THE AMERICAN SOCIETY OF BREAST SURGEONS

2013 ANNUAL MEETING

OFFICIAL PROCEEDINGS, Volume XIV

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 or fellow. 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.

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Ann Surg Oncol (2013) 20:S179–S300
DOI 10.1245/s10434-013-2964-z

Oral Presentations

Friday, May 3, 2013 (listed in order of presentation)

0098 Is Postexcision, Preradiation Mammogram Necessary in Patients With Breast Cancer After Breast Conservation Surgery With Negative Margins?

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Objectives: In women with breast cancer diagnosed as calcifications, controversy exists over the need for post-excision/lumpectomy, preradiation mammogram (PEM) after breast-conserving surgery (BCS). Further, the need for subsequent re-excision of remaining calcifications seen on PEM when surgical margins are negative is not established. We sought to characterize the utility of PEM and hypothesized the value of PEM in directing the need for additional surgery is minimized after achieving negative surgical margins.

Methods: We identified 524 women with breast cancer diagnosed as calcifications on mammography treated with BCS between 1996 and 2011. All specimens underwent intraoperative specimen radiograph at surgery and all women had negative surgical margins at the time of PEM or prior to radiation. We collected clinicopathological, PEM and local recurrence data, and estimated proportions of patient outcomes after PEM (or lack of PEM) along with exact binomial 95% confidence intervals (CIs).

Results: Initial diagnostic mammogram demonstrated calcifications only in 345 (66%) of the 524 women, or calcifications and mass in 179 (34%) of the 524. Biopsy found primary tumor type as: DCIS (40%), IDC + DCIS (10%), IDC (40%), ILC (5%), other (4%). Overall, 112 (21%) of the 524 had PEM, which identified residual calcifications in 10 (9%) of the 112. Tissue diagnosis confirmed residual disease in only 2 (1.8%; 95% CI, 0-6.3%) of the 112, 1 of whom had residual DCIS despite an initial margin of 2 mm. The second patient had residual IDC + DCIS but re-review of the initial diagnostic mammogram found multicentric suspicious calcifications suggesting the patient was a poor BCS candidate at the outset. Local recurrence occurred in 5 (4%) of the 112 patients, none of whom had calcifications identified on PEM. The remaining 412 (79%) of 524 women did not have PEM but had a new baseline postradiation mammogram 6-12 months after treatment, of which 19 (5%; 95%CI, 3%-7%) of 412 had calcifications identified on this first postradiation mammogram. Tissue diagnosis was benign in 14 and not pursued in the remaining 5. Local recurrence occurred in 13 (3%) of 412 patients; none of whom had calcifications on the postradiation baseline mammogram.

continues

Table 1.

Variable	All patients (N = 524)	Patients With a PEM (N = 112)	Patients Without a PEM (N = 412)
333Age at surgery, median (min, max)	65.8 (37.2, 92.6)	64.7 (39.1, 90.7)	65.9 (37.2, 92.6)
Reason for diagnosis Calcifications only Calcifications and mass	 345 (66%) 179 (34%)	 91 (81%) 21 (19%)	 254 (62%) 158 (38%)
Re-excision to achieve negative margins	83 (16%)	26 (23%)	57 (14%)
Diagnosis DCIS IDC IDC + DCIS ILC Other	 212 (40%) 218 (42%) 50 (10%) 24 (5%) 20 (4%)	 70 (63%) 26 (23%) 13 (12%) 1 (1%) 2 (2%)	 142 (34%) 192 (47%) 37 (9%) 23 (6%) 18 (4%)
Neoadjuvant chemotherapy	7 (1%)	1 (1%)	6 (1%)
Calcifications following PEM		10 (9%; 95%CI, 4% - 16%)	N/A
Pathology on evaluation after calcifications on PEM Benign DCIS IDC ILC Not performed		 4 (67%; 95%CI, 22%-96%) 1 (17%; 95%CI, 0%-64%) 1 (17%; 95%CI, 0%-64%) 0 (0%; 95%CI, 0%-46%) 4	N/A
Calcifications at 6-month mammogram following radiation		N/A	19 (5%; 95%CI, 3%-7%)
Pathology on evaluation after calcifications on 6-month mammogram Benign DCIS IDC ILC Not performed		N/A	 14 (100%; 95%CI, 77%-100%) 0 (0%; 95%CI, 0%-23%) 0 (0%; 95%CI, 0%-23%) 0 (0%; 95%CI, 0%-23%) 5
Local recurrence		5 (4%; 95%CI, 1%-10%)	13 (3%; 95%CI, 2%-5%)

Conclusions: Mammographically apparent calcifications representing residual disease occur infrequently after BCS with negative margins. The value of PEM may be to document the new radiographic baseline but should not be required to ensure adequate surgery. Radiation plays an integral role in sterilization of the remaining breast tissue after BCS.

0167 Increased Postoperative Complications in Bilateral Mastectomy Patients Compared to Unilateral Mastectomy: An Analysis of NSQIP Data

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Objectives: Recent studies have demonstrated that women with unilateral breast cancer are choosing contralateral prophylactic mastectomy (CPM) at an increasing rate. This is despite the well-established evidence of a low risk for future contralateral breast cancer, coupled with a lack of survival benefit. With the exception of a minority of high-risk patients who have the benefit of risk reduction with CPM, evidence suggests the majority of patients choose contralateral mastectomies based on fear of recurrence and perceived survival benefit. There is limited literature evaluating the postoperative complication rates associated with CPM without breast reconstruction. Using NSQIP data, we compared the postoperative complication rates in women undergoing unilateral mastectomy (UM) and sentinel lymph node biopsy (SLNB) to those undergoing bilateral mastectomy (BM) and SLNB for the treatment of their breast cancer.

Method: This is a retrospective cohort study using the American College of Surgeons National Surgery Quality Improvement Program (ACS NSQIP) Participant Use Data Files between 2007 and 2010. Females older than 18 years of age with malignant breast disease undergoing UM were compared to those undergoing BM. Both groups underwent unilateral SLNB. Various exclusion criteria (eg, ASA > 4, metastatic disease, immediate reconstruction cases) were applied to ensure a homogenous population. Individual and composite endpoints of 30-day complications were used to compare the UM and BM groups using both univariate and multivariate analyses.

Results: We identified 4,219 patients that met the inclusion criteria for this study; 3,722 (88.2%) had UM, while 497 (11.8%) patients had BM. The wound complication rate (which includes infection and wound dehiscence) was significantly higher in the BM group, 5.8% (n = 29), vs the UM group, 2.9% (n = 106). The unadjusted OR (95% CI, P value) for wound complications comparing UM to BM was 2.1 (1.3-3.3, <0.001). The overall 30-day complication rate in UM patients was 4.2% (n = 164) vs 7.6% (n = 39) in the BM group. The unadjusted OR for overall complications comparing UM to BM was 1.88 (1.27-2.72, P < 0.001). The adjusted OR for overall complications adjusting for important patient characteristics was 1.92 (1.31- 2.82, P = 0.001). Independent predictors of overall postoperative complications were BMI (OR = 1.05, P <0.001) and smoking (OR = 2.21, P < 0.001).

Table 1. Multivariable Model of Factors Associated With Overall Postoperative Complications.

Model Variables	OR (95% CI)	P Value
BM vs UM	1.92 (1.31, 2.82)	0.001
Age	1.01 (1.00, 1.02)	0.132
Diabetes	1.29 (0.86, 1.93)	0.213
Smoker	2.21 (1.53, 3.19)	<0.001
BMI	1.05 (1.03, 1.07)	<0.001
COPD	1.26 (0.65, 2.41)	0.495
CAD	1.40 (0.79, 2.49)	0.246
HTN	1.02 (0.73, 1.43)	0.900
ASA 3 and 4*	1.06 (0.76, 1.48)	0.721
Chemotherapy	0.89 (0.21, 3.75)	0.877
BM vs UM	1.92 (1.31, 2.82)	0.001
Age	1.01 (1.00, 1.02)	0.132
Diabetes	1.29 (0.86, 1.93)	0.213

*Compared to groups ASA 1 and 2.

Conclusions: Bilateral mastectomies are associated with an increased risk of wound complications and overall postoperative complications. The risk is even more marked among obese patients and smokers. Postoperative complications may impact on the timing and delivery of adjuvant chemotherapy and radiation. Discussion of the potential complications of bilateral mastectomies is imperative when counseling women contemplating CPM and the potential role in delaying their adjuvant treatments.

0060 Breast Conservative Surgery With and Without Radiotherapy in Patients Aged 55-75 With Early-Stage Breast Cancer: A Prospective Randomized Multicenter Trial Analysis After 90 Months of Medium Follow-Up

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Objectives: Breast-conserving therapy (BCT), including postoperative irradiation of the remaining breast tissue (WBI), is generally accepted as the treatment of choice for the vast majority of patients with early-stage breast cancer, resulting in advantages of improved cosmetics and quality of life (QOL) as compared to mastectomy (MX).

continues

The question of whether postoperative WBI is mandatory in all patients, and herewith overtreating almost half of them, remains one of the most controversial issues in BCT. To properly answer this question, a randomized prospective multicenter study was launched in January 2001 based on long-term follow-up data of the Milan III trial comparing BCT with or without postoperative WBI. Those data demonstrated a significant lower risk of local recurrence in patients older than 55 years in comparison to the younger age group. Moreover, in patients older than 65 years the risk of local recurrence was similar in the irradiated and the control group. The main aim of the presented study was to assess the cumulative incidence of local recurrence after conservative surgery with (arm 1) vs without (arm 2) breast irradiation. Added values of the study were to avoid the inconvenience and the risk of side effects of radiation therapy and to prevent unnecessary mastectomies in hospitals where the facilities for radiation treatment are not available.

Method: From January 2001 until December 2005, in total 749 patients from 11 centers in Italy were randomly assigned to arm 1 (373 pts) BCT + WBI (50 Gy +10-Gy boost) or arm 2 (376 pts) BCT alone. Main patient and tumor characteristics were fairly well balanced between treatment groups. Adjuvant systemic therapy in patients at moderately high risk of distant recurrence was allowed as per participating center policy.

Results: At a median follow-up of 7.5 yr, the cumulative incidence of local relapse was 1.8% (0.8% in the index quadrant and 1.0 % other quadrants) in arm 1 and 2.9% (1.6% in the index quadrant and 1.3% in other quadrants) in arm 2, respectively. Contralateral tumors were observed in 1.2 % in arm 1 and in 0.9 % in arm 2, respectively. OAS was 95% in arm 1 and 96% in arm 2. Distant disease-free survival was 96% and 96.5%, respectively. The interim analysis failed to reveal a statistically significant difference in the risk of local recurrence and death in the 2 treatment groups. Local-regional treatment was well tolerated and devoid of major side effects.

Conclusions: These data are promising and suggest that WBI after BCT can be avoided in patients aged 55-75 years without exposing them to an increased risk of local recurrence and death. For this selected patient population, longer follow-up is needed to further consolidate these results.

0053 Selection Criteria for Postmastectomy Radiation in T1-2 Tumors With 1-3 Positive Lymph Nodes

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Objectives: Past studies have shown a decrease in locoregional recurrence (LRR) with postmastectomy radiation (PMRT) in T1-2 tumors with 1-3 positive lymph nodes (LNs). However, modern series have demonstrated a lower risk of LRR in this group. Currently, there are no formal guidelines for selection of these patients for PMRT. We examined the clinicopathologic criteria used for PMRT and compared outcomes of LRR, recurrence-free survival (RFS), and overall survival (OS) among patients with and without PMRT.

Method **:** From a prospectively maintained institutional database, we identified all patients who underwent total mastectomy with sentinel and/or axillary lymph node dissection from 1995-2006. Patients receiving neoadjuvant chemotherapy, T3-4 tumors, or >3 positive LNs were excluded. Patients were categorized based on receipt of PMRT. The chi-square test was used to compare distributions of clinicopathologic features between groups. The Kaplan-Meier method and Cox regression analysis were used to examine the association between receipt of PMRT and LRR, RFS, and OS.

Results **:** One thousand eighty-seven patients (924, no PMRT; 163, PMRT) were included. Median follow-up was 7 years (range, 0-17 years). Fifty-five LRRs occurred in the entire cohort (48, no PMRT; 7, PMRT). Compared to the no-PMRT group, those patients who received PMRT had larger tumor size ($p = 0.013$), higher histologic grade ($p = 0.03$), a greater number of positive LNs ($p < 0.0001$), LVI ($p < 0.0001$), extranodal invasion ($p < 00001$), macroscopic axillary lymph nodes metastases ($p < 0.0001$), and were age ≤50 years ($p = 0.001$). The PMRT and no-PMRT groups did not differ in LRR ($p = 0.57$), RFS ($p = 0.70$), and OS ($p = 0.28$). On multivariate analysis, age ≤50 years (0.0003), presence of LVI ($p = 0.0006$), and size of axillary metastases ($p = 0.05$) were predictors of LRR; however, PMRT was not ($p = 0.18$).

Table 1. Comparison of Clinicopathologic Features in Patients With and Without PMRT

		No PMRT (924) N (%)	PMRT (163) N (%)	P value
Tumor size	<.5 to 1	151 (17%)	14 (8%)	
	1 to 2	353 (38%)	55 (34%)	
	2 to 5	420 (45%)	94 (58%)	0.0132
Age	≤50	411 (44%)	95 (59%)	
	>50	513 (56%)	68 (42%)	0.0011
Histological grade	I	20 (2%)	2 (1%)	
	II	204 (22%)	23 (14%)	
	III	572 (62%)	118 (73%)	0.029
No. of positive nodes	1	577 (62%)	51 (31%)	
	2	242 (26%)	61 (38%)	
	3	105 (11%)	51 (31%)	<.0001
Nuclear grade	I	20 (2%)	0 (0%)	
	II	366 (40%)	57 (35%)	
	III	365 (40%)	77 (48%)	0.0435
LVI	No	516 (56%)	59 (36%)	
	Yes	408 (44%)	104 (64%)	<.0001
Extranodal invasion	No	809 (88%)	108 (67%)	
	Yes	115 (12%)	54 (33%)	<.0001
Size of axillary node metastases	Microscopic	259 (28%)	19 (12%)	
	Macroscopic	661 (72%)	143 (88%)	<.0001

Conclusions: At our institution, 15% of patients with T1-2 breast cancer and 1-3 positive LNs received PMRT. Risk factors, such as larger tumor size, age ≤50 years, higher histologic grade, LVI, greater number of positive LNs, size of axillary lymph node metastases, and extranodal invasion predicted use of PMRT. In patients with T1-2 tumors and 1-3 positive LNs, clinicians were able to recommend PMRT based on clinicopathologic features, resulting in similarly low rates of 5-year LRR, regardless of whether PMRT was received.

0077 Eligibility for Nipple-Sparing Mastectomy May Be Safely Expanded

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Objectives: Absolute contraindications to nipple-sparing mastectomy (NSM) include clinical or imaging evidence of nipple areola complex involvement, locally advanced breast cancer with skin involvement, inflammatory breast cancer, and bloody nipple discharge. Active smoking, diabetes, obesity, and large, ptotic breasts have been considered relative contraindications. It is unclear how other factors, such as tumor size, positive axillary lymph nodes, prior chest wall radiation, or receipt of neoadjuvant chemotherapy, should impact eligibility for NSM. We evaluated the outcomes of NSM over time in our institution as experience was gained and eligibility criteria were broadened.

Method: We performed a retrospective and prospective review of all patients undergoing NSM at a single institution from January 2007 to October 2012. Data on patient and tumor characteristics, systemic and local treatments, complications, and local recurrences were collected. NSM procedures performed from 2007-2010 were compared with NSM performed from 2011-October 2012 to assess trends in patient selection and outcomes over time.

continues

Results: NSM was performed on 583 breasts in 334 patients. Mean patient age was 46 years (range, 23-78). Mean BMI was 23.9 (range, 16.9-44.8). Few patients were smokers (n = 17, 5.1%) or diabetic (n = 3, 0.9%). Indication for NSM was risk reduction in 309 (53.0%), invasive cancer in 196 (33.6%), and DCIS in 78 (13.4%) breasts. Mean invasive tumor size was 1.8 cm (range, 0.01-6.2 cm). Forty-one (12.3%) patients had positive lymph nodes. Twenty-one (6.3%) patients had received neoadjuvant chemotherapy. Forty (6.9%) breasts had received prior radiation therapy. Total nipple necrosis occurred in 10 (1.7%) breasts. An additional 26 (4.5%) breasts had nipples removed due to a positive nipple margin. At a mean follow-up of 12.8 months, local recurrence occurred in 4 (1.4%) of 274 breasts operated on for cancer. No recurrences involved the nipple areola complex. No prophylactic NSM patient developed breast cancer. NSM performed in 2011-2012 (n = 413), compared to 2007-2010 (n = 170), were more often for a cancer diagnosis (p = 0.0011) in patients with higher BMI (p < 0.001), and on larger breast volumes (p < 0.001) (Table 1). There was no significant difference in total nipple necrosis rates between earlier and later groups (p = 0.44). Nipple loss due to a positive nipple margin was significantly less frequent in the 2011-2012 group (3.1% vs 7.6%, p = 0.0017), even though a higher percentage of patients undergoing NSM in the 2011-2012 group had a cancer diagnosis (51.3% vs 36.5%, p = 0.0011), suggesting improved patient selection over time.

Table 1. Comparison of Patients Undergoing Nipple-Sparing Mastectomy, 2007-2010 vs 2011-2012

	Total	**2007-2010**	**2011-2012**	***P* value**
No. of Patients	**334**	**94**	**240**	
Mean age (yr) [range]	46	45 [27-78]	46 [23-70]	0.22
Mean BMI (kg/m^2) [range]	23.9	22.9 [18.2-31.0]	24.3 [16.9-44.8]	<0.001
Current smoker (%)	17 (5.1)	3 (3.2)	14 (5.8)	0.32
Diabetes (%)	3 (0.9)	0 (0.0)	3 (1.2)	0.28
+ Lymph node(s) (%)	41 (12.3)	7 (7.4)	34 (14.2)	0.13
Neoadjuvant chemo (%)	21 (6.3)	4 (4.3)	17 (7.1)	0.34
No. of Breasts	**583**	**170**	**413**	
Mean breast volume (cm^3) [range]	473	366 [55-986]	518 [46-1706]	<0.001
Indication				
Cancer (%)	274 (47.0)	62 (36.5)	212 (51.3)	0.0011
Prophylactic (%)	309 (53.0)	108 (63.5)	201 (48.7)	
Invasive tumor size (cm)	1.77	1.62	1.82	0.34
Prior radiation (%)	40 (6.9)	12 (7.0)	28 (6.8)	0.12
Total nipple necrosis (%)	10 (1.7)	4 (2.3)	6 (1.4)	0.44
+ Nipple margin (%)	26 (4.4)	13 (7.6)	13 (3.1)	0.0017
Local recurrence (%)	4/274 (1.4)	1/62 (1.6)	3/212 (1.4)	
Mean follow-up (months)	12.8	26.4	7.2	

Conclusions: Eligibility for NSM at our institution has expanded over time to include women with higher BMI and larger breasts, with no increase in nipple loss due to ischemia. Rates of positive nipple margins have decreased over time even though NSM is being performed more frequently for cancer. Consideration for NSM should be given to breast cancer patients without absolute contraindications, including those with higher BMI and larger breasts.

0092 DC1 Vaccines Induce Significantly Greater Complete Responses in Estrogen-Independent HER-2 Overexpressing Early Breast Cancer

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Objectives: Patients with estrogen-independent (ER-) human epidermal growth factor receptor-2 (HER-2) positive ductal carcinoma in situ (DCIS) treated with lumpectomy alone or lumpectomy and radiation therapy display increased number of breast cancer events, including ipsilateral breast cancer.

Method: Forty-eight patients with DCIS or T1a HER-2 expressing breast cancer received HER-2 pulsed autologous dendritic cell (DC1) vaccines by either 4 weekly lymph node injections in the groin or 6 weekly injections in the area of DCIS or groin nodes prior to surgical resection of tumor. HER-2 and estrogen receptor (ER) expression was determined by immunohistochemical staining pre- and post-vaccination. In 44 pts, CD4 T-cell sensitization to 6 HER-2 peptides was determined by ELISPOT assay and a positive response was defined by >2-fold increase post vaccination. In 21 patients, CD8 T-cell response was determined by in vitro sensitization. Tumor presence and immune response post vaccination was compared between ER- and estrogen-dependent (ER+) patients. Two-tailed Fisher exact tests were performed for all statistical analyses.

Results: There was a significant difference in response to vaccination between ER+ and ER- subjects. Of 24 ER+ subjects, 1 (4.2%) had no residual disease post vaccination, while of 24 ER- subjects, 8 (33.3%) had no residual disease ($p = 0.0226$) post vaccination. This response was particularly robust in the HER-2 (2+) population with 3 (60%) of 5 ER- patients having complete tumor regression; however, when ER status is the same, there is still no significant difference in complete tumor regression between HER-2 (2+) and (3+) patients (5 [26.3%] of 19 ER-/Her-2 [3+] patients had complete tumor regression, $p = 0.2885$). Overall 40 (90.9%) of 44 patients developed CD4 T-cell responses to HER-2 peptide and CD4 responses were equally likely in ER+ and ER- patients (86.4% vs 95.5%, $p = 0.6069$). Overall, 18 (85.7%) of 21 HLA A2+ patients developed CD8 T-cell immune responses to HER-2 and CD8 T-cell responses were equally likely in ER+ and ER- patients (100% vs 75%, $p = 0.2285$).

Conclusions **:** Despite equivalent immune response induction between ER- and ER+ DCIS, HER-2 pulsed DC1 induces more complete responses in ER- DCIS. This provides the rationale to develop these vaccines to reduce recurrence in patients with ER- DCIS for which there are currently no adjuvant therapies. Combining anti-estrogen therapy with DC1 vaccines may improve responses in patients with ER+ DCIS.

0080 DCIS Treated With Excision Alone Using the National Comprehensive Cancer Network (NCCN) Guidelines

Patricia Wehner[1], Katherine Kopkash[1], Amanda Woodworth[1], Melvin Silverstein[1,2]

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Objectives: Until recently, most patients with DCIS were treated with mastectomy or excision followed by radiation therapy. In 2008, the NCCN published guidelines stating, “If the patient and physician view the individual risk as ‘low,’ some patients may be treated by excision alone.” The NCCN stated that factors that may determine local recurrence risk are palpable mass, larger size, higher grade, close or involved margins, and age under 50 years. The goal of this study is to determine local and distant recurrence and breast-cancer specific survival in patients with DCIS treated with excision alone.

Method: A prospective, single-institution database was analyzed for patients who met the NCCN guidelines for treatment of DCIS by excision alone. We used the following inclusion criteria: pure ductal carcinoma in situ (no microinvasion), tumor extent 20 mm or less, age equal or greater than 50 years, margin width equal or greater than 2 mm, and nuclear grade 1 or 2 (non-high grade). All patients were treated with excision alone. No adjuvant hormonal, systemic, or radiation therapy was used in conjunction with surgery. Kaplan-Meier analysis was used to determine recurrence and survival rates.

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Results:

Number of patients	204
Average time of followup	67 mo
Average disease size	9.4 mm
Number of ipsilateral invasive recurrences	4
Number of ipsilateral DCIS recurrences	5
Number of distant recurrence	1
6-year local recurrence rate	6.6%
12-year local recurrence rate	7.8%
12-year breast cancer-specific survival	100%

Conclusions: The 12-year local recurrence rate for DCIS patients in NSABP Protocol B-17 treated with excision alone was 32%, and for excision plus radiation therapy, was 16%. In this study, retrospectively using the NCCN Guidelines to our patients, the 12-year local recurrence rate for excision alone was 7.8%. If radiation therapy had been added to our treatment plan, the recurrence rate would have dropped by 50% to 3-4%. One hundred patients were to have been irradiated, 96 would have received no benefit. Radiation therapy is time consuming and has side effects. Should mastectomy have to be performed in the future, reconstruction will be compromised. Patients with a low risk of local recurrence, if treated by excision alone, can be safely selected using the NCCN Guidelines. Should a patient recur after excision alone, re-excision and radiation therapy can be used at the time of recurrence.

0188 Imaging Response and Residual Metastatic Axillary Lymph Node Involvement Following Neoadjuvant Chemotherapy for Primary Breast Cancer

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Objectives: While surgical management of the breast in neoadjuvant chemotherapy (NAC) patients is generally based on clinical and imaging assessment of response to treatment, axillary management continues to be determined by preoperative stage. Ultrasound (US)-guided fine-needle aspiration (FNA) is an efficient method to detect lymph node (LN) metastases for pre-NAC staging, but imaging assessment of the axillary treatment response remains to be defined. We undertook this study to evaluate our experience with post-NAC axillary imaging to understand how this information might direct our surgical approach to the axilla.

Method: From our prospective breast surgery database, we identified 234 patients who received NAC for primary breast cancer and underwent operation at our institution between 2010 and 2012. We evaluated pre- and post-NAC axillary imaging studies, and clinical and histopathology data. Treatment response on imaging was categorized as complete (CR), partial (PR), and none/progression (NR).

Results: Pre-NAC axillary staging by US with FNA of abnormal nodes classified patients as: US-negative/no FNA (57), FNA-LN-negative (35), and FNA-LN-positive (142). Axillary imaging after NAC included US in 113, MRI in 106, and PET-CT in 27. At surgery, 108 (46%) of 234 patients were LN-positive: 23% (22/92) of clinically N0 patients and 62% (86/142) of clinically N1 patients at presentation. In the 38% LN-negative after NAC, an imaging CR was seen in 64% (21/33) by US, 61% (14/23) by MRI, and 89% (8/9) by PET-CT. The performance of post-NAC axillary imaging in detecting persistent LN metastases (CR vs not CR) for the patients node-positive at presentation is summarized below:

	Post-NAC US	Post-NAC MRI	Post-NAC PET-CT
Sensitivity	70.6%	63.8%	66.7%
Specificity	63.6%	42.4%	88.9%
Positive predictive value	75.0%	61.2%	90.9%
Negative predictive value	58.3%	45.1%	61.5%

Conclusions: Specificity of US, MRI, and PET in detection of a complete response to chemotherapy is poor; therefore surgical staging of the axilla remains important. No imaging modality after NAC was sufficiently predictive of a complete pathologic response to treatment to omit axillary surgery in pre-NAC, LN-positive breast cancer patients.

0125 The Value of 6-Month Interval Imaging Following Benign Radiologic-Pathologic Concordant Minimally Invasive Breast Biopsy

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Objectives: Image-guided, minimally invasive breast biopsy is standard of care in women with suspicious imaging findings. Current National Comprehensive Cancer Network (NCCN) guidelines recommend repeat imaging 6 to 12 months after a benign, concordant image-guided breast biopsy. We hypothesized that interval imaging less than 12 months after a benign, radiologic-pathologic concordant breast biopsy has a low cancer yield and increases healthcare costs.

Method: Following IRB-approval, a retrospective chart review identified 689 patients who underwent image-guided breast biopsy at the Comprehensive Breast Center between January 2010 and December 2010. Biopsy type included stereotactic, ultrasound-guided, or MRI-guided biopsy. All charts were evaluated for documentation of radiologic-pathologic concordance.

Results: Of the 689 patients undergoing biopsy, 186 (27%) had malignant pathology, 3 (0.4%) had non-breast malignant pathology, and 500 (72.6%) had "benign" pathology. Of 500 "benign" patients, 48 (9.6%) had surgical excision secondary to discordant pathology, atypia, papillary lesion, or other benign finding. Of the remaining 452 "benign" biopsy patients who did not undergo surgical excision, 338 (74.8%) had documented radiologic-pathologic concordance by the radiologist. Interval imaging less than 12 months after benign biopsy was obtained in 186 (55%) of the 338 concordant patients. Thirty-four patients had more than 1 interval imaging study done for a total of 220 studies. Imaging was benign as designated by BI-RADS I, II, or III in 179 (96.2%) of the patients imaged. Two (1.1%) received a BI-RADS 0 and underwent additional imaging that was ultimately deemed benign. Five (2.7%) patients had suspicious (BI-RADS IV) findings on follow-up imaging, 2 away from the original biopsy site and 3 at the biopsy site. Ultimately, only 1 breast cancer was identified, representing 0.5% of all benign concordant patients undergoing interval imaging. Cost analysis reveals a global charge of $204 per patient for a unilateral diagnostic mammogram, $984 per patient for a breast ultrasound, and $5349 per patient for a bilateral breast MRI with contrast. In this patient cohort, omission of these studies could have resulted in a cost savings of $150,450 (Table1).

Table 1. Breakdown of Imaging Studies and Cost-Savings for 186 Patients Undergoing 220 Interval Imaging Studies After Benign Radiologic-Pathologic Concordant Biopsy

Follow-Up Imaging Study	N	Cost
Mammography	163	$33,252
Ultrasound	43	$42,312
MRI	14	$74,886

Conclusions: Interval imaging performed less than 12 months after benign radiologic-pathologic concordant breast biopsy had a low yield for the detection of breast cancer (0.5%) and resulted in increased healthcare costs. These data support the policy for discontinuation of interval imaging less than 12 months after benign radiologic-pathologic concordant biopsy.

0123 Partial-Breast Irradiation vs Whole-Breast Irradiation for Early-Stage Breast Cancer Patients Undergoing Breast Conservation, 2003-2010: A Report From the National Cancer Data Base

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Objectives: We hypothesized that there has been an increase in the use of partial-breast irradiation (PBI) by multiple different techniques for early-stage breast cancer patients that is associated more strongly with facility and socioeconomic factors as opposed to tumor factors.

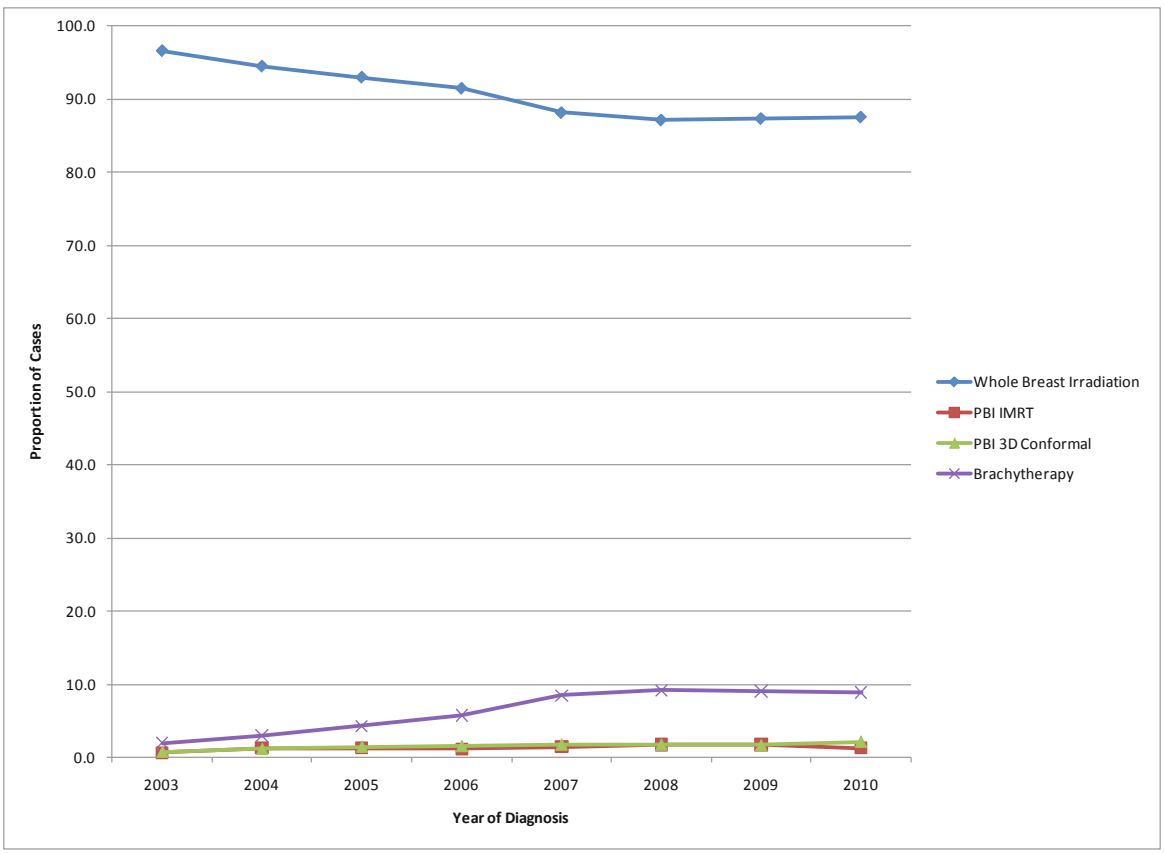
Method: Through the use of the National Cancer Data Base, we selected 575,438 non-neoadjuvant AJCC stage 0/I/II breast cancer patients who underwent lumpectomy from 2003-2010 and either whole-breast irradiation (WBI) or PBI. ASTRO guideline concordance was assessed in patients who underwent PBI. Chi-square tests and logistic regression models were used to determine trends and factors related to the use of PBI.

continues

Results: The proportion of patients undergoing WBI decreased from 96.6% in 2003 to 87.6% in 2010, whereas the use of PBI by 3D conformal, intensity-modulated radiation therapy (IMRT) and brachytherapy increased from 3.4% to 12.4% (Figure 1) ($p < 0.001$). Eleven percent of stage 0, 12.5% of stage I, and 5.8% of stage II who chose radiation underwent PBI in 2010. Independent factors related with PBI use were age, race, insurance status, facility type, facility location, facility volume, population density, tumor histology, grade, and node status. Patients 80-89 years old were 3.8 times more likely to undergo PBI, as compared to patients 30-39 years old (OR:3.77, 95% CI: 3.45-4.10, $p < 0.001$). Patients living in the West census region were 2.0 times more likely to undergo PBI as compared to patients living in the Northeast (OR: 2.0, 95% CI: 1.93-2.15, $p < 0.001$). Interestingly, as compared to whites, blacks were 3.5% less likely, Hispanics 17.7% less likely, and Asians 37.5% less likely to undergo PBI (OR: 0.97, 95%CI: 0.93-0.99, $p = .041$; OR: 0.82, 95%CI: 0.75-0.90, $p < 0.001$; OR: 0.63, 95% CI: 0.58-0.68, $p < 0.001$).

