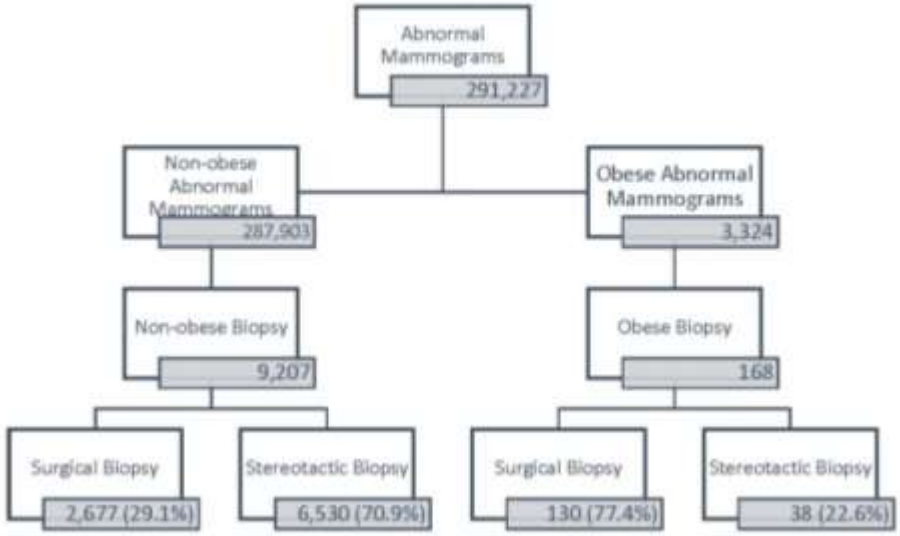
Objective: Image-guided core needle biopsy (CNB) for evaluation of a mammographic abnormality is preferred to surgical biopsy due to its lower complication rate and ability to reduce the total number of surgical interventions. The ratio of CNB to surgical biopsy for the diagnosis of a breast abnormality has been suggested by several national organizations as a quality metric. Previous studies have documented factors associated with a higher surgical biopsy rate inclusive of patient and surgeon factors. We hypothesized that obesity, given the technical weight limitations of a stereotactic table, would be associated with higher rates of surgical biopsy for mammographic abnormalities. Our objective was to determine the rate of surgical biopsy in obese compared with non-obese patients.

Methods: Using ICD-9 and CPT codes, we performed an IRB-approved, hospital-level evaluation of abnormal mammograms in the University Health System Consortium (UHC) outpatient billing database from 2011 to 2015. The rate of surgical biopsy (CPT 19120, 19125, 19126, 19301, 19281) without prior stereotactic biopsy (ICD-9 793.8) was assessed in patients aged 18 and older with a diagnosis of obesity (ICD-9 278.0-.03), compared to those without an obesity diagnosis. Exclusions included a diagnosis of breast cancer prior to the surgical or stereotactic biopsy. Chi-square analysis was used to assess biopsy rate correlations, p values < 0.05 were considered significant, and all statistics were performed in SPSS v. 22.

Results: Data on biopsy information were available from 168 hospitals. From 2011–2015, 291,227 abnormal mammograms were coded in a patient population that was primarily non-obese (n = 287,903; 98%). During this time interval, the rate of surgical biopsy was significantly higher for obese patients as compared with non-obese patients (77% vs 29%, $p < 0.001$) (figure). Across the study period, annual rates of surgical biopsy were found to be consistently elevated in obese patients.

Figure 1: UHC Database October 2011 – June 2015



Conclusion: Obese patients underwent surgical biopsy more than twice as often as non-obese patients. Utilization of the rate of surgical biopsy as a quality metric for breast program accreditation will likely need to adjust for patients factors, such as obesity, due to the technical inability for many of these patients to undergo stereotactic interventions. However, the rate of surgical biopsy for non-obese patients in this cohort was also high, at greater than 25%. This highlights the need for surgeon and institutional education on the benefits of CNB over surgical biopsy in the work-up of mammographic abnormalities.

0217 - A Comparison of Interval-Detected and Screening-Detected Breast Cancer in a Community Breast Center

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Objective: Although the American Cancer Society recently updated their breast cancer screening guidelines, there remains significant controversy on whom, when, and how often screening mammography should be performed. To evaluate this, we looked at the difference in stage and tumor markers between screening and interval mammography in breast cancers detected over a 5-year period.

Methods: An IRB-approved retrospective chart review of all female patients diagnosed with invasive ductal carcinoma (IDC), invasive lobular carcinoma (ILC), mixed carcinoma (MC), ductal carcinoma in situ (DCIS), and lobular neoplasia (LCIS) from January 2009 through February 2015 (n = 1001) was performed. We separated the group into 2 arms: cancers detected by screening mammography (SM) and those detected by a mammogram performed for symptoms between normal screening mammography and interval mammography (IM). We had a total of 1001 patients, of which 772 were invasive. Of those, 469 invasive cancers were found by SM and 303 by IM. We further subclassified groups by age and evaluated the tumor markers (ER+, ER–/HER2–, HER2+) and stage of cancer.

Results: In the SM group 76.3% (n = 358) presented as stage 1 vs 37.6% (n = 114) in the IM group. In the SM group, 19.2% (n = 90) presented as stage 2 vs 42.9% (n = 130) in the IM group. In the SM group, 4.1% (n = 19) presented as stage 3 vs 17.5% (n = 53) in the IM group. In the SM group, 0.4% presented as stage 4 vs 2% in the IM group.

Age		Screening (55)	Percent	Interval (65)	Percent
40–49	ER+	41	74.6	40	64.5
	ER–/HER–	5	9.1	10	15.4
	HER2+	9	16.4	15	23.1
		Screening (104)	**Percent**	**Interval (80)**	**Percent**
50–59	ER+	86	82.7	46	57.5
	ER–/HER–	4	3.8	18	22.5
	HER2+	14	13.5	16	20
		Screening (137)	**Percent**	**Interval (64)**	**Percent**
60–69	ER+	108	78.8	46	71.9
	ER–/HER–	13	9.5	13	20.3
	HER2+	16	11.7	5	7.8
		Screening (169)	**Percent**	**Interval (63)**	**Percent**
>70	ER+	138	81.7	44	69.8
	ER–/HER–	17	10.1	13	20.6
	HER2+	14	8.3	6	9.5

Conclusion: As expected, IM in every age group had a higher incidence of more aggressive ER-/HER2– and HER2+ tumors (except HER2+ in the 60–69 age group). The IM group also presented at a more advanced stage resulting in additional systemic chemotherapy and making breast conservation more difficult. The more aggressive nature of these cancers may lead to symptoms which trigger IM. Although IM cancers are being found with more aggressive genomics and at a later stage, a significant number of cancers are still being found by SM. Of note, approximately 36% of patients with invasive cancer in our screening group were age 70 or older, leaving us to conclude that in healthy women over 70 we need to continue annual screening. In younger women (40–49), we found more cancers by IM (21.5%) vs SM (11.7%). The difficulty in detecting cancers in this age group may be secondary to breast density. We conclude that SM should continue in women >49 but additional modalities of screening may need to be employed for younger women.