Patients with managed care were 50.9% more likely to undergo PBI as compared to patients without insurance (OR:1.51, 95%CI:1.37-1.66, $p < 0.001$). Patients treated at comprehensive community centers were 55.8% more likely and those treated at academic/research institutions were 6.5% less likely to undergo PBI (OR:1.56; 95%CI: 1.51-1.60, $p < 0.001$; OR: 0.94, 95%CI: 0.90-0.97, $p < 0.001$). Patients with grade III tumors were 16.5% less likely to undergo PBI as compared to patients with grade I tumors (OR: 0.84, 95% CI: 0.81-0.86, $p < 0.001$). As compared to patients with ductal carcinomas, patients with lobular carcinomas were 30.4% less likely to undergo PBI (OR: 0.69, 95% CI: 0.67-0.73, $p < 0.001$). Of the noninvasive patients who received PBI, 92.9% met the ASTRO “cautionary” guidelines and 7.1% met the ASTRO “unsuitable” guidelines while, of the invasive patients, 97.8% met the ASTRO “suitable” guidelines and 2.2% met the ASTRO “unsuitable” guidelines.

Figure 1. Proportion of patients undergoing whole-breast irradiation and partial-breast irradiation from 2003-2010.



Conclusions: PBI utilization significantly increased from 2003-2010 accounting for approximately 12.4% of all radiation therapies in 2009-2010. Socioeconomic and facility factors impacted PBI use more than tumor factors. Over 90% of patients met the “suitable” and “cautionary” ASTRO guidelines among both invasive and noninvasive patients.

"Quickshot" Presentations

Saturday, May 4, 2013 (listed in order of presentation)

0149 Trends in Incidence and Management of Lobular Carcinoma In Situ: A Population-Based Analysis

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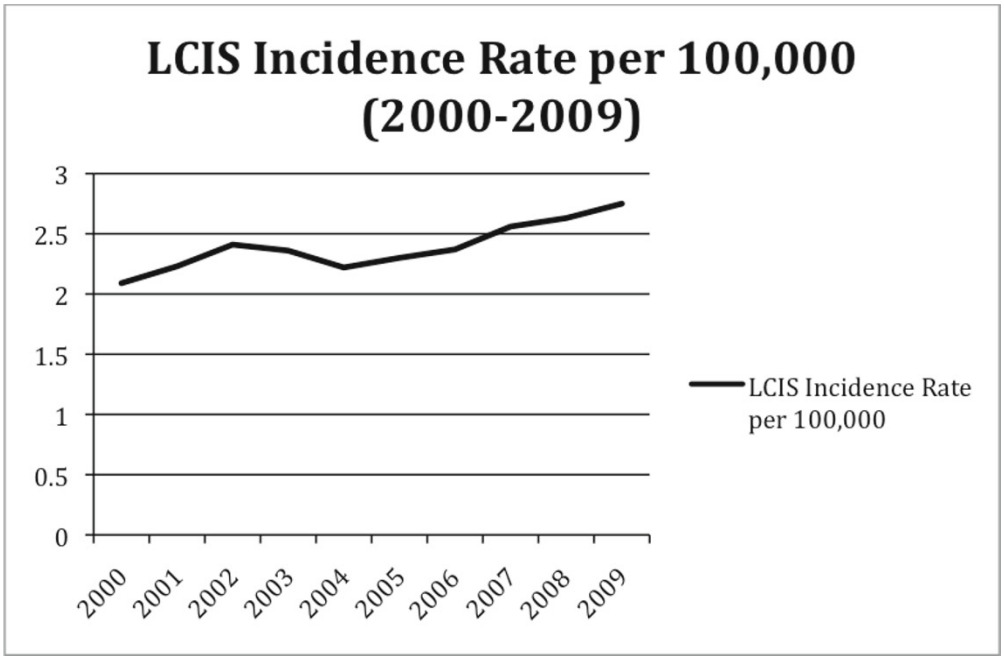
Objectives: Lobular carcinoma in situ (LCIS) is a marker of increased risk of breast cancer rather than a true precursor for the development of it. Current National Comprehensive Cancer Network guidelines do not recommend mastectomy as a strategy for risk reduction for most patients with LCIS. Presently, published studies describing management strategies for LCIS have been limited to single institutional studies. To evaluate the incidence and current trends in management of LCIS in the United States, we conducted a population-based study among patients diagnosed with LCIS.

Method: Using the Surveillance, Epidemiology, and End Results database, we conducted a retrospective cohort analysis of women diagnosed with microscopically confirmed LCIS from 2000 through 2009. We excluded patients with invasive breast cancer or ductal carcinoma in situ. We limited our analytic sample to registries that reported 500 cases of LCIS within the study period. We evaluated variation in treatment, including observation alone, excision, excision with radiation therapy, and mastectomy. We compared the use of these strategies by demographic and tumor factors. We utilized logistic regression to simultaneously control for multiple factors in assessing these patterns.

Results: We identified 14,048 patients diagnosed with microscopically confirmed LCIS from 2000-2009. The rate of LCIS incidence increased from 2.0 per 100,000 in 2000 to 2.75 per 100,000 in 2009 (a 38% increase) (Figure 1). Of these patients, 10% were treated with observation only, 72% underwent excision alone, 1% underwent excision with radiation, and 16.8% underwent mastectomy. Only 7% of patients underwent lymph node evaluation. The mastectomy rates were significantly higher among white women and younger women (40-59 years). The proportion of women with LCIS to receive mastectomy increased significantly over time, after adjusting for patient characteristics ($p < 0.0001$). The mastectomy rates varied significantly based on geographic region ranging from 12.4% to 23.5%. Women from Greater Georgia were more likely to receive mastectomy vs women from San Francisco-Oakland (OR =1.41; 95% CI, 1.1-1.96; $p < 0.001$).

Figure 1. LCIS incidence rate per 100,000 from 2000 to 2009.



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Conclusions: This is the first population-based analysis evaluating trends in surgical management of LCIS. Despite current recommendations, risk-reduction surgery is still frequently performed in the United States for many women with LCIS. Mastectomy rates varied significantly based on geographic region, suggesting that local practice patterns are an important determinant of how particular LCIS cases are managed. Limitations of the study include lack of information on endocrine treatment and patient family history. Future work is needed to assess the association between LCIS management strategies and subsequent risk of invasive breast cancer.

0101 Correlation Between Breast Cancer Molecular Subtype and Mammographic Appearance

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Objectives: The identification of distinct molecular subtypes has changed breast cancer management. However, the correlation between breast cancer molecular subtype and mammographic appearance has not been extensively studied.

Methods: A retrospective review of our prospectively collected database was performed to evaluate the mammographic and molecular subtypes of all cases of invasive breast cancers diagnosed between 2003 and 2010.

Results: There were 985 cases of invasive breast cancer that had complete data on receptor status and mammographic appearance. There was no significant difference in the percent of falsely negative mammograms by molecular type. Luminal cancers were more likely than other types to present with architectural distortion (8.5% vs 1%, $p < .001$). This was partly, but not completely, explained by histology as 16 of the 60 cases were infiltrating lobular cancers. Her-2 positive cancers, either with or without ER/PR expression, were much more likely than other types to be associated with mammographic calcifications (51% vs 22%, $p < .001$). Interestingly, triple-negative cancers were most likely to be associated with a mass on mammography (88% vs 73%, $p < 0.01$).

	Arch Dist	Calcs	Mass	Mass and Calcs	Normal	Total
ER/PR pos, Her2 neg	60 (8.5%)	82 (11.7%)	441 (62.7%)	79 (11.2%)	41 (5.8%)	703 (100%)
ER/PR pos, Her2 pos	0	17 (21.8%)	34 (43.6%)	22 (28.2%)	5 (6.4%)	78 (100%)
ER/PR neg, Her2 pos	0	20 (33.9%)	23 (39%)	11 (18.6%)	5 (8.5%)	59 (100%)
ER/PR and Her2 neg	3 (2.1%)	5 (3.4%)	104 (71.7%)	24 (16.6%)	9 (6.2%)	145 (100%)
Total	63 (6.4%)	124 (12.6%)	602 (61.1%)	136 (13.8%)	60 (6.1%)	985 (100%)

Conclusions: There were characteristic associations between molecular subtype and mammographic appearance. Although the majority of invasive breast cancers presented with a mass on mammography, there was a strong relationship between her-2 positivity and mammographic calcifications. These findings may have clinical utility in understanding tumor biology.

0005 Implications of Tissue Expander Salvage During Implant-Based Breast Reconstruction

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Objectives: Tissue expander-based breast reconstruction continues to be the most commonly used reconstructive modality for women after mastectomy. No existing data correlate expander-related complications with permanent prosthesis outcomes. We sought to determine if patients with a previously salvaged tissue expander are at increased risk for permanent implant complications.

Method: A review was performed from 2007-2011 assessing for age, cancer, tobacco use, body mass index, comorbidities, acellular dermal matrix, chemotherapy, radiation, timing of reconstruction, tissue expander fill, expander/permanent implant exposure/rupture, infection, seroma/hematoma, type of permanent implant, capsular contracture, and requirement for debridement, explantation, or flap salvage of expander/implant were assessed. A logistic regression was performed using SPSS 15.0 (SPSS Inc, Chicago, IL).

Results: The database identified 196 patients undergoing mastectomy with 304 tissue expander-based breast reconstructions. One hundred seventy-five patients underwent immediate reconstruction, while 21 patients were delayed. One hundred sixty-six patients underwent second-stage exchange to a permanent implant (17 awaiting implant exchange, and 13 explanted prior to implant exchange). Twenty-six percent of patients (51/196) had an expander complication. Of those undergoing exchange to permanent implant, 21.7% (36/166) had a complication and 9.0% (15/166) had both expander and permanent implant complications. Excluding those awaiting second-stage reconstruction, 89.8% (158/176) successfully completed tissue-expander reconstruction. Only HTN, tobacco use, and radiation therapy were statistically significant variables associated with an increased likelihood of complications (Table 1). Patients with a salvaged tissue expander complication are 3 (OR = 3.183, 95%CI [1.408,7.198]) (p = 0.004) times more likely to have a complication after placement of a permanent implant (Table 2) and 9 times more likely to fail permanent implant reconstruction (explantation +/- flap salvage) (OR = 9.034, 95%CI [1.579,51.699]) (p = 0.003) (Table 3).

Table 1. Patient Characteristics

Characteristic	Complications (n = 79)	No Complications (n = 117)	p
Age, yr	51.86 ± 10.55	50.96 ± 11.15	0.578
BMI	29.55 ± 6.45	28.32 ± 7.24	0.600
HTN	30 (51.7%)	28 (48.3%)	0.035
DM	8 (57.1%)	6 (42.9%)	0.183
Smoker	33 (57.9%)	24 (42.1%)	0.001
Chemotherapy	31 (38.8%)	49 (61.3%)	0.712
Radiation	29 (49.2%)	30 (50.8%)	0.098
Acellular dermal matrix	70 (39.3%)	108 (60.7%)	0.379
Expander fill (cc)	205.13 ± 109.95	188.38 ± 111.69	0.994

Table 2. Permanent Implant Complications After Salvaged Expander Complication

		Permanent Implant Complication		
		Yes	**No**	**Total**
Expander Complication	**Yes**	14 (42.4%)	19 (57.6%)	33 (100%)
	No	25 (18.8%)	108 (81.2%)	133 (100%)
Total		39 (23.5%)	127 (76.5%)	166 (100%)

P = 0.004

Table 3. Failed Permanent Implant Reconstruction After Salvaged Expander Complication

		Failed Permanent Implant Reconstruction		
		Yes	**No**	**Total**
Expander Complication	**Yes**	4 (12.1%)	29 (87.9%)	33 (100%)
	No	2 (1.5%)	131 (98.5%)	133 (100%)
Total		6 (3.6%)	160 (96.4%)	166 (100%)

P = 0.003

Conclusions: Despite complications, almost 90% of women successfully complete tissue expander-based breast reconstruction. Women with complications during the expansion phase of breast reconstruction are at a statistically significantly increased risk after placement of a permanent implant. This patient subset should be closely followed after placement of implant to monitor for complications as they have a much higher likelihood of failing implant-based breast reconstruction.

0024 Pretumoral Approach of Transaxillary Video-Assisted Breast Surgery Aimed at Low Invasion and High Aesthetics

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Objectives: Endoscopic surgery for the early breast cancer is outstanding in native aesthetics without harming the breast skin. We called it video-assisted breast surgery (VABS). However, the skin incision at the edge of the areola is the perils of deformation and dislocation of the nipple and the areola, and also of disturbance of the sensory nerve in the breast skin. We devised the transaxillary retromammary (TARM) approach of VABS. It needs only 1 skin incision in the axilla and can treat any tumor even in the medial or lower side of the breast without making any injuries on the breast skin and it can preserve skin touch sensation. We improved this technique easier to be performed by the pre-tumoral approach.

Method: We have performed VABS on 300 patients since December 2001 and we performed the newly devised TARM on 120 patients of early breast cancer, stages I and II, and the new pretumoral approach on 20 patients, 3D-CT lymphography on 200 patients. The endoscopic SN biopsy was performed from 1-cm-long skin incision by Visiport. We elongated the axillary skin incision to 2.5 cm. We marked the surgical margin 2 cm apart from the tumor edge by injecting blue dye into subcutanea and retro-mamma. We dissected major pectoral muscle fascia to detach retromammary tissue just before the tumor. We cut the mammary gland vertically to the skin at the proximal cut margin, and dissect the subcutaneous tissue above the tumor. Then we cut the gland with clear surgical margin, and removed it through the axillary port. In the pretumoral TARM, the resection area behind the tumor was not dissected before dissecting above the gland. The breast reconstruction was made by filling absorbable oxidized cellulose. The postoperative aesthetic results were evaluated by ABNSW.

Results: The tumor size was 2.2 cm. The average patient age was 50.2 years old. Though gentle care was needed in manipulating the skin side, there were 2 patients of 1-degree burn curable with conservative treatment. Surgical margins were all negative. There was no serious complication after surgery. The original shapes of the breast were preserved well. The follow-up is 126 months at maximum and 66 months on average. There are 3 locoregional recurrences and 14 distant metastases. Five-year survival rate is 100%. With regard to pretumoral TARM, the skin incision only in the axilla made better looks and shapes of the breast. It could shorten the operation time and minimize the resection volume. The reconstruction with oxidized cellulose needs no excessive detachment of the skin beyond the surgical margin. The postoperative esthetic results were excellent and better. The sensory disturbance was minimal. All patients expressed great satisfaction.

Conclusions: VABS can be considered as a good surgical procedure concerning locoregional control and esthetics. Pretumoral TARM is better to facilitate VABS for the popular benefit.

0180 Postmastectomy Radiation and Recurrence Patterns in Breast Cancer Patients Under the Age of 35: A Population-Based Cohort Study

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Objectives: Breast cancer in young women is associated with high recurrence rates and poorer overall survival. The benefit of postmastectomy radiation (PMRT) in very young patients on recurrence and survival is unclear and may affect quality-of-life issues, such as reconstruction options. We evaluated the effect of PMRT on isolated local recurrence (ILRR), local-regional recurrence (LRR), distant metastases (DM), and overall survival (OS) stratified by nodal status in women 35 and under.

Method: All women aged 35 or younger diagnosed with invasive breast cancer from 1994 to 2003 were identified from the Ontario Cancer Registry. Patients with missing nodal data were excluded. Patient-related characteristics, such as tumor size, histology, grade, lymphovascular invasion, ER/PR, HER2/neu, and margin status, were evaluated. Kaplan-Meier curves were generated to examine the association between PMRT and ILRR, LRR, DM, and OS by nodal status (N0, N1-3, and N > 4). Fisher exact test was used to evaluate the association between PMRT and recurrence.

Results: We identified 451 patients who comprised the study cohort. Median follow-up was 8.1 years. All patients underwent a modified radical mastectomy. PMRT was administered in 42.8% of the patients and 76.1% received chemotherapy. Overall, 232 (51.4%) of patients sustained some type of recurrence during the follow-up period. Distant failure was the most common first-recurrence event occurring in129 (28.6%) of the patients. Median time to first recurrence was 1.8 years overall. Chest wall ILRR was 5%, 2.5%, and 8.5% in patients with N0, N1-3, N > 4, respectively. No significant difference was seen in ILRR, LRR, and distant disease between those who received PMRT vs no PMRT. The PMRT group in N > 4 nodal category had statistically significant better overall 10-year survival on univariate analysis compared to the no PMRT group (26% vs 41% P = 0.003).

Table. Recurrence Rate and Patterns Stratified by Nodal Status Comparing Patients Treated With PMRT vs No PMRT

Node Status	PMRT	N	No Recurrence	ILRR	P-value	LRR (May have DF)	P-value	Distant Failure	P-value
N0	No	83	57 (68.7%)	5 (6.0%)	1.00	9 (10.8%)	0.11	19 (22.9%)	0.02
	Yes	18	8 (44.4%)	0 (0.0%)		4 (22.2%)		9 (50.0%)	
N1-3	No	105	50 (47.6%)	3 (2.9%)	1.00	17 (16.2%)	1.00	48 (45.7%)	0.86
	Yes	57	25 (43.9%)	1 (1.8%)		8 (14.0%)		26 (45.6%)	
N>4	No	70	15 (21.4%)	6 (8.6%)	0.55	22 (31.1%)	0.10	42 (60.0%)	0.26
	Yes	118	37 (31.4%)	10 (8.5%)		25 (21.2%)		63 (53.4%)	

Conclusions: This population-based cohort of very young women, 35 and younger, treated with mastectomy confirms high overall rates of LRR and distant failure. Interestingly, isolated LRRs were uncommon and appeared to be independent of PMRT use. Further exploration is warranted to better identify in whom PMRT benefits in this unique population.

0076 Axillary Surgery Among Estrogen Receptor Positive Women 70 Years of Age or Older With Clinical Stage I Breast Cancer, 2004-2010: A Report From the National Cancer Data Base

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Objectives: The CALGB 9343 trial did not show a survival benefit for women 70 years of age or older with pT1N0 estrogen receptor (ER) positive cancer with the use of adjuvant radiation therapy, and over 60% of the women in each arm did not undergo axillary surgery. We hypothesized that women ≥70 years of age with pT1N0M0 ER-positive tumors still undergo axillary surgery despite the CALGB trial results.

Method: We utilized the National Cancer Data Base to study the use of axillary surgery from 2004-2010 on 102,026 clinically node-negative, ER-positive patients with pT1N0 tumors who were 70 years of age or older. Chi-square and logistic regression models were used to determine the trends and factors related to axillary surgery.

Results: Axillary nodes were examined in 88.9% of the total cohort, and the trend significantly increased from 87.7% in 2004 to 89.2% in 2010. In 2004, 44.6% of the cohort had less than 3 nodes examined, which significantly increased to 59.3% in 2010, while 20.2% of patients had greater than 10 nodes examined in 2004 which significantly decreased to 9.4% in 2010. 77.2% of patients underwent lumpectomy and 22.8% underwent mastectomy, with 87.0% of lumpectomy patients undergoing axillary surgery compared to 95.5% of mastectomy patients. Independent predictors of axillary surgery were age, co-morbidity, income, histology, grade, facility type, facility location, and population density. The strongest independent predictor of axillary surgery was age: 96.0% of women 70-75 years old underwent axillary surgery vs 92.3% of women 75-80 years old, 83.2% of women 80-85 years old, 66.5% of women 86-90 years old, and 45.6% >90 years old. Patients with infiltrating lobular and mixed lobular and ductal carcinomas were 22.6% (OR = 1.22; 95% CI, 1.14-1.33) and 21.6% more likely (OR =1.21; 95% CI, 1.11-1.34) to have axillary surgery than ductal carcinomas. Patients treated at academic/research facilities were 18.5% less likely (OR = 0.81; 95% CI, 0.76-0.87) than community cancer programs to undergo axillary surgery. There was significant regional variation among the census regions; patients treated in the Midwest were 3.8 times more likely to undergo axillary surgery than those treated in the Northeast.

continues

Conclusions: Despite data indicating decreased utility, axillary surgery remains over utilized in women with advancing age. Axillary surgery rates vary by patient, tumor, and facility characteristics, with age being the most predictive.

0069 Trends in Radiation Therapy After Breast-Conserving Surgery in Elderly Patients With Early-Stage Breast Cancer

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Objectives: Radiation therapy (RT) after breast-conserving surgery (BCS) has been shown to decrease local and regional recurrence. Recent trials, however, demonstrated similar ipsilateral mastectomy-free survival rates and overall survival (OS) rates between women with early-stage breast cancer who do and do not receive RT after BCS. For elderly patients with lower risk estrogen receptor (ER) positive tumors, the benefit of radiation post-lumpectomy is debatable. The purpose of this study is to evaluate current trends in the rates of adjuvant radiotherapy after BCS and outcomes using a large population database. We hypothesize that the rates of RT after BCS is decreasing in elderly women without adverse effects on survival.

Method: Early-stage breast cancer patients age 70 years and older treated from 2000 to 2009 were evaluated using the Surveillance, Epidemiology, and End Results (SEER) database. Other inclusion criteria included ER-positive status and lymph node negative or unknown status. Patients who died within 6 months of diagnosis were excluded. Clinical and pathologic characteristics and therapies received were examined. Trends in radiation use after BCS were examined by the Jonckheere-Terpstra test. Multiple regression analysis was used to determine factors associated with omission of radiation and Cox proportional hazards model was to determine factors associated with survival.

Results: 49,062 evaluable patients were identified. Of all patients who underwent BCS, 32,550 (66.3%) received RT, 15,692 (32.0%) did not receive RT, and 820 (1.7%) were recommended to undergo RT after surgery but it was unknown if radiation was administered. Significant characteristics associated with omission of recommendation for RT included more current year of diagnosis, older age category, larger tumor size, and lymph nodes not examined. Over the time period studied, the use of RT after BCS steadily decreased ($p < 0.0001$). When stratified by the 18 SEER registries, 8/18 registries exhibited statistically significant trends in decreased radiation use, 3/18 registries had significant increases in RT rates in elderly patients, and 7/18 registries did not demonstrate any trend in radiation use. On survival analysis, omission of radiation (HR, 1.651; $p < 0.0001$), larger tumor size (HR, 2.130 for tumors >2- 5 cm; $p < 0.0001$), older age category (HR, 2.376 for age 80+ years; $p < 0.0001$), and no nodes examined (HR, 1.912; $p < 0.0001$) were associated with decreased survival. More recent year of diagnosis was associated with improved overall survival.

Conclusions: Recent reports challenging the benefit of postlumpectomy radiation in elderly patients brought about changes in treatment guidelines in 2004 advocating omission of RT in select patients. Our study suggests that postlumpectomy RT rates in elderly patients has been steadily decreasing over time and did not show any appreciable acceleration in this decline after new guidelines were established. In addition, this trend does not appear to be consistent across all regions. Continued research must be undertaken to assess differences in clinical practice and its impact on patient outcomes.

0022 Hormone Receptor Negative Breast Cancer – the Undertreatment of Patients Over 80

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Objectives: Patients over 80 represent a significant breast cancer population though they continue to be underrepresented in clinical trials. While it is established that ER/PR- status confers a worse prognosis in patients under 70, this phenomenon is not well studied in those over 80. The objectives of this study are first to examine the prognosis of patients over 80 with ER/PR- disease, and to determine if these patients are more likely to die of breast cancer than the younger cohorts, second, to determine if patients over 80 are more likely to die of an ER/PR- breast cancer related or cardiovascular related death; and last, to study the treatment patterns in patients over 80.

Method: We queried the Surveillance, Epidemiology, and End Results (SEER) Database between 1992 and 2009. Inclusion criteria were all patients with invasive carcinoma. Exclusion criteria were unknown hormone receptor status, unknown stage, and more than 1 primary malignancy. Primary outcomes were breast cancer death or cardiovascular death. Secondary outcomes were radiation and surgery. The Cox proportional hazard analysis and

multivariate logistic regression were used to determine adjusted outcomes over time, adjusting for demographics, geographic location, stage, and treatment modalities. Subset analysis was performed comparing mortality rates by stage.

Results: There were a total of 502,807 patients with breast cancer in SEER, 6,933 of which were over 80 years old with ER/PR- disease. ER/PR- patients over 80 years faced significantly decreased 10-year survival compared to ER/PR+ patients according to Kaplan-Meier survival estimates (61.5 vs 81.4%, $p < 0.05$). ER/PR- patients were more likely to die of breast cancer than cardiovascular disease (25.6% vs 12.2%). Adjusting for confounders, ER/PR- patients over 80 were more likely to die a breast cancer specific death than patients aged 50-79 (HR 1.49; CI 1.38-1.61). This finding was consistent across all stages. Compared to younger cohorts, elderly patients with ER/PR- disease received significantly less radiation therapy (OR = .42; CI, .38-.46), and had a trend for less surgery (OR = .81; CI, .64-1.02).

Conclusions: Even at advanced age, patients are more likely to die of their breast disease than cardiovascular disease, and they are more likely to die of breast cancer specifically than younger patients. Clinicians should consider standard treatment regimens utilized in younger women in the management of elderly patients.

0143 Impact of Race in Prevalence of BRCA Mutations Among Women With Triple-Negative Breast Cancer (TNBC) in a Genetic Counseling Cohort

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Objectives: Recently revised NCCN guidelines recommend that women with newly diagnosed triple-negative breast cancer (TNBC) be referred for consideration of genetic testing regardless of family history. Small and homogenous sample sizes have previously limited the ability to evaluate the prevalence of BRCA mutations among different ethnicities affected by the triple-negative breast cancer subtype. We sought to determine whether the prevalence of BRCA mutations among women diagnosed with TNBC differs by race.

Methods: We performed a retrospective review of patients with a diagnosis of TNBC referred for genetic counseling at 2 academic Hereditary Cancer Risk Clinics between 2003 and 2011. Demographic, clinical, and pathologic data were collected. Risk factors for BRCA mutations included BRCA status, BRCAPRO-predicted mutation risk, and family history. Race was categorized as African American (AA), Ashkenazi Jewish (AJ), Asian, Caucasian, Hispanic, or Other. Study outcomes included prevalence of TNBC associated with BRCA mutations.

Results: Four hundred forty-five patients with TNBC were identified, of which 302 (67.9%) tested negative for genetic mutations. One hundred forty-three (32.1%) had a confirmed BRCA1 (25.8%) or BRCA2 (6.3%) mutation. The prevalence of genetic mutations differed by ethnicity and race: AA (15.4%), AJ (63.6%), Asian (25%), Caucasian (32.7%), Hispanic (44.4%), and Other (50%) (25.78-44.99, $p < 0.0001$). Patient age also impacted the prevalence of genetic mutations among triple-negative breast cancers: <40 years old (43.8%), 40-49 years old (32.7%), 50-59 years old (24.8%), 60-69 years old (16.7%), and >70 years old (14.3%) ($p < 0.05$).

Conclusions: The prevalence of genetic mutations in triple-negative breast cancer among women referred for genetic counseling significantly differs by race and age. This data helps refine mutation risk estimates among women with TNBC, allowing for more personalized genetic counseling and potentially aiding in improved patient decision-making.

Posters

(in alphabetical order by presenting author)

0189 "Fast 5" Program Expedites Care for Patients With BI-RADS 5 Imaging Studies

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Objectives: In March 2010, our multidisciplinary breast cancer team met and designed a program aimed to expedite medical care for women with BI-RADS 5 breast imaging studies. We called this program "Fast 5."

Method: The day of BI-RADS 5 was designated day 0. The goal was to perform image-guided biopsy on day 1 or 2, pathology results by day 3 or 4, and surgical consultation on day 5 or 6. BI-RADS 5 imaging results prompted a series of coordinated alerts and priority appointments aimed to accomplish this goal. From April 15, 2010, to September 30, 2012, 125 patients entered our Fast5 program because of highly suspicious BI-RADS 5 imaging studies. We compared these 125 patients with 101 patients with BI-RADS 5 studies treated at our center before we implemented the Fast5 program. This was a retrospective chart review. Time intervals were measured as working days. Weekends and holidays were excluded. A total of 226 records were extracted for analysis. Wilcoxon rank sum tests were performed to detect differences between pre- and post-Fast5 groups for each time interval. Chi-squares were used to detect any differences in distribution between pre- and postFast5 groups for type of surgery performed, and whether or not patients had MRI.

Results: The Fast5 program significantly reduced targeted time intervals (Table 1). Overall time (mean days) from BI-RAD 5 to surgical consultation was reduced from 8.3 days in the pre-Fast5 group to 5.5 days in the Fast5 group ($p < 0.001$). There was a slightly higher mastectomy rate in the Fast5 vs pre-Fast5 group (41.9% vs 36.8%), but the difference was not statistically significant ($p = 0.51$). MRI was much more common in the Fast5 group, compared with the pre-Fast5 group (75% vs 30%, $p < 0.0001$) (Table 2), consistent with national trends.

Table 1

Time interval	Pre "Fast 5"		"Fast 5"		P value
	N	mean # days	N	mean # days	
B5 to biopsy	101	4.6	125	1.6	<0.001
Biopsy to path result	101	2.7	125	1.4	<0.001
B5 to surgery consult*	51	8.3	90	5.5	<0.001

**Excludes patients with benign tumors (12), pre-op chemo patients (22), and patients with surgical consults prior to B5 testing date (41).*

Table 2**

	Pre Fast 5		Fast 5		P value
	N	%	N	%	
Breast conservation	43	63.2	54	58.1	
Mastectomy	15	22.1	25	26.9	
Bilateral mastectomy	10	14.7	14	15.0	0.76
Breast conservation	43	63.2	54	58.1	
All mastectomy	25	36.8	39	41.9	0.51
Preoperative MRI	20	30.1	69	75.0	<0.0001

***Excludes patients with benign tumors (12), pre-op chemo patients (22), and patients who had surgery elsewhere (27).*

Conclusions: Our Fast5 program significantly reduced the time from BI RADS 5 through biopsy to surgical consultation. This program required buy-in and support by physicians, nurses, and other members of our team. This type of improvement in care demonstrates the importance and potential successes of a cooperative multidisciplinary breast cancer team. We plan to expand this program to patients with BI-RADS 4B and BI-RADS 4C studies.

0032 Breast Lesion Excision System (BLES) State of Art

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Objectives: Open excision biopsy has been for a long time the procedure of choice for nonpalpable suspicion mammographic lesions. Recently the minimal invasive stereotactic breast biopsy utilizing radiofrequency tends to become the golden standard since it offers many advantages compared to open biopsy. Breast Lesion Excision System (BLES) is an automated, vacuum-assisted breast biopsy device for nonpalpable mammographic lesions.The aim of this study is to validate the efficiency of the BLES for diagnosis of suspicious nonpalpable lesions.

Method: In a 28-month period, we used the BLES device in 199 consecutive patients (204 procedures) with nonpalpable mammographic lesions. The inclusion criteria consisted of suspicious microcalcifications, solid lesions, and asymmetric density. In order to retrieve an intact biopsy specimen, we used the 12-mm, 15-mm, or 20-mm tissue basket under local anesthesia, depending on the size of the lesion.

BLES biopsies are performed with a single needle pass. After stereotactic localization of the suspicious area, a 6- to 8-mm skin incision is performed and a retrieval basket is deployed to circumscribe the lesion. Radiofrequency is used to ablate the surrounding breast tissue and the basket containing the captured specimen is removed from the incision site. The whole procedure lasts 2-5 min and local anaesthesia is enough to ensure a painless biopsy.

Results: One hundred ninety-nine patients with nonpapable mammographic lesions underwent biopsy with BLES. The histological findings included: fibrocystic changes: 40 (19.7%), mild hyperplasia: 9 (4.43%), adenosis (non-sclerosing):12 (5.91), phyllodes tumor: 4 (1.97%), a single papilloma: 6 (2.95%), fat necrosis 7 (3.44%), duct ectasia:15 (7.38), squamous and apocrine metaplasia:17 (8.37), fibroadenoma: 46 (22.66), sclerosing adenosis: 8 (3.94%), papillomatosis:12 (5.91%), atypical ductal hyperplasia (ADH):4 (1.97%), ductal carcinoma in situ: 6 (2.95%), invasive ductal carcinoma: 4 (1.97%), invasive lobular carcinoma: 5 (2.46%), invasive tubular carcinoma: 2 (0.98%), invasive mixed carcinoma: 2 (0.98%), basket deployed in 4 cases.

Conclusions: The method has the unique advantage of completely removing the lesion without cutting through it. This way the specimen retains its original architectural structure intact, which means even more accurate histologic diagnosis and thus lower underestimation rates.