0386 - MRI in Invasive Lobular Carcinoma Improves Preoperative Tumor Size Determination But Increases Mastectomy Rate

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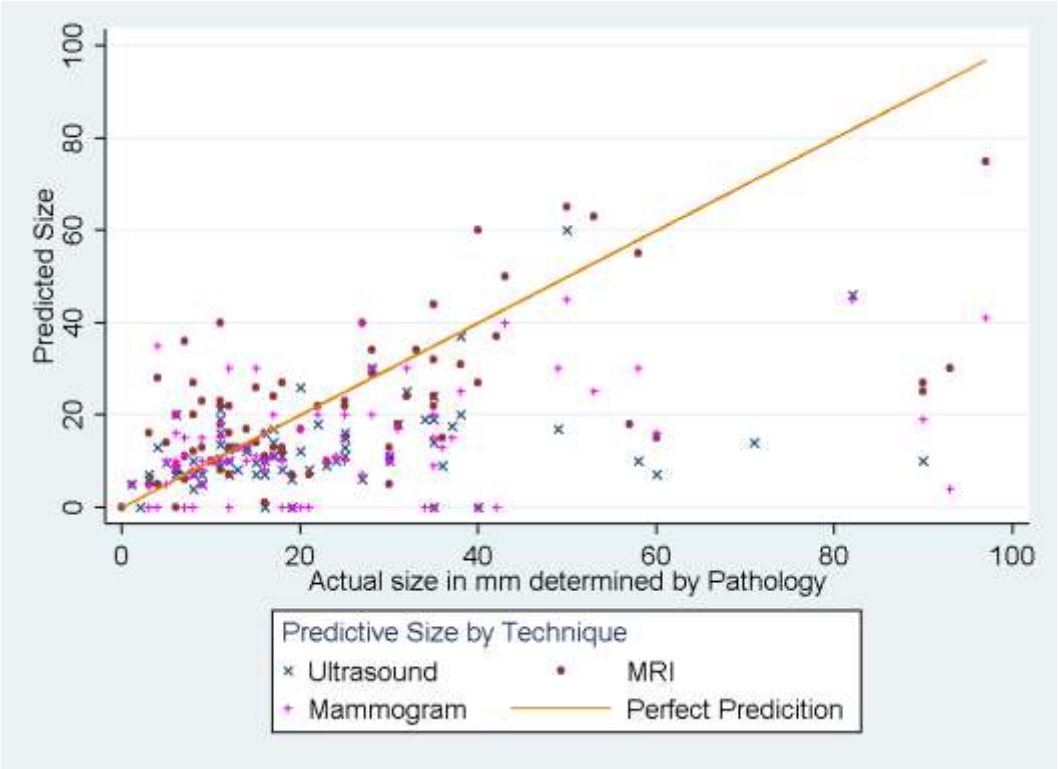
Objective: Studies suggest that MRI has greater utility in the clinical staging of invasive lobular carcinoma (ILC). This study aims to evaluate the accuracy of MRI compared to mammogram (MG) and ultrasound (US) in predicting pathologic tumor size (pTs) in ILC and to examine its effect on management.

Methods: A single-institution, retrospective review was performed of all patients undergoing surgery for ILC from 2003–2015. Preoperative MRI was obtained at clinician discretion. Patients undergoing MRI were compared with those who did not. The maximal diameter of the largest suspicious lesion on MRI, MG, and US was compared with pTS. In patients who underwent neoadjuvant chemotherapy, only the posttreatment MRI was compared to pTS. Multivariate analysis was used to correct for confounding variables.

Results: MG and US was performed on all 124 patients with ILC; 81 (65.3%) had MRI. Patients who received MRI were younger ($p = 0.003$), more likely to have dense breasts ($p = 0.030$), and received treatment after 2010 ($p = 0.001$). Mean pTS was 24 mm (0–97 mm) and was not significantly different in the 2 groups. Although MRI was the most predictive modality, imaging accuracy varied by pTS (figure). In tumors < 20 mm, there was no significant difference in pTS when compared to size estimated by MG and US, while MRI overestimated pTS by 4.7 mm ($p = .003$). In tumors > 20 mm, MG underestimated pTS by 21.3 mm ($p <$

.001), US by 20.3 mm ($p < .001$), and MRI by 12.1 mm ($p = .004$). MG accuracy, but not that of US or MRI, was better in older women ($p = 0.015$) and unaffected by breast density ($p = 0.149$). MRI found synchronous ipsilateral lesions not seen on MG/US in 57/81 (70.4%), but additional cancers were only confirmed in the pathology report in 19/57 (33.3%) patients. Patients with MRI were less likely to require re-excision (OR = 0.11, $p = 0.012$) if breast-conserving therapy (BCT) was performed. However, patients with MRI were more likely to undergo mastectomy (OR = 4.59, $p = 0.003$) even after controlling for pTS, clinical stage, age, year of diagnosis, and breast density.



Predictive size by technique as compared with pathologic tumor size

Conclusion: MRI was more accurate than MG and US for predicting pTS in ILC ≥ 20 mm, and decreased re-excision in BCT. This increase in accuracy was offset by an increase in mastectomy, regardless of clinical stage or pTS. These findings support careful consideration regarding the use of MRI for preoperative staging in ILC.

0336 - Primary Radiotherapy and DIEP [Deep Inferior Epigastric Perforator] Flap Reconstruction (PRADA) Study: Findings From the Pilot Study

Paul Thiruchelvam[1], Susan Cleator[2], Simon Wood[2], Daniel Leff[2], Navid Jallali[2], Fiona MacNeill[3], Dimitri Hadjiminas[2]

[1]Imperial College, London, United Kingdom, [2]Imperial College NHS Trust, London, United Kingdom, [3]The Royal Marsden Hospital, London, United Kingdom

Objective: Postmastectomy chest wall radiotherapy (PMRT) has established oncological benefit, both in terms of locoregional recurrence (LRR) and overall survival (OS). Accordingly, patients with T3/T4 breast cancer and/or with a significant burden of axillary disease commonly now receive a treatment sequence comprising primary chemotherapy followed by mastectomy (+/–immediate reconstruction) and finally adjuvant

radiotherapy to the affected chest wall +/– supraclavicular fossa. Many reconstructive surgeons are reluctant to perform immediate, autologous reconstruction in the setting of potential PMRT due to the perceived risk of higher rates of long-term complications and potentially inferior aesthetic outcomes. As the indications for PMRT widen, this practice may deny an increasing number of women the benefits of immediate reconstruction. This pilot study sets out to formally evaluate the safety of delivering radiotherapy prior to mastectomy and immediate DIEP flap reconstruction.

Methods: Patients scheduled for neoadjuvant chemotherapy, mastectomy (either following failed breast conservation surgery (BCS) or following upfront selection for mastectomy), and radiotherapy were prospectively recruited into the study. Data captured contemporaneously are presented on 12 patients, including demographic information, tumor biological characteristics, operative parameters (eg, anastomotic revision), oncological outcomes, and postoperative outcomes (eg, unplanned return to theatre [RTT] <30 days, mastectomy skin flap necrosis [partial and full-thickness], and signs of wound infection) at 5 days, 4 weeks, and 3 months were recorded.

Results: The average age of patients was 47.6 years; body mass index, 27.6; and mastectomy specimen weight, 617 gm. The mean time from completion of neoadjuvant chemotherapy (NACT) to neoadjuvant radiotherapy (NART) was 4.7 weeks and time from completion of NART to mastectomy and DIEP, 2.2 weeks. One patient experienced an unplanned RTT at 72 hours for evacuation of a hematoma. There was 1 revision of microvascular anastomosis and 1 fat necrosis requiring excision. There were no flap failures, no skin flap necrosis, no wound infections, or wound dehiscence. With a mean follow-up of 12.3 months, 3 distant metastatic relapses (DMR) and 2 breast cancer–related deaths were reported but there were no loco-regional recurrences.

Conclusion: This pilot study suggests that neoadjuvant radiotherapy is not associated with wound healing or skin necrosis complications in these selected patients, provided surgery is performed within 3 weeks from completion of neoadjuvant radiotherapy. A future multicenter phase I study will assess aesthetic and patient-reported outcome measures (using 3-D photography, applanation tonometry, and the Breast-Q) and identify biological markers of sensitivity to radiotherapy.