0159 Breast Ductal Carcinoma In Situ: A 20-Year Population-Based Study

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Objectives: Management of ductal carcinoma in situ (DCIS) remains controversial. The incidence of DCIS has significantly increased more than 200-fold in past few decades. Numerous studies of DCIS and invasive carcinoma have focused on biomarkers, tumor, and patient characteristics showing a correlation between in situ and invasive breast cancer. However, limited studies exist regarding the influence of menopausal status on outcomes in women with primary DCIS. Our study investigates the influence of menopausal status in women with DCIS.

Methods: The Surveillance, Epidemiology, and End Results database was queried for histologically confirmed DCIS in women between the years 1990 and 2009. Women were excluded if age < 18 years and if complete demographics and staging information were unknown. Women were grouped as premenopausal (Pre-M, age < 50) and postmenopausal (Post-M, age > 50). Overall and disease survival curves (OS and DSS, respectively) were analyzed using the Kaplan-Meier method and compared using log-rank testing. Log-rank and multivariate Cox regression analysis was used to identify predictors of survival using modified age groups (< 40, 40-49, 50-70, 71+), race, tumor histology/size/location, laterality, ER/PR status, surgery performed, and number of lymph nodes (LNs) examined.

Results: Of the 35,727 women analyzed, there were 8,852 Pre-M women and 26,875 Post-M women. Mean age was 59.26 years (18-90 years, + 12.46). Both groups presented with similar distributions of patient demographics, tumor characteristics, and surgical management. However, more Pre-M women had tumors < 2 cm (74% vs. 80%, $p < 0.001$), were ER+/PR+ (77% vs 68%, $p < 0.001$), were more likely to have mastectomies (39% vs. 27% $p < 0.001$), and had more LNs examined (44% vs 34%, $p < 0.001$) when compared to Post-M women. For women with only 1 primary (n = 26,734), the 15-year OS % for Pre-M and 81.4% and 84.8% for Post-M ($p < 0.001$) while the DSS was not statistically different (99.1% and 98.1%, respectively, $p = 0.275$). On multivariate Cox regression

analysis, younger age, race, tumor grade, ER/PR status, extent of surgery, and number of LNs examined correlated with improved OS.

Conclusions: This is the largest population-based study of women with DCIS in the literature. Pre-M women were more likely to have less aggressive DCIS yet undergo more extensive surgery and LN staging compared to Post-M, while radiation rates remained equivalent. This raises questions regarding the current treatment guidelines for Post-M women with DCIS and further studies are needed to address this issue.

0170 Improving Breast Diagnostic and Treatment With an Interdisciplinary Rapid Diagnostic and Support (RADS) Program

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Objectives: A multidisciplinary team of breast cancer specialists in a regional referral center embarked on a new initiative to improve breast care by setting up a *Rapid Diagnosis and Support (RADS) Clinic* to coordinate the diagnostic imaging workup, needle biopsy, pathological diagnosis, and surgical management for women with a high probability of breast cancer based on suspicious initial diagnostic imaging findings.

Method: Consecutive patients with an initial diagnostic mammogram and/or ultrasound classified as BI-RADS 5 were invited to participate in the study. Interventions in the model included prioritizing biopsy appointments, initiating follow-up imaging, providing support and coordination of care by a nurse navigator. Wait times were evaluated at 4 different intervals, from (a) diagnostic imaging to biopsy (b) biopsy to pathology report verification, and (c) pathology to surgical consultation and (d) consultation to OR, and were compared to historical wait times in these categories from the prior year. Satisfaction surveys were given to all patients in the study.

Results: A total of 211 consecutive patients with a BI-RADS 5 diagnostic imaging consented to the RADS program over 1 year. Ninety-three percent of the biopsies resulted in carcinoma or lymphoma. All wait times significantly improved after initiation of the RADS Clinic. Biopsy wait times improved from a mean of 7 to 3 days ($p < 0.0001$); pathology verification from 3.9 to 3.3 days ($p = 0.0007$); surgical consultation improved from 16.1 to 5.95 days ($p < 0.0001$); and operative wait times improved from 31.5 to 24 days ($p = 0.042$). Overall patient satisfaction was 97%.

Conclusions: The Rapid Access and Diagnostic Clinic significantly improved diagnostic and treatment wait times for patients with a high probability of diagnosis of breast cancer by improving the efficiency of service delivery. This initiative can serve as an innovative service delivery model for other breast care centers.

0029 Validation Study of a Modern Treatment Algorithm for Nipple Discharge

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Objectives: Nipple discharge occurs in 2%-5% of women, the vast majority of whom have a benign etiology. This study was undertaken to evaluate the effectiveness of a previously proposed evidence-based treatment algorithm for these patients.

Method: A review of all patients with nipple discharge from 2005 through 2011 at a single institution. Patients with pathologic discharge and a negative mammogram and subareolar ultrasound were offered clinical follow-up according to the algorithm.

Results: There were192 patients, of whom 190 were female. The mean age was 56 years (range, 19-94). The discharge was unilateral in 77%, spontaneous in 72%, from a single duct in 69%, and bloody in 34%. Primary care physicians determined the discharge was nonpathologic in 50 patients and a breast surgeon was consulted for the remaining 142 (74%) patients. No patient who was not referred to a breast surgeon subsequently developed breast cancer. Among patients seeing a surgeon, 34% underwent initial subareolar duct excision/biopsy, including 12% (13/107) of those with no imaging abnormality and 100% (35/35) of the patients with an imaging abnormality. The rates of carcinoma were 0% (0/13) for those with no imaging abnormality and 23% (8/35) for those with an imaging abnormality. Of 94 patients undergoing close clinical follow-up by a surgeon, 1 (1%) was subsequently found to have DCIS at 6 months of follow-up. This patient had not undergone a subareolar ultrasound at initial evaluation and when performed at the 6-month follow-up appointment, this demonstrated intraductal abnormalities prompting the subareolar duct excision that provided the diagnosis. The 9 carcinomas diagnosed included DCIS (n = 5, 56%),

invasive ductal carcinoma (n = 2, 22%), invasive papillary carcinoma (n = 1, 11%), and invasive lobular carcinoma (n = 1, 11%). The stages at diagnosis were stage 0 (n = 5, 56%), stage I (n = 3, 33%), and stage III (n = 1, 11%). Median follow-up for those with cancer was 46 months and all patients remained cancer-free.
Of the patients undergoing close clinical follow-up by a surgeon, 21% (20/94) underwent subsequent subareolar duct excision due to developing an imaging abnormality (1/94, 1%) or for bothersome, persistent discharge (19/94, 20%). The median follow-up was 28 months for the 74 patients not undergoing subareolar duct excision and 81% of these patients had resolution of their discharge at last follow-up.

The risk of carcinoma among the entire cohort was 5%, including 4% among women and 50% (1/2) among men. All patients with carcinoma had an imaging abnormality, including 2 with an abnormal mammogram (sensitivity 22%, specificity 18%), 8 with an abnormal subareolar ultrasound (sensitivity 89%, specificity 23%), 1 with an abnormal ductogram (sensitivity, 100%; specificity, 8%), and 1 with an abnormal breast MRI (sensitivity, 50%; specificity, 100%).

Conclusions: Low-risk patients with nipple discharge can be prospectively identified based on radiographic findings and clinical examination. These patients can safely be offered close clinical follow-up and most will have resolution of their symptoms. This strategy allows more than half of patients to avoid an unnecessary surgical procedure.

0126 Lymphovascular Invasion and Modified Bloom-Richardson Grade As Predictors of Axillary Lymph Node Metastasis and Disease Recurrence

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Objectives: Higher Modified Bloom-Richardson (MBR) grade and presence of lymphovascular invasion (LVI) are considered negative prognostic indicators in breast cancer. We sought to determine the association between MBR grade and LVI in axillary lymph node (ALN) status and disease recurrence.

Method: Invasive breast cancer patients from 2003-2011 were identified from a single institutional database. Patient charts were reviewed for demographic factors and tumor characteristics including age, race, stage, histologic subtype, ER/PR/Her2-neu status, LVI, MBR grade, and adjuvant treatment. Univariate and multivariate logistic regression analyses were performed to determine the prognostic significance of MBR grade and LVI on ALN status and disease recurrence and represented with an odds ratio (OR) and 95% confidence intervals (95% CI).

Results: During the study period, 1,183 patients were included. Of these, 46% (N = 543) were ALN positive and 8.4% (N = 99) had disease recurrence. On multivariate analysis, the presence of LVI was the only independent predictor of ALN positivity (OR, 3.21; 95% CI, 2.32-4.51; p = .001). MBR grade 3 and triple-negative disease were independent predictors of disease recurrence (OR, 2.49; 95% CI, 1.21-5.09; p = .013; and OR, 2.44; 95% CI, 1.38-4.32; p = .002).

Conclusions: The presence of LVI and MBR grade 3 are independent negative prognostic indicators in breast cancer. After controlling for clinicopathologic factors, LVI is a more accurate predictor of ALN disease and MBR score 3 is a stronger predictor of disease recurrence.

0151 Selective Use of Intraoperative Histopathologic Analysis of Axillary Sentinel Lymph Nodes in Breast Cancer Patients

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Objectives: The objective of our study was to assess the following:

1. If a surgeon could accurately predict the status of axillary nodal metastases while performing sentinel lymph node (SLN) biopsy, therefore allowing for selective intraoperative pathologic evaluation in breast cancer patients.
2. The relationship between patient and tumor factors and malignant involvement of sentinel lymph nodes

Method: Following institutional review board approval, retrospective chart review of clinically node-negative patients with breast cancer who underwent sentinel lymph node biopsy by 2 dedicated breast surgeons was performed from a prospective database. All patients underwent SLN biopsy between January 2009 and December

2011. The patients' charts were reviewed for information on demographics. The operative reports were reviewed for the surgeon's pre-pathology prediction (PP) on the status of the sentinel lymph nodes. The intraoperative nodal touch preparation (TP) results were recorded along with the final histopathology assessment from permanent sections (FP). Demographics and other baseline patient characteristics were analyzed with descriptive statistics. The significance of the relationships of the nominal and continuous variables was calculated with *t* test or chi-square test. A multivariate analysis was performed with logistic regression to ascertain the relationship of the variables with SLN positivity. P values less than 0.05 were considered significant. Statistical analysis of the data was performed using the SPSS statistical software, version 18.0 (SPSS Inc., Chicago, IL).

Results: Three hundred seventy-four consecutive patients with a mean age of 59.2 ± 12.1 years were included in the study. The population included 3 male patients. Seventy-seven percent of the patients were diagnosed with invasive ductal carcinoma, followed by 12.8% and 7.2% with ductal carcinoma in situ and invasive lobular carcinoma, respectively. The average tumor size was 1.7 ± 1.3 cm. 50.5% and 32.7% of the patients had stage I & II disease, respectively. A median of 3 SLN (range, 0-11) was removed in each patient. Forty-three and 33 patients had evidence of lymphovascular invasion and extra-nodal extension, respectively. Estrogen receptors were positive in 82.4% of the tumors, while progesterone and HER2 receptors were found in 73.7% and 15.7% of the tumors. The total number of patients with SLN metastases was 90 (24%). Of these, TP identified 48 of 374 cases (12.8%) with macro-metastases. The remaining 42 patients had micro-metastases, diagnosed by permanent section later. PP identified 40 of 374 patients (10.7%) with SLN macro-metastases (sensitivity, 81.6%; positive predictive value, 70.2%; $p < 0.0001$). PP failed to detect metastases in 8 of 374 patients (2.1%, $p < 0.0001$), which were diagnosed with intraoperative touch preparation assessment. Subsequent multivariate analysis revealed that tumor size, stage of disease, and lymphovascular invasion of the tumor had a statistically significant association with SLN positivity ($p < 0.0001$)

Conclusions: Surgical judgement and selective use of intraoperative pathologic analysis will identify comparable fraction of patients with macro-metastases in early breast cancer as those identified by routine intraoperative nodal touch preparation evaluation, thereby decreasing the overall cost and time of surgery. Both the methodologies usually will fail to detect micro-metastases, which require enhanced final histopathology evaluation.

0117 Increasing Incidence of Phyllodes Tumors May Necessitate Removal of Fibroadenomas at a Smaller Size

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Objectives: Breast phyllodes tumors (PT) are fibroepithelial lesions representing less than 1% of all breast cancers and often bear similarities to fibroadenomas (FA) on core needle biopsy (CNB). The sensitivity of CNB in detecting PT remains under 76%. The objective of this study is to determine factors associated with identifying PT upon surgical excision after CNB identifies FA. Our study attempts to review parameters that may aid initial diagnosis by evaluating a group of patients with FA and PT and comparing their initial and final findings.

Method: We performed a retrospective review of patients who received a diagnosis of breast PT or FA on CNB between 8/2010 and 10/2012 at our institution. All radiologic and pathologic specimens were reviewed. Factors assessed included: mass size and shape on ultrasound (US), CNB findings, and final diagnosis.

Results: One hundred five cases of PT or FA on CNB were found at our institution over this time period: 89 cases of FA and 16 cases of PT were utilized for analysis. One hundred and two (97%) cases revealed FA on CNB; however, upon surgical excision, 13 (13%) were identified as PT. Only 3 cases (19%) demonstrated pathologic-radiologic concordance. The 3 PT identified on CNB demonstrated sizes ranging from 2.6 cm to 4.8 cm on US. The 13 nonconcordant cases had sizes ranging from .8 cm – 5.8 cm on US. The mean diameter of PT was 2.96 cm, compared to the average diameter of FA, 1.41 cm. The median diameter of PT was 2.4 cm, compared to the median diameter of FA, 1.2 cm. Of the 89 FA cases, 68 (76%) cases showed a well-circumscribed, regular mass on US. Nineteen (24%) cases showed a poorly marginated or lobulated mass. Of the PT, 9 cases (56%) were well-defined on US. Seven (44%) demonstrated a lobulated, irregular mass, 30% of which were correctly identified on CNB. Upon final pathology, 14 (88%) cases were diagnosed as benign PT. Two (13%) were diagnosed as malignant PT and demonstrated pathologic-radiologic concordance.

Conclusions: One hundred five surgical excisions of suspected FA and PT were reviewed. Of the PT cases, only 3 (19%) were correctly identified as breast PT on CNB. The data gathered suggests that there may be a link between size of a mass on US and the diagnosis of PT upon surgical excision. The mean diameter of PT was 2.96 cm, compared to the average diameter of all true FA, 1.41 cm. The median diameter of PT was 2.4 cm, compared to the median diameter of FA, 1.2 cm. Current recommendations suggest removal of a suspected FA greater than 3 cm. If

we had followed these guidelines, we would not have excised 60% of phyllodes cases. This may suggest removal of breast masses at a smaller size. Our data also suggest that the recognition of PTs is increasing among pathologists, as the rate of PTs in our sample was 15%, much higher than the 1% that is historically reported.

0100 Outcomes of Early Onset Breast Cancer After Breast Conservation Surgery: A Pakistani Perspective

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Objectives: Early onset breast cancer is usually associated with poorer outcomes but variable results have been reported in the literature. It is a significant problem in Pakistani women but remains underreported. Breast conservation plays an important role in surgical management of this younger patient population. The objective of this study was to determine the outcome of breast conservation surgery in patients with early onset breast cancer in our population.

Method: A review of patients with breast cancer who underwent breast conservation surgery at SKMC from 1997 to 2009 was performed. Patients were divided into 2 groups (ie, group I: age up to 40 years (early onset) and group II: >40 years). A total of 401 patients with early onset breast cancer were identified. A similar number of patients from group II were randomly selected. Chi-square test was used for categorical variables and *t* test for interval variables. Outcome was assessed on basis of 5-year locoregional control, disease-free survival, and overall survival. For survival analysis, Kaplan-Meier curves were utilized and significance was assessed using log-rank test. Cox regression was applied for multivariate analysis.

Results: A total of 806 patients were included in the study with 401 in group I and 405 patients in group II. Mean follow-up was 5.01 ± 2.4 years in group I and 4.5 ± 2.3 years in group II ($P < 0.0001$). Both groups were significantly different for grade of tumor, ER/PR status, Her2/neu status, triple negativity, tumor size stage, and use of neoadjuvant therapy. No significant difference was present between groups in terms of 5-year locoregional control (93% vs 95%) ($P = 0.14$), disease-free survival (77% vs 74%) ($P = 0.30$), and overall survival (82% vs 81%) ($P = 0.14$). On multivariate analysis, tumor size stage ($P < 0.0001$) was an independent predictor of locoregional control, disease-free survival, and overall survival.

Conclusions: Early onset breast cancer is associated with a distinct biology but does not lead to poorer outcomes in our population.

0070 Shorter Treatment Regimens Have Not Overcome Barriers to Radiotherapy Utilization in Breast Cancer Patients

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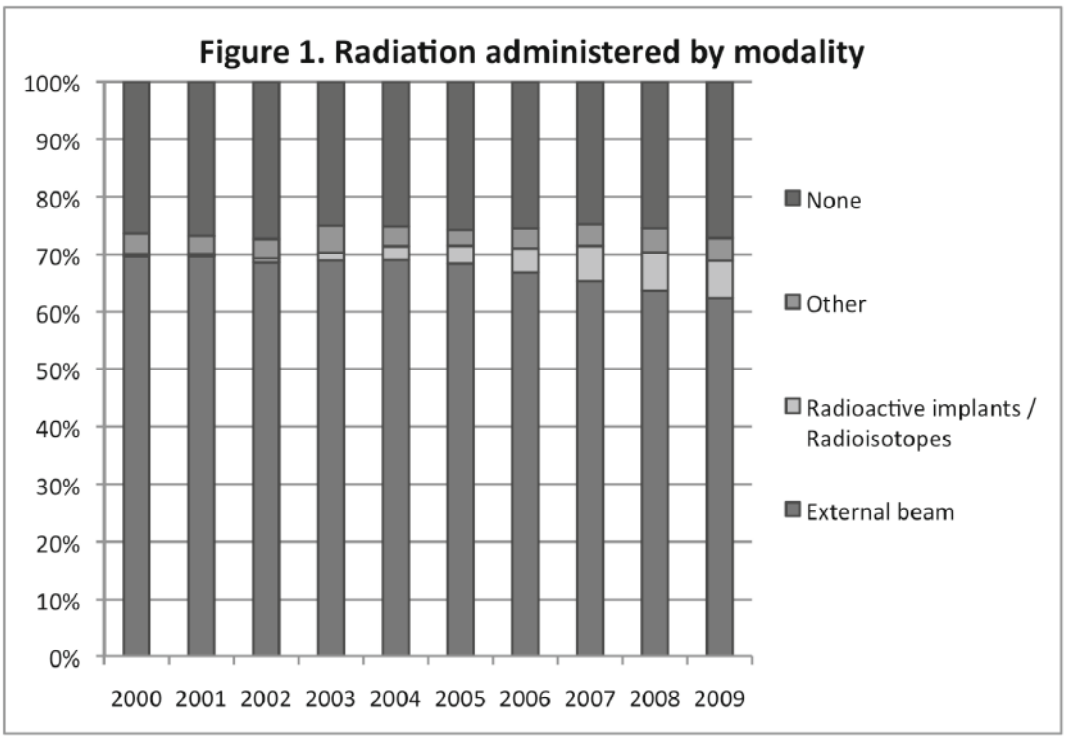
Objectives: Adjuvant radiation therapy (RT) improves local control after breast-conserving surgery, but the time commitment and inconvenience of standard 6-week regimens may be a barrier for patients with breast cancer. Within the past decade, shorter treatment regimens, such as hypofractionated RT and accelerated partial breast irradiation (APBI), have been introduced to improve RT accessibility. We sought to determine the impact of these shorter treatment regimens on RT utilization and to identify if there were persistent barriers to RT utilization.

Method: The Surveillance, Epidemiology and End Results (SEER) registry was used to identify women who underwent breast-conserving surgery for stage 0 or I breast cancer from 2000-2009. RT utilization and RT modality were determined. Factors impacting RT utilization were identified using chi-square and multivariate logistic regression.

Results: Of 180,219 study patients with known radiation status, 131,343 (73%) received RT; 123,703 (94%) of these patients received external beam radiation. RT rates remained relatively stable over the 10-year period (Figure 1), but there was a profound increase in the use of radioactive implants/radioisotopes as the primary modality of RT: from 0.32% in 2000 to 6.5% by 2009 ($p < 0.0001$). Whereas most women under age 70 received RT (73% for age <40; 76% for age 40-49; 77% for age 50-59; 78% for age 60-69), only 63% of patients ≥70 years received RT ($p < 0.0001$), and this rate remained relatively unchanged throughout the study period. When lymph node evaluation was deemed unnecessary, RT was also omitted more frequently, being used in only 60% of patients with zero lymph nodes assessed, as opposed to 77% when any lymph nodes were assessed ($p < 0.0001$). Hispanic, American, Indian, and Black patients received RT less frequently than other racial groups ($p < 0.0001$). When analyzed by SEER catchment area, the 2 regions with the highest proportion of Hispanic individuals (20% in Los Angeles and 25% in New Mexico) had the lowest rates of RT utilization (59% in Los Angeles and 65% in New

Mexico). Lower rates of RT utilization were also more common in counties with less education, increased poverty, and higher rates of unemployment ($p < 0.0001$).



Conclusions: Despite providing improved accessibility and acceptability, the introduction of shorter RT treatment regimens has not resulted in increased RT utilization for stage 0 and I breast cancer patients. Barriers to care still exist that accelerated RT regimens have not alleviated.

0156 Smoking and Breast Cancer Recurrence After Breast Conservation Therapy

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Objectives: Prior studies have shown earlier recurrence and decreased survival in patients with head and neck cancer who smoked while undergoing radiation therapy. The purpose of the current study was to review breast cancer patients treated with partial mastectomy and radiation therapy to see if smoking status at the time of treatment affected breast tumor recurrence or survival.

Method: After IRB approval, our single-institution hospital tumor registry was queried to determine type of surgery, radiation therapy, recurrence, and survival for breast cancer patients over a 10-year period (2002-2011). Breast conservation therapy patients' charts were reviewed and smoking status (nonsmoker, prior smoker, current smoker, or not on file) was determined from the patient or physician documented history. SPSS was used for statistical calculation.

Results: There were 624 breast conservation patients in whom smoking history and follow-up was available. There was no association between smoking and tumor stage, grade, histology, or receptor status. African American women were more likely to be current smokers (22% vs 7%, $p < 0.001$). With a mean follow-up of 45 months, any recurrence was significantly higher in current smokers compared to former or never smokers. ($p = 0.039$, see Table) There was no difference in distant recurrence between the groups, but there was a trend toward a difference for locoregional recurrence. There was no statistically significant difference in overall survival.

continues

	Never Smoker	Prior Smoker	Current Smoker	Total
No recurrence	366 (97.3%)	189 (96.4%)	47 (90.4%)	602 (96.5%)
Recurrence	10 (2.7%)	7 (3.6%)	5 (9.6%)	22 (3.5%)
Total	376 (100%)	196 (100%)	52 (100%)	624 (100%)

P = 0.039

Conclusions: Although the numbers are very small, this study suggests that smoking may negatively influence recurrence rates after partial mastectomy and radiation therapy. A larger study is needed to confirm these observations.

0142 Immediate Breast Reconstruction After Surgery for Breast Cancer: A Retrospective Review of Cancer Quality Initiatives (CQI) at a Public, Academic, and University-Owned Private Hospital in a Metropolitan Area

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Objectives: In 2009, the National Accreditation Program for Breast Centers (NAPBC) added the audit filter that all appropriate patients undergoing mastectomy for breast cancer are offered immediate reconstruction and is monitored for compliance annually. Postmastectomy breast reconstruction improves psychological well being, as well as cosmetic results. The aim of this study is to determine if there are existing disparities in postmastectomy breast reconstruction among 3 hospitals in a metropolitan area.

Method: A retrospective chart review was done from January 1, 2010, to December 31, 2011, during the CQI audit to identify patients who underwent mastectomy for breast cancer treatment in a public, academic, and university-owned private hospital. All 3 hospitals have breast providers within the same healthcare system. Other covariates identified included the rate of immediate reconstruction, socio-economic status, insurance status, race, age, stage of cancer, and radiotherapy (a relative contraindication to immediate reconstruction). SAS 9.3 was used to conduct chi-square tests and univariate logistic regression to identify patterns of association.

Results: All patients' medical records from 2010-2011 were reviewed retrospectively and identified 75 patients who underwent mastectomy for breast cancer treatment in the public hospital, 261 patients in the academic hospital, and 267 patients in the university-owned private hospital. Twenty-four percent (18/75) in the public hospital, 54% (162/261) at the academic institution, and 35% (93/267) at the university-owned private hospital underwent immediate postmastectomy breast reconstruction (<0.0001). Eighty-three percent (62/75) of patients treated in the public hospital, 26% (67/261) in the academic hospital, and 76% (204/267) at the university-owned private hospital were African American women (<0.0001). There were significant differences in socio-economic and insurance status for patients in these settings, with Medicaid covering 76% (60/75) in the public hospital, 11% (29/261) in the academic hospital, and 15% (39/267) in the university-owned, private hospital ($p < 0.0001$). Radiation therapy was administered in 46% (35/75) in the public hospital, 31% (82/267) in the academic hospital, and 23% (59/261) in the university-owned, private institution ($p < 0.002$). We found significantly higher odds of immediate postmastectomy reconstruction at the academic hospital (OR = 3.78; 95% CI, 2.11-6.77), but not at the university-owned, private hospital (OR = 1.69; 95% CI, 0.94-3.04), as compared to the public hospital.

Conclusions: This retrospective study shows that disparities may exist in the public hospital with respect to immediate breast reconstruction. Although many of the physicians who work at these 3 hospitals overlapped considerably and participate in multidisciplinary conferences, we found that disparities exist in spite of this. Direct correlation to race and financial status exist in these settings, with an increased number of patients undergoing immediate breast reconstruction when the patient population is composed of nonminorities, with private insurance, and treated in an academic and not a public hospital. This study provides additional data to the existing literature by comparing 3 distinct settings within the same healthcare system in a metropolitan area. Given the identified barriers to reconstruction following breast cancer surgery, our next step is to intervene and alter current practices to eliminate differences in medical treatment among different patient populations.

0054 Sentinel Lymph Node Biopsy During Prophylactic Mastectomy: Is There a Role?

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Objectives: Prophylactic mastectomy (PM) is performed to decrease future breast cancer risk for many reasons, but there is a 3% to 5% likelihood of finding occult cancer within the prophylactic specimen. If an invasive cancer is found, the lymph node status becomes relevant for staging and prognostication. Whether sentinel lymph node biopsy (SLNB) can be performed reliably following mastectomy is unknown. Performing an SLNB at the time of PM permits evaluation of the axillary status in the event that an occult cancer is identified. However, SLNB is not without potential morbidity, and its utility during PM remains unclear. This study aims to determine rates of occult malignancy in the breast and/or sentinel lymph nodes (SLNs) in patients undergoing PM and whether routine SLNB is justified during PM.

Method: A retrospective review of a prospectively maintained database was performed to identify patients undergoing bilateral or contralateral PMs from July 2005 to August 2012. Patients having an SLNB during the PM were included in the analysis. Pathology reports were analyzed to determine occult cancer rate and SLNB status. Clinical characteristics, including demographics, BRCA status, and postoperative complications, were also obtained. Descriptive statistics were utilized for data summary and compared by Fisher exact test or ANOVA, where appropriate. A P value of <0.05 was considered significant.

Results: There were 384 patients identified during the study period who underwent 467 PMs (mean age, 45 years; range, 20-86). Of these, 301 patients underwent a contralateral PM and 83 patients underwent bilateral PM. Of the 467 PMs performed, 15 (3.9%) cancers were found on final pathology, including 4 invasive ductal, 2 invasive lobular, and 9 ductal carcinoma in situ. In addition, 43 (9.2%) PM specimens revealed atypical proliferative lesions on final pathology. All 6 of the invasive cancers identified were T1 (mean, 6.3 mm; range, 3-10 mm). A total of 682 SLNs were taken for an average of 1.46 SLNs per PM. There were 5 SLNs positive overall (1.1%). All were in patients undergoing contralateral PM for either history of breast cancer or new diagnosis of breast cancer; no SLNs were positive in patients undergoing bilateral PM. Two of the 5 patients with positive SLNs underwent completion axillary lymph node dissection, but no further lymph nodes were positive. No patient factors (age, BRCA mutation status, unilateral vs bilateral PM) or tumor characteristics (biomarker status, tumor size, nodal status) were predictive of finding occult malignancy in the breast or axilla.

Conclusions: In 467 PMs performed, 15 (3.9%) cancers were found, and only 5 (1.1%) were associated with a positive SLN. There were no specific patient and/or tumor characteristics that were predictive of finding occult malignancy. The occult malignancies identified were all T1 and all 5 of the patients with positive SLNs in the PM specimen had contralateral breast cancer which further limited the clinical significance of the occult disease. Based on these results, the routine use of SLNB at the time of PM is unnecessary and does not warrant the morbidity associated with the procedure.

0161 Nipple Skin-Sparing Mastectomy Is Feasible for Advanced Disease

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Objectives: Skin-sparing mastectomy (SSM) and nipple skin-sparing mastectomy (NSSM) are procedures commonly offered as part of the surgical treatment for breast cancer. Each involves a mastectomy with preservation of the skin overlying the breast (in SSM) and often also the skin overlying the nipple areolar complex (NSSM). At the time of mastectomy, immediate reconstruction with a tissue expander or implant is performed for a more favorable cosmetic outcome. Until now, these procedures have been reserved for low-risk patients and are rarely offered to patients with advanced disease where neoadjuvant chemotherapy and postmastectomy radiation are a planned part of the treatment. We report our experience of SSM and NSSM in such high-risk patients.

Method: This retrospective study from 2001-2012 evaluates the outcomes of 527 patients who underwent SSM of NSSM. Sixty patients with advanced disease who underwent neoadjuvant chemotherapy followed by SSM or NSSM with immediate reconstruction and subsequent XRT were identified. The cosmetic and oncologic outcomes of this patient group were noted.

Results: Five hundred twenty-seven patients in our study group had a total of 1,035 skin-sparing mastectomies (558 NSSM and 477 SSM—444 patients with bilateral and 83 with unilateral procedures). Of the 60 patients with locally advanced disease, 39 underwent NSSM and 21 underwent SSM. All patients received XRT to the diseased

side. Mean age of the group was 50.2 ± 10.8 years, with a range of 27-75 years for NSSM and 29-73 years for SSM. The lymph node status was positive in 71.8% with an average tumor size of 3.8 ± 2.5 cm. The overall radiation-induced complication rates observed are as follows: Wound infections and tissue necrosis occurred at a rate of 16.7%. The implant was removed in 5 % of the cases. Capsular contracture occurred at a rate of 10.2%. The cosmetic outcome was rated at an average of 9/10 on a visual analogue scale. Loco-regional recurrence was 6.7% at median follow up of 7 years. Radiation-related nonbreast complications occurred in 6.7% of the cases.

Conclusions: SSM and NSSM have been offered to patients with relatively low-risk breast cancer as oncologically safe while affording superior cosmesis with 1-step immediate reconstruction. Our series demonstrates that either procedure can be offered to patients with more advanced cancers requiring postoperative radiation therapy. The complications rates are comparable to those reported for patients undergoing XRT after traditional mastectomies.

0153 How the Onco*type* Dx Breast Cancer Assay for Ductal Carcinoma In Situ Impacts Treatment Decisions

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Objectives**:** To discuss the impact of the Onco*type* Dx Breast Cancer Assay for Ductal Carcinoma In Situ on the use of adjuvant radiation therapy.

Method: The Onco*type* Dx Breast Cancer Assay for Ductal Carcinoma In Situ (DCIS Score) has been developed and validated for risk recurrence in ductal carcinoma in situ (DCIS). It is a 12-gene assay performed on an individual patient's tumor and is used to predict the 10-year local recurrence risk of an ipsilateral breast event. The score is divided to give the 10-year likelihood of local recurrence for either DCIS or invasive breast cancer and the 10-year risk of an invasive breast cancer. The clinical validation study was based on patients enrolled in ECOG 5194. The purpose of this study was to evaluate the impact of the DCIS Score in our recommendations regarding adjuvant radiation therapy. In this IRB-approved study, 19 patients at our institution underwent unilateral or bilateral partial mastectomy for DCIS from April 2012 to October 2012. All patients had specimens submitted for DCIS Scores. Eleven of the 19 patients had margins of 3 mm or greater. Seven patients had margins of 1 mm to 2.5 mm, and 1 patient had margins that were less than 1 mm from the DCIS. The patient mean age was 56 years, with a range of 43 to 82 years old. The DCIS Score is reported on a scale of 0-100. This is then divided into subcategories of low (0-39), intermediate (39-50), and high (>55). All patients underwent consultation with Radiation Oncology. The radiation oncologists formulated their preliminary recommendation prior to reviewing the patients' DCIS Scores. The final recommendation for adjuvant radiation treatment was rendered after reviewing the DCIS Score. This recommendation was then discussed with the patient. We then compared the pre-DCIS Score and post-DCIS Score treatment recommendations.

Results: Sixteen patients (84%) were advised to have adjuvant radiation therapy. Three of the 19 patients (16%) were advised not to undergo adjuvant radiation and opted for observation alone. The DCIS Score did not alter treatment for any patient in this study group. For the patients who were advised not to have radiation, their DCIS Scores were 0-7. The mean age of the radiated group was 54 years old, compared to the mean age of the not-radiated group, which was 65.