0319 - Racial Differences in Utilization of Breast Conservation Surgery: Results From the National Cancer Database (NCDB)

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Objective: The rate of breast conservation surgery (BCS) has not been extensively studied between different racial and ethnic groups nor in various molecular subtypes on a national level.

Methods: All women in the NCDB diagnosed with invasive breast cancer from 2010 through 2011 were identified. The effect of race/ethnicity, age, tumor size, grade, nodal status, neoadjuvant chemotherapy, and molecular subtype on BCS was determined.

Results: There were 299,827 patients with known race and ethnicity who underwent definitive breast surgery. The number who underwent BCS by race were 135,065/241,236 (56%) whites, 17,819/33,301 (53.5%) blacks, 4,722/9,508 (49.7%) Asian/Pacific Islanders, and 7,919/15,782 (50.2%) Hispanics. Mean tumor size differed among the racial groups: 2.16 cm in whites, 2.73 cm in blacks, 2.33 cm in Asians, and 2.64 cm in Hispanics ($p < 0.001$). When stratified by tumor size, BCS was most common in blacks and least common in Asians for all tumors >1 cm ($p < 0.001$). On multivariable analysis, compared to whites, the odds ratio (OR) for BCS among blacks was 1.19 for all tumors and 1.35 for tumors >3 cm, and among Asians was 0.90 for all tumors and 0.80 for tumors >3 cm (see table). There were also differences by molecular subtype. Those with HER2+ tumors were less likely to undergo BCS, but women with triple negative tumors (TNBC) were similar to those with ER/PR+ HER2– tumors. Interestingly, black women with TNBC had higher BCS rates than black women with non TNBC tumors (OR, 1.28; CI, 1.19–1.37), but this was not true for any other racial group. This was not due

to the effect of neoadjuvant chemotherapy because, in contrast to whites and Asians, blacks showed no increase in BCS with neoadjuvant chemotherapy (OR, 1.00; CI, 0.88–1.14).

Multivariable Analysis of Breast Preservation

	All Tumors		Tumors >3 cm	
	Odds Ratio (95% CI)	**P value**	**Odds Ratio (95% CI)**	**P value**
Race/ethnicity				
Non-hispanic white	Reference		Reference	
Non-hispanic black	1.19 (1.16–1.23)	<0.001	1.35 (1.26–1.43)	<0.001
Asian/Pacific Islander	0.90 (0.86–0.95)	<0.001	0.80 (0.70–0.91)	0.001
Hispanic	1.02 (0.98–1.06)	0.400	1.17 (1.07–1.28)	0.001
Age				
≤30	Reference		Reference	
31–40	1.22 (1.08–1.38)	0.001	1.27 (0.99–1.62)	0.055
41–50	1.94 (1.72–2.18)	<0.001	1.67 (1.32–2.12)	<0.001
51–60	2.72 (2.41–3.06)	<0.001	2.04 (1.62–2.58)	<0.001
61–70	3.05 (2.71–3.44)	<0.001	1.97 (1.56–2.49)	<0.001
> 70	2.61 (2.31–2.94)	<0.001	1.54 (1.21–1.95)	<0.001
Tumor characteristics				
Size (each cm increase)	0.70 (0.69-0.70)	<0.001	0.73 (0.72–0.74)	<0.001
Nodal status				
Negative	Reference		Reference	
Positive	0.53 (0.52–0.54)	<0.001	0.45 (0.43–0.47)	<0.001
Grade				
1	Reference		Reference	
2	0.86 (0.84–0.88)	<0.001	0.98 (0.90–1.07)	0.633
3	0.91 (0.88–0.93)	<0.001	1.14 (1.05–1.25)	0.002
Molecular type				
ER/PR+, Her2-	Reference		Reference	
ER/PR+, Her2+	0.81 (0.79–0.84)	<0.001	0.87 (0.81–0.94)	<0.001
ER/PR–, Her2+	0.62 (0.59–0.65)	<0.001	0.79 (0.72–0.88)	<0.001
ER/PR–, Her2–	0.96 (0.93–0.98)	0.003	1.03 (0.97–1.10)	0.377
Neoadjuvant chemotherapy				
No	Reference		Reference	
Yes	0.85 (0.83–0.88)	<0.001	1.24 (1.17–1.30)	<0.001

Conclusion: When adjusted for stage and receptor status, BCS rates are higher in blacks and lower in Asians compared to whites. HER2+ tumors have the lowest BCS rates in all races and ethnicities. Although TNBC tumors result in slightly lower BCS rates in whites and Asians, they are actually associated with higher BCS rates in blacks. Neoadjuvant chemotherapy resulted in higher BCS rates for whites and Asians with tumors >3 cm but not for blacks.

0178 - Drain Care After Mastectomy: Practice Patterns Among Members of The American Society of Breast Surgeons

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Objective: Surgical site infection (SSI) remains one of the most common complications after mastectomy and can result in loss or significant complication of immediate reconstruction. Prior studies have demonstrated antiseptic measures for breast drain sites can reduce bacterial colonization. This survey sought to establish the

current patterns of drain use and drain site care after mastectomy by the members of The American Society of Breast Surgeons (ASBrS) as background for a potential comparative effectiveness research project investigating drain antisepsis.

Methods: This study was approved by the Research Committee of ASBrS and our institutional IRB. The 10-question survey was administered using Survey Monkey™ and sent to all members of the ASBrS. Questions concerning mastectomy volume, reconstruction rates, and drain care practices were included.

Results: Surveys were completed by 782 of 2889 (27%) members. The reported volumes of mastectomies per year were: 1–25 (32.3 % of respondents), 26–50 (30.2%), 51–75 (20.8%), 76–100 (9.7%), and >100 (7.0%). The most common response for percentage of cases undergoing immediate reconstruction was 61%–80% reported by 208 (26.6%) surgeons. Seven hundred sixty-six (98.0%) of responding surgeons use a drain after mastectomy 81%–100% of the time without reconstruction, and 717 (91.7%) surgeons use drains in 81%–100% cases with reconstruction. In mastectomy cases without reconstruction, the most common drain site dressing reported was gauze dressing alone by 526 (67.3%) respondents; in mastectomy with reconstruction, members most commonly reported drain dressings are per the plastic surgeon (43.9%) (see table). Antiseptic measures (ointment or chlorhexidine disc) was reported by 25.6% members for mastectomy alone and 25.2% members for mastectomy with reconstruction. Regarding postoperative antibiotic use, 24.6% of respondents reported never using them; among the remainder, the factors driving use were reported as reconstruction (50.3%); drain use (15.7%); high-risk factors, such as diabetes or tobacco use (3.2%); and other (6.3%). Three hundred seventy members (47.3%) report interest in participating in future studies regarding drain antisepsis protocols. Most members (570, 72.9%) cited improving clinical care as an incentive for participation.

Drain Site Dressing Used by ASBrS Members in Mastectomy Cases Both Without and With Reconstruction

	Mastectomy WITHOUT Reconstruction (%)	Mastectomy WITH Reconstruction (%)
Antibiotic ointment/ gauze	62 (7.9)	50 (6.4)
Gauze dressing alone	526 (67.3)	225 (28.8)
Chlorhexidine disc/ occlusive dressing	138 (17.7)	147 (18.8)
Nothing	56 (7.2)	17 (2.2)
Depends on the plastic surgeon	N/A	343 (43.9)
Total	782	782

Conclusion: Although most ASBrS surgeons use drains in mastectomy cases, with and without reconstruction, few use antiseptic measures for the drain site dressing. Nearly half of the respondents are interested in participating in additional studies to test the hypothesis that drain site antisepsis measures could lower SSI. Many members indicate willingness to participate, even without financial incentive.