DCIS Score	XRT Recommended Prior to Score	Did DCIS Score Change Radiation Plan?
Low (14)	No (3), Yes (11)	No
Intermediate (2)	Yes	No
High (N=3)	Yes	No

Conclusions: The DCIS Score is a validated tool to assess the local risk of recurrence for ductal carcinoma in situ. In our study population, the results of the DCIS Score did not alter treatment in any patient. In the 3 patients who were advised not to have radiation, the low DCIS Score confirmed the radiation oncologist's perceived low risk of recurrence. In order to increase confidence in results of the DCIS Score, further large-scale studies need to be performed.

0036 BRCA-Positive Patients Without Cancer at the Time of Diagnosis and the Plan of Care Chosen

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Objectives: BRCA mutation carriers have a lifetime risk of developing breast cancer up to 80%. The decision to pursue prophylactic mastectomy is a personal decision which weighs cancer prevention against changes in body image. The purpose of this study was to investigate the utilization of surgical prophylaxis by patients with a BRCA mutation and their long-term outcomes, as compared to those who chose continued surveillance.

Method: In a single-institution retrospective review, all female patients with a BRCA mutation who did not have a history of cancer at time of genetic testing were followed and their outcomes documented. All patients tested between 1996 and 2011 were included. The outcomes measured include whether each individual chose to undergo surgical prophylaxis or surveillance, pathology results at time of prophylactic surgery, time to cancer development, and stage at time of subsequent cancer development.

Results: BRCA mutation testing was performed in 2,056 individuals, with 246 (12%) identified as mutation carriers. One hundred patients did not have an established cancer diagnosis. Thirteen of these 100 patients (5%) were males, which were excluded from analysis. Thus 87 women comprised the study population. Twenty-three of these 87 women (26%) were age 35 or younger. Forty of these 87 women (46%) elected continued surveillance, 47 (54%) elected prophylactic surgical intervention. Thirty-seven of the 47 women (79%) who chose surgical prophylaxis underwent prophylactic bilateral mastectomy, 25 of these (53%) in combination with a hysterectomy and bilateral salpinogoophorectomy (TAH BSO). The remaining 10 women underwent TAH BSO alone. No women in the group who underwent prophylactic surgery developed an invasive cancer with a median follow-up of 3 years (range, 1-11 years).

Five women who underwent prophylactic mastectomy were found to have evidence of neoplasia on pathology review. Three of these 5 women had findings of atypical hyperplasia. The remaining 2 women (4%) were found to have ductal carcinoma in situ upon pathologic evaluation. No invasive cancers were identified.

Five of the 40 patients undergoing surveillance (12.5%) developed an invasive cancer with a median follow-up of 36 months (range, 5-84 months) after genetic testing. The resulting pathology at time of surgical intervention is documented as follows: T1a(m)N0M0 breast cancer 5 months after diagnosis, T1bN0M0 breast cancer at 12 months, T1aN1M0 breast cancer at 36 months, T2N0(i+)M0 breast cancer at 72 months, and a T1bN0M0 with synchronous contralateral T2N0M0 breast cancer diagnosed 84 months after genetic testing.

Conclusions: Fifty-four percent of the women in this study group who tested positive for a BRCA mutation elected to undergo surgical prophylaxis. The majority of women (79%) elected to undergo a bilateral mastectomy. Two of these 47 women (4%) had evidence of DCIS at time of prophylactic surgery. No cancer was noted to develop within the prophylactic group, while 12.5% of woman in the surveillance group developed breast cancer. Prophylactic surgical intervention is an effective means of cancer prevention in the BRCA-positive population.

0152 Interstitial Laser Ablation of Breast Fibroadenoma

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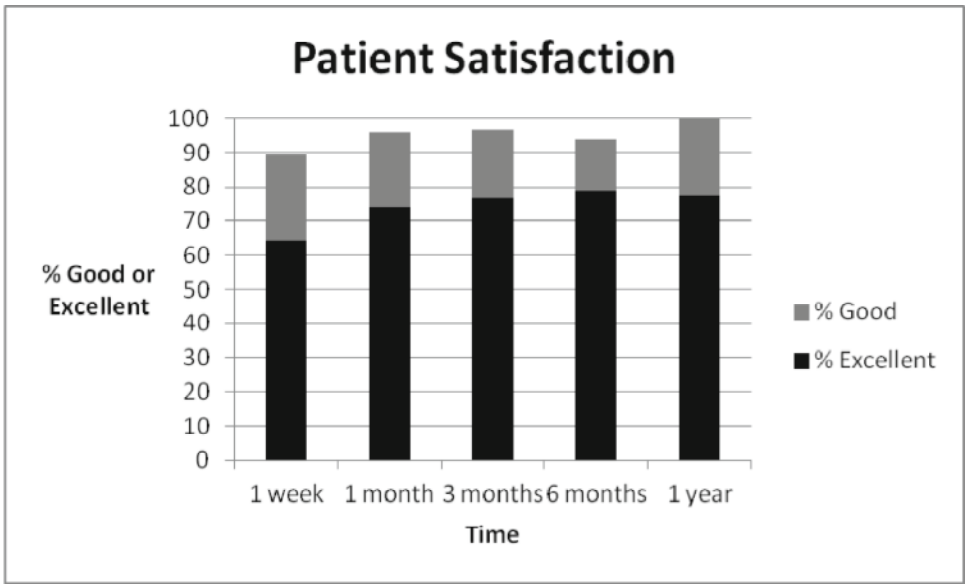
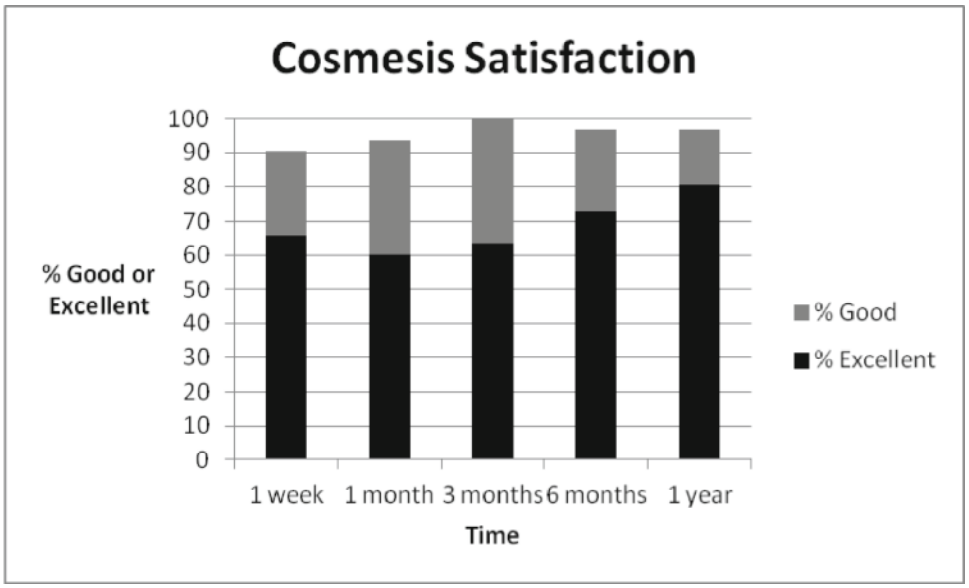
Objectives: Fibroadenoma of the breast occurs commonly in young women. Although benign, watchful waiting causes patient anxiety, and surgical excision is associated with pain and scarring. This study examines the use of percutaneous, interstitial laser ablation (ILA) as an alternative treatment.

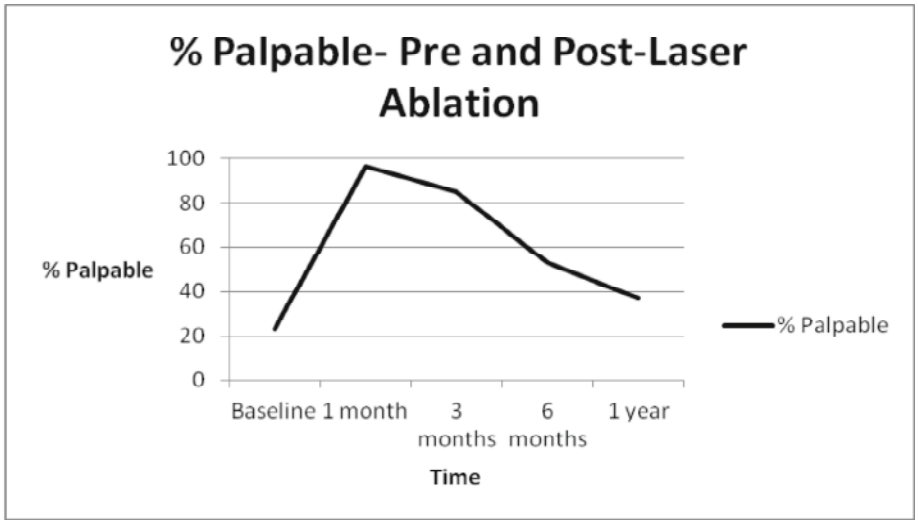
Method: Thirty-nine patients (median age, 40 [22-69]), with core needle biopsy-proven fibroadenomas were treated with ultrasound-guided ILA (Novilase®, Chicago, IL) at the Breast Center between 2009 and 2011: 56% Asian, 18% White, 5% Black, 18% Other, and 3% unknown race. The mean tumor diameter was 10.5 (6-18.9) mm. Average treatment time was 14.2 min, at laser temperature of 60.3°C. Patients were followed up for 1 year.

Results: Ablation was well tolerated with a median pain score of 2/10. The median return time to normal activities was 24 hours. Thirty-seven of the 39 patients (94.9%) had complete ablation of fibroadenoma after 1 treatment as determined by ultrasound imaging. One patient with residual tumor was successfully treated a second time. A second patient appeared to have a possible scar suggestive of a lesion. The most common patient's symptom after

ablation was a painless, palpable lump, becoming less noticeable during the ensuing 6 months. Two patients had mild skin scalding which resolved without significant scarring. Patient satisfaction was recorded on a scale of “Excellent,” “Good,” “Fair,” and “Poor”. On evaluation at 1 year, 100% patients reported Excellent-Good overall satisfaction, and 96.8% were satisfied with the cosmesis.







Conclusions: ILA appears to be a promising and safe method for the treatment of breast fibroadenoma. Longer follow-up is needed to assess this new technique.

0006 Axillary Lymph Node Metastasis in Ductal Carcinoma In Situ

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Objectives: The aim of the present study is to determine the prevalence of SLN metastasis in a multi-institutional series of patients with DCIS and to follow their outcomes.

Method: An IRB-approved retrospective review of our Breast Cancer Database was done to identify all cases with DCIS and positive axillary lymph node(s) from January 2000 to December 2010. Clinical, biochemical, and pathological variables were analyzed, and patient outcomes were followed.

Results: Nine hundred thirty-two cases with DCIS were identified, and 7 patients (0.75%) were found to have metastasis in their sentinel lymph nodes (SLN). All, but 1, are Caucasian and their median age was 51 years old (37-73 years). Four had breast conservation therapy, 3 had a mastectomy. One had a minute focus suspicious for invasive carcinoma in the breast and the rest had pure DCIS without invasion/microinvasion. Six patients had a single positive lymph node, 1 patient had 2 positive lymph nodes. All were micrometastatic disease. Three underwent a completion axillary dissection that showed no additional positive nodes. Four were given chemotherapy. With a median follow-up of 9 years, 3 patients (42.86%) developed a recurrence--2 had local recurrences and 1 developed metastatic disease to the contralateral axilla which spread to bone and stomach.

Conclusions: Our results confirm that the finding of SLN metastasis in breast DCIS is a very rare occurrence (6 of 932 cases) if the primary tumor has been completely excised and microinvasion has been ruled out. DCIS with metastasis to axillary lymph node(s) have worse outcomes.

0176 Predictors of Treatment With Mastectomy, Use of Sentinel Lymph Node Biopsy and Upstaging to Invasive Cancer in Patients Diagnosed With DCIS on Core Biopsy

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Objectives: Sentinel lymph node biopsy (SLNB) is recommended in patients undergoing definitive surgery for ductal carcinoma in situ (DCIS) when there is a high preoperative suspicion of invasive cancer or when treatment is total mastectomy (TM). The main objective of this study was to identify the factors associated with initial TM, the use of SLNB, and upstaging to invasive cancer in Alberta, Canada.

continues

Method: Patients who were diagnosed with DCIS on preoperative core needle biopsy (CNB) and underwent definitive surgery for DCIS from January 2009 - July 2011 were identified using a provincial synoptic database. Patient demographics, tumor characteristics on diagnostic core and final pathology, as well as type of surgery (breast-conserving surgery [BCS], TM, SLNB) were obtained from chart review. Logistic regression models that incorporated random effects to account for between-surgeon variability were used to model the relationship between baseline patient and tumor characteristics and treatment with TM, the use of SLNB, and upstaging. The variable with the largest P value at each step was removed from the full model manually, 1 at a time, until a final, parsimonious model was reached.

Results: There were a total of 394 patients identified, with a mean age of 57. Preoperative tumor size averaged 3 cm and microinvasion was identified in 33 patients (8%) on preoperative CNB. A total of 148 patients (37.6%) underwent TM, while 246 patients (62.4%) had BCS. Preoperative tumor size was a significant predictor of initial treatment with mastectomy (OR, 1.92; 95% confidence limits, 1.65-2.24). Overall, SLNB was performed in 306 cases (77%) and 140 (61%) of the 229 patients with pure DCIS on CNB. The SLN was positive in 7 patients (5%) treated with BCS, of which 1 had a macro-metastases (0.7%); the remaining were micro-metastases 3 (2%) or isolated tumour cells 3 (2%). Significant predictors of SLNB in this population were estimated preoperative tumor size (OR, 1.55; 95% confidence limits, 1.18-2.04) and the operating surgeon. In these models we found significant variability of the random effects due to surgeon, suggesting that surgeon also influenced the likelihood of receiving initial TM and SLNB. For those with pure DCIS on CNB, final pathology confirmed DCIS in 277 (76.7%) of 361 patients and 84 patients (23.3%) were upstaged to invasive carcinoma. On multivariable analysis, only pre-operative tumor size (OR, 1.14; 95% confidence limits, 1.03 to 1.27) was a significant predictor of upstaging to invasive carcinoma. Surgeon was not associated with the likelihood of upstaging, as expected.

Conclusions: The use of SLNB in Alberta, Canada, is high in patients undergoing BCS. In addition to tumor size, the operating surgeon was predictive of SLNB use, which suggests surgeon preference is an influential factor. Despite a 23% rate of upstaging to at least microinvasion, the rate of significant SLNB positivity >2 mm in patients treated with BCS is low, supporting omission of upfront SLNB.

0014 Axillary Reverse Mapping: A Prospective Study on Feasibility, Oncologic Safety, and Lymphedema

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Objectives: Determine the feasibility, oncologic safety, and lymphedema outcomes in patients treated with axillary reverse mapping (ARM).

Method: This is a prospective single-institution study of 184 patients (28 bilateral, 212 procedures) with ARM at the time of SLNB or ALND between December 2009 and February 2012. One hundred fifty-four had SLNB alone (group 1) and 58 had ALND with or without SLNB (group 2). Blue dye was injected into the upper inner arm for arm lymphatic identification if radioisotope SLN localization was confirmed preoperatively with gamma probe evaluation. In group 1, preservation of the blue lymphatic/node was attempted unless it was an SLN. In group 2, preservation was attempted if the blue/node lymphatic was outside the boundaries of a standard ALND. Lymphedema was assessed by circumferential arm measurements. An increase of 2 cm at any level compared to baseline was considered positive for lymphedema.

Results: No patient experienced a systemic reaction to blue dye injection. Superficial skin necrosis occurred in 1 patient at the arm injection site. A blue lymphatic/node was identified in 47% (73/154) of Group 1 and in 71% (41/58) of group 2. SLNB was performed in 197 procedures (154/154 in group 1 and 43/58 in group 2). SLN identification was 100% (154/154) in group 1 and 98% (42/43) in group 2. A blue node was also an SLN (crossover) in 11% (22/197) of procedures with an SLN identified: 12% (18/154) of group 1 and 10% (4/42) of group 2. Arm lymphatic preservation was successful in 83% (38/46) of eligible group 1 procedures and 100% (7/7) of eligible group 2 procedures. One blue SLN and 2 blue non-SLNs were positive for malignancy. One blue/hot SLN was negative for malignancy at ALND, but contained the clip from a positive axillary core needle biopsy (CNB). All positive blue nodes occurred in neoadjuvant patients with a positive axillary CNB at diagnosis. None of the blue nodes in clinically node-negative patients were positive for disease. One-year lymphedema results were available for 137 SLN only and 46 ALND procedures. Lymphedema occurred in 9 patients (3 bilateral, 12 procedures): 4% (6/137) of SLN-only procedures and 13% (6/46) of ALNDs. One patient in group 1 and 1 patient in group 2 with arm lymphatic preservation developed lymphedema.

Conclusions: ARM is feasible with minimal morbidity. Crossover between arm and breast lymph nodes occurred in 11% of patients. The finding of disease in sentinel and non-sentinel blue (ARM) nodes in neoadjuvant patients with a positive axilla at diagnosis raises concerns over the oncologic safety of ARM in this setting. No blue nodes were positive in patients with a clinically negative axilla at diagnosis. Evaluation of this technique in a larger sample of early-stage patients is needed to confirm the oncologic safety of blue arm node preservation in clinically node-negative patients.

0026 Does the Type of Primary Care Physician Influence the Stage of Breast Cancer at Time of Diagnosis?

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Objectives: Significant controversy has arisen in recent years regarding both the age of initiation and the frequency of mammogram screenings. In 2009, the United States Preventive Services Task Force (USPSTF) recommended that women wait to begin baseline mammograms until the age of 50, rather than 40, and that screening mammograms be performed biennially instead of annually. Our hypothesis for this study is that the primary care physician (PCP) specialty type would influence the diagnostic work-up and stage of breast cancer at the time of diagnosis because of differing guidelines for physician practice specialties (ie, family practice using USPSTF guidelines).

Method: Data was collected from the medical records of breast cancer patients via a community hospital's tumor registry. It included symptoms at the time of diagnosis, age at diagnosis, type of physician ordering the mammogram, type of mammogram performed, and stage of breast cancer at diagnosis. Patients were grouped into 4 categories by physician type: gynecologist, family practitioner, internal medicine, and "other." Each patient was then subsequently grouped according to stage: early (0-1), mid-stage (2), or late (3-4).

Results: 58.5% of cancers were mammogram-detected, 36.8% were detected by patient report of a mass, 3% were found by physician exam, and 1.7% presented as nipple discharge (Figure 1). After documentation of a palpable mass or nipple discharge, 11.4% of mammograms ordered were screening instead of diagnostic.

There was no correlation of stage of cancer and type of referring physician (Figure 2), however, gynecologists were shown to have significantly younger diagnosed patients, while internal medicine physicians had significantly older ones. It was also shown that patients diagnosed with "late" stage cancer were significantly younger, while those diagnosed with "early" stage cancer were significantly older. All of the confidence intervals for age and stage at time of diagnosis extended into the 40s age bracket.

Conclusions: A significant portion of breast cancers present by patient report of a mass, which argues strongly that PCPs should receive continuing education concerning patient self-breast awareness. PCPs should also be educated on the proper ordering of diagnostic mammograms with palpable abnormalities or nipple discharge, because screening mammograms may have subtle changes and interpreting radiologists may not be aware of the palpable mass. PCPs should perform breast exams prior to mammograms to determine if a diagnostic or screening mammogram should be ordered.

There is insufficient evidence that the age stage of cancer correlates to the physician type. However, patients having mammograms ordered by internal medicine physicians tend to be older than the younger patients being referred by gynecologists. In this community setting, patients with "late" stage cancer may fall into a significantly younger age range than patients with "early" stage cancer. This is potentially due to younger patients having a more aggressive form of cancer or a less intense screening. We interpret the confidence intervals for all cancer stages extending into the 40s age bracket as reinforcing the need for women to receive regular screening mammograms in their 40s.

0027 Use of a 3-D Bioabsorbable Marker to Delineate the Lumpectomy Cavity for Radiation Treatment Planning

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Objectives: Localized breast radiotherapy has been shown to be advantageous in early-stage breast cancer; however, external beam radiotherapy has not been widely used to accomplish this because of difficulty defining the target region of the surgical margin surrounding the lumpectomy cavity. Common methods of targeting include use of anatomic landmarks, radio-opaque clips placed during surgery, and use of the tissue changes surrounding the

seroma cavity as seen on CT. While improvements in surgical techniques have increased the adoption of breast conservation, clearly defining the gross tumor volume (GTV) remains challenging, with overestimation leading to large treatment volumes and resultant complications, thus limiting the use of advanced radiation technologies, such as 3-D conformal, IMRT, etc. In order to assist with delineation of the surgical site, we evaluated the utility of an implantable 3-D bioabsorbable tissue marker for postsurgical treatment planning after lumpectomy.

Method: Fifteen patients with early-stage breast cancer were prospectively selected to have a 3-D tissue marker (Focal Therapeutics BioZorb™) implanted at the time of lumpectomy, preoperative work-up included mammography, MRI, US, and core biopsy. Patients with multifocal disease, breast implants, or serious medical conditions were excluded. At the time of lumpectomy and sentinel node biopsy, the 3-D marker was sutured into the lumpectomy cavity using monofilament bioabsorbable sutures. Postoperative imaging for pre-treatment planning included standard CT simulation studies. Treatment plans were generated and compared, including standard tangent pairs, coplanar IMRT, and/or VMAT on the Varian Clinac iX platform. Most patients received standard whole-breast irradiation with a boost to the tumor bed as their adjunctive radiation treatment.

Results: Postoperative clinical imaging easily identified the marker, and clearly assisted with the 3-dimensional characterization of the borders surrounding the lumpectomy cavity. The 3-D marker was easily distinguishable from the seroma, and assisted in achieving significantly smaller planned treatment volumes (PTVs). A 30% volume reduction was typically seen in the boost volume when using the 3-D marker as compared to traditional methods. In some cases, where no seroma remained, the 3-D marker identified a lumpectomy cavity site that could not be identified at all with traditional methods. In addition, the device enabled image-based tracking of the lumpectomy cavity (as opposed to a surrogate target) during respiratory motion (4-D CT) and can be used to assist with image-guided radiation delivery.

Conclusions: The utility of this 3-dimensional, bioabsorbable tissue marker was confirmed when placed into the lumpectomy site during surgery. The marker was consistently visualized without difficulty, was readily incorporated into standard and advanced dose planning methods, and had appreciable benefits when designing optimal dose treatment plans. Most notably, it allowed for more accurate targeting with significantly decreased PTV values as compared to seroma-based methods. The unique features of this marker may facilitate the use of advanced radiation techniques as outlined by the NSABP B-39/ RTOG 04-13.

0146 Outcomes Following Stereotactic Biopsy Using Different Gauge Needles with the Mammotome Device

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Objectives: Minimally invasive breast biopsy has become the standard of care for patients with mammographic lesions. A number of different types of devices and gauges of needle have been used for biopsies. The reliability of the diagnosis and the possibility of upgrading lesions on subsequent excisional biopsy have been postulated to be dependent on the gauge of the needle used.

Method: A retrospective review of all minimally invasive biopsies done under mammographic guidance from 12/03 to 9/10 was done. All biopsies were done with the Mammotome device. Charts were reviewed for patient data, needle gauge, pathology results, and the need for subsequent surgery. All biopsies were done by 1 surgeon. Patients were divided into 2 groups based on the gauge of needle used. There were 292 patients undergoing 305 biopsies in the 11-gauge group and 380 patients undergoing 419 biopsies in the 8-gauge group. Over 90% of patients had calcifications as the indication for the procedure. Chi-square analysis was performed.

Results: The diagnosis of atypia was twice as common in the 8 gauge group compared to the 11 gauge group ($p = 0.07$). The diagnosis of invasion was twice as common in the 11-gauge group compared to the 8-gauge group ($p = 0.04$). The overall rate of malignancy was equal in the 2 groups. Of the patients with atypia, 16% of patients in the 11-gauge group were upgraded pathologically on subsequent excisional biopsy, while 21% of the patients in the 8-gauge group were ($p = NS$). Of the patients with DCIS, 9.1% of the patients in the 11-gauge group were upgraded to invasive cancer while 12.8% of the patients in the 8-gauge group were.

Conclusions: Atypia was more commonly diagnosed with the larger needle size. The increased rate of atypical diagnosis in the 8-gauge group is most likely explained by the increased size of the tissue samples. The 2 types of needles result in a similar rate of malignant diagnoses. The increased rate of invasive cancer in the 11-gauge group cannot be explained by the type of needle used or the indication for the procedure. Both needle sizes appear to accurately diagnose patients. There is no role in excluding excisional biopsy for patients with atypia in either group.

Patient characteristics need to be evaluated to determine which patients might need a sentinel node biopsy during their re-excision for DCIS.

0154 A Retrospective Review of the Association of Lobular Carcinoma In Situ Associated With Invasive Lobular Carcinoma at Surgical Resection: A Marker or a Precursor for Invasive Lobular Carcinoma?

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Objectives: Lobular carcinoma in situ (LCIS) has for years been considered a significant risk factor for developing an invasive ductal (IDC) or lobular breast cancer (ILC). Ductal carcinoma in situ (DCIS) is identified in conjunction with invasive ductal cancer in surgical specimens as often as 50% of the time. A similar association of LCIS with ILC has been rarely reported. This study investigates the association of LCIS and invasive lobular cancer at surgical resection perhaps indicating a precursor relationship.

Method: A 10-year review of an institutional breast cancer database was performed to identify those patients treated for invasive lobular carcinoma. Surgical pathology reports were reviewed to identify patients who had LCIS associated with the ILC at definitive surgical resection. Analysis of the 2 groups with and without LCIS was performed to determine if there were significant differences in age at diagnosis, method of diagnosis, tumor size, stage at diagnosis, recurrence, and overall survival.

Results: A 10-year review of our institutional database from 1/2007 to 1/2012 identified 200 patients diagnosed with or treated for invasive lobular carcinoma. Based on electronic chart availability, data was collected on 141 of these patients. Nineteen lacked sufficient data, 15 were diagnosed with only LCIS, and 26 had ductal, mixed, or NOS pathology. Of the remaining 81 invasive lobular cancers, 37 (46%) of the removed tumors had associated LCIS in proximity to the ILC**.** The age at diagnosis for the 2 groups was similar; ILC only 29-88 yr (mean, 62 yr) and LCIS/ILC group 30-84 yr (mean, 64 yr). The tumor size was also similar between the 2 groups: ILC, 1-110 mm (median, 25 mm); LCIS/ILC, 5-85 mm (median, 15 mm). Surgical treatment for the ILC group was mastectomy, 62%, vs breast-conserving therapy, 38%, compared to the LCIS/ILC group, 46% mastectomy vs 54% breast-conserving therapy. For patients with staging data available, lymph node involvement was similar between the 2 groups: ILC 29/75 (38.7%), compared with 13/34 (38.2%) for the LCIS/ILC group. Median follow-up was longer in the ILC-only group, 48 months, vs 37 months for the LCIS/ILC group. Local recurrence after BCT was higher in the LCIS/ILC group 3/19 (16%) vs 0/16 in the ILC-only group. Distant recurrence rates for both groups were similar: 21% for the ILC group vs 20% for the LCIS/ILC group and 6 (14%) patients died of disease in the ILC group and 3 (9%) died in the LCIS/ILC group.

Conclusions: The incidence of LCIS associated with ILC in this study (46%) was similar to the reported incidence of DCIS associated with IDC. Additionally the local recurrence rate after BCT with associated LCIS was increased, although not significantly due to small numbers of recurrence, compared with the ILC-only group which has been reported by other investigators. Additional larger studies investigating the association between LCIS and ILC may further indicate a precursory relationship.

0108 Reproducibility of the Skin Ischemia and Necrosis (SKIN) Scale for Mastectomy Flaps

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Objectives: We have previously developed a new scale to discriminate severity and extent of mastectomy skin ischemia/necrosis to help monitor outcomes. Our objective was to evaluate reproducibility of the scale across multiple surgeons.

Method: In this IRB-approved study, women who underwent skin-sparing or nipple-sparing mastectomy with immediate breast reconstruction from Nov 2009 - Oct 2010 were studied retrospectively. Surgeons reviewed patient records to identify all cases with any concern of skin ischemia or necrosis within 90 days of operation. Cases were reviewed (medical records and available photographs) by a workgroup of breast surgeons and plastic surgeons. The SKIN scale was created based on the severity of ischemia/necrosis, applicable to the nipple-areolar complex (NAC) and the breast skin separately. The SKIN scale assigns a letter score for depth and a numerical score for area (see Table). The depth and area scores can also be combined into a 10-point combination score. Sixty photographs (30 NAC and 30 breast skin) were selected using a stratified random sample to represent the

spectrum of ischemia/necrosis. The 60 photographs were collated into a booklet and scored by consensus of the workgroup. To evaluate the reproducibility of the scale, booklets were sent to 5 breast surgeons and 5 plastic surgeons (validation raters) from different institutions. Weighted kappa (κ) statistics were used to assess agreement between scores provided by the validation rater surgeons compared to the consensus panel and also inter-rater agreement among the validation raters. The number of photos and raters were chosen to estimate kappa within ± 0.12.

Results: Scored booklets were received from 4 breast surgeons and 3 plastic surgeons. Overall, external scores agreed well with the consensus panel scores for both depth and area of necrosis. The proportion of photos that had a majority of respondents concur with the panel score ranged from 67-100% for all categories except photos judged by the consensus panel to have no evidence of ischemia (see Table). Formal analysis of agreement with weighted kappa statistics showed moderate to very good agreement for validation surgeons vs the consensus panel for breast mound photos, with mean weighted kappa scores of 0.82 (depth of necrosis), 0.60 (area of necrosis), and 0.82 (depth/area combination score). Agreement with the consensus panel was similar for the NAC photos: 0.75 (depth), 0.63 (area), and 0.79 (combined score). Inter-rater agreement among the scoring surgeons was very good for breast mound photos for depth (kappa 0.75) and combined depth/area (kappa 0.74), but only moderate for area of necrosis (kappa 0.54). For NAC photos, inter-rater weighted kappas were 0.69 (depth), 0.64 (area of necrosis), and 0.73 (combined depth/area).

Necrosis Depth Score	N*	N (%) With Majority** Assigning Correct Score	Necrosis Area Score	N*	N (%) With Majority** Assigning Correct Score
A: No evidence of ischemia	9	4 (44%)	1: None	9	4 (44%)
B: Skin color change indicating ischemia	8	8 (100%)	2: 1-10%	23	19 (83%)
C: Partial thickness skin necrosis	21	14 (67%)	3: 11-30%	18	13 (72%)
D: Full thickness skin necrosis	22	19 (86%)	4: >30%	10	8 (80%)

*Number of photos in each category as determined by the consensus panel review score.
**Majority defined as at least 4 of the 7 validation raters.

Conclusions: The SKIN scale is a simple scoring system for the severity of mastectomy skin ischemia/necrosis which incorporates the depth and area of skin necrosis. SKIN scale scores are reproducible among breast and plastic surgeons. Agreement was stronger for depth than area of necrosis, but the combined depth/area scores showed consistently good agreement.

0134 A Surgical Decision Support System (SDSS) to Promote Enhanced Communication Between Low English Proficiency (LEP), Ethnically Diverse Breast Cancer Patients and Their Providers in an Inner City Hospital

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Objectives: Ethnically diverse and LEP breast cancer patients are at a disadvantage in participating in shared decision making and informed treatment decisions due to language barriers and deficiencies in health literacy. Additional educational resources must be employed in those settings to support and enhance communication with those patients. An interactive surgical decision support system (SDSS) was created, by utilizing medical interpretation and computer-based animations to promote more effective and culturally competent communication among patients and their surgical providers. A pilot study was conducted at an inner city hospital to evaluate the effectiveness of the SDSS.

Methods: Newly diagnosed breast cancer patients were identified as eligible for participation in the study by their surgeon at the Breast Care Clinic. The SDSS consisted of a 10-minute, one-on-one consultation between the patient and her surgical provider or a research coordinator in a private room with the additional support of trained medical interpreters in Chinese and Spanish, as needed. The SDSS was developed in collaboration with the IT department and consisted of computer-based animations and a companion script informed by guidelines from the American Society of American Oncology (ASCO). Assessments were conducted using a mixed-method interview guide at 4 points during surgical oncology visits–Q1-Q3 were pre-surgery–(pre-SDSS-Q1, post-SDSS-Q2, after signing consent-Q3, and post-surgery-Q4) and were guided by variables as outlined by the Health Belief Model and

Theory of Planned Behaviour. Validated scales were used to assess preparation for decision-making, decision conflict, and satisfaction with the SDSS.

Results: Data were collected from 70 patients, 39 patients (mean age, 49.4) completed all 4 questionnaires. Of these patients, 33.3% spoke Spanish, 25.6% spoke Mandarin, and 25.6% spoke English. 33.3% patients underwent a mastectomy and 66.7% patients underwent a lumpectomy. At Q3, 100% of the participants felt confident about their decision and prepared for their surgical procedure. At Q4, 100% of the patients were satisfied with the information they received regarding their surgery options. The conflict felt in making decisions was reduced from Q2 and Q3. 94.9% did not want to change their decision at Q3. The difference in the decision conflict scale between Q3 (pre-surgery) and Q4 (post-surgery) was not statistically significant. Based on decision-making scales at each of the 4 time intervals, preparation for decision-making improved not only with time, but also after watching the surgical animations. Additionally, the decision-conflict was decreased at each time interval.

Conclusions : The SDSS improved patient's preparation for making a decision and reduced decisional conflict over the course of time and aided in their decision-making ability. These findings suggest that the SDSS is a useful tool to help LEP patients make a decision when given the options of a lumpectomy or a mastectomy. Our study also illustrates the effectiveness of a mixed-media SDSS for use as a tool to overcome the significant barriers of language and health literacy that exist for many ethnically diverse and LEP patients.