0429 - Disease-Free Survival Using Lymph Node Ratio Analysis After Neoadjuvant Chemotherapy

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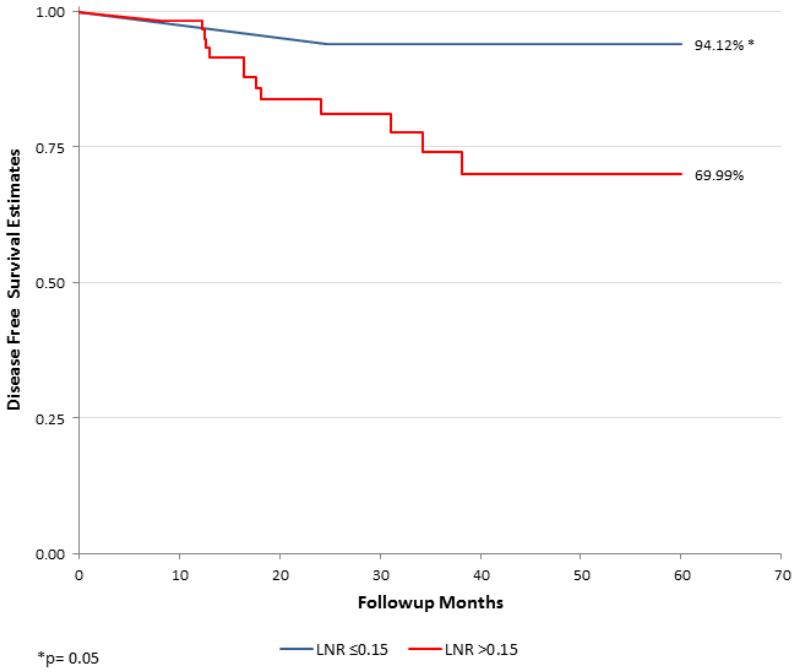
Objective: Axillary lymph node metastasis is one of the most significant prognostic indicators for survival in breast cancer. A calculated lymph node ratio (LNR), the proportion of positive lymph nodes (LN) over the total number of excised lymph nodes, has been shown to have prognostic value for overall survival (OS) and disease-free survival (DFS). However, LNR after neoadjuvant chemotherapy (NAC) has not been studied. Our aim was to determine DFS using LNR in patients who received neoadjuvant chemotherapy.

Methods: From 2003 to 2014, a total of 461 patients who underwent definitive surgery after neoadjuvant chemotherapy were identified from our institutional cancer registry. Patients who had fewer than 6 LN

removed at the time of surgery were excluded. For the node-positive patients, the LNR was calculated. The DFS was calculated using the Kaplan-Meier log-rank test for p N0-3 status and for previously described LNR categories (LNRC) of 0, ≤0.20, 0.21–0.65, >0.65.[1] New LNR values were explored and analysis was done for the group as a whole and by molecular subtypes.

Results: Of the 461 NAC patients identified, 182 (38.0%) were node positive: N1 = 109 (60.0%), N2 = 48 (26.4%), N3 = 25 (13.7%). Among the node-positive cancers, the median number of LN removed was 14 (range, 6–40). The median LNR was 0.23 (range, 0.03–1.0). Nodal staging was associated with decreasing 5-year DFS: 87% (N0), 71% (N1), 50% (N2), and 47% (N3). These differences were statistically significant when comparing N1 to N2/N3; p = 0.04. The 5-year DFS decreased with increasing LNRC, 86% (n = 279), 69% (n = 82), 63% (n = 54), 49% (n = 36), respectively, p = 0.15. In a subgroup analysis of node-positive, hormone receptor–positive cancers (ER/PR+), there was a significant difference in DFS associated with LNRC (92%, 84%, 52%, p = 0.013). A single LNR value of 0.15 was shown to discriminate between higher and lower DFS; 74% vs 57%, p = 0.04. Using LNR ≤ 0.15 was also significant in the ER/PR+ subgroup, with a DFS of 94% vs 70%, p = 0.05 (figure).

Figure 1: Kaplan-Meier Survival Estimates



Conclusion: The previously described lymph node ratios were only found to be prognostic of DFS in patients receiving neoadjuvant chemotherapy who were ER/PR positive. A new LNR of 0.15 was found to discriminate for survival in all patients who had NAC. This was even more significant in hormone receptor-positive, node-positive cancers, where LNR ≤ 0.15 identified patients with an excellent 5-year DFS.

Reference

1. Schiffman SC, McMasters KM, Scoggins CR, Martin RC, Chagpar AB. Lymph node ratio: a proposed refinement of current axillary staging in breast cancer patients. *J Am Coll Surg*. 2011; 213:45-53.

0312 - A Population-Based Study of the Effects of a Regional Guideline for Completion Axillary Node Dissection on Axillary Surgery in Patients With Breast Cancer

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Objective: Completion axillary node dissection (cALND) has traditionally been the standard of care following positive sentinel lymph node biopsy (+SLNB) in breast cancer (BC). Recent evidence from ACOSOG Z0011 suggests cALND after +SLNB does not improve outcomes in select patients, likely leading to uncertainty and practice variation amongst surgeons. In response to Z0011, a multidisciplinary group of surgeons, oncologists, and pathologists developed a regional guideline for cALND following +SLNB, which was disseminated in August 2012. We assessed the impact of Z0011 and the regional guideline on rates of cALND.

Methods: Consecutive cases undergoing SLNB for invasive BC were reviewed at 12 hospitals performing BC surgery. Patient, tumor, and process measures were collected for 3 time periods: TP1 -before publication of Z0011 (05/2009 to 08/2010); TP2 -after publication of Z0011 (03/2011 to 06/2012); and TP3 -after regional guideline dissemination (01/2013 to 04/2014). Cases were categorized by whether they did (ie, ≤50 years, mastectomy, T3 tumor, ≥3 positive SLNs) or did not (eg, age >50 years, breast-conserving surgery, T1/T2 tumor, and 1–2 positive SLNs) meet guideline criteria for cALND.

Results: SLNB rate increased from 56% (n = 620), to 70% (n = 774), to 78% (n = 844) in TP1, TP2, and TP3, respectively. Among cases not recommended for cALND by guideline criteria, rates of cALND decreased significantly over time (TP1, 71%; TP2, 43%; TP3, 17%) ($p < 0.001$), with 83% compliance with guideline at TP3. cALND rate also decreased over time among cases recommended to have cALND by guideline criteria (TP1, 92%; TP2, 69%; TP3, 58%) ($p < 0.001$), with 58% compliance with guideline at TP3. Overall cALND rate varied across hospitals for all times (TP1, 65%–100%; TP2, 24%–90%; TP3, 9%–60%). For TP3, physicians at academic hospitals were more likely to omit cALND while surgeon volume and specialty had no effect. Nodal irradiation rates increased over time ($p < 0.001$) and the total number of nodes harvested during SLNB increased at TP3 ($p < 0.01$). We also found within our cohort that age and nodal characteristics (eg, lymph node ratio and size of nodal metastasis) appeared to be important for decision-making for cALND on multivariable analysis.

Conclusion: Publication of ACOSOG Z0011 and regional guideline dissemination were associated with a marked decrease in cALND after +SLNB, even among some cases recommended to receive cALND. We found that there was good compliance overall in this locally developed guideline and that age and nodal characteristics were important in decision-making.

0295 - Clinical Benefit and Accuracy of Preoperative Breast Magnetic Resonance Imaging for Breast Cancer

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Objective: The use of breast magnetic resonance imaging (MRI) prior to surgery remains controversial. Although studies have shown that MRI is more accurate in delineating tumor size then mammogram (MGM), it is not clear whether MRI provides additional "clinical benefit" over what an MGM or ultrasound (U/S) provide in aggregate.

Methods: This is a single-institution retrospective review of 500 stage 0–III breast cancer patients who received a preoperative MRI from 2009–2015. We compared tumor size and number of tumor foci between MGM, U/S, and MRI using pathological findings as the correct size and foci. Tumor size was considered nonconcordant if it differed from the pathologic size by ≥33% and tumor foci was nonconcordant if >1 foci

was seen. If the MRI was nonconcordant to pathologic size of foci, then the MRI was deemed not clinically beneficial. If one or both of the MGM or U/S was nonconcordant and the MRI was concordant, the MRI was deemed clinically beneficial. If MGM, U/S, and MRI were all concordant, MRI was deemed not clinically beneficial because it did not provide any additional information over the MGM and U/S.

Results: The median age was 53 years old (range, 30–86), and 62.4% had tumors <2.0 cm. Tumor size on MRI was concordant with pathologic size in 259 (51.8%) patients vs 181 (50.3%) for U/S and 163 (43.6%) for MGM. MRI overestimated tumor size in 171 (34.2%), while U/S and MGM underestimated size in 144 (40.0%) and 125 (33.4%), respectively. All 3 imaging modalities predicted tumor foci 68%–70% of the time. MRI overestimated foci in 120 (24.0%) patients, whereas U/S and MGM underestimated tumor foci in 73 (20.3%) and 88 (23.5%) patients, respectively. Of 270 patients with MGM, U/S, and MRI, MRI provided clinical benefit for 100 (37%) of patients for tumor size and for 71 (26.3%) for tumor foci. Of 104 patients with just MRI and MGM, MRI provided clinical benefit for 24 (23.5%) and 14 (13.5%) patients, respectively. Patients who derived a clinical benefit for size and foci were compared to those who did not for patient age, race, BMI, menopausal status, breast density, mammographic finding, and tumor factors. The only significant factors associated with clinical benefit were increasing tumor size, higher stage, and Her2neu status ($p < 0.05$).

Conclusion: MRI provides clinical benefit above MGM and U/S in approximately one fourth of patients but there are few clinicopathologic factors that are associated with this benefit.

0197 - Process of Care in Breast Reconstruction and the Impact of a Dual-Trained Surgeon

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Objective: For postmastectomy reconstruction, the current most widespread model in the United States is a 2-team approach with a breast surgical oncologist working with a plastic surgeon. We propose that a dually-trained breast and plastic surgeon would decrease the postoperative clinic burden for patient and surgeon without compromising outcomes.

Methods: A retrospective review was performed of patients undergoing mastectomy with immediate expander reconstruction from January 2013 to October 2014. One-year postoperative patient data were reviewed. Patients were stratified by treatment to "single-surgeon" or "two-surgeon" team. Clinic visits included visits with the surgeon, nurse, or physician extender. Visits to the Emergency Department or hospitalizations were not counted as clinic visits. Data on age, BMI, stage, unilateral vs bilateral mastectomy, nipple sparing, axillary surgery, use of neoadjuvant chemotherapy, postoperative chemotherapy, postoperative radiation therapy, complications (reoperative and nonoperative), and tissue expander size were assessed. Patients with prior surgical treatment for breast cancer or history of preoperative radiation were excluded. The primary outcome of total number of postoperative clinic visits was assessed with a *t* test. A backwards stepwise regression model was used to assess factors predictive of postoperative clinic visits. A p value < 0.05 was considered significant.

Results: During the study period, 103 patients underwent mastectomy with expander reconstruction (46, single-surgeon; 57, two-surgeon). For the 1-year follow-up period, patients with the single surgeon had a mean of 9.4 (standard deviation [SD] 3.6) postoperative visits vs 15.9 (SD, 4.2) visits in the 2-team group ($p < 0.0001$). At the 1-year postoperative timepoint, 38 (82.6%) of single-surgeon-team patients completed expander/implant exchange vs 44 (77.2%) for 2-surgeon-team patients ($p = 0.67$). Additionally, there were no statistical differences between groups in the rate of nonoperative or operative complications. In the final model, treatment team, bilateral mastectomies, and complications (operative and nonoperative) were significant predictors of total number of postoperative visits (table).

Factors Affecting Total Number of Postoperative Visits Following Mastectomy With Expanders

Variable	Coefficient	95% Confidence Interval	P value
Single surgeon	–6.4	(–7.8 - –5.0)	< 0.0001
Bilateral	1.7	(0.3 - 3.1)	0.018
Complication (nonoperative)	3.4	(1.8 - 5.1)	0.0001
Complication (operative)	3.8	(0.8 - 6.7)	0.014

Conclusion: Patients under the single-surgeon team required fewer postoperative visits than those under the traditional two-surgeon team. Fewer postoperative clinic visits may have significant socioeconomic and psychological benefits to patients. Given these results, we suspect there will be increasing interest and support for the "oncoplastic" surgeon training model and practice.

0379 - Clinical Presentation and Management Considerations for Breast Cancer Patients With Germline PALB2 Mutations

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Objective: PALB2 is now known to be a moderate- to high-penetrance breast cancer predisposition gene. National Comprehensive Cancer Network (NCCN) guidelines recommend an annual breast MRI for PALB2 mutation carriers but leave surgical prophylaxis decisions contingent on "family history or other clinical factors." Our study describes the clinical presentation (hormone receptor status, age of onset, presence of multiple primaries, and reported family history) of 77 PALB2 mutation carriers and reviews risk management considerations for these PALB2-positive patients in order to help inform decisions that surgeons will need to make as broad genetic testing becomes increasingly common.

Methods: Seventy-seven sequential patients referred for genetic testing were selected if they were found to have a pathogenic or likely pathogenic mutation in PALB2, as well as a personal history of cancer. De-identified personal and family histories provided by ordering clinicians were examined. Lifetime risks were estimated from Antoniou et al. (*N Engl J Med*, 2014).

Results: Among the 77 cancer-affected patients, almost half were 49 years old or younger, and 5 patients were younger than 35. Twenty-seven percent presented with bilateral breast cancer or had history of multiple primaries and 12% had triple-negative breast cancer. Thirteen percent reported a personal history of pancreatic cancer and almost 25% had a history of another cancer, including prostate, colorectal, thyroid, endometrial, urothelial, gastric, melanoma, and urinary tract. Seventy-three percent of affected PALB2 carriers described a significant family history of cancer.

Conclusion: PALB2 may be the most significant breast cancer predisposition gene to come to light in recent years. PALB2 is mutated in the germline of roughly 1% of appropriately tested patients, and it confers lifetime cancer risks that vary based on family history from 30% to over 60%. The high end of this risk estimate is comparable to that of BRCA2. In our case series, we observed both early-onset breast cancer and multiple primary cancers in both the patient and at-risk family members, consistent with a high-penetrance effect of PALB2. Managing PALB2-positive patients with a strong family history may warrant special consideration. As always, clinicians will need to use professional judgement with these patients until more specific guidelines are available to help inform management choices.

0448 - Upper Extremity Port Placement Is a Safe and Preferred Approach for Women With Breast Cancer: Patient-Reported Outcomes

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Objective: Patients undergoing treatment for breast cancer are often recommended for vascular port placement to facilitate administration of systemic therapy. Most commonly, these ports are placed in the anterior chest opposite the side of the breast cancer. With the vast improvement in cosmetic outcome following breast cancer surgery, we hypothesize that, given the option, patients would prefer placement of the port in the upper extremity rather than the chest, and that this approach would result in greater patient satisfaction.