0033 Young Women With Breast Cancer in Boston and Seoul: Comparison of Demographics, Pathology, and Management

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Objectives: Breast cancers diagnosed in young women may be more aggressive, and higher rates of local and distant recurrences have been reported in some cohorts compared to older women. Epidemiologic evidence suggests that Korean women have a lower incidence of breast cancer than women in the United States. These women, however, present at a younger age than their American counterparts. The objective of this study was to compare risk factors and management of young women with breast cancer in Boston, MA, and Seoul, South Korea.

Method: A retrospective review was performed of consecutive patients less than 35 years old with a diagnosis of breast cancer at quaternary medical centers in Boston, Massachusetts (US) and Seoul, South Korea (KR) from 2000-2005. Patient data were obtained by chart review. Demographic, tumor, and treatment characteristics were compared utilizing Pearson's chi-square or Wilcoxon rank-sum tests, where appropriate. All differences were assessed as significant at the 0.05 level. Long-term outcomes and survival were not evaluated.

Results: Two hundred six patients from US and 309 from KR were analyzed. Patients in US were more likely to have hormone receptor positive breast cancer, higher body mass index, and report use of birth control pills. Patients in KR had a higher rate of triple-negative breast cancer and were less likely to have a sentinel node procedure performed. They also were less likely to receive postmastectomy radiation.

Conclusions: Patients under age 35 diagnosed with breast cancer in the US and KR differ with respect to demographics, tumor characteristics, and management. Although rates of breast conservation and mastectomy were similar between groups, US patients were more likely to receive postmastectomy radiation. The lower use of sentinel node biopsy is explained by the later adoption of the technique in KR. Further evaluation is necessary to evaluate recurrence rates and survival in the setting of differing disease subtypes in these patients.

0132 Intraoperative Radiotherapy for Breast Cancer—A Single-Institution Experience

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Objectives: The TARGIT-A trial demonstrated that intraoperative radiotherapy (IORT) is safe, with a complication rate of 17.6%, and effective for the treatment of low-stage breast cancers. This study evaluated the population currently receiving IORT at our institution, the acute and long-term complication rates, as well as possible associated patient- and therapy-related factors.

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Method: We conducted an IRB-approved retrospective chart review of patients who underwent IORT delivered by the Zeiss Intrabeam System at our institution from 2009-2012. Radiation dose to the skin was measured using Nanodot dosimeter. Acute skin toxicity was determined using CTCAE version 3.0 and RTOG cooperative group common toxicity criteria. RTOG/EORTC was used to grade late radiation morbidity. Pearson's chi-square and Wilcoxon tests were used to assess the association of skin toxicity and clinical-pathologic factors.

Results: Forty-six patients were identified. The median age was 68 years and median follow-up was 15 months. Thirty-six of patients had mobility deficits or previous radiation which precluded breast preservation with standard external beam radiation. Fifteen percent had serious medical co-morbidities. The median pathologic tumor size was 1.02 cm. All patients received 20 Gy prescribed to the applicator surface. The median applicator size was 4 cm. Seventy-five percent of patients had more than 1 operation (lumpectomy and re-excisions) prior to the Intrabeam delivery. Six percent of patients also received whole-breast radiotherapy due to positive axillary lymph nodes or close final margins. Thirty-nine percent of patients developed grade 2 toxicities, including wound healing difficulties and recurrent seromas. Acute Grade 3 or 4 toxicities were observed in 10% of the patients. Nine percent of patients had grade 3 or 4 late-radiation toxicity. There were no significant correlations between skin toxicity and depth of tumor from skin, number of procedures, applicator size, tumor size, or patient BMI. There was a trend toward complication with increased radiation skin dose (P = 0.06). One patient developed a local recurrence of breast cancer.

Conclusions: At our institution, IORT made breast preservation an option for elderly, immobile, co-morbid patients, and patients who have had prior breast irradiation who would otherwise receive a mastectomy. Severe complication rates are similar to rates seen in external beam radiation. Moderate toxicities are common and could have a greater impact on this fragile patient population. No predictive factors of acute or long-term toxicity were identified. Decreasing the radiation dose to the skin may reduce acute and or late skin complications.

0165 Upper Extremity Lymphedema Rates Following Treatment for Breast Cancer: The Role of Radiation, Surgery, Nodal Status, and Node Count

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Objectives: The rate of breast cancer related lymphedema (LE) in the published literature varies widely from < 5% to > 60% depending on type and extent of surgery and radiation therapy. The use of sentinel lymph node biopsy (SLNB) in place of the more extensive axillary lymph node dissection (ALND) has resulted in significantly lower rates, but has not eliminated LE. In this retrospective chart review, we analyze the role of radiation therapy, surgical procedure, nodal status, and number of lymph nodes removed in the development of LE.

Method: The study sample includes 48 patients treated at the university who had previously been enrolled in an IRB-approved study. Subjects had bilateral circumferential forearm and upper arm measurements recorded pre-operatively and 6, 12, and 24 months postoperatively to evaluate for LE. For this study, LE was defined as ≥2 cm change in arm circumference compared to the contralateral arm. Records of radiation therapy (location, dose, and frequency), surgical procedure, pathologic nodal status, and total number of lymph nodes removed were reviewed.

Results: The rate of LE for the entire cohort was 10.0%. Following radiation therapy, the rate was 11.0% compared to 9% when there was no radiation (*ns*). Of those treated with radiation, the rates following treatment with a supraclavicular (SCLV) field, posterior axillary boost, and whole-breast irradiation alone were 22.0%, 25.0%, and 5.0%, respectively. There was a trend level of significance (*phi coefficient = 0.18, p = 0.23* for SCLV and phi = *0.21, p = 0.19* for chest wall fields) between the more aggressive treatments and subsequent LE development. Patients who had a greater number of lymph nodes removed (>9) had LE at a rate of 50.0% vs 3.0% with fewer nodes removed (≤9) (*p < 0.01, phi coefficient = 0.43).* There was a significant association between the mean number of nodes removed and LE. Patients who did not have LE had an average 5.7 ± 5.5 nodes removed vs 14.8 ± 9.6 in those who had LE (*p < 0.01*). The total number of positive nodes and the percent of positive nodes were not associated with the outcome of LE. Within our cohort, all patients who had modified radical mastectomy (MRM) also had radiation (n = 6), with an LE rate of 17.0%.

Conclusions: We report a rate of LE following radiation therapy that is not statistically different from those who were not treated with radiation. Of the factors evaluated, removing more than 9 nodes from the axilla is most strongly associated with the subsequent development of LE. Although not statistically significant, there was a trend level of significance between the more aggressive radiation treatment (SCLV field) and LE. Nodal status and MRM with radiation were not significant predictors of LE within our cohort. Larger studies are necessary to identify factors that may result in LE.

0028 Evaluation of Margin Index for Prediction of Residual Disease After Breast-Conserving Surgery: Can It Be a Useful Tool for the Breast Surgeon?

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Objectives: Breast conservation surgery (BCS) for breast cancer involves removal of tumor with a surrounding margin of normal tissue, but the appropriate margin width is controversial. Margin index is defined as the mathematical relationship between the size of the tumor and the closest margin. It was shown to be predictive of the probability of residual disease following surgery with close margins for women with stage I-II breast cancer within 1 large academic center. We applied this predictive tool to patients at our institution with breast cancer to determine its suitability for predicting those who require re-excision in this population.

Method: We retrospectively reviewed a prospectively maintained database which included women undergoing BCS between 1980 and 2010 at the hospital. We identified 246 women who underwent re-excision for invasive breast cancer with or without DCIS and close margins prior to radiation. As previously reported, margin index was calculated as closest margin (mm)/tumor size (mm) x 100. Margin index was compared for the groups with and without residual disease present in the re-excision specimen. Student's *t* test was used for statistical analysis.

Results: Of the 246 patients identified, 174 (71%) had no residual disease found on re-excision and 72 (29%) had residual disease. Of patients with residual disease, 30 had invasive cancer and 42 had ductal carcinoma in situ (DCIS). The mean margin index was 12.67 for patients without residual disease and 10.29 for patients with any residual disease. This was not statistically significant ($p = 0.32$). The mean margin index was 8.10 and significantly different from those with no residual disease ($p = 0.03$) when only patients with residual invasive disease were analyzed. Regardless of these differences, in our patient population, margin index was not a statistically significant indicator of the likelihood of having residual disease in a re-excision specimen ($p = 0.32$). We analyzed other cutoff values for margin index and there were no values that proved to be significant predictors of residual disease in the re-excision.

Conclusions: In the population of women undergoing BCS at our institution, margin index was not shown to be predictive of the risk of having residual invasive or in situ disease in the re-excision specimen. We did note a significant difference in margin index between all patients with residual invasive disease only and patients with no residual cancer. This suggests that margin index is less accurate in predicting residual disease when DCIS is associated with invasive cancer because the DCIS extent may not be accurately reflected in the measured invasive tumor size used in the index calculation.

0105 The Komen-Community Assisted Mammogram Program and the Impact on the Underserved in Maryland

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Objectives: The Komen-Community Assisted Mammogram Program (K-CAMP) working with our hospital seeks to increase detection of breast cancer in Montgomery County, Maryland, by targeting women in the underserved community. This culturally sensitive program is unique in that each participant is provided with comprehensive breast care all within 1 hospital, including breast health education and links to free breast care services from screening to surgery. Our goal is to show the impact of K-CAMP's screening mammography and breast cancer detection in this vulnerable community. We compare our rates of screening and detection within various ethnic groups to those seen nationally. We believe that our unique combination of a community breast screening program with hospital assistance can serve as a prototype for similar communities across the country.

Method: Participants are recruited based on income and health insurance status, from multiple community health centers in Montgomery County. Once referred for screening, participants are fully navigated through the appropriate follow-up breast diagnostics and treatment, including referral to a breast surgeon for consultation, biopsy, and surgery as indicated. Women with breast cancer are linked to further treatment options, including chemotherapy, radiation, reconstructive surgery, and survivorship resources. Significant financial assistance is provided by the Komen Foundation, the State of Maryland, and our hospital.

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Results: From 2004 to 2011, the number of yearly screening mammograms and/or ultrasounds increased from 129 to 1120. Of the 3,467 total participants from 2004 through 2011, 271 (7.82%) were then referred to breast surgeons for consultations. Of those, 194 participants (5.60%) required biopsies and 39 (1.12%) needed a mastectomy or lumpectomy. In total, 31 women (0.89%) were diagnosed with breast cancer. Broken down by ethnicity, incidence rates of breast cancer were the following: 15 (1.42%) of 1,053 African Americans, 6 (0.31%) of 1,937 Hispanics, 6 (2.32%) of 259 Asians, and 3 (2.29%) of 131 Caucasians.

Conclusions: In the United States the incidence of breast cancer has been lower in the Hispanic population compared to other groups, but only 69.7% of the age-adjusted female Hispanic population report having screening mammograms within the last 2 years, compared to 73.2% of African Americans and 72.8% of Caucasians. For each racial group, the incidence of cancer among our program participants was higher than the national average. In particular, the Hispanic population in our study had a 0.31% rate of breast cancer vs the national average for Hispanic women of 0.09%. These differences are likely multifactorial and may be attributed in part to the fact that our sample group is taken from an underserved population with low income and poor access to healthcare. Our data suggest, however, that the true breast cancer incidence among Hispanic women could actually be higher than the national data show. Our study demonstrates that K-CAMP and our hospital provide an effective breast health screening program with significant financial assistance, as well as excellent follow-through, in a small but ethnically diverse community. This program can be replicated in Maryland, as well as in similar populations across the United States.

0118 Management of Occult Primary Breast Cancer at a National Cancer Institute-Designated Comprehensive Cancer Center

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Objectives: Approximately 0.1% to 0.8% of all breast cancers are occult, ie, patients present with regional or distant disease (usually axillary lymphadenopathy) that is histologically consistent with a primary breast cancer, but clinical and radiographic evaluation of the breast fails to demonstrate the primary lesion. Management of occult breast cancer has been controversial and inconsistent. Some case series have reported outcomes comparable to those of nonoccult breast cancers with similar nodal involvement, while others have reported outcomes that are significantly worse or better. We describe the management and outcomes of occult primary breast cancer treated at our institution.

Method: A retrospective review was conducted of women diagnosed with breast cancer at our institution between March 1999 and September 2010. Women with no history of in situ or invasive breast cancers who presented with isolated axillary lymphadenopathy proven to be histologically consistent with primary breast malignancy but without evidence of a breast mass on physical exam, mammography, ultrasound, and/or magnetic resonance imaging (MRI) were included. Descriptions of treatments received, recurrence, morbidity, and mortality as of October 2012 are reported.

Results: Of 5,533 patients reviewed, 7 patients (0.12%) met inclusion criteria. Median age was 65 years old (range, 40-72), and median length of follow-up was 86 months (range, 42-124). Six patients were Caucasian, and 1 was Asian. Six patients had breast MRI as part of their pre-treatment workup. Four patients underwent modified radical mastectomy (MRM), 1 patient had a lumpectomy (despite no radiographic findings in the breast) of the axillary tail of the breast in continuity with axillary lymph node dissection (ALND), and 2 patients had ALND without breast surgery. Four patients received adjuvant radiation therapy to the breast, chest wall, and/or nodal basins. All 7 patients received chemotherapy: 3 received only neoadjuvant therapy, 2 received only adjuvant therapy, and 2 received both. One patient received tamoxifen, and 4 patients received anti-HER2 therapy. Two patients experienced adverse sequelae, including lymphedema and upper extremity venous thrombosis after MRM, and 2 patients experienced significant chemotherapy-related side effects, including neutropenic fever and pancytopenia with hypotension. There were no locoregional recurrences. All 7 patients are alive at follow-up without any evidence of disease. One patient developed a contralateral breast cancer 3 years after her initial diagnosis that was successfully treated without evidence of recurrence.

Conclusions: While there was some variation in the management of occult primary breast cancer at our institution, a multidisciplinary approach with systemic therapy, surgical therapy, and/or radiation therapy was utilized for all. Our patients had excellent outcomes, and all were alive without disease at long-term follow-up. These results support a curative-intent approach to treatment of this subset of locally advanced breast cancer patients and illustrate the need for individualized treatment algorithms based on tumor biology and extent of disease at diagnosis.

0119 Geographic and Temporal Trends in the Management of Occult Primary Breast Cancer: A Systematic Review and Meta-Analysis

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Objectives: Given increased but disparate utilization of breast magnetic resonance imaging (MRI), we wished to explore how diagnosis and management of occult primary breast cancer (OPBC) – ie, breast cancer that first presents through regional or distant disease without clinical-exam or radiographic evidence of a breast mass – differs internationally and has changed over time. Here, we report the results of a pooled analysis of patients with OPBC and a meta-analysis of MRI accuracy in OPBC.

Method: We searched 5 databases (PubMed, EMBASE, Scopus, Cochrane, and ClinicalTrials.gov) and reviewed the bibliographies of retrieved articles. Data were independently abstracted and cross-checked by 2 coders.

For the pooled analysis, we included only case series and reports published in 1994 and after that provided patient-level treatment data for female patients with initial diagnoses of clinically and radiographically confirmed OPBC (by mammogram, ultrasound, and/or MRI). Using chi-square tests and multivariate logistic regression models, we examined associations between demographic, clinical, and geographic data (independent variables) and each type of treatment as well as recurrence (outcomes). We report adjusted odds ratios (OR) and 95% confidence intervals (CI) significant at 2-tailed $p < 0.05$.

For the meta-analysis of MRI accuracy, we included observational studies and case series of female patients with clinically and mammographically OPBC who received MRIs as part of their diagnostic work-up. We report pooled sensitivity and specificity with 95% CIs.

Results: Of the 201 articles reviewed, 15 studies (n = 85) met inclusion criteria for the pooled analysis. We also included data for 7 patients from our own institutional review (1999-2010) for a total of 92 patients. Median age was 56 years old (range, 28-88). Median follow-up was 42 months (range, 4-310). Multivariate analysis results are reported in Table 1.

Table 1. Occult primary breast cancer pooled analysis – multivariate analysis results (n=92)

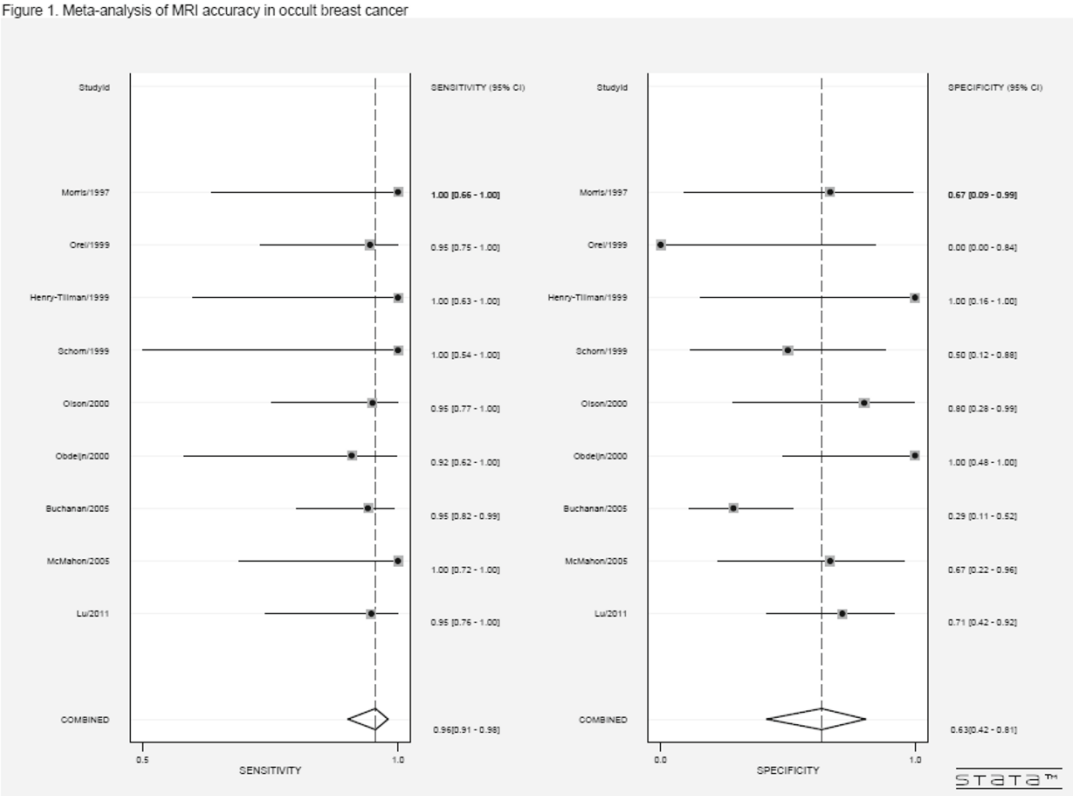
Independent Variable→Outcome	OR	95% CI	p-value
Being from Asia [a] → receiving breast surgery	6.0	2.0-17.7	0.0012
Being from US [b] → receiving chemotherapy	13.1	2.6-64.8	0.0016
Being from Asia [a] → NOT receiving chemotherapy	0.3	0.1-0.8	0.0167
Study published ≥2004 [c] → receiving XRT	3.9	1.4-10.5	0.0084
Receiving breast surgery [d] → NOT receiving XRT	0.2	0.1-0.6	0.0027
Receiving chemotherapy [e] → having distant recurrence [f]	9.8	1.1-87.2	0.0412

[a] Reference category – not being from Asia; [b] Reference category – not being from the United States
[c] Reference category – publication in 2003 or earlier; [d] Reference category – not receiving any type of breast surgery; [e] Reference category – not receiving chemotherapy; [f] n=61, no recurrence status for 31 patients.
CI – confidence interval; OR – odds ratio; US – United States; XRT – radiation therapy

Twenty-five of the patients in the pooled analysis received MRIs with individually reported results, and all 25 were from studies published in 2004 or later. In univariate analysis, patients with positive MRIs consistent with breast cancer (n = 13) were more likely than patients with negative MRIs (n = 12) to undergo lumpectomy (8/13, 61.54% vs 0/12, 0%) rather than modified radical mastectomy (MRM, 3/13, 23.08% vs 3/12, 25.00%) or no breast surgery (2/13, 15.38% vs 9/12, 75.00% p = 0.0011). In addition, patients with negative breast MRIs were more likely to receive chemotherapy (10/12, 83.33%) than those who had positive MRIs (5/13, 38.46%, p = 0.0414). Nine studies (n = 250) met eligibility criteria for the MRI accuracy meta-analysis (Figure 1). Two hundred twenty-five patients had MRIs with confirmable results. Pooled MRI sensitivity was 96% (95% CI, 91-98%). Pooled MRI specificity was 63% (95% CI, 42-81%).

continues

Figure 1. Meta-analysis of MRI accuracy in occult breast cancer



Conclusions: Management of OPBC varied significantly with geographic location. Furthermore, it is unclear whether use of systemic therapy provides long-term benefits. MRI sensitivity for OPBC is comparable to that for other types of breast cancer, but OPBC incidence has not decreased since the introduction of MRI. Given the rarity of this condition, we recommend the establishment of an international OPBC patient registry to facilitate longitudinal study and eventual development of global treatment standards.

0044 Cobalt Sheet Source Reduces Image Contrast and Node Visibility in Lymphoscintigraphy

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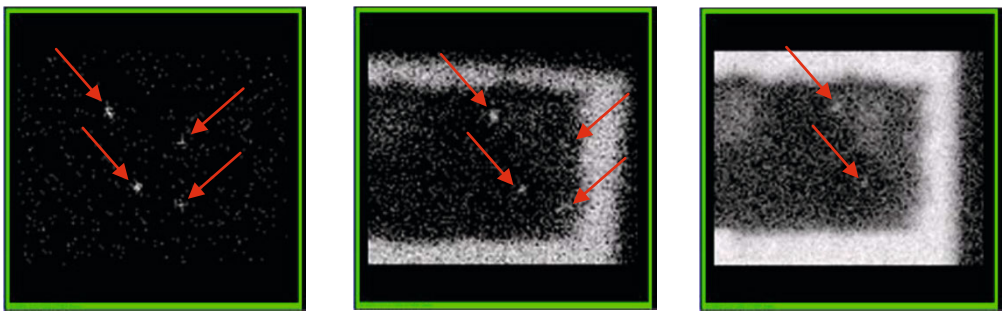
Objectives: Cobalt sheet sources are commonly used in lymphoscintigraphy to show the relative anatomical position of radiating lymph nodes (RLN) in the patient's body; however, until now, the impact of this practice on RLN detection has been poorly characterized. The goal of this work is to study the effect a sheet source has on RLN visibility if the same image is used for both node detection and body outline.

Method: An anthropomorphic torso phantom representing a large patient was imaged using a planar gamma camera. Simulated lymph nodes were filled with 0.2 μCi of Tc-99m in 0.1-cc volumes and attached to the front and right side of the phantom, mimicking 0.1% uptake nodes (with 200 μCi injection). We compared images without using sheet sources to images using a 5.0 mCi or a 1.2 mCi Co-57 sheet source. Additionally, simulated soft tissue attenuators with thicknesses of 1.0 and 0.5 inches were added between nodes and the sheet source to reduce the effective source strength. Cobalt sources were positioned at the back of the phantom and the images were acquired in 2 minutes with the detector facing the front of the phantom. For the node visualization evaluation, we calculated the ratio of the average counts in the region of interest (ROI) of the nodes to the average counts in the immediate background and used those ratios to calculate the contrast (in percentage) for each node.

Results: We observed that images using cobalt sources showed reduced node contrast when compared to images not using cobalt sources as seen in Figure 1. The contrast of a front node was 60% without using sheet sources, but reduced to 41% and 26% when using the 1.2 mCi and 5.0 mCi sources, respectively. Similarly, the contrast of a side node was 48% without sheet sources, but reduced to 15% and 0% when using the 1.2 mCi and 5.0 mCi sources. After adding 0.5 and 1.0 inches of soft tissue attenuators to the 1.2 mCi source, the contrast of the side node was improved from 15% to 22% and 24%, respectively. Increasing attenuation of the sheet source effectively reduced the source strength and increased node contrast.

Figure 1. Acquired images without and with Co-57 sheet source showing decreased node contrast using the sheet sources.



Conclusions: Cobalt sheet sources used in lymphoscintigraphy decrease node to background contrast and hence reduce node visualization. Such effects can be minimized by either using sheet sources with less activity or attenuating the source. For the best compromise of node visualization and body outline, the sheet source activity should be adjusted according to the uptake of the nodes to be imaged.

0002 The Presentation of Primary and Metachronous Breast Cancer: The Importance of Self and Clinical Breast Exams

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Objectives: Breast cancer patients remain at risk of developing a second breast cancer in the ipsilateral or contralateral breast after the completion of treatment for the initial cancer. Early detection of breast cancer, whether it is a recurrence or a new primary, is associated with improved survival. We sought to determine the method of presentation of metachronous breast cancers and compare them to the presentation of the initial breast cancer.

Method: A retrospective review of a prospectively maintained database was performed of all patients who developed breast cancer between 1984 and 2010. Patients included in this analysis had previous breast cancer and developed a metachronous lesion. Patients with ipsilateral metachronous cancers were included only if the tumor was located in a different quadrant, occurred more than 1 year after the initial cancer, or, if in the same quadrant, was a different pathology than the primary.

Results: Metachronous breast cancer was identified in 147 patients. The presentation of metachronous cancers was comparable to that of primary cancers (Table 1). Forty-two percent (n = 61) of primary and 48% (n = 71) of metachronous cancers were identified by mammography. Breast exam identified 43% (n = 64) of primary cancers and 40% (n = 59) of metachronous cancers. Patients palpated the primary cancer more frequently while physicians palpated the metachronous cancer more frequently. Of the cancers that were identified by physical examination, metachronous cancers were significantly more likely than primary cancers to be mammographically occult (12% vs 29%, p = 0.0008).

Conclusions: Forty percent of metachronous breast cancers were detected by patient or physician breast examinations and 29% were mammographically occult. In conjunction with mammography, clinical and self-breast exams remain essential in detecting primary and metachronous breast cancers.

0066 Screening Prior to Breast Cancer Diagnosis: The More Things Change, the More They Stay the Same

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Objectives: In November 2009, the U.S. Preventative Service Task Force (USPSTF) recommended biennial screening mammography in women aged 50-74 years and recommended against routine mammographic screening in women aged 40-49 years. The purpose of this study was to evaluate the pattern of screening subsequent to the revised USPSTF guidelines in a population of women who were newly diagnosed with breast cancer at our institution.

Method: In January 2010, we established a Breast Cancer Database at our medical center. This prospective database is intended to include all individuals undergoing definitive breast cancer surgery at our institution, and includes elements of pre-diagnosis personal and family history, screening history, method of diagnosis, stage at diagnosis, details of treatment and outcomes. We queried the database for the following variables: age, race, how the cancer was first detected, mass palpability, screening frequency [regular (annual), biennial, and not regular screeners], histology, stage, and ER/PR/Her2-neu status. Statistical analyses were performed using Pearson's chi-square and Fisher exact tests.

Results: A total of 1,216 women were diagnosed with ductal carcinoma in situ and invasive breast cancer from January 2010-2012. The median age at diagnosis was 58 years and majority of our patients were Caucasian (75%). Most of the cancers were detected on mammography (59%). A total of 833 women (69%) did not present with a palpable mass at the time of diagnosis. There was no statistically significant difference in detection on screening mammography ($p = 0.79$) and palpability ($p = 0.31$). The majority of our patients had invasive ductal carcinoma (60%), stage 0 (24%), and stage 1 (49%) breast cancers that were ER positive (81%), PR positive (68%), and Her2-neu negative (64%). These tumor characteristics did not change significantly over time: histology ($p = 0.66$), stage ($p = 0.68$), ER ($p = 0.35$), PR ($p = 0.62$), and Her2-neu ($p = 0.66$). The frequency of screening (regular (annual) vs biennial vs not regular) did not change significantly over time ($p = 0.22$). In the several years following the USPSTF guidelines, screening frequency, and stage at diagnosis did not vary significantly. However, when we looked at screening frequency and breast cancer stage, women who were not regular screeners had an increased risk of developing later stage breast cancer ($p < 0.001$) and were more likely to present with a palpable mass when compared to women who were regular screeners (61% vs 21%; $p < 0.001$).

Conclusions: In our study cohort of women with newly diagnosed breast cancer, prior screening behavior did not significantly change in the years following the USPSTF guidelines. There is also no evidence of stage migration over time and most cancers continue to be detected by mammography while remaining clinically occult. This study supports previous research which has demonstrated the benefits of annual screening mammography in increasing the opportunity for early detection of breast cancer. Furthermore, these results suggest that women who are not screened annually are at increased risk of a delay in breast cancer diagnosis, which may impact treatment options and outcomes.

0061 Initial Experience in Sentinel Lymph Node (SLN) Detection by Fluorescence Lymph Angiography Technique

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Objectives: At the General Surgery of the hospital (Rimini – Italy), indocyanine green (ICG) was tested; ICG, once in human body, can be detected by an infrared video-camera. ICG is a lightweight (774.96 dalton) molecule that, once injected, binds proteins to plasma almost immediately without modifying their dimensions and becomes fluorescent in the near-infrared range. Infrared light and video camera allow us to monitor the flow till the lymph node.

Method: This equipment, PDE (Photodynamic Eye, PULSION Medical Systems, marketed in Italy by SEDA S.p.A.) enables to discover the SLN after 5-15 minutes, following the lymph flow in real time, once the marker is injected around the cancer area or under the areola.

Results: This technique, always in combination with radioactive technetium (Tc 99), was used in 100 cases: in 95 of them the SLN was detected and the ICG use allowed us to find the SLN rapidly perfectly in line with radioactive technique. In 1 case (1%), we did not detect sentinel node with no one of the 2 methods.

In 4 cases (4%), there not was concordance between ICG and TC because:

- In 1 case we found SLN only with IGC and not with TC.
- In 3 cases we found 2 sentinel nodes with ICG, but only 1 of these was positive with Tc 99 and in all 3 cases the node IGC positive and TC negative was metastatic.

There is a concordance of 100% of positive nodes at TC99 and positive with ICG, in 4% of cases the tecnique with ICG was superior than TC99, but it is not statistically significant.

Conclusions: The use of PDE would allow a remarkable economic saving due to elimination of radioactive material and less discomfort for patients who do no longer need attending nuclear medicine department. This experience allows us to say that this technique is worth further tests, always in combination with the traditional technique, followed by randomized studies. Most likely, further studies should confirm our first findings: the above technique could be adopted in SLN detection, instead of radioactive marker, in specific cases.

0106 Nonsurgical Ablation for Small Breast Cancer

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Objectives: After the pilot pathological study of a small number of patients with small breast cancer, we have tried to develop nonsurgical cryoablation under image-guided manner as the local treatment for small breast cancer since 2006 and we would like to report 6-year result of our experience.

Method: This study was approved by ethical committee and divided into 2 parts:

Study I--We used Visica I system provided by Sanarus .c.c. in USA. Cooling down driven with high-pressure argon gas forms an ice ball 4- x 4-cm in size. Indication of nonsurgical cryoabaltion is that lesion should be less than 10 mm, measured by breast MRI, mammography, and ultrasonography. We have experienced 38 patients breast cancer (mean diameter of lesions is 8.6mm). US-guided cryoabaltion was carried out in 37 patients and MR-guided cryoablation was done in 1 patient. Inclusion criteria of the patients other than size of the lesion is subtype luminal A, diagnosed from biopsy specimen. Postprocedural follow-up is scheduled with breast MRI and other imaging modalities, 3, 6, 12 months after the procedure. After 1 postprocedural year, patients also have serial check-up every 6 months. All 38 patients had radiation Tx and adjuvand hormonal Tx.

Study II--Since May 2012, we induced liquid nitrogen-based cryoablation system with IceSense3, supplied by IceCure c.c. in Israel. Fifteen patients had nonsurgical cryoablation, followed by vacuum-assisted biopsy (Mammotome), to obtain 4 specimens from center and peripheral of ablated zone for clarifying postprocedural pathological change.

Results: *Study I*--Median follow-up time is 36 months. We have never had in-breast local recurrence or distant metastasis among those 38 patients. Particularly, 2 patients who had 2 breast cancers (multicentric breast cancer was surgically resected with endoscopic quadrantectomy, and ablated with Visica I) in 1 breast had breast conservative treatment with 2 local treatment methods.

Study II--Although follow-up period of 15 patients is short, postprocedural biopsied specimen failed to find residual cancer within ablated zone. No local recurrence or distant metastasis is identified.

Conclusions: Although it might be concluded that nonsurgical cryoablation would be alternative local treatment for the patient with small and luminal A breast cancer, we have to study larger number of patients for a longer time period.

0084 Surgeon-Performed Cytology of Breast Core Biopsies Provides Accurate Same-Day Diagnosis

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Objectives: Fine needle aspiration (FNA) has the unique advantage of same-day diagnosis of breast lesions. On the other hand, core biopsy (CB) reliably preserves intact cores for final histology, receptor evaluation, and molecular studies

although the diagnosis is delayed. We hypothesized that surgeon-performed touch prep cytology (TPC) of breast biopsy cores would allow for accurate same-day diagnosis while obtaining permanent tissue for routine pathology studies.