Methods: The Margie Petersen Breast Center database was queried to identify female breast cancer patients who had a port placed for systemic therapy from 2009-2015. A 20-question, self-reported, anonymous online survey was sent via SurveyMonkey® in October 2015 to the identified patients. Six of the 20 questions are part of the validated Patient Scar Assessment Questionnaire (PSAQ), grading scar self-consciousness. The remainder included questions regarding patient demographics, complications, and treatment information. A descriptive comments section was also provided for the participants. Chi-square test was used for the statistical analysis of the survey results.

Results: Of the 105 surveys sent to patients, 64% (67/105) responded. Fifty-five percent (37/67) of patients had the port placed in the upper arm and 45% (30/67) of patients had it placed in the chest. The patient-reported demographics, duration of the port, complications, and scar consciousness were similar in the 2 groups (table). Only 6% (4/67) of patients report not noticing their scars at all, but 94% (60/67) notice their scars to some degree. Sixty-nine percent (44/67) feel their scar is noticeable to others, and 50% (22/44) of those patients make an effort to hide their scars. Of those patients who had a choice for port site placement, 65% (24/37) chose placement in the arm, which trended toward statistical significance ($p = 0.057$). Self-reported descriptive comments were significantly more favorable and associated with higher patient satisfaction in patients who had port placement in the arm compared to the chest ($p = 0.013$).

Patient-Reported Demographics, Complications, and Scar Self-Consciousness

Variable	Arm (n = 37)	Chest (n = 30)	P value
Age at diagnosis			P = 0.152
25–39 years	8 (22%)	4 (13%)	
40–49 years	6 (16%)	5 (17%)	
50–59 years	19 (51%)	11 (37%)	
60–69 years	4 (11%)	7 (23%)	
70–79 years	0 (0%)	3 (10%)	
Race			P = 0.285
African American	0 (0%)	2 (7%)	
Asian/Pacific Islander	3 (8%)	5 (17%)	
Caucasian/white	30 (82%)	18 (60%)	
Hispanic	2 (5%)	3 (10%)	
Other	2 (5%)	2 (6%)	
Surgery type			P = 0.507
Lumpectomy	14 (40%)	14 (48%)	
Mastectomy	21 (60%)	15 (52%)	
Complications			
Blood clot	3 (8%)	3 (10%)	P = 0.815
Infection	1 (2.8%)	1 (3.4%)	P = 0.861
Pneumothorax	0 (0%)	0 (0%)	
Scar Self-Consciousness PSAQ mean score	11.37	11.29	P = 0.925

Conclusion: Vascular access ports are commonly recommended for breast cancer patients for systemic therapy and are most often placed in the chest. The effect of port site placement for breast cancer patients has not been previously studied. These patient-reported outcomes data demonstrate that the majority of patients feel their port scar is noticeable to themselves and to others, and, when given the choice, patients prefer placement in the upper arm rather than the chest. Upper extremity port placement is safe, has higher patient satisfaction compared to the chest site, and should be considered as an option for all breast cancer patients requiring systemic therapy.

0187 - Comparison of Toxicity and Cosmesis Outcomes of Single Fraction and Hypofraction With Intraoperative Radiation Therapy Boost in Breast Cancer

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Objective: Adjuvant radiation therapy is proven to reduce local recurrence in patients with early-stage breast cancer. To reduce toxicity, improve geographic accuracy, and reduce treatment time, intraoperative radiation therapy (IORT) has been utilized as either definitive treatment or as a boost. The study's objective was to compare the short-term toxicity and cosmesis profile of single fraction (SF) and hypofraction (HFb) with IORT boost given as definitive treatment.

Methods: From 3/2011 to 12/2013, 81 patients (83 breasts) with clinically node-negative, stage 0–II breast cancer were treated on IRB-approved protocols with SF or HFb (Mobetron, IntraOp Medical, Sunnyvale, CA).There were 57 patients in the SF group (age 45–91) and 24 in the HFB group (age 43–83). In the SF treatment, a single post-resection, pre-closure 21-Gy fraction was delivered using 4.5–6 cm applicators with electron energies from 6–12 MeV. For HFb, an intraoperative boost of 10 Gy was delivered using 4–7 cm applicators with electron energies from 4-12 MeV. This was followed postoperatively by whole-breast radiation with 40.5 Gy in 2.7-Gy fractions given over 3 weeks. Toxicity was assessed at 2 weeks, 6 months, and 12 months, according to CTCAE Version 4.0 acute skin toxicity criteria (range, 0–4) and cosmesis based on the Harvard scale.

Results: In SF, median pathological tumor size was 13.0 mm (4 > 25 mm) with 42 IDC, 3 ILC, 13 DCIS, and 1 other. In HFb, median pathological tumor size was 15.5 mm (3 > 25 mm) with 21 tumors being IDC and 3 DCIS. The difference in tumor size and histology was not statistically significant with p values of 0.17 and 0.59, respectively. After the initial resection with IORT, 3 SF and 1HFb required re-excison for positive margins (p = 1.00). Preoperative MRI was performed in 50/59 (85%) breasts from the SF group and 17/24 (71%) breasts from the HFb group (p = 0.064). In the SF and HFb groups, 31/59 (53%) breasts and 11/24 (46%) breasts underwent oncoplastic reconstruction, respectively, (p = 0.58). Sentinel node was performed for invasive cancer in SF (44 total, 9% positive) and HFb (20 total, 20% positive).

continues

Single Fraction vs Hypofraction/Boost Outcomes***		2 wk %		P value*	6 mo %		P value*	12 mo %		P value*
		SF	HFb		SF	HFb		SF	HFb	
Toxicity Grade	0	51.7	47.8	0.92*	70.4	40	0.013*	68.6	50	0.16*
	1	41.4	47.8		29.6	50		29.4	40	
	2	6.9	4.4		0.0	10		2.0	10	
Cosmesis	Excellent	69.0	65.2		85.2	60.0		80.4	45.0	
	Good	29.3	34.8	0.85*	14.8	35.0	0.029*	19.6	55.0	0.0033**
	Fair	1.7	0.0		0.0	5.0		0.0	0.0	

*P values obtained using Fisher exact test due to low cell counts.
**P value obtained with chi-square.
***No patients had toxicity 3 or 4, or cosmesis poor.

Conclusion: When evaluated for 12 months, SF and HFb IORT were well tolerated by all patients with no grade 3+ toxicity. Ninety-eight percent of SF patients and 90% of HFb patients had 0–1 grade toxicity. At 1 year, all grade 2 toxicity was resolved. In both the SF and HFb groups, 100% of patients had excellent or good cosmesis at the 12-month follow-up interval. However, the SF group as a whole exhibited a more favorable cosmesis with a higher percentage of excellent scores when compared to the HFb group (80.4% vs 45%; p = 0.0033). Both treatments, consistent with current reports, meet critical criteria for incorporation into practice and reduce treatment by 3–6 weeks. There is a modest benefit for cosmesis with SF.

0427 - Incidence in DCIS in Over-80 Population and Survival Benefits of Treatment

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Objective: The amount of invasive treatment indicated for ductal carcinoma in situ (DCIS) remains controversial. As the elderly population continues to increase, we aimed to better characterize the current incidence and treatment patterns of DCIS in women greater than 80 years of age (>80) to potentially describe the benefit of therapy and the effect of grade on treatment efficacy.

Methods: Retrospective observational study of women diagnosed with single primary DCIS from 2000–2012 in the Surveillance, Epidemiology, and End Results (SEER) 18 registries database. The incidence of DCIS was calculated utilizing SEER STAT. STATA was used to calculate multivariable Cox proportional hazards model and subset analysis.

Results: 42,899 female patients with single primary DCIS were identified; of these 2,566 (5.98%) were >80 years of age. Overall the incidence of DCIS in the less than 80 (<80) cohort was 8 per 100,000, while it was 11.7 per 100,000 for >80. Patients > 80 have similar incidence of high-grade DCIS (12.45%) compared to <80 cohort (p = .246). Ninety-seven percent of the entire population was treated with surgery and 54% of them were managed with radiation. Patients >80 received significantly less surgery at 92%, vs 97% in the <80 (p < .001). Patients > 80 also received significantly less radiation at 22%, vs 47% in the <80 (p < .001). Thirty-seven or 1.44% of patients >80 died from a breast cancer–related death. When controlled for race, marriage, ER/PR, grade, and region, treatment with surgery was protective for all single primary DCIS patients [hazards ratio (HR), .57 (95% CI, .34–.96)]. When controlling for the same variables, the >80, surgery was overall protective [HR, .32 (95% CI, .2–.47)]. In the >80, surgery alone was protective when compared to no treatment [HR, .66 (95% CI, .39–1.12)] as was surgery plus radiation [HR, .38 (95% CI, .21 to .688)]. For high-grade DCIS in the <80 population, surgery was protective when controlling for race, marriage, ER/PR, region, and radiation [HR, .18 (95% CI, .06–.55)] and nonsignificant for low grade [HR, .43 (95% CI, 0.1–1.83)]. For high-grade DCIS in the >80 population, the HR of surgery was .14 (95% CI, .02–.68) for high-grade vs nonsignificant for the low-grade DCIS [HR, .46 (95% CI, 0.1–2.03)].

Conclusion: As the population ages, careful assessment of the utility of standard treatment strategies for cancer and in particular precancerous lesions is necessary. Utilizing the SEER database we demonstrated that despite lack of solid evidence supporting screening mammograms in women >74, the incidence of DCIS found in women over 80 is similar to if not greater than that of younger age groups. As in the under-80 population, patients over 80 years of age with DCIS have a survival benefit with surgery in the high-grade subset, while there is no benefit in the low-grade DCIS. Although perhaps not all DCIS warrants treatment in the over-80 population, it appears that it is the biology of the disease, not the age of the patient, that dictates efficacy of treatment.

0205 - How Reliably Does Magnetic Resonance Imaging Predict Pathologic Complete Response in the Breast and Axilla Following Neoadjuvant Chemotherapy for Breast Cancer?

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Objective: Determination of extent of residual disease is key in selecting appropriate surgical therapy in the breast and axilla after neoadjuvant chemotherapy (NAC). We sought to evaluate the utility of radiologic complete response (rCR) on breast magnetic resonance imaging (MRI) in predicting pathologic complete response (pCR) of the breast primary and the presence of nodal involvement following NAC.

Methods: We prospectively collected data on 129 cancers in 128 women with clinical stage I–III breast cancer undergoing NAC between June 2014 and August 2015. Patients who had both pre- and post-NAC MRI were selected. We investigated agreement between rCR by MRI and pCR of the primary tumor and axillary disease on final pathology. pCR was defined as the absence of both invasive and in situ disease.

Results: Median patient age was 50.8 years (range, 27.2–80.6). Tumors were triple-negative in 31/129 (24%), HER2 amplified in 52/129 (40%), and estrogen receptor positive/HER2 negative in 46/129 (36%); pCR rates in these groups were 9/31 (29%), 26/52 (50%), and 5/41 (11%), respectively. Median greatest tumor size on MRI pre-NAC and post-NAC were 4.1 cm (range, 0.7–15.0) and 1.45 cm (range, 0.0–9.0), respectively. Post-NAC MRI demonstrated rCR of the primary tumor in 37/129 (29%), while pCR of the primary was present in 40/129 (31%). Of 37 cases with rCR in the primary tumor, 13 (35%) did not have pCR on final pathology. In 16/92 (17%) cases with residual disease by MRI, pCR was achieved. The table illustrates axillary findings pre- and post-NAC on MRI in relation to pathologic nodal status. Nodes were abnormal on pre-NAC MRI in 95 cases; 76 of these were sampled pretreatment and 68 had metastases. Of those with proven metastases, the nodes were normal on post-NAC MRI in 33 (49%); axillary pCR was present in 21/33 (64%). In the 35 cases with metastases that remained abnormal post-NAC by MRI, axillary pCR was achieved in 13/35 (37%).

continues

Imaging Characteristics by Magnetic Resonance Imaging (MRI) and Nodal Status Pre- and Post-Neoadjuvant Chemotherapy (NAC), Compared With Complete Pathologic Response (Pcr) and Statistical Diagnostic Tests With Respect to MRI and the Primary Tumor. Percentages Are Row Percent

	No pCR in Breast (N = 89)	**pCR in Breast (N = 40)**	
Persistent breast MRI abnormality post-NAC			
No (N = 37)	13 (35%)	24 (65%)	Negative predictive value: 24/37 (65%)
Yes (N = 92)	76 (83%)	16 (17%)	Positive predictive value: 76/92 (83%)
	Sensitivity: 76/89 (85%)	Specificity: 24/40 (60%)	
Nodal Status on MRI			
	Pathologic Disease in Axilla **(N = 49)**	No Pathologic Disease in Axilla **(N = 80)**	
Normal pre-NAC, Normal post-NAC (N = 34)	5 (15%)	29 (85%)	
Abnormal pre-NAC, Normal post-NAC (N = 48)	16 (33%)	32 (67%)	
Abnormal pre-NAC, Abnormal post-NAC (N = 47)	28 (60%)	19 (40%)	

Conclusion: This study indicates that rCR does not predict pCR with significant sensitivity to replace surgical excision of either the breast tumor or axillary nodes. However, in patients with normal axillary nodes on MRI pre-NAC, residual disease in the axilla was detected in 5/34 (15%) cases, rendering those patients ideal candidates for sentinel lymph node biopsy.

0235 - The Level of Estrogen and Progesterone Receptor Immunoreactivity Correlates With Time to Disease Recurrence in Hormone Receptor-Positive Breast Cancer

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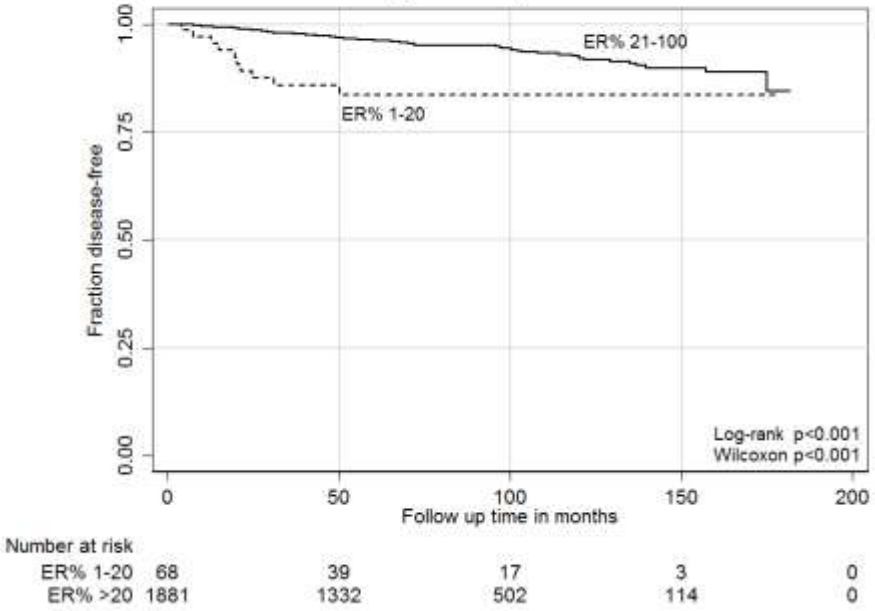
Objective: Estrogen and progesterone receptor-positive (ER, PR) breast cancers are defined by histologic observation of ≥1% of tumor nuclei demonstrating immunoreactivity. ER- and PR-positivity are favorable prognostic indicators; however, little has been published as to how the course of disease may vary by different levels of receptor expression within hormone-positive tumors. We hypothesized that level of ER- and PR-immunoreactivity in hormone-positive tumors is associated with time to disease recurrence.