Method: Breast surgeons at our institution routinely perform TPC on biopsy cores obtained in the outpatient setting, prior to sending specimens to pathology. The glass slide smear is prepared and fixed in alcohol in the biopsy suite, then stained and interpreted by a pathologist during the same clinic visit. A retrospective review of TPC results of US-guided breast core biopsies, performed by surgeons at a single institution from 2004-2012 was performed. TPC results were classified as (a) positive, (b) suspicious for malignancy, (c) atypical, (d) negative/benign, or (e) deferred. The TPC results were compared with the final pathology of core specimens to calculate accuracy, sensitivity, specificity, positive, and negative predictive values.

Results: Four hundred thirty-nine patients had touch preps performed at the time of core biopsy of the breast. Biopsies were performed using a 14-G or 12-G gun or an 11-G or 8-G vacuum-assisted device. Two hundred two (46%) of lesions were malignant on final pathology.

One hundred sixty-nine smears were interpreted as positive (137 reported “positive” and 32 “suspicious”) for malignancy. The positive predictive value was 98.2% (95% CI, 94.9%-99.6%). Of the 3 false-positives cases, 2 were papillomas and 1 had fibrocystic changes with chronic inflammation. All 3 patients were asked to await final pathology results given low level of clinical suspicion.

One hundred ninety-seven smears were reported as “benign or negative for malignancy” with an NPV of 94.9% (95%CI, 90.9%-97.5%) Of the 10 false negatives, the majority were low-grade, well-differentiated lesions (3 ILC, 3 grade I IDC, 1 tubular carcinoma, and 2 grade II IDC) and 1 was an inflammatory cancer. The negative results were nonconcordant with clinical and radiological exams and all 10 patients were asked to await final pathology results.

Nineteen smears (4.3%) were reported “atypical cells.” In all such cases, the management was deferred to permanents by the surgeons. This group had 10 invasive cancers, 1 DCIS, 1 ADH, 1 ALH, 1 papilloma, and 5 other benign lesions. Fifty-four smears (12%) were deferred to permanents by the pathologist, mainly due to hypo-cellularity and 3 due to air-drying artifact. Twenty-five percent of these lesions were malignant on final pathology. The overall sensitivity, specificity, and accuracy of TPC were 94.3% (95% CI, 89.8%-97.2%), 98.4% (95% CI, 95.5% -99.7%), and 96.4% (95%CI, 94.8%-97.7%), respectively.

Conclusions: Surgeon-performed cytology of US-guided core biopsies is a low-cost, rapid, and simple outpatient procedure for same-day diagnosis that preserves tissue for final histologic studies. Collaboration of the surgeon and pathologist can provide accurate same-day diagnosis of breast lesions, alleviate significant patient anxiety, and facilitate treatment planning.

0037 Facing a Breast Abnormality: A Qualitative Exploration of Spiritual Means of Coping

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Objectives: Having a breast abnormality precipitates an existential and emotional crisis that has the potential to set off a cascade of negative psychosocial consequences, including anxiety, depression, lack of energy, and worry, among others. We sought to examine the role of spirituality as a coping mechanism and explore a theoretical framework for its use in response to a possible breast cancer diagnosis.

Method: We conducted this study as part of a larger mixed methods investigation titled the Spirituality, Emotional Well Being, and Quality of Life (SEQL) Breast Cancer Study. For this qualitative aspect of the study, 30 women participated, 10 with benign disease and 20 with breast cancer; of these, 10 were treated with lumpectomy and radiation alone and 10 were treated with lumpectomy, radiation, and chemotherapy. Participants had 2 semi-structured interviews, 1 just after their tissue biopsy and another 1 year later. Interviews were conducted by a licensed marriage and family therapist and began with the following prompt: “Tell me your story from the time you first noticed that something was wrong to this point in time.” Several coping methods were probed in an open-ended fashion, including spirituality, social support and other methods of coping.

Results: The average age of participants at the first interview was 56.3 years. Twenty-nine participants were Caucasian and 1 was African American. All had at least some college education. Prior to their diagnosis, the women with breast cancer and the group with benign disease had strikingly similar findings regarding the use of spirituality as a coping mechanism.

Three primary categories of spiritual coping were identified: cognitive, behavioral, and affective. Cognitive spiritual coping is defined as the engagement in processes that enhanced the women's perception and understanding of their personal journey and includes control paradox, social comparison, trauma recall, and idealized attribution. Behavioral spiritual coping describes activities in which women intentionally participated, resulting in augmented coping with their cancer crisis; these processes include unified interconnectedness, prayer/meditation, attending spiritual services, and reading spiritual texts. Affective spiritual coping describes the positive emotional processes resulting from the spiritual journey of facing a possible or confirmed breast cancer diagnosis; these processes include gratitude, peace, and transcendent awareness. These 3 dimensions of spirituality appeared to aid the women's adjustment to the pre-diagnosis crisis and continued to operate for the women with breast cancer as evidenced by individual reports at the follow-up interview.

Conclusions: According to the Centers for Disease Control and Prevention (CDC), spirituality is an essential component of quality of life. Using the principles of beneficence and patient autonomy, physicians can promote the best quality of life for their patients by inquiring about spiritual coping and well-being. Understanding the multidimensional aspects of spirituality and its utilization as a coping mechanism during times of inevitable existential crisis may enhance the care of the patient facing a possible diagnosis of breast cancer. Modern medicine currently supports the biopsychosocial model of care, but this study advocates for further expansion to include an understanding of spiritual coping as an important contribution to overall well-being.

0030 Referral to a High-Risk Breast Clinic Can Improve Patient Acceptance and Compliance With Chemoprevention Therapies

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Objectives: The use of chemoprevention agents in patients at high risk of developing breast cancer has been accepted for more than a decade. Recommendation guidelines estimate that 16% of US women are eligible to receive these medications. Studies have shown that as few as 6% of women offered chemoprevention accept it and further evidence suggests that only 0.08%-0.2% are compliant with the medication. The objective of this study is to evaluate whether patient referral to a high-risk breast clinic improves patient usage and compliance of chemoprevention agents.

Method: A retrospective review of patients referred to a university-based high-risk breast clinic between January 2007 and December 2009 was performed. Charts were reviewed and patient age at referral, referral physician specialty, Gail model score, personal history of breast cancer, and history of benign breast biopsies were identified. Chemoprevention recommendation, acceptance, and duration of compliance were recorded.

Results: Six hundred patients were referred to the high-risk breast clinic over a 3-year period. Sixty patients were excluded from analysis due to incomplete medical records (N = 31), or personal history of breast cancer (N = 29). Of the remaining 540 patients, 210 qualified to receive chemoprevention based on a Gail model score >1.66, age >35, and no contraindications to treatment. Ninety-six patients (41.71%) elected to pursue chemoprevention and 114 (54.29%) declined. Raloxifene and tamoxifen were offered depending on menopausal status. The acceptance rate for raloxifene was higher than tamoxifen (47.19% vs 37.16%). Compliance rates for patients who accepted chemoprevention was 81.25% (raloxifene, 83.33%; tamoxifen, 76.36%). 62.5% of patients with histories of ADH/ALH referred to high-risk clinic by a breast surgeon accepted chemoprevention while PCP referrals had acceptance rates of only 36.96%.

Conclusions: Chemoprevention in high-risk patients has been shown to decrease the risk of developing breast cancer by 49%. Despite this, patient acceptance and compliance remains low. The results of this study suggest that referral to a high-risk breast clinic does improve patient acceptance and compliance with chemoprevention agents. The acceptance is higher for raloxifene, which may be due to a more favorable side-effect profile compared to tamoxifen. Along with counseling, factors which may predict patient acceptance and compliance include referral from a breast surgeon and a personal history of a benign breast biopsy.

0058 Has ACOSOG Z0011 Changed Surgical Technique in Sentinel Lymph Node Biopsy?

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Objectives: Since adopting the ACOSOG Z0011 protocol and omitting a completion axillary dissection for <3 involved lymph nodes in breast-conserving surgery for early-stage breast cancer, some surgeons have altered their

sentinel lymph node biopsy technique to remove more lymph nodes during sentinel lymph node biopsy procedure to assess axillary tumor burden. The goal of this study is to assess whether surgeons are removing a statistically significant increased number of sentinel lymph nodes during sentinel lymph node biopsy since adopting ACOSOG Z0011.

Method: A retrospective chart review was performed evaluating 100 consecutive patients undergoing sentinel lymph node biopsy for breast cancer from 2008-2009 (prior to ACOSOG Z011) and 100 consecutive sentinel lymph node biopsies from 2011-2012 (post ACOSOG Z0011). Charts were analyzed for number of sentinel lymph nodes removed, and surgeon performing the operation. Those undergoing a sentinel lymph node biopsy for a diagnosis of noninvasive disease were excluded.

Results: Two hundred patient charts were reviewed. Of the 100 sentinel lymph node biopsies performed prior to Z0011 compared to 100 sentinel lymph node biopsies performed after Z0011, the number of nodes removed ranged from 1-11 (mean, 2.77; median, 2 nodes) pre-Z0011 and 1-12 (mean, 3.29; median, 3 nodes) post Z0011. Although this showed a trend toward removing more nodes, it was not statistically significant ($p = 0.076$). When we analyzed individual surgeons' data based on surgeon performing the procedure, all surgeon data trended toward the removal of more nodes; however, only 1 of the 3 surgeons had a statistically significant increase in the number of nodes removed after Z0011. For this surgeon, the mean number of nodes removed pre-Z0011 (57 procedures) was 2.77 vs 3.78 post Z0011 (50 procedures) with a median of 2 vs 4 nodes removed, respectively ($p = 0.011$).

Conclusions: Since adopting ACOSOG Z0011, some surgeons have increased the number of nodes they remove during sentinel lymph node biopsy. Whether this changes further patient management, increases procedure-related complications, or increases procedure-related cost has yet to be determined.

0157 How Accurately Can Clinicians Predict the Onco*type* Dx DCIS Score?

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Objectives: To evaluate clinicians' ability to predict the DCIS Score.

Method: The Onco*type* DX DCIS Score was developed to assess the risk of recurrence for ductal carcinoma in situ, as well as an invasive breast cancer. It is a 12-gene assay performed on an individual patient's tumor and is used to predict the 10-year local recurrence risk of an ipsilateral breast event, which can be either an invasive breast cancer or ductal carcinoma in situ. It is also used to predict the 10-year risk of an invasive cancer. The DCIS Score was clinically validated using patients from ECOG 5194. The purpose of this study was to investigate how often clinicians (medical oncologists, breast surgical oncologists, and radiation oncologists) can predict the DCIS Score.

In this IRB-approved study, we retrospectively reviewed the charts of 19 patients at our institution who underwent unilateral or bilateral partial mastectomy for DCIS from April 2012 to October 2012 and who had their pathology specimens submitted for DCIS Scores. Patient age range was 43-82 years old, with a mean of 56. All patients underwent consultation with Radiation Oncology. A chart was compiled to include the patient's age and tumor histology. This included grade of DCIS, extent of DCIS, presence of necrosis, margin width, and hormone receptors. We then removed all identifying factors from the patients' data, and surveyed our radiation oncologists, medical oncologists, and breast surgical oncologists on whether patients had a low, intermediate, or high DCIS Score.

Results: Breast surgical oncologists accurately predicted the DCIS score 55% of the time. Medical oncologists predicted the DCIS score 42% of the time, while radiation oncologists were accurate 52% of the time. The actual DCIS Scores correlated poorly with the clinicians' predicted scores.

Department	Ability to Predict DCIS Score
Surgery	55%
Medical Oncology	42%
Radiation Oncology	52%

Conclusions : This study demonstrates the difficulty in predicting the DCIS Score. The information obtained from the DCIS Score is specific to the genetic behavior of each individual tumor, whereas traditional methods of

predicting risk of recurrence and benefit of radiation are based on standard pathologic and clinical criteria. Further studies on larger patient populations need to be performed prior to wide scale acceptance of this genomic test.

0148 Papillomas of the Breast 15 mm and Smaller: 4-Year Experience in a Private Breast Imaging Center

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Objectives: Over the past decade, multiple reports describe 15-20% surgical upgrade diagnosis of benign papillomas of the breast diagnosed on core needle biopsy (CNB), to either atypia (ADH, ALH, LCIS) or cancer (DCIS or invasive carcinoma). Meanwhile, improving diagnostic acuity of breast imaging identifies many more asymptomatic breast papillomas. In our private, dedicated breast imaging center, we frequently face decisions regarding management of small intraductal masses or benign papillomas on CNB. This study was undertaken to examine the significance of breast papillomas ≤15 mm.

Method: We reviewed all papillomas of the breast seen in our center from Jan 2008 through Dec 2011. Of 310 suspected papillomas, 266 were confirmed histologically, 207 completed CNB followed by surgical excision, and 179 papillomas in 147 patients were ≤15 mm. To accurately reflect our practice environment, we did not exclude suspected papillomas more than 1 cm away from a new ipsilateral cancer (nonpapillary), or patients with previous breast cancer or atypia. Clinical presentation of each papilloma was recorded. Variables for each papilloma included size, distance from nipple (cmFN), CNB diagnosis, surgical outcome, patient age, and risk (NR vs HR). High-risk (HR) patients had 1 or more of the following: history of breast cancer or atypia, or family history of breast cancer (first or second degree). Normal risk (NR) patients had none. Multiple logistic regression was performed on variables.

Results: Patients ranged in age from 27 to 85, with both mean and median ages 58 years. CNB diagnosis, surgical outcome, and upgrade diagnosis are shown in Table 1. Of 146 papillomas diagnosed as benign on CNB, 25 showed atypia, and 7 showed cancer at surgery. Overall surgical upgrade rate was 21%. Results were stratified for patient age, risk, size of papilloma, and distance from nipple (cmFN). Although HR and increasing age trended to more atypia, none of the variables reached statistical significance. A subset of papillomas were incidental findings on breast ultrasound (77/179; 43%), and thus mammographically occult. Surgical outcomes showed atypia in 16 (21%) and cancer in 12 (15%). Within this subset, specifically in patients with a newly diagnosed nonpapillary cancer, incidental mammographically occult papillomas yielded 2 additional ipsilateral and 5 additional contralateral cancers.

Table 1. Final Outcome 179 Breast Papillomas ≤15 mm

	Benign	Atypia	Cancer
CNB diagnosis	146 (81%)	23 (13%)	10 (6%)
Surgical diagnosis	114 (64%)	43 (24%)	22 (12%)
*Upgrade		*25	*12

Conclusions: Over one third (36%; 65/179) of papillomas ≤15 mm in our series had associated atypia or cancer. Surgical upgrade rate, following CNB, was 21%. Breast ultrasound played a significant role in identifying asymptomatic mammographically occult papillomas, 36% of which had atypia or cancer. Any papilloma diagnosed on CNB should be surgically excised.

0102 Re-excision for a Close or Positive Margin During Mastectomy for Primary Breast Cancer Does Not Increase the Risk of Short-Term Local Recurrence

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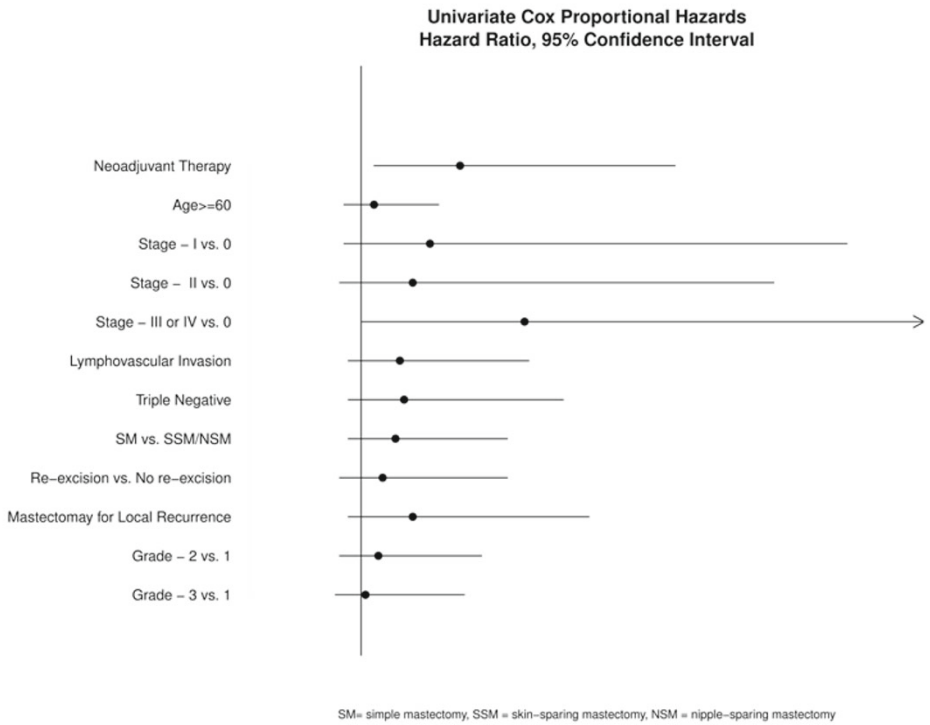
Objectives: While there is considerable evidence focusing on margin status and re-excision for patients undergoing breast conservation therapy, there is little data addressing the impact of close or positive margins in patients with a primary breast cancer undergoing mastectomy. There has been an increase in the percentage of patients undergoing skin-sparing mastectomy (SSM) and nipple-sparing mastectomy (NSM) for breast cancer and the technical challenges associated with these procedures may increase the risk for a close or positive margin. This

study was undertaken to determine if a close or positive margin requiring re-excision was an independent risk factor for local recurrence.

Method: A retrospective review identified 711 consecutive patients who underwent a total of 793 mastectomies for a primary breast cancer from 2006 to 2008. Margins were considered positive if invasive or in situ disease was present at the margin. Margins were considered close if disease was identified within 2 mm of a margin. Inadequate margins were re-excised by removing additional tissue according to the location of the close or positive margin as assessed by the operating surgeon and pathologist. We are in the unique situation of having this pathologic margin assessment determined intraoperatively. The microscopic findings and gross orientation of the specimen, performed in real time, allows a more precise re-excision than likely could be achieved in a delayed fashion Univariate analysis and hazard ratio were utilized to determine the effect of re-excision and other clinical and pathological factors on local recurrence.

Results: Twenty-six patients (3.3%) developed a local recurrence with a mean follow-up of 51 months for the entire cohort. In 90 mastectomies (11%), there was a re-excision for a close (n = 53) or positive (n = 37) margin. All of the re-excisions took place at the primary procedure and no patients required a second operation to obtain a negative margin. Patients undergoing an SSM or NSM were almost twice as likely to require intraoperative re-excision compared to simple mastectomies (15.7% vs 8.9%). Need for re-excision for a close or positive margin was not found to increase the risk of local recurrence (p = 0.68, HR = 1.35, and p = 0.47, HR 1.70, respectively). Patients who underwent neoadjuvant systemic therapy prior to mastectomy were more likely to locally recur (p = 0.009, HR 3.34). Patient age, tumor grade, stage, lymphovascular invasion, triple-negative receptor status, and breast procedure (simple mastectomy vs SSM/NSM) did not impact short-term local recurrence.

Figure 1. Univariate analysis of factors associated with local recurrence.



Conclusions: Close or positive margins are not uncommon during SSM/NSM mastectomies. Intraoperative re-excision for close or positive margins during mastectomy for breast cancer does not result in an increased risk of short-term local recurrence; however, with few events and modest follow-up definitive conclusions cannot be made at this time. These findings may not translate when close/positive margins are determined in a postoperative fashion.

0163 Variables Correlating With Excellent and Good Cosmetic Outcomes Using APBI With a Strut-Based Breast Brachytherapy Applicator: Experiences of an NAPBC-Accredited Breast Center

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Objectives: This report details the findings of statistical correlations between cosmetic results and numerous dosimetry variables for patients treated using a strut-based brachytherapy device at a DC area NAPBC-accredited breast center.

Method: This single institutional database is a retrospective (2010-2011) review of 135 patients treated with the strut-based breast brachytherapy applicator, following American Society of Breast Surgeons criteria for accelerated partial breast irradiation (APBI). Dosimetry parameters were recorded for patients: V90, V95, V100, V150, V200, skin spacing, maximum skin dose, tumor size, PTV_EVAL, and device size (largest, 10-1; smallest, 6-1mini). Cosmesis was graded by physicians at early (<1 yr), 1-year, and 2-year follow-up using the Harvard Scale (Excellent/Good/Fair/Poor). Parameters were evaluated for association with cosmetic outcomes.

Results: For the early follow-up period, 18 breasts were evaluated with 100% having excellent or good grades. Skin spacing was the only variable correlating significantly with cosmesis. For all other variables, no clinically significant correlations were found. For the 1-year follow-up period, 48 breasts were evaluated with 97.4% having excellent or good grades. For all other variables, no clinically significant correlations were found. For the 2-year follow-up period, 62 breasts were evaluated with 94% having excellent or good grades. No other variable correlated statistically with cosmesis (all $p > 0.10$).

Conclusions: The strut-based breast brachytherapy applicator provided excellent to good cosmetic results in greater than 94% of patients. Skin spacing correlated with outcome at early follow-up and weakly correlated with outcome at 2 years. Even in anatomically challenging cases (skin bridge <3 mm & 3-5 mm), cosmetic outcomes were excellent/good in 90% of patients at these follow-up intervals. The utilization of this device provided an excellent-to-good option for APBI in patients otherwise felt to be poor candidates due to small skin bridge.

0087 Is Granulomatous Mastitis an Infectious Disease? Implications for Clinical Management

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Objectives: Granulomatous mastitis (GM) is a rare benign disorder of the breast that historically was thought to be idiopathic and often treated with steroids. Recent studies have suggested an infectious etiology with Corynebacterium. We reviewed our single-institution experience with GM and correlated results of retrospective Gram staining, tissue histology, tissue culture, and clinical parameters.

Method: An IRB-approved retrospective pathology database review identified breast biopsy specimens with granulomatous inflammation (GI). Silicone granulomas, tuberculosis specimens, and fat necrosis were excluded. Gram stain was done to look for Gram-positive bacilli. Demographics and clinical characteristics of disease course were reviewed. Data were examined for associations between the prevalence of Gram-positive bacilli among patients with and without GM, and to identify clinical predictors for the disease.

Results: Fourteen patients with biopsy-proven GI were identified. Five patients were excluded due to incomplete data. Of the remaining patients, 5 were clinically diagnosed with GM and the other 4 GI patients had either periductal mastitis or granulomatous fibrosis. All GM patients (5/5) had Gram-positive bacilli on Gram stain compared to none of the GI patients (0/4) (p value, 0.007). One patient with GM grew Corynebacterium from tissue culture. GM patients were fewer years post-partum at diagnosis compared to non-GM patients (3.9 vs 10.3 years from last delivery; p value, 0.01), and tended to present at an earlier age (34 yr vs 41 yr; p value, 0.24). Both groups were composed of at least 50% ethnic minorities (3/5 for GM and 2/4 for non-GM). All GM patients were effectively treated with prednisone, antibiotics, or surgery.

Conclusions: Our data better delineate the clinicopathologic characteristics of GM and suggest that it may have an infectious etiology. Compared to non-GM patients, women with GM are more likely to have Gram-positive bacilli on Gram stain, present fewer years post-partum, and are younger at diagnosis. Although surgery, steroids, or selective antibiotics all appear effective in treating GM, the presented infectious correlates may help better direct therapy in the future.

0031 Ultrasound-Guided High-Intensity Focused Ultrasound (HIFU) Treatment of Breast Fibroadenoma

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Objectives: Breast fibroadenoma (FA) is the most common benign breast tumor in young women. It is a well-circumscribed tumor, easily distinguishable from adjacent normal breast tissue on ultrasound images. The diagnosis is based on the consistent results of clinical examination, imaging, and core needle biopsy. Surgical resection of the FA is achieved when the fibroadenoma is troublesome because of its size or location, or it is causing a major state of anxiety in the patient. Ultrasound-guided high-intensity focused ultrasounds (USg-HIFUs) can be an alternative to surgery. HIFU penetrates through soft tissues and causes localized hyperthermia responsible of irreversible cell damage, protein denaturation and coagulation necrosis, without any damage to surrounding tissues. The objective of our open prospective multicentric study is to demonstrate the feasibility, the safety, and the efficacy of USg-HIFU in the treatment of the breast FA.

Results: The average treatment time was 1h30 (0h30-2h30). Volume reductions are described in Table 1. A 27-year-old patient became pregnant 1 month after HIFU treatment. Despite hormonal impregnation she showed a reduction of volume of 73% at M12. Breastfeeding has been achieved without any complication. HIFU treatment was well tolerated. In 43.5%, FA became indurated between D7 and M3. Thirteen percent had a skin irritation and erythema between D7 and M1 that disappeared spontaneously. No other adverse events were observed.

Table 1. Volume Reduction Over Time

Follow-Up Period (months)	Patients (n)	Mean Volume Reduction (%)
M2	29	32.7 ± 17.0 [6.4–62.7]
M4	16	54.0 ± 11.0 [35.2–74.9]
M6	12	60.7 ± 16.0 [39.0–85.9]
M9	5	61.5 ± 11.0 [46.9–70.0]
M12	2	68.5 ± 6.0 [63.9–73.0]

Conclusions: HIFU treatment is a noninvasive method, well tolerated by patients. For all patients, the volume of the FA declined with a decreasing rate which seems related to the size of the initial volume. Preliminary results are encouraging and show that HIFU could be an alternative treatment for benign breast tumors.

0144 Margin Width Is Not Predictive of Residual Disease on Re-excision in Breast-Conserving Therapy

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Objectives: Re-excision is frequently performed in patients who undergo breast-conserving therapy (BCT) and have close (less than 2 mm) margins on final pathology. There is lack of consensus regarding what constitutes an adequate margin. We hypothesize that margin width alone does not predict residual disease at re-excision and thus we examine the value of margin width, as well as other clinicopathologic variables, in predicting residual disease on re-excision.

Method: The cancer registry was queried from 2005-2007 for patients (pts) with BCT who underwent re-excision for positive margins, using 2 mm as the definition of a close margin. Pts who had additional disease on re-excision were compared to those who did not. Demographics, clinical, radiologic (using US, MXR, MRI), and pathologic staging were recorded. Univariate and multivariate analyses were performed to determine factors associated with additional disease on re-excision.

Results: From 2005-2007, 1,843 pts underwent BCT. A re-excision rate of 42% was observed. After exclusion criteria were applied, which included an excisional biopsy, neoadjuvant therapy, and/or insufficient data, clinicopathologic factors from 228 pts (12%) who underwent re-excision for margins less than or equal to 2 mm are shown in Table 1. One hunded five pts (46%) had additional disease on re-excision and, of those, 58% had BCT and 42% had mastectomy. One hundred twenty-three (54%) had no additional disease on re-excision and, of those, 82% had BCT and 18% had mastectomy. Of the 66 pts who underwent mastectomy as their final surgery, 44 (67%) had residual disease on re-excision; of the 161 who had BCT as their final surgery, 61 (38%) had residual disease on re-excision ($p < 0.01$). On univariate analysis, margin width did not correlate with residual disease on re-excision. However, tumor multifocality, noninvasive histology at or near the margin, increasing number of

close/positive margins, and higher nuclear grade were significantly associated with additional disease on re-excision ($p < 0.05$) (Table 1). On multivariate analysis, only number of close/positive margins remained significant. Age, race, breast tumor histology, tumor size, ER/PR/Her2 status, presence of lymphovascular invasion, and pathologic nodal status were not associated with additional disease on re-excision.

Table 1. Clinicopathologic Factors of Patients Who Underwent BCT With Re-Excision for Close/Positive Margins

Clinicopathologic Factor	Categories	No Additional Disease on Re-excision n (%*)	Additional Disease on Re-excision n (%*)	p Value
Total		123 (64)	105 (46)	
Age	<50	33 (46)	39 (54)	0.095
	>50	90 (58)	66 (42)	
Race	White	114 (54)	97 (46)	0.293
	African American	5 (46)	6 (55)	
	Asian	1 (100)	0 (0)	
	Other	3 (100)	0 (0)	
Histology	IDC	33 (69)	15 (31)	0.103
	ILC	8 (42)	11 (58)	
	IDC + ILC	10 (71)	4 (29)	
	DCIS	30 (50)	30 (50)	
	IDC + DCIS	36 (47)	41 (53)	
	Other	6 (60)	4 (40)	
Grade	1	27 (64)	15 (36)	0.043
	2	66 (57)	49 (43)	
	3	29 (42)	40 (58)	
ER	Positive	105 (57)	80 (43)	0.132
	Negative	16 (43)	21 (57)	
PR	Positive	96 (55)	80 (46)	0.981
	Negative	25 (54)	21 (46)	
Her2	Positive	15 (65)	8 (35)	0.430
	Negative	87 (57)	67 (44)	
Path T	Tis	81 (58)	58 (42)	0.102
	1	12 (43)	16 (57)	
	2	1 (33)	2 (67)	
	3	16 (76)	5 (24)	
Path N	0	100 (55)	83 (45)	0.201
	1	15 (52)	14 (48)	
	2	4 (100)	0 (0)	
	3	0 (0)	1 (100)	
Multifocality	No	90 (59)	63 (41)	0.027
	Yes	32 (43)	42 (57)	
Lymphovascular Invasion	No	98 (53)	87 (47)	0.518
	Yes	24 (59)	17 (42)	
Width of margin	0.0 mm	34 (51)	33 (49)	0.595
	0.1–1.0 mm	65 (59)	46 (41)	
	1.1–2.0 mm	4 (57)	3 (43)	
Number of margins <2mm	1	71 (65)	39 (36)	0.001
	>1	47 (43)	63 (57)	
Histology at margin	Invasive	54 (62)	33 (38)	0.05
	Noninvasive	69 (49)	72 (51)	

**Missing data accounts for numerical disparity in some variables.*

Conclusions: We have shown, in our cohort, that margin width did not predict presence of additional disease on re-excision, and this calls into question the common practice of using this criteria to select re-excision candidates. In fact, 22 (10%) of 228 patients returning to the operating room for re-excision using margin width less than or

equal to 2 mm as criteria for re-excision had needless mastectomies. Extent of disease in the breast, as evidenced by increased number of involved margins was predictive of residual disease. This highlights the critical need for a robust predictive model for residual disease after BCT, and our data suggest that tumor behavior and extent of disease may play a more significant role than margin width. It remains to be determined whether residual microscopic disease on re-excision could effectively be managed with appropriate adjuvant therapies.

0059 The Underutilization of Mechanical Retractors in Breast Surgery

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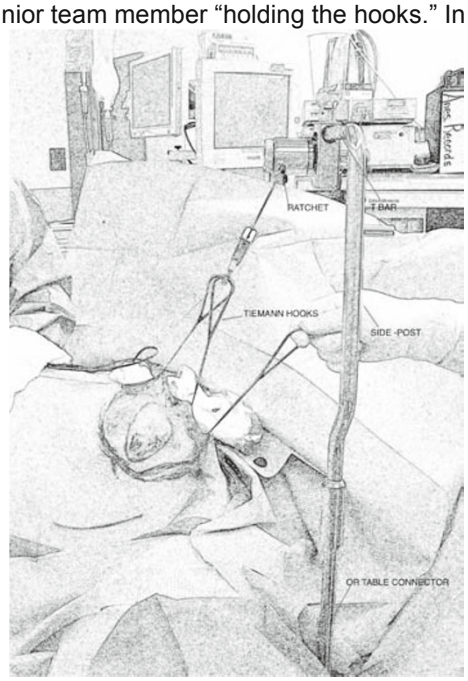
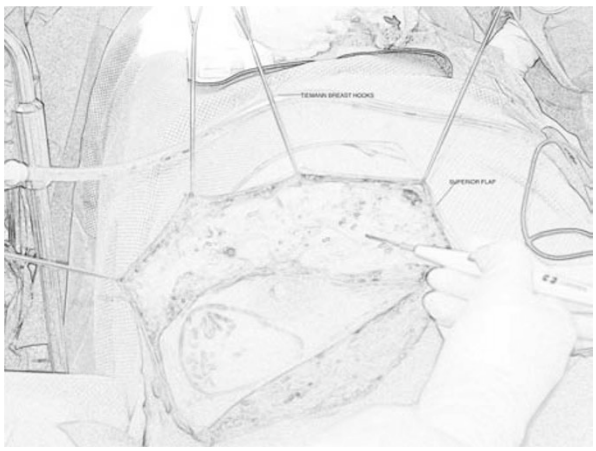
Objectives: The incidence of mastectomy significantly decreased after studies concluding in 1980 demonstrated that breast-conserving surgery provided similar outcomes in early-stage breast cancer. However, the incidence of mastectomy in both Great Britain and the US has increased in the past decade. The reason for a higher mastectomy rate is multifactorial. Factors contributing include more accurate estimation of tumor size by imaging (eg, MRI) and patient choice, especially with improvements in reconstruction. There have been a larger proportion of symptomatic patients presenting with larger tumors and tumors which were multifocal in nature. Additionally, accelerated partial breast irradiation (APBI) which has increased in used for early-stage breast cancer, may be associated with higher rates of later mastectomy, compared to traditional whole-breast irradiation (WBI). Several aspects of mastectomy are extremely labor intensive and may detract from residency and student education. Also, in nonuniversity hospitals mastectomies may require additional assistance as a second assistant either mid-level assistant or second surgeon. Details of mastectomy include retraction in raising of flaps, removal of the breast from the chest wall, and often axillary nodal sampling. The skin flap dissection is a critical part of mastectomy requiring technical expertise and sound surgical judgment. Uniform retraction and sufficient tension of the skin flaps is essential in obtaining desirable results. The age-old dictum has the junior team member "holding the hooks." In this day of reduced residency hours when valuable OR time should be spent providing education on technical procedural aspects of mastectomy, the creation of flaps may expose the resident or student to nonlearning tasks. The current focus is that the junior team members are integral parts of the decision-making and learning paradigm.Only 1 previous report discusses using a mechanical retractor to aid in developing mastectomy flaps.This study demonstrates the use of the Rultract retracting device, commonplace in most ORs as a tool for thoracic surgery.



Method: The patient is prepped and draped in the supine position. The side-post is attached to the side rail of the OR table. The ratchet attachment is inserted on the T bar and Tiemann breast hooks are attached to the ratchet with appropriate tension maintained and adjusted with the ratchet.



Results: We have used this technique over the past 5 years without complication.This report demonstrates how a mechanical retraction device can be used to provide mechanical retraction. The resident can then participate and visualize the critical steps and essential techniques required for creating a suitable flap instead of retracting in a nonlearning manner.

Conclusions: This report demonstrates the utility of a mechanical retractor for developing flaps for mastectomy. We believe that these devices are underutilized. The use of this mechanical retractor permits the active participation of a resident in training and provides better visualization for a medical student and in nonuniversity programs may obviate the need for a second assistant or another surgeon, thus lowering the cost of the procedure.

0147 Why Should Breast Surgeons Know About Leukemia?

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Objectives: Surgeons biopsying breast masses need to be aware of malignant conditions mimicking epithelial breast cancer to avoid mistakes in therapy. Leukemic breast tumors are important to recognize because of their similarities to breast carcinoma, with different treatment and prognosis. In a recent publication, morphologic and progression patterns similar to invasive lobular carcinoma (ILC) were found among 235 cases reported over 40 years (*Am J Hem*, 2012). That study documented leukemic breast tumors presenting at any age (1 to 74 years) and showing poor survival and a pattern of tumor spread similar to ILC (ipsi- and contra-lateral recurrence, then pelvic/abdominal, then meningeal). Our goal was to correlate clinical and pathologic features of these under-investigated neoplasms.

Method: Samples from paraffin blocks of leukemic breast tumors from 25 patients (AML and ALL) presenting before, during, or after marrow leukemia were contributed. Histologic review and immunohistochemical stains for cytokeratin, E-cadherin, and CD44 were performed.

Results: Breast tumors may occur before evident marrow leukemia, simultaneously, or up to 10 years thereafter. The marrow may not be simultaneously involved, but may relapse within months. The majority of leukemic tumors are not eradicated with anti-leukemia drugs and next relapse is in extramedullary sites as often as in the marrow. In the large review, 13 of 43 patients known to have had complete tumor excision with systemic therapy survived for 8 to 30+ years, while only 4 of 106 receiving chemotherapy alone survived 4 years. Leukemic breast tumors are typically single or multiple nodules, though in some cases the entire breast may be involved. Lesions are firm, mimicking breast carcinoma, and some have “orange peel” skin changes. They grow rapidly, as large as 12 cm. The majority of reported cases are unilateral with ipsilateral axillary lymphadenopathy but subsequently the other breast is often involved. Imaging and gross pathologic features are similar to breast carcinoma: tumors are solid, hypoechoic, lobulated masses. Microscopically, tumor nodules were well circumscribed; surrounding breast parenchyma appeared normal. H&E staining showed sheets of leukemic cells but all cases also had single-file arrangements of leukemic cells, sometimes forming targetoid patterns, typical of ILC. Dense keloid-like fibrosis reminiscent of fibrosis in chemoresistant epithelial tumors was noted and suggests a possible relationship between tumor-associated fibrosis and chemoresistance in leukemic tumors. Often, distinction from carcinoma could not reliably be made without special stains. Histologically, the differential diagnosis includes poorly differentiated carcinoma, ILC, lymphoma, and leukemia. Tumor cells were negative for cytokeratin and E-cadherin and positive for CD44.

Conclusions: Breast tumors composed of leukemic cells are important to recognize as they may appear indistinguishable from breast carcinoma on physical exam, imaging, and gross and microscopic examination. Clinical history is important, but there may be a distant or no history of leukemia. Communication between surgeon and pathologist is critical to correct diagnosis, as cytokeratin stains to document the epithelial nature of breast tumors are not routinely performed. When feasible, surgical excision of tumor, with systemic chemotherapy to protect the marrow, is appropriate treatment, and has been associated with cure.

0131 The Exploitation of the CD206 Receptor in Stably Localizing the Radiotracer Tc99m-Tilmanocept Provides Enhanced SLN Localization, Degree of Localization, and Found Nodal Metastasis in Tis-T4, N0, M0 Breast Cancer Patients

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Objectives: ILM/SLNB is a key, real-time diagnostic component of the tumor excision procedure for breast cancer and other solid tumors. This diagnostic procedure utilizes the injection of either a colorimetric agent, eg, blue dye (VBD), and/or the injection of a radiopharmaceutical agent where the latter may be tracked intraoperatively using a handheld gamma detection probe. Currently, ILM/SLNB most often employs the use of a Tc99m-labeled particulate colloid along with VBD. As objectives, we compared the key clinical metrics of localization (per patient population) and degree of localization (nodes/patient) for (A) Tc99m-tilmanocept (TMCPT) to VBD (Phase 3 clinical study; within patient), and (B) Tc99m-tilmanocept versus Tc99m-colloid (TcSC), via meta-analysis. We also compared TMCPT vs VBD in the localization of pathology in SLNs (nodal metastasis).

Method: (A) In 2 phase 3 clinical studies, we compared the localization rates of Tc99m-tilmanocept with VBD on a within patient (pt) schema. All patients received both agents; concordance (hot/blue and blue/hot) defined the localization differential of the 2 agents. We also assessed pathology of the blue nodes, hot nodes, hot/blue nodes, or not-hot/not-blue nodes for concordance of the findings. (B) To create statistical review and contrast of the 2 radiolabeled agents, TMCPT and TcSC, we employed a meta-analysis of peer-established data based on the FDA-reviewed TcSC published data. Both localization metrics effectively defined the potential for performance of either agent in vivo in aiding the surgeon in excising potentially disease-harbouring SLNs.

Results: (A) The concordance of TMCPT with VBD was >99% (blue was hot) while the reverse concordance of VBD to TMCPT (hot was blue) was ~65% (both contrasts, $P < 0.0001$). The localization rate for VBD was ~99% with mean number of nodes 2.16/pt, while VBD was localized in only 89% of pts with an average node count of 1.6/pt ($P < 0.0001$, both metrics). The % of all path+ nodes found by TMCPT was 100%, while VBD found 80% (1 patient was excluded for N+ condition) ($P < 0.001$). (B) The meta-contrast of TMCPT vs TcSC indicates that for a patient standardized population of patients (based on intent to treat), the localization rate for TMCPT vs the TcSC, 99.9 vs 94 (per pt population) and 2.08 vs 1.6 (nodes/pt), respectively (both $p < 0.0001$).

Conclusions: TMCPT provided significantly greater performance in both key performance metrics, node localization per patient, and degree of localization (nodes found per patient) against both agents, which, coincidently, benchmarked at essentially the same level. All benchmarks are highly statistically significant regarding these key clinical performance parameters. With regard to pathology findings, TMCPT found significantly more path+ nodes, indicating that the additional nodes/pt provide additional found disease, not just superfluous radio-agent localization. Receptor-targeted TMCPT may provide better SLNB staging via improved specificity and stable localization.

0051 Financial Impact of a Protocol for Breast MRI

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Objectives: Overutilization has been expressed as “health care spending that can be eliminated without reducing the quality of care.” As such, the role of breast magnetic resonance imaging (MRI) has undergone further scrutiny in recent years. Overutilization of breast MRI has led to the increased cost of breast cancer treatment without favorably affecting outcomes. A model for the analysis of a breast MRI protocol was applied at our institution to determine the financial impact of overutilization of this modality.

Method: A financial model for the reduction in use of breast MRI by implementing a protocol of utilization based on published current consensus opinion was developed and analyzed. The following assumptions were included in the model after implementation of the protocol:

- A 90% reduction in utilization of breast MRI
- A 30% reduction of needle biopsies and 10% reduction of surgical biopsies in women who previously would have undergone breast MRI
- A 5% reduction of contralateral mastectomy for women with newly diagnosed breast cancer
- No increase in local recurrence, metastatic disease, or cancer related mortality by avoidance of breast MRI
- Expenditure is expressed in insurance adjusted dollars, costs reflect direct and professional expenses, and margin expresses net profit.

Results: The annual number of breast MRIs at our institution would be reduced from 405 to 40. One hundred ten needle breast biopsies, 36 surgical breast biopsies, and 18 contralateral mastectomies would be avoided by the protocol. The associated decrease in expenditures and margin is expressed in dollars below:

Procedure	Expenditure	Margin
MRI	414, 661	310,636
Needle biopsy	90,640	53,384
Surgical biopsy	37,152	12,024
Contralateral mastectomy	100,620	41,220
Total	643,073	417,464

Conclusions: A model for the implementation of a breast MRI protocol would result in a significant reduction in imaging and associated surgical procedures. This would translate to a decrease in health care expenditures of more than $640,000 at a single institution. This model could serve as an example for other institutions as we move from a volume-driven to quality-driven health care system.

0048 Evaluation of Low-Level Laser Therapy (630 nm) in Prevention of Radiation-Induced Dermatitis in Breast Cancer Patients

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Objectives: Radiation dermatitis is a common side-effect of radiotherapy. The purpose of this study was evaluation of low-level laser therapy (630 nm) in prevention of radiation-induced dermatitis.

Method: Twenty-eight patients who underwent breast-conserving surgery for breast cancer and were going to receive radiation therapy (RT) were randomly assigned to receive low-level laser (630 nm) or sham (laser off) treatment in conjunction with radiotherapy. The frequency and severity of dermatitis measured at the end of each week during RT and every 2 weeks until 3 months after treatment.

Results: All patients developed some degree of dermatitis. In the laser therapy group (n = 13), 14.6% of the patients had mild (grade 1) and 15.4% moderate (grade 2) dermatitis. In sham group (n = 11), 54.5% of the patients had moderate to severe (grade 2 or 3) dermatitis. In comparison between 2 groups, patients in sham therapy group had relative risk 2.75 (P = 0.04) for presenting more severe dermatitis.

Conclusions: Prophylactic use of low-level laser therapy during chest wall RT for breast cancer can significantly reduce the incidence of radiation-induced skin reactions.

0010 Immediate Breast Reconstruction Does Not Increase Postmastectomy Pain

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Objectives: Postmastectomy pain syndrome (PMPS) is a recognized complication of breast surgery with a reported prevalence of 20% to 52%. There are few studies that have examined the impact of immediate reconstruction on PMPS. The aim of this study was to establish whether patients having immediate reconstruction reported more long-term pain.

Method: Patients who had undergone mastectomy alone or with immediate reconstruction between 01/01/2009 and 01/06/2011 were identified. All patients from this group who attended a follow-up clinic between 01/02/2012 and 05/07/2012 were approached and asked to complete 2 questionnaires – a pain intensity scale and a screening tool for neuropathic pain.

Results: Three hundred eighteen patients were due to attend and 272 (86%) submitted complete questionnaires. One hundred thirty-six (49%) women had undergone immediate reconstruction using implants, pedicled and free

flaps. The overall point prevalence of neuropathic pain was low – 24 patients (9%) had positive or intermediate scores. There was no significant difference in neuropathic pain between patients having mastectomy alone (n = 9, 6.5%) or with immediate reconstruction (n = 15, 11.2%). Using the pain rating scale, 81% of patients (n = 221) reported their current pain intensity as zero. Only 8 patients (3%) reported a score of 5 or above.

Conclusions: The prevalence of PMPS in patients who have had a mastectomy is lower than historic reports. Immediate reconstruction does not increase chronic pain after mastectomy and does not increase levels of overall pain intensity. This is despite additional tissue dissection and potential donor site morbidity. Patients should be reassured that breast reconstruction does not increase the risk of chronic pain complications.

0025 Suspected Fibroadenomas of the Breast: When Should Excision Be Recommended?

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Objectives: Fibroadenomas are a common, benign tumor found primarily in premenopausal women. Both benign and malignant phylloides tumors may mimic fibroadenomas. Additionally, published reports have described adenocarcinoma and DCIS arising within fibroadenomas or misdiagnosed as fibroadenomas. Despite these concerns, literature describing criteria for excision is limited. We sought to find clinical or radiologic criteria that would help identify patients who should have surgical excision, and those who can be safely observed.

Method: A retrospective review was performed of patients with a preoperative diagnosis of fibroadenoma who underwent surgical excision from 2002 through 2011. Data collected included demographics, risk factors for breast cancer, physical exam characteristics, imaging results, preoperative size, preoperative biopsy results, and final pathology. Biopsy results were categorized to fibroadenoma and not definitive for fibroadenoma (includes fibroepithelial neoplasm, spindle-cell neoplasm, fibroadenoma vs phylloides, and other nonspecific diagnoses). Statistical analyses were performed using chi-square analysis and Mantel-Haenszel estimates, with a p value of 0.05 being significant.

Results: Seven hundred twenty-three patients met inclusion criteria. Of these, 681 had fibroadenoma on final pathology. The other 42 patients had pathology demonstrating phyllodes (23), malignant phyllodes (2), atypical ductal hyperplasia (1), intraductal papilloma (5), and other benign pathology (11). The overall incidence of non-fibroadenoma pathology in our study was 5% and malignant findings 0.3%. No cases of adenocarcinoma were identified. Non-fibroadenoma pathology was associated with higher use of hormonal therapy (OR, 4.1; $p < 0.001$), age >35 (OR, 2.8; $p < 0.005$), an immobile (OR, 9.4; $p < 0.05$) or poorly circumscribed mass (OR, 15.4; $p < 0.005$), preoperative size greater than 2.5 cm (OR, 2.3; $p < 0.03$), and preoperative biopsy not definitive for fibroadenoma (OR, 11.2; $p < 0.001$).

Conclusions: In women with risk factors, including the use of hormone therapy, age greater than 35, immobile or poorly circumscribed on physical exam, mass > 2.5 cm, or preoperative biopsy not definitive for fibroadenoma, surgical excision to exclude more aggressive disease is recommended. Patients can be counseled that, in the absence of these risk factors, the presumed fibroadenoma can be safely observed.

0115 The Clinical Impact of the Z0011 Trial: Are Canadian Surgeons Performing Axillary Lymph Node Dissections in T1 to T2 Node-Positive Breast Cancer?

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Objectives: The American College of Surgeons Oncology Group Z0011 trial (Giuliano et al, 2011) is a Phase 3 noninferiority trial that randomized T1 or T2 breast cancer patients with 1 to 2 positive sentinel lymph nodes (SLN) to either axillary lymph node dissection (ALND) or no further axillary treatment. The Z0011 trial demonstrated no significant difference in the 2 groups with regards to overall 5-year survival, disease-free 5-year survival, or locoregional recurrence-free 5-year survival, challenging whether ALND should still be performed in this specific group of patients.This study investigates whether the publication of the Z0011 trial has influenced the clinical practice of Canadian surgeons.

Method: A Web-based survey (SurveyMonkey) was distributed by email through societal distribution lists to general surgeons (Canadian Association of General Surgeons, CAGS) and surgical oncologists (Canadian Society of Surgical Oncology, CSSO) across Canada. Approval was granted by the Health Science Research Ethics Board at

Queen's University. Fisher exact test and 1-way ANOVA were used to determine differences between the study groups and whether surgeon demographics affected their responses.

Results: Ninety-six surgeons responded, of whom 69 went on to complete the survey. The response rate from the 184 CSSO surgeons was 27.7%; we were unable to determine this for CAGS. 94.6% were aware of the Z0011 trial. For isolated tumor cells and macrometastases identified on SLN biopsy, there was no change in practice. There was a significant change in practice for SLN micrometastases (P = 0.027); 34 of 51 surgeons who previously performed completion ALND now no longer do. Duration in practice, breast fellowship, academic or cancer center practice did not impact on whether a surgeon's practice changed due to the trial. There was a trend toward those with surgical oncology fellowships being less likely to continue to perform ALND for micrometastases (P = 0.25).

Conclusions: Although the sample size was small, those surveyed seemed to have changed their practice as a result of the Z0011 trial, at least in micrometastases. This was not limited to those at academic centers or those with cancer center affiliations. A large number of the respondents were aware of the trial and subjectively felt the Z0011 trial had changed their practice. This survey documents the current practice of Canadian surgeons in this specific clinical situation.

0160 Do All Patients With DCIS Undergoing Mastectomy Need to Be Evaluated by Sentinel Lymph Node Biopsy?

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Objectives: DCIS, by definition, does not metastasize to regional lymph nodes. However, it has been shown that 10%-38% of patients with a preoperative diagnosis of DCIS have subsequently been found to have an invasive component (Goyal, 2006). In these patients, factors that were associated with the presence of invasive cancer included the presence of a palpable mass on exam, presence of a mass on mammography, microinvasion, high-grade disease, and preoperative diagnosis made on core needle biopsy (Takacs, 2009). Due to the relatively high rate of invasive cancer, it is recommended that this subset of patients have lymph node evaluation. SLNB is routinely performed in patients undergoing mastectomy for DCIS. Given the low frequency of SLNB positivity in other series (0-7.3%) and the subsequent negativity of completion ALND (Takacs, 2009), we wanted to evaluate the value added by SLNB in patients with DCIS undergoing mastectomy. The aim of this study is to identify which patients can be spared SLNB at the time of mastectomy for DCIS.

Method: Patients in a public hospital setting who had SLNB between 2010 and 2011 were identified. Of these, patients with DCIS were identified. The preoperative and postoperative histologic and mammographic findings and the results of the SLNB were analyzed.

Results: Between 2010 and 2011, preoperative DCIS was the indication for sentinel lymph node biopsy in 37 (21.5%) of the 172 patients. Of those, 9 patients (24.3%) were upstaged to invasive disease. However, none of the patients had macroscopic metastatic disease. An average of 3 lymph nodes were sampled. A single patient had micrometastatic disease (2.3 mm). In addition, we evaluated our patient population for the previously identified predictive factors. The majority of the patients had advanced disease with comedo necrosis present in 86.5% and grade 3 DCIS in 78.4% of patients. Five patients (13.5%) had microinvasive disease at presentation, only 1 of which was upstaged to invasive disease. A mass was identified in 9 (24.3%) patients, with an average size of 2.4 cm.

Conclusions: Despite the relatively high incidence of invasive disease after mastectomy for DCIS, the incidence of metastatic disease found on SLNB remains low. None of our patient population with multiple high-risk factors who underwent SLNB for DCIS had operative findings that mandated ALND. In light of the results of the Z0011 trial, where patients with invasive disease did not gain any survival benefit from the addition of ALND, one could argue that this patient population is exposed to the morbidity associated with SLNB without significant benefit. These preliminary results from our institution indicate that further multidisciplinary study is warranted to evaluate the value of continuing to perform SLNB for DCIS in a larger patient group.

0007 Mammogram Use and Self-Efficacy in an Urban Minority Population

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Objectives: Hispanic and African American women are more often diagnosed at a later stage and with negative prognostic features, such as greater tumor size and higher grade tumors, leading to the increased mortality rate. There is a consistent association between diagnosis at later stage and survival after a breast cancer diagnosis and socioeconomic status – lower income women have a significantly greater risk of dying of breast cancer than do higher income women. Yet removing financial and access barriers to screening has not been adequate to increase screening rates in low-income women. Self-efficacy has been proposed as a theoretical framework with which to predict or explain mammogram use. Self-efficacy refers to an individual's beliefs about their ability to achieve a desired health outcome. Yet in studies of racially and ethnically diverse women, it is likely that social and cultural factors may modify or strengthen self-efficacy. This study evaluates the utility of the construct self-efficacy to predict/explain mammogram use in a diverse population. The goal of this study was to examine the relationship between self-efficacy and race/ethnicity and self-efficacy and the likelihood of ever having had a mammogram in a population of urban Hispanic and African American women.

Method: A cross-sectional research design was used. A convenience sample of 73 Hispanic and African American women over the age of 40 attending services at 2 churches in Camden, New Jersey, were surveyed using a demographics survey and the Mammography Specific Self-Efficacy Scale. The main research variables were mammogram-specific self-efficacy and the likelihood of ever having had a mammogram.

Results: Differences were noted in total mammographyspecific self-efficacy delineated by race/ethnicity and whether or not a woman had ever had a mammogram; the differences were not statistically significant. Total self-efficacy was not significantly associated with being screened. Insurance status was significant; insured women were 11.6 times as likely as uninsured women to have been screened.

Conclusions : Self-efficacy, while positively associated with screening in diverse populations, may not adequately capture the determinants of preventive health seeking in this population. Social and cultural factors, if added to the self-efficacy framework, may provide a model that is more relevant to poor and minority women who experience significant structural barriers and cultural norms that differ from the experiences of the majority white population. Although insured women were more likely to be screened, providing insurance is not sufficient to increase screening rates. Understanding the cultural and social norms and values and developing interventions to increase a woman's self-efficacy will allow researchers to take a proactive role in helping women seek mammogram screening.

0046 Breast-Specific Gamma Imaging Is a Cost Effective and Efficacious Imaging Modality When Compared With MRI

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Objectives: Recent studies have shown both MRI and breast-specific gamma imaging (BSGI) to be good imaging tools for surgical planning in newly diagnosed breast cancer and imaging dense breast. BSGI is used less frequently although it appears to be of similar utility, at less cost. We evaluated BSGI's diagnostic and cost efficacy compared with MRI.

Method: Retrospective data review of 1,480 BSGIs performed in a community comprehensive breast center. Data was evaluated on patients that had both an MRI and BSGI performed within 2 months of each other. Institutional cost, including professional fees of BSGI ($850) and MRI ($3,381), were noted. IRB guidelines were observed.

Results: Seventy-five patients had both BSGI and MRI within 2 months. Eight patients had a +BSGI/-MRI, 4 had cancer. Fourteen patients had +MRI/-BSGI, 3 had cancer. Thirty-seven patients had +BSGI/+MRI, 31 had cancer. Sixteen patients had -BSGI/-MRI, with benign results. BSGI had a sensitivity of 92%, specificity of 73%, PPV of 78%, and NPV of 90%. This compared favorably with MRI, which had sensitivity of 89%, specificity 54%, PPV 67%, and NPV 83%. The accuracy of BSGI was higher at 82% vs MRI at 72%. Total cost of MRI imaging was $253,575 vs BSGI at $63,750. The cost of false positives was MRI $30,429 vs $8,500 for BSGI (not including cost of biopsy).

Conclusions: BSGI was equivalent to MRI in the detection of breast cancer. The BSGI imaging was associated with fewer false positives and a lower cost, compared to MRI. BSGI is a cost-effective and accurate imaging study for further evaluation of dense breast tissue and new diagnosis of cancer.

0145 Adverse Outcomes in Obese Breast Cancer Patients Cannot Be Attributed to Recognized Prognostic Characteristics of the Primary Tumor

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Objectives: Women who are obese at the time of diagnosis of their breast cancer have a higher risk of recurrence and death from breast cancer. Multiple factors are associated with poorer outcomes in breast cancer, including hormone receptor status, grade of the primary tumor, presence or absence of lymphovascular invasion (LVI), the overexpression of Her2/neu, as well as the status of the regional lymph nodes. The purpose of this study is to investigate the relationship between obesity and these recognized prognostic features.

Method: A retrospective chart review of patients with stage0-III breast cancer was undertaken. The patient's body mass index (BMI) was determined from the height and weight of the individual at the time of initial visit utilizing a standard BMI calculator. Patients were determined to be obese if their BMI $\geq$30 kg/m^2. The relationship, if any, between BMI and prognostic tumor features were determined.

Results: Between January 1, 2004, and December 31, 2010, 594 female patients with stage 0-III breast cancer underwent surgical care at our institution. The patients ranged in age from 21 to 93 y (mean, 58 y). The majority of women were either non-Hispanic white (52.6%) or non-Hispanic black (44.5%). The mean primary tumor size was 1.9 cm (range, 0-19 cm). Fifteen percent of patients had DCIS. The majority of patients were staged as T1 (63%), while 6% presented with T3 primary tumors. The mean BMI of the study population was 31.6 kg/m^2 (range, 14-91 kg/m^2). Fifty-six percent of patients were considered obese (BMI $\geq$ 30 kg/m^2). Obesity was not associated with ER status (p = 0.52), PR status (p = 0.89), Her2/neu status (p = 0.95), LVI (p = 0.83, primary tumor grade (p = 0.85), T stage (p = 0.10), or triple-negative status (p = 0.66). However, patients who are obese are far more likely to be node positive (37% vs 29.8%, p = 0.0001). Because obesity-related risk of developing breast cancer is most clearly associated with postmenopausal women, we examined the relationship of BMI to these tumor biologic features in postmenopausal women. Seventy-six percent of women were postmenopausal. The mean BMI was 31.7 kg/m^2. Once again, we did not observe any significant association of obesity with ER status (p = 0.2), PR status (p = 0.9), Her2/neu status (0.55), presence of LVI (0.88), primary tumor grade (p = 0.65), or triple-negative status (p = 0.78). In a multiple regression model, nodal status was associated only with LVI and not obesity.

Conclusions: The higher risk of recurrence and death in obese breast cancer cannot be explained by an increased incidence of recognized adverse primary tumor characteristics. Although obese patients are more frequently node positive, this is associated with the presence of LVI and not increased BMI. Other mechanisms other than recognized prognostic primary tumor characteristics are needed to explain the poorer outcomes in obese breast cancer patients.

0068 Update on the Utility of Breast MRI in the Evaluation of Nipple Discharge: Correlation With Pathologic Diagnoses and Imaging Follow-up

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Objectives: To evaluate the current role of breast MRI in the evaluation of nipple discharge by correlating with pathologic diagnoses and follow-up imaging

Method: IRB approval was obtained for this retrospective study of patients undergoing breast MRI for the clinical indication of nipple discharge. Sixty-six patients underwent breast MRI on a 1.5 Tesla magnet between 1/1/2008 and 12/31/2009; 19 patients were excluded due to lack of follow-up clinical or imaging data. MRI findings, pathologic data, and follow-up clinical data and imaging were reviewed. The MRI BI-RADS (ACR breast imaging-reporting and data system) category given to the breast with nipple discharge was correlated with pathologic diagnosis (when available), or follow-up breast imaging for up to 2 years. Additionally, correlation of MRI BI-RADS category to the patient's clinical history or symptoms related to nipple discharge was also performed. For the purposes of correlating MRI BI-RADS categories to pathologic data and follow-up imaging, categories 1, 2, and 3 breast MRI recommendations were considered concordant with "benign" pathology and follow-up benign imaging results; MRI BI-RADS categories 4 and 5 were considered concordant with "malignant" pathology or follow-up imaging with subsequent biopsy with malignant results.

Results: Overall, results between the MRI BI-RADS category and pathology data or 2-year imaging follow-up was concordant in 68.1% (32/47) of cases and discordant in 31.9% (15/47) of cases. Of patients with a prior history of breast cancer or high-risk lesion in either breast (eg, lobular carcinoma in situ), 83.3% (5/6) had discordant results on MRI, with all discordant results being an MRI BI-RADS category 4/5 with subsequent benign pathology or follow-

up imaging; this group ultimately represented 33.3% (5/15) of all discordant findings on MRI. Additionally, of those patients with prior abnormal imaging (ultrasound, mammography) prior to MRI, 23.5% (4/17) were ultimately found to have malignancy by biopsy/excision, which were all concordant results between MRI and pathology. The remaining 76.5% (13/17) of patients with prior abnormal imaging demonstrated benign pathology or 2-year imaging follow-up, of which 38.5% (5/13) had concordant MRI BI-RADS category of 1, 2, or 3 and 61.5% (8/13) had discordant results, with MRI BI-RADS categories of 4 or 5. Seventeen percent of patients (8/47) imaged overall were found to have malignancy on biopsy or excision. The MRI results for patients with malignant pathology or follow-up imaging with biopsy demonstrated 100% sensitivity and 61.5% specificity in this study.

Conclusions: Breast MRI used for the evaluation of nipple discharge appears sensitive, though not specific, for malignancy. In this study, the negative predictive value of a benign MRI result was 100%. Patient clinical factors appear to impact the rates of discordant MRI results. Breast MRI appears useful both in detecting breast cancer, as well as potentially precluding biopsy/excision or other invasive testing to exclude cancer. Further studies will also be useful.

0128 Impact of Postmastectomy Radiation Therapy after Nipple-Sparing Mastectomy With Immediate Reconstruction

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Objectives: There is general concern that postmastectomy radiation therapy (PMRT) increases complication rates and worsens cosmetic outcome in patients undergoing mastectomy with immediate reconstruction. Additional reservations exist for PMRT after nipple-sparing mastectomy with immediate reconstruction (NSM) since tissue perfusion may be less robust, which could compromise nipple viability. There is little data on outcomes of PMRT following NSM. We wanted to evaluate postoperative complications and outcomes following NSM and PMRT at our institution.

Method: We performed an institutional review board approved retrospective review of 592 consecutive NSM performed at our institution from 6/2006 to10/2012 and identified patients who received PMRT. Patient demographics, risk factors, reconstruction details, pathology, treatments, and clinical outcomes were collected and evaluated.

Results: We identified 24 NSM that received PMRT: 6 patients had a unilateral NSM with PMRT and 18 patients had bilateral NSM with PMRT to 1 breast. Median patient age was 46 years (range, 35-68 years) and median BMI was 22 (range, 18-26). Median mastectomy specimen tumor size was 2.5 cm (range, 0-6 cm). Immediate reconstruction was performed with all NSM: 13 single-stage silicone implant reconstructions and 11 tissue expander reconstructions. Ten patients had tissue expanders exchanged for permanent implants after PMRT; 1 had implant exchange before PMRT. Indications for PMRT included positive axillary nodes, lymphovascular invasion, tumor size, and close or positive margins. One patient received PMRT for chest wall and nodal recurrence 14 months after NSM without radiation.Seven patients had received preoperative chemotherapy and 16 received adjuvant chemotherapy between mastectomy and PMRT. All patients with estrogen receptor positive tumors received endocrine therapy. The mean interval between NSM and PMRT was longer in patients receiving adjuvant chemotherapy, 6.8 months (range, 2.8-21 months), compared with those who had preoperative chemotherapy or no chemotherapy, 1.7 months (range, 0.8-3.2 months). At 15 months median follow-up after NSM surgery (range, 3-43 months), 1 patient (4%) developed an infection and skin necrosis after radiation that required tissue expander removal. The interval between NSM and radiation was 3 months in this patient. There were no other cases of implant loss, infection, skin necrosis, or nipple loss after PMRT. No patient has had chest wall recurrence after PMRT. Four patients (17%) have undergone minor or major revision of their irradiated reconstructions for cosmetic concerns. Indications for revision included: implant exchange for wrinkling, to increase size or to improve implant position. Fat grafting was performed in 1 patient.

Conclusions: Nipple-sparing mastectomy with immediate reconstruction can be safely performed in patients who require postmastectomy radiation. There were no cases of nipple loss due to necrosis in our series and implant/expander loss rates were low. Additional studies are required to determine the impact of the time interval between NSM surgery and initiation of PMRT, optimum time for expander/implant exchange, and to determine long-term cosmetic outcomes.

0041 Incorporation of Nurse Practitioners in a Breast Surgery Practice to Improve Efficiency and Productivity – A Single-Institution Experience

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Objectives: A shortfall in oncology services has been predicted by 2020 due to the growing and aging population. Americans over 65 years of age will double, and there will be a 48% increase in cancer incidence. Utilizing of mid-level practitioners will help address these increasing demands. However, incorporation of this workforce into surgical practices to improve efficiency and productivity can be quiet challenging.

Method: Evolution of a breast surgery practice consisting of 3 part-time breast surgeons (BS) and 2 nurse practitioners (NP) was observed over 5 years (2007–2011) to understand the incorporation of NP, their role and the metamorphosis of the practice. Our practice (tertiary care centre) provides benign and malignant breast care in the community and sees an average of 3565 office patient visits per year. Trends in practice volume, relative value units (RVUs), and revenue were evaluated. Total office volume (office procedures; new and follow-up visits) and new vs follow-up visits between BS and NP were observed. Total office volume and surgical procedure RVU trends of BS were studied.