Methods: We retrospectively analyzed consecutive, nonmetastatic, unilateral, ER-positive invasive breast cancers diagnosed at a single institution from 2000–2011. Records were reviewed for age at diagnosis, nodal status, percent of ER- and PR-immunoreactive cells, and histologically confirmed recurrence. We used Kaplan-Meier curves to determine the association between level of hormone receptor immunoreactivity and time to disease recurrence. Patients were censored at last follow-up or a diagnosis of contralateral breast cancer; events included any locoregional or distant invasive breast cancer relapse.

Results: We included 1949 individuals. The mean age at diagnosis was 58 and median follow-up time was 66 months (interquartile range, 45–102). We observed 101 cases of histologically confirmed recurrence: 68 locoregional (ipsilateral breast, chest wall, or regional nodes) and 33 distant relapses (viscera, bone, and distant

nodal basins). Low ER expression (1%–20% immunoreactivity) was significantly associated with earlier disease recurrence, as compared to higher ER expression (median time to recurrence, 20 vs 43 months, figure). The group with low ER expression was more likely to be younger at diagnosis (53 vs 58 years) and node positive (50% vs 23%); however, the relationship between level of ER-immunoreactivity and time-to-recurrence persisted in node-positive (Wilcoxon, $p < 0.01$) and node-negative patients ($p = 0.09$). Among patients with high ER-immunoreactivity, low vs high PR-immunoreactivity (0–80% vs 81%–100%) was associated with a higher hazard of recurrence (HR = 1.68, $p = 0.02$).

Figure 1: Disease-free survival by level of ER immunoreactivity among ER>0% positive tumors



Conclusion: A low vs high level of ER-immunoreactivity in hormone-positive breast cancers is associated with shorter disease-free survival, even when stratifying by node status. Among high-ER tumors, a low vs high level of PR-immunoreactivity is associated with shorter time to recurrence. As more specific pathologic data are reported and long-term outcomes mature, it may be possible to construct accurate recurrence nomograms to identify women who, though historically placed into favorable prognostic groups (hormone receptor-positive), may merit a more aggressive treatment approach based on predicted disease behavior. This study is limited by lack of data on treatment; however, we have confined our analysis to the period in which aromatase inhibitors were available, and adding information on chemotherapy would likely strengthen these findings.

0384 - Surgical Breast Cancer Care for Hispanic Patients Who Travel to an Academic Cancer Center

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Objective: Studies have demonstrated persistent breast cancer treatment disparities for racial and ethnic minorities, specifically with respect to the underutilization of breast-conserving therapy and postmastectomy reconstruction. Racial and ethnic minorities appear to cluster in low-performing hospitals and on average travel shorter distances for their breast cancer care. With the growing population of Hispanic patients in California,

we aimed to examine travel distance to and differences in surgical care at our academic cancer center for Hispanic patients.

Methods: Patients who initiated treatment for a new breast cancer diagnosis at our academic cancer center during the years 2010–2014 were included. Ethnicity was classified as non-Hispanic and Hispanic. Patient travel distance was classified as 0–10 miles, 10–30 miles, 30–60 miles, and >60 miles and was calculated using Google Maps to determine the distance from the central point of the recorded patient ZIP code to the address of our institution. Invasive and noninvasive ductal carcinomas were classified by tumor size. Type of surgery and travel distance was examined by ethnicity using the chi-square test.

Results: A total of 173 Hispanic and 1765 non-Hispanic patients who received treatment for newly diagnosed breast cancer were identified over a 5-year period. Of those with tumors <5 cm, 59.7% of non-Hispanic and 56.3% of Hispanic patients underwent breast conservation ($p = 0.47$). Postmastectomy reconstruction was performed in 44.7% of non-Hispanic and 50.6% of Hispanic patients ($p = 0.31$). Bilateral mastectomy was performed in 8.5% of non-Hispanic and 10.9% of Hispanic patients ($p = 0.26$). A greater percentage of Hispanic patients traveled 30–60 miles or >60 miles to our institution, when compared to non-Hispanic patients (18.7% vs 10.1%, 37.9 % vs 34.3%, respectively; $p < 0.001$).

Conclusion: Surgical care was similar for Hispanic and non-Hispanic patients treated at our cancer center with respect to breast-conserving therapy, immediate breast reconstruction, and bilateral mastectomy rates, despite a growing body of literature demonstrating ethnic disparities in these domains of treatment. Hispanic patients traveled further than non-Hispanic patients to receive care at our cancer center, suggesting that disparities in breast cancer care may be related to the hospitals where minorities receive care. The capacity of some Hispanic patients to travel far to a hospital of choice is likely related to complex cultural and socio-economic factors and would benefit from further investigation.

0341 - Cost Analysis of a Surgical Margin Consensus Guideline in Breast-Conserving Surgery

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Objective: Positive surgical margins following breast-conserving surgery have been associated with a significantly increased risk of local recurrence, and optimum management frequently requires operative re-excision. The SSO/ASTRO consensus statement set forth in May 2014 was the first professional guideline to declare the adequacy of "no ink on tumor" as a negative margin in patients with stages I/II invasive breast cancer undergoing breast-conserving surgery followed by whole-breast irradiation. We sought to analyze the patients affected by this guideline at our institution and to extrapolate the financial impact on a historic cohort.

Methods: From a prospectively maintained institutional database, a review was conducted of all women undergoing breast re-excision procedures for invasive breast cancer or ductal carcinoma in situ (DCIS) between January 2010 and December 2013. Clinical and pathological data were recorded from the electronic medical record, and billing data were abstracted from institutional and physician administrative resources based on CPT codes. Patients whose index procedure was performed at a referring institution or who underwent index mastectomy were excluded from analysis. The guideline definition of a positive margin (ie, ink on invasive cancer or DCIS) was utilized. Descriptive statistics were used to analyze clinical factors and associations with margin status.

Results: Of 384 women who underwent re-excision over this 3-year period, 252 (65.6%) had invasive disease and 132 (34.4%) had DCIS alone. A total of 119 women (31%) had 1 or more positive margins, and the anterior (56, 47.1%) and inferior (52, 43.7%) margins were the most commonly involved. On re-excision, 266 (69.3%) had negative histology on pathological exam--of these patients, 70 (26.3%) initially had positive margins following the index procedure. Odds of positive margins increased with tumor size greater than 2 cm (OR, 2.37; 95% CI, 1.51–3.74) and with estrogen receptor positive status (OR, 2.58; 95% CI, 1.22–5.46). Under the consensus guideline, 87 patients (22.6%) would have been spared 91 additional procedures,

accounting for approximately 88 hours of operative time. Considering institutional fees and primary surgeon billing alone, the total estimated cost savings would have been $166,400.

Conclusion: Implementation of the SSO/ASTRO consensus guideline holds great potential to decrease the rate of re-excision for margin status following breast-conserving surgery and to optimize resource utilization in the surgical management of early-stage breast cancer. Limitations of the current study included lack of granularity of cost data. Further analyses of cost-effectiveness, patient outcomes, and margin assessment methods are needed to define the impact of the consensus guideline on long-term changes in surgical practice.