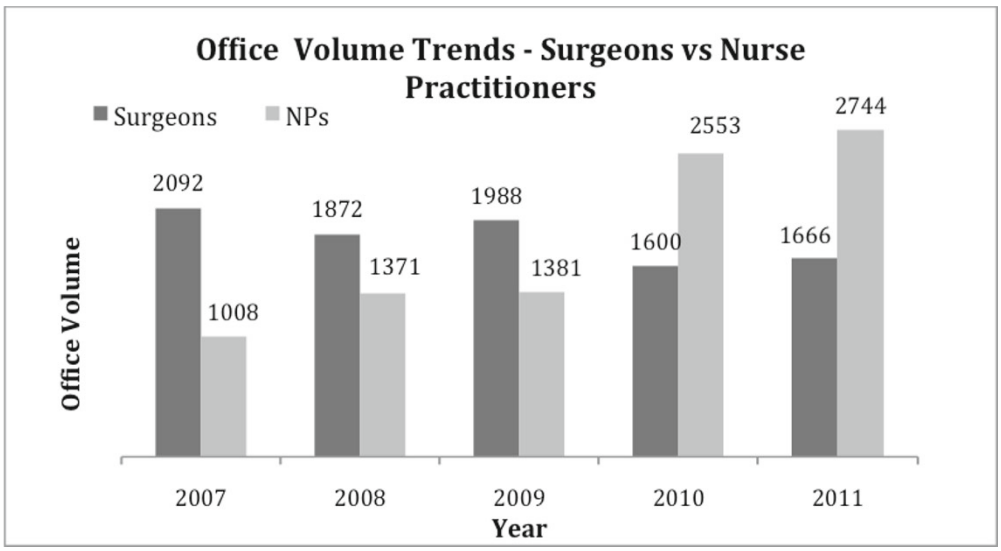
Results: NP worked independently and sought surgeon input when necessary. They served a very diverse role in the outpatient practice (Table 1). However, they did not participate in inpatient and intraoperative care. Total practice volume, RVUs, and revenue from 2007 – 2011 showed a yearly steady mean increase of 8%, 12%, and 18%, respectively. Total office volume increased by 42% in 5 years. However, the office activity of BS dropped over the years while the NP activity increased (Figure 1). BS total RVU and revenue increased by a yearly mean of 6% and 12%. Interestingly, the RVU from BS office activity decreased by a yearly mean of 8%, while the RVU from surgical procedure activity increased by a yearly mean of 14% (Figure 1). This change in RVU percentages indicated that surgeons were able to use their time more efficiently and productively by performing activities where their expertise is absolutely essential. BS new-visit volume dropped by a yearly mean of 10%, and NP volume increased by 42%. Surgical procedural RVUs increased, reflecting an increase in surgical consults, while NPs were handling nonsurgical consults. The follow-up visit volume of BS remained relatively stable over the years, while the NP volume increased by a yearly mean of 29%. This rise represents the bulk of the follow-up volume that was being handled by the NP.

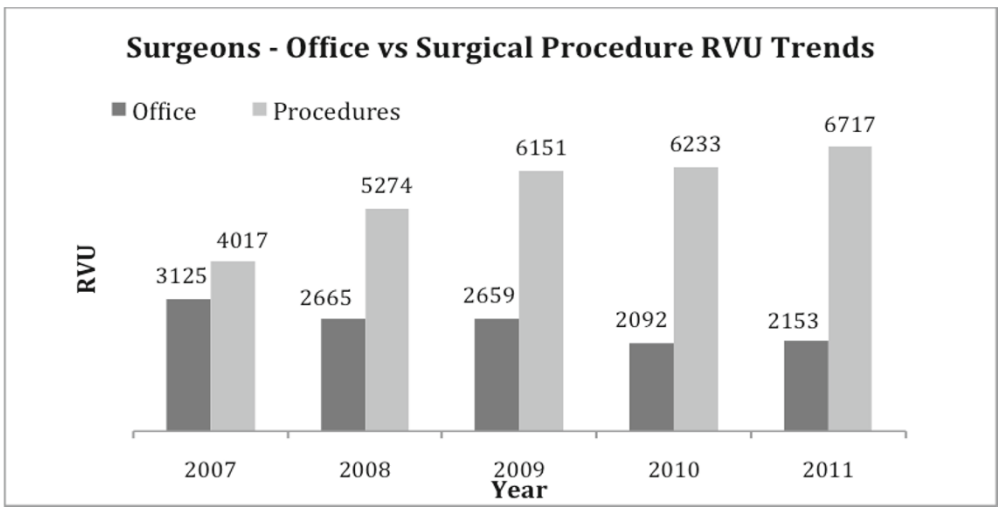
Table 1. **Role of Nurse Practitioners in the Breast Surgery Practice**

1. Run the Fast Track Program – evaluate patients with abnormal radiology and triage ones with positive pathology to appropriate specialists according to practice guidelines and stay in communication with Primary Care Physicians
2. Evaluate and manage benign breast patients independently, refer to a surgeon appropriately
3. Manage immediate postoperative patients along with surgeons
4. Long-term follow-up of breast cancer patients after immediate postoperative care
5. Participate in the Survivorship Program and High-Risk Clinic
6. Available Monday through Friday for emergencies when surgeons are in the operating room
7. Perform office procedures independently – core needle and punch biopsies; fine needle aspirations; hematoma, seroma, and cyst aspirations

continues

Figure 1.





Conclusions: Our observation showed that incorporation of independent NP in a busy growing breast practice was possible and beneficial. We were able to address the needs of a growing practice without increasing the number of BS and more importantly were able to use our BS time more efficiently and productively.

0063 Shared Decision Making in Breast Cancer: National Practice Patterns of Surgeons

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Objectives: Although it is widely accepted that patients benefit from shared decision making and informed consent, data shows that breast cancer patients may only understand 50% of the information provided regarding their disease. Our aim was to describe the current national practices of surgeons who treat breast cancer in order to identify opportunities to improve patient education.

Method: In June 2012, the membership of The American Society of Breast Surgeons (ASBS) (n = 2,818) was surveyed to evaluate their current practice of shared decision-making and informed consent for breast cancer

patients, perceived barriers to optimal consent, and use of educational resources. Members were provided an email link to the questionnaire via SurveyMonkey.

Results: Seven hundred thirty-seven members (26%) responded to the survey, including 384 breast surgeons and 306 general surgeons, 13 mid-level providers, and 25 other specialists. Seventy-two percent of respondents were in private practice and 28% were in academic/teaching practice settings, with 46% reporting that their practice was 100% breast patients. Surgical residents and fellows routinely participated in seeing patients in 11% of practices. Ninety percent of surgeons spent more than 30 minutes meeting with a new cancer patient and, of these, 31% spent more than an hour. The greatest amount of time was spent in discussion of breast surgical choices, followed by the pathology report, nodal staging, and systemic therapy. Surgeons in private practice reported spending more time with new cancer patients, compared to their academic colleagues, with 30% of private practice surgeons spending 61-90 minutes, compared to 19% of academic surgeons ($p < 0.001$). Surgeons who spent more than 1 hour face-to-face with a new cancer patient reported higher levels of overall patient knowledge as compared to those who spent less than 1 hour (mean = 3.80 vs 3.64 of 5; $p = 0.001$). Patient knowledge of surgical choices, as reported by surgeons, positively correlated with increasing time spent with patient ($p = 0.003$). The great barriers to obtaining optimal consent were socioeconomic (mean = 3.05) and cultural issues (2.90), as rated on a Likert scale 1-5. Eighty-nine percent of respondents reported utilizing educational tools, of whom more than than 90% utilized written tools. Despite overall low implementation of Web-based tools and video, more academic surgeons relied on video tools as compared to private surgeons. Sixty-five percent of members stated an interest in a free online educational tool if available and indicated a preference for a flexible tool that could be used by the patient alone or with a nurse.

Conclusions: While practice patterns may vary, our results reveal that one third of surgeons spend at least 1 hour in consultation with a new breast cancer patient. More time spent translated to a higher perceived patient understanding of their disease and treatment options. Although the majority of surgeons currently use written materials in patient education, there was clear support for a free online educational tool.

0090 Assessing Axillary Response After Neoadjuvant Chemotherapy in Patients With Positive Nodes at Presentation

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Objectives: Patients with a clinically negative axilla undergoing neoadjuvant chemotherapy can be accurately staged with sentinel lymph node biopsy at the time of their definitive surgery. This group of patients is therefore potentially spared the morbidities associated with axillary node dissection (ALND). Currently patients with a positive axilla prior to neoadjuvant chemotherapy are relegated to a complete axillary dissection, regardless of their response to neoadjuvant chemotherapy. This study questions whether patients with a positive axilla prior to neoadjuvant chemotherapy could be spared an axillary dissection, based on the response in their axilla.

Method: An IRB-approved retrospective review of patients with invasive breast cancer undergoing neo-adjuvant chemotherapy at a single institution from 2008-2012 was performed. Patient and tumor characteristics were examined, including pre- and post-neoadjuvant nodal status, and receptor profiles. Pre-neoadjuvant status was determined by clinical exam, imaging, or biopsy-proven positivity. Postoperative nodal status was determined by either sentinel node biopsy or axillary node dissection. Patients were further analyzed based on receptor status subgroup, divided into Luminal A (ER/PR+, Her2-), Luminal B (ER/PR+, Her2+), Her2 (ER/PR-, Her2+), and Basal-Like (ER/PR-, Her2-).

Results: Forty patients had positive axillary nodes by clinical exam, radiographic studies, or pathologic sampling, prior to initiation of neoadjuvant chemotherapy. Taking all subgroups, 43% had a complete response to chemotherapy in the axilla, meaning their axillary nodes were found to be negative at time of surgery. When subgroups were stratified based on receptor status, there was no statistical significance in response to chemotherapy between the different receptor subtypes (Table 1). However, there was a trend toward more responders in the Her2 group. The Luminal A subtype had a 38% response rate, compared to 40% in the Luminal B subtype, 63% in the Her2 subtype, and 36% in the Basal-Like subtype.

continues

Table 1. Comparison of Post-Neoadjuvant Nodal Status and Tumor Subtype

***	Positive	Negative	% Negative
Luminal A	10	6	38%
Luminal B	3	2	40%
HER2	3	5	63%
Basal Like	7	4	36%
Total	23	17	43%
			P = n.s.

Conclusions: This study found a substantial subset of patients with positive lymph nodes prior to neoadjuvant chemotherapy that had a complete pathologic response in their axillary nodes. Receptor status did not seem to predict which patients responded; however, there was a trend toward better response to chemotherapy in the Her2 group. Of note, this was a review of patients at a single institution and a major limitation is the small sample size. This data suggest that a significant number of patients who present with positive axillary nodes might avoid the morbidities associated with a complete axillary dissection, if sentinel node biopsy was employed to identify a subset of complete axillary responders. More studies with larger numbers are needed in this population in order to confirm these findings.

0093 Comparision of Standard Skin-Sparing Mastectomy to Inverted-T Pattern Mastectomy in Patients Undergoing 2-Stage Implant Reconstruction

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Objectives: Patients with moderate to large breasts undergoing mastectomy followed by tissue expander/implant-based reconstruction may benefit from an inverted-T reduction mammoplasty incision pattern compared to a traditional horizontal incision. The reduction pattern optimizes the size and contour of the skin envelope providing a natural breast shape with improved symmetry that is safe and reproducible. The goal of the study is to demonstrate that the inverted-T incision pattern is safe with comparable complication rates to traditional skin-sparing incision patterns.

Method: A database was created by identifying patients who had undergone mastectomy and a 2-stage reconstruction with tissue expanders and implants through an inverted-T excision pattern from 2004 to 2010. A control group undergoing horizontal elliptical mastectomy was also identified during this same time period. Patient characteristics associated with increased risk of complications, as well as breast size and body mass index, were collected. The complication rates of infection, seroma, and mastectomy skin flap necrosis, both minor and major, were also recorded.

Results: The medical record search identified 59 patients who had an inverted-T mastectomy and 64 patients who had a traditional mastectomy. A majority of patients underwent bilateral mastectomy, resulting in 98 and 97 breast reconstructions in each group. These groups were comparable in regards to age (52 vs 54) and diabetes (9% vs 8%), but the mean BMI was higher for patients undergoing an inverted-T approach (30 vs 26) and higher smoking rates in the control group (13% vs 4%). In regard to outcomes, we found similar rates of infection (6% vs 4%) but a greater number of seromas in the inverted –T group (5% vs 1%). There were higher rates of minor flap necrosis, 15% for the inverted-T and 8% for horizontal ellipse excisions. The difference in the major flap necrosis rate (5% vs 0%) did not result in a significantly higher rate of expander loss (2% vs 0%) or increase requirements for salvage surgery (3% vs 1%).

Table 1. Complications

	Group I	Group II	p-values
Infection	4/97 (4%)	6/98 (6%)	0.26
Seroma	1/97 (1%)	5/98 (5%)	0.05
Flap necrosis	8/97 (8%)	20/98 (20%)	**0.008**
Minor	8/97 (8%)	15/98 (15%)	0.06
Major	0/97 (0%)	5/98 (5%)	**0.012**
Expander loss	0/97 (0%)	2/98 (2%)	0.08
Salvage surgery	1/97 (1%)	3/98 (3%)	0.16
Capsular contracture	4/97 (4%)	3/98 (3%)	0.35

**Group I (control, n = 97 reconstructions)*
**Group II (inverted-T, n = 98 reconstructions)*

Conclusions : Our results demonstrate that the inverted T- mastectomy approach can be performed safely with complication rates comparable to 2 previously published inverted-T studies. When compared to an internal control group, complication rates were equivalent with the exception of mastectomy flap necrosis and seroma. Despite a higher rate of flap necrosis, 95% of patients had successful completion of their reconstruction. The benefit of performing this type of mastectomy excision pattern is improvement in symmetry and breast shape for patients with moderate to large breast size.

0004 Harmonic Scalpel vs Electrocautery Dissection in Modified Radical Mastectomy: A Randomized Controlled Trial

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Objectives: To determine whether harmonic dissection yields better outcomes than electrocautery dissection in female adult patients undergoing modified radical mastectomy (MRM) for breast malignancy.

Method: We randomized adult females who underwent MRM between April 2010 and July 2011 to either harmonic (n = 76) or electrocautery (n = 76). The outcomes were estimated blood loss (EBL), operating time, drain volume and drain days, complications, and postoperative pain.

Results: Both the groups were comparable for baseline variables with age of 50.5 ± 12.2 and 48.5 ± 14.5 years in harmonic and electrocautery group, respectively. Harmonic dissection yielded better outcomes as compared to electrocautery with lower EBL (100 ± 62 vs 182 ± 92, *p* value: <0.001), drain volume (631 ± 275 vs 1035 ± 413, *p* value: <0.001), drain days (12 ± 3 vs 17 ± 4, *p* value: <0.001), seroma formation (21.3% vs. 33.3%, *p* value: 0.071), and median (range) postoperative pain {2 (2-2) vs 3 (3-4), *p* value: <0.001}; Whereas mean operative time (191 ± 44 vs 187 ± 36, *p* value: 0.49) and surgical site infection (0% vs 4%, *p* value: 0.122) did not differ. Harmonic dissection was associated with lower risk of significant postoperative pain with RR (95% CI) of 0.028 (0.004-0.2) after adjusting for age, breast weight, neoadjuvant therapy, and BMI. Similarly, the risk of complications in harmonic group was significantly lower as compared to electrocautery group, with RR (95% CI) of 0.47 (0.26-0.86) after adjusting for neoadjuvant therapy and BMI.

Conclusions: Significant reduction in operative time was not observed; however, it significantly reduced postoperative discomfort and morbidity to the patient. Therefore, we recommend preferential use of harmonic in MRM.

0040 Breast Cancer: Recurrence in the Modern Era

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Objectives: Breast cancer recurrence continues to pose a challenge in the modern era. Recurrence may occur in the form of local recurrence (LR), regional recurrence (RR), or distant recurrence (DR). The objective of this study

was to determine whether recurrence rates (LR, RR, and DR) for surgically treated stage I, II, and III breast cancer are lower in the modern era especially since the advent of new and more effective therapies.

Method: A retrospective chart review was performed on patients treated at our medical center with stage I, II, and III invasive breast adenocarcinoma between 2000 and 2007. We compared our recurrence rates after breast conservation therapy (BCT) to mastectomy (M). Stage I and II recurrence rates were then analyzed in light of historical rates defined by the results of NSABP-B06 trial. Statistical analysis was performed using the chi-square test.

Results: For stage I and II breast adenocarcinoma, 165 patients were treated with BCT and 227 patients with mastectomy. For stage III disease, 14 underwent BCT and 40 had mastectomy. Mean follow-up was 72 months. In stage I and II, recurrence rates were similar among the 2 groups for LR (1.2% vs 3.5%; p = 0.152), RR (1.8% vs 2.6%; p = 0.59), and DR (3.6% vs 7.0%; p = 0.14). For stage III patients, a trend toward lower recurrence was seen in the mastectomy group although it was not statistically significant, LR (7.1% vs 3.5%; p = 0.43), DR (21.4% vs 17.5%; p = 0.74). In light of NSABP-B06 results, in BCT group, we observed similar LR (1.2% vs 0.6%; p = 0.45) and RR (1.8% vs 2.2%; p = 0.74), but lower DR (3.6% vs 9.9%; p = 0.01). No statistical difference was seen in Mastectomy group in LR (3.5% vs 4.6%; p = 0.49), RR (2.6% vs 3.1%; p = 0.74), or DR (7.0% vs 8.9%; p = 0.39).

Conclusions: BCT and mastectomy have similar recurrence rates. Although improvements in systemic treatment in the modern era have led to lower DR after BCT in stage I and II breast adenocarcinoma, LR and RR remain unchanged from the NSABP B-06 era.

0072 Molecular Subtypes and Feasibility of Sentinel Lymph Node Biopsy After Neoadjuvant Chemotherapy in Patients With Initial Cytologically Proven Breast Cancer Axillary Node Metastasis

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Objectives: The role of sentinel lymph node biopsy (SLNB) in locally advanced breast cancer patients after neoadjuvant chemotherapy (NAC) is still controversial. It has been known that the response to NAC may be different according to the molecular subtypes of the primary tumor. In this context, we performed sentinel lymph node biopsy in patients treated with NAC with cytologically confirmed axillary lymph nodes metastases at presentation. We analyzed the relationship of molecular subtypes and the feasibility of SLNB as well as pathologic responses in the breast and axillary nodes after NAC.

Method: We retrospectively evaluated 47 patients with invasive breast cancer with ultrasound-guided fine needle aspiration-proven axillary nodal metastases at the time of diagnosis who underwent SLNB after receiving NAC at our institution between Jan 2006 and Dec 2012. In these patients with proven metastasis, we analyzed the breast and axillary responses on molecular subtypes. Axillary lymph node dissection was performed in cases of confirmation of sentinel node metastasis with frozen pathology during the operation and in the presence of suspicious nonsentinel node enlargement.

Results: Sentinel node identification rate was 97.9% (46/47), presenting false-negative rate for SLNB after NAC of 8.7% (2/23). Median number of sentinel lymph nodes retrieved was 2 (range, 1-10). Post-NAC sentinel lymph nodes of 9 patients (39.1%) are the only nodes containing residual axillary metastases. Of these 47 patients, pCR of both the primary breast tumor and the axilla was achieved in 10 patients (21.3%). Twenty-four of cytology-positive patients had an axillary pCR (51.1%) and 11 patients achieved breast pCR (23.4%). Fourteen of those patients who achieved axillary pCR (14/24) did not accomplish breast pCR. Ten of the patients who had a pCR of the primary tumor (10/11) achieved axillary pCR. On the analysis by subtypes according to receptor status, 5 achieved an axillary pCR among 14 ER+/HER2- patients (35.7%). Of 19 HER2+ patients and 14 triple-negative patients, an axillary pCR was achieved in 12 (63.1%) and 7 (50.0%), respectively. Breast pCR was achieved in 7 HER2+ patients (36.8%), in 4 triple-negative patients (28.6%), and no one achieved breast pCR in ER+HER2- patients. The median follow-up was 7 months (range, 1-56) with 6 events; 1 local recurrence in the HER2+ patient with axillary pCR only, 2 regional recurrences in triple-negative and HER2+ patients without achievement of pCR, 3 systemic recurrences in an ER+HER2- patient, and 2 triple-negative patients who did not achieved pCR.

Conclusions: The post-neoadjuvant chemotherapy sentinel lymph node biopsy in patients with cytologically documented breast cancer axillary metastases is feasible. The axillary pCR rate is higher in subgroups with HER2-positive tumors and triple-negative tumors. In those patients, axillary clearance could be avoided through sentinel lymph node biopsy.

0082 Outcomes of Modified Round-Block Technique in Patients With Breast Cancer

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Objectives: The round-block mammoplasty for correction of breast ptosis has been applied to breast cancer surgery for tumors located near the nipple areolar complex. By making 2 periareolar incisions, this technique allows us to obtain oncologically adequate removal of tumor and a final scar confined to nipple areolar complex; however, its greater complexity is a technical disadvantage. In round-block technique of breast cancer surgery, the zone of de-epithelialization does not need to be as large as in ptosis correction. As the distance of 1 or 2 cm from inner to outer circle is enough for central tumor resection, we modified skin closure technique and used interrupted sutures instead of a purse-string periareolar blocked suture. We performed oncoplastic breast-conserving surgery with our modified round-block technique for Korean women who have small- to moderate-sized breasts, and have assessed the outcomes of round-block technique.

Method: A total of 97 patients with a diagnosis of breast cancer had been treated by breast-conserving surgery using round-block technique at our institution from July 2009 to May 2012. We evaluated tumor characteristics, locations, and postoperative pathologic data, including status of the postoperative resection margins, widths of the nearest margins. Patient's cosmetic satisfaction was assessed by subjective questionnaires 6 months after the operation.

Results: The median age at surgery was 48 years (26-73), and the average of their BMI (kg/mm^2) was 23.2 (SD, 2.6). Seventy-three patients (75.2%) had palpable tumors and 92 patients underwent simultaneous axillary surgery. Five patients (5.1%) received neoadjuvant chemotherapy and 8 (8.2%) had a multifocal tumor confined to the same quadrant. Most of the tumors were located in the upper breast (82.6%). The average distance of the tumors from the nipple was 2.0 cm (range, 0.5-6.0) and the median operative time was 101.5 minutes (range, 55-180). In 87 patients (88.7%), the nearest margin widths were reported 2 mm or more, except in anterior and posterior side of the specimen, and in 10 cases were reported 1 mm margins. Only 1 patient had a positive tumor cell in inferior margin, but refused reoperation and received radiation therapy. There was no early complication recorded within 30 days after operation. Median follow-up was 12 months (2-36) and none of the patients developed breast cancer recurrence. In cosmetic assessment, variable degree of areolar widening occurred, however, it was acceptable in most of the patients.

Conclusions: We expect that the application of modified round-block technique in breast cancer surgery can be broadened and widely used as a useful technique for patients with small to moderate breasts.

0178 Breast Cancer Reconstruction in the State of Florida: Trends in Delayed vs Immediate Surgery and Implant vs Flap Techniques

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Objectives: Federal law mandates insurance coverage of reconstruction for breast cancer patients having mastectomy. Despite improved cosmesis from advanced techniques and psychosocial benefits of immediate reconstruction (IR), few patients receive reconstructive breast surgery.

Method: Database linking the Florida Cancer Data System (FCDS) to the Agency for Health Care Administration (AHCA) and US Census identified breast cancer patients over a 10-year period. Surgical patients were identified using ICD–9 and CPT codes which indicated oncologic and reconstructive procedures performed. Differences in reconstruction technique (implant, flap, or combined) and immediate vs delayed procedure were evaluated. Frequency of procedure by year and patient demographics, such as race, marital status, institution type, insurance and socioeconomic status (SES), were characterized. Clinical features, including co-morbidities and smoking status, were also examined.

Results: 118,713 surgical breast cancer patients were identified between 1996 and 2007. Only 17,350 (15%) had reconstructive surgery. Seventy percent had implant only, 5% had flap procedure only, and 26% had a combined procedure. A decline in overall reconstruction rate from 16% to 11% was seen between 1996 and 1997. However, rates then increased to 19% in 2007 ($p < 0.0001$). Over the time interval, type of reconstruction evolved with implant-only decreasing from 79% to 58%, flap-only increasing from 2% to 6%, and combined procedures increasing from 19% to 36% ($p < 0.0001$). Only 44% of all plastic surgery patients had IR. When evaluated by year, an increase in IR was seen over time from 37% (1996) to 53% (2007), ($p < 0.0001$). Demographic factors, such as

Black and Other race, low SES, and public insurance (Veterans, Indian Health Service, Medicaid), influenced the type and increased the rate of delayed reconstruction. There was no difference in IR or technique based on marital status. Although only 18% of reconstructed patients were cared for at high-volume centers, 48% were reconstructed immediately vs 43% IR at low-volume centers ($p < 0.001$). Current smokers were less likely to have immediate reconstruction (41% vs 58%) and more likely to have implant-only reconstruction (74% implant, 3% flap, 23% combined). More than 4 co-morbidities increased the rate of implant-only reconstruction (68%) and decreased the rate of IR (43%).

Conclusions: Overall rates of reconstruction for breast cancer patients in Florida remain low. An increasing trend in more advanced reconstructive techniques is seen along with an increase in timing of the procedure with the oncologic surgery.

0091 Outcomes in Women With Ipsilateral Breast Tumor Recurrences After Lumpectomy and Accelerated Partial Breast Irradiation: Results From the ASBrS MammoSite Registry Trial

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Objectives: The American Society of Breast Surgeons (ASBrS) enrolled women on a registry trial to prospectively study patients treated with the MammoSite® RTS breast brachytherapy device. Patient outcomes after local recurrence/ipsilateral breast tumor recurrence (IBTR) have been well described in women initially treated with lumpectomy + whole-breast irradiation. Patient outcome data after IBTR are scarce for women initially treated with lumpectomy + accelerated partial breast irradiation (APBI). This report characterizes IBTRs that occurred in the ASBrS patient cohort and reports on post-recurrence patient outcome.

Method: One thousand four hundred forty-nine primary early-stage breast cancers were treated in 1,440 women. Of these, 52 women had an IBTR. Fisher exact test was performed to correlate IBTR type (true recurrence vs elsewhere) with categorical clinicopathological variables. The association of continuous variables with LR and distant failure times was investigated by fitting a parametric model.

Results: With a median follow-up of over 60 months, a total of 52 IBTRs were reported in the data set for a crude rate of 3.6%. Thirty-six IBTRs were scored as being elsewhere failures (69%), while the remaining 16 were scored as true recurrences (TR). The 5-year actuarial rates of LR, OS, DFS, and CSS will be reported and compared for TR vs elsewhere failures. Salvage strategies (mastectomy vs second breast conservation) will be reported.

Conclusions: Unlike IBTRs in the conventional whole-breast setting, elsewhere failures are more common than TRs after APBI. IBTRs after APBI can be salvaged with similar frequency and expected outcomes as post-whole-breast IBTRs. Additional work will be needed to assess whether repeat breast conservation is an acceptable strategy for elsewhere failures after APBI.

0184 Surgical Re-Excision and Debridement Due to Complications Following Skin-Sparing and Nipple-Sparing Mastectomy With Immediate Breast Reconstruction

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Objectives: Total mastectomy (TM) with complete removal of the breast skin and nipple-areolar complex (NAC) was previously the standard of care in patients with breast cancer. Skin-sparing mastectomy (SSM) enhances cosmesis by preserving the native breast skin envelope, allowing for immediate breast reconstruction (IBR). Recent advances in surgical technology now include nipple-sparing mastectomy (NSM), which preserves the NAC, as well as the native skin. While oncologic safety is comparable for TM, SSM, and NSM, NSM provides superior aesthetic results and benefits patients psychologically. One concern of NSM is the possible increased risk of postoperative necrosis or infection requiring surgical intervention. This study compares rates of subsequent surgery in SSM and NSM.

Method: A retrospective review was completed of all SSMs and NSMs performed by the principal investigators at the University Hospital between January 2004 and October 2012. Indication for both SSM and NSM included high-risk prophylaxis, atypia or lobular carcinoma in situ, or newly diagnosed ductal carcinoma in situ or invasive carcinoma. IBR was performed on all patients, which included prosthetic reconstruction with tissue expanders or implants, and

autologous reconstruction using pedicle transverse rectus abdominus myocutaneous (TRAM) flap, latissimus dorsi flap, deep inferior epigastric artery perforator (DIEP) flap, or free EPIA/TRAM/DIEP. Data was collected to compare rates of surgical debridement and re-excision after IBR due to direct complications from SSM or NSM.

Results: Complications of patients who underwent SSM or NSM included flap dehiscence, full- or partial-thickness flap necrosis, flap cellulitis, fat lysis of flap with infection, implant loss, extensive mastectomy skin necrosis, prolonged seroma formation, partial or total mastectomy incision dehiscence, and wound infection. Additional complications associated with NSM included partial- or full-thickness nipple and/or areolar necrosis. One hundred twelve SSMs were performed on 80 women (mean age of 49) and 87 NSMs were performed on 54 women (mean age of 47). Of the 112 SSMs that were performed, 61 (54%) were associated with at least 1 of the complications listed above. Thirty-three (29.4%) had complications that required surgical intervention. Of the 87 NSMs performed, 42 (48%) had at least 1 of the complications listed above, but only 19 (21.8%) required surgical intervention. While the rate of complication was higher for SSM patients as compared to NSM, statistical analysis showed no significant difference ($p = 0.368$). The same association was seen with the rate of surgical intervention ($p = 0.225$). There was no difference between indication for mastectomy or type of reconstructive procedure between the 2 groups.

Conclusions: While the overall rate of postmastectomy complications and those that require surgical debridement or re-excision after IBR is statistically comparable in patients who undergo either NSM or SSM, the rates for both are lower in NSM. As NSM is associated with better cosmetic and psychological outcome for patients following mastectomy, NSM should be offered and utilized over SSM in qualifying patients.

0021 A Comparison of Breast Conservation Methods: Ellipse vs Reduction Excision

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Objectives: Breast conservation surgery is based on the principle of adequate oncologic resection with an acceptable cosmetic result. The average lumpectomy often falls short of these goals; it removes, on average, 20-30 grams of tissue, no overlying skin, may cause breast deformity, and results in a positive margin in a significant percentage of cases. Based on these concerning findings, we decided to compare wider excisions than the standard approach using either an ellipse, which takes the overlying skin, or an oncoplastic reduction, that takes even more skin and underlying breast tissue.

Method: A prospective, single-institution database was analyzed for patients with the following inclusion criteria: operation performed between 2008 and 2011, invasive and noninvasive breast cancer, tumor span of 50 mm or less on final pathology, and breast conservation surgery using either an ellipse (n = 100) or Wise-pattern reduction (n = 100). Two or more localizing wires were used in every case (placed by either ultrasound or mammography, depending on how the lesion was most adequately visualized). Skin overlying the tumor was removed in every case. Specimen weight, margin width, re-excision rate, complications, and local recurrences were analyzed. All procedures were performed at the same institution, using the same surgical team, pathologists, and radiologists.

Results:

	Ellipse (n = 100)	Reduction (n = 100)	P Value
Mean specimen weight	60 grams	133 grams	
Mean tumor size (mm)	18.0	18.2	NS
Transection (ink on tumor)	12%	1%	0.001
<1-mm margin	23%	4%	0.0001
Average margin width	3.9 mm	6.5 mm	0.0001
Re-excision rate	19%	0%	<0.0001
Complications	1%	5%	NS
Any local recurrence	1%	0	NS

continues

Conclusions: When compared with elliptical excision, oncoplastic reduction routinely produced larger specimens, wider margins, a lower percentage of close or transected margins, and a lower re-excision rate in similar-sized tumors. This type of surgery did all of this while routinely producing excellent cosmetic results.

0111 Male Breast Cancer: A Comparison Between BRCA Mutation Carriers and Noncarriers in Hong Kong, Southern China

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Objectives: Male breast cancer is suggested to be biologically different from female breast cancer. The differences in clinicopathology between male and female breast cancer raise the issues of establishing specific strategies and treatment regime for male breast cancer patients. The single most significant risk factor for male breast cancer is a mutation in the BRCA2 gene. The lack of information on hereditary breast cancer in males, particularly in Asians, leaves great but forgiven research area on epidemiological studies for this group of patients.

Method: All male breast cancer patients and their family members from a Hong Kong Hereditary and High Risk Breast Cancer Program since year 2007 were recruited in this study. All received genetic counseling and BRCA mutation testing using DNA extracted from blood samples. A questionnaire was administered at their first visit which included questions on their demographics and socioeconomic status. Other information, including family history of breast cancer or other kinds of cancer, method of diagnosis, surgical strategies, pathological results, treatment regime, relapse, metastasis, and outcomes, were obtained from their medical records. Descriptive analysis was performed describing the background characteristics. Chi-square test and Student *t* test were applied to calculate the associations between BRCA mutation and risk factors. Survival analysis was performed to look for their survival patterns.

Results: Thirty-six male breast cancer patients were recruited between years 2007 and 2012, while 21 were diagnosed before year 2007 (range: 1996 to 2012). Mean, standard deviation, and median follow-up time were 5.75, 4.31, and 5.25 years. Seven were found to carry the BRCA mutation. All were BRCA2 mutation and the mutation rate was 19.4% (N = 7). Family history of cancer was found in 52.8% (N = 19).Male BRCA mutation carriers were found to have higher risk of secondary cancer, and their first- and second-degree family members had higher risk of either breast cancer or other kinds of cancers. T stage in BRCA patients was significantly higher than non-BRCA patients (p = 0.028). All BRCA mutation carriers had ER-positive cancers, compared with 96.2% who were noncarriers. Half of the male BRCA patients were PR positive, compared with higher percentage in non-BRCA patients (50% vs 80.8%, p = 0.117). Both groups had similar overall (p = 0.962) and disease-free survivals (p = 0.919). The means and standard deviations of 5-year overall survival between BRCA and non-BRCA patients were 2.08 0.25 and 4.24 0.12 years, respectively, and 2.08 3.03 and 4.41 1.46 years for disease-free survival.

Conclusions: The prevalence of male breast cancer patients with BRCA2 mutation in Hong Kong is comparable with other similar studies. Male breast cancer patients with BRCA2 mutation are suspected to have higher chance of secondary cancer and familial cancer. Although percentage of ER-positive cancers are similar to the 2 groups, BRCA2 mutation carriers tend to have fewer PR-positive cancers, which may suggest a poorer prognosis although, due to a small sample size, this cannot be shown in this cohort. Further collaborative studies to better understand male breast cancer patients carrying the BRCA mutation are warranted.

0141 Long-Term Survival Results of Patients With Node-Negative Early Breast Cancer Receiving Sentinel Lymph Node Biopsy

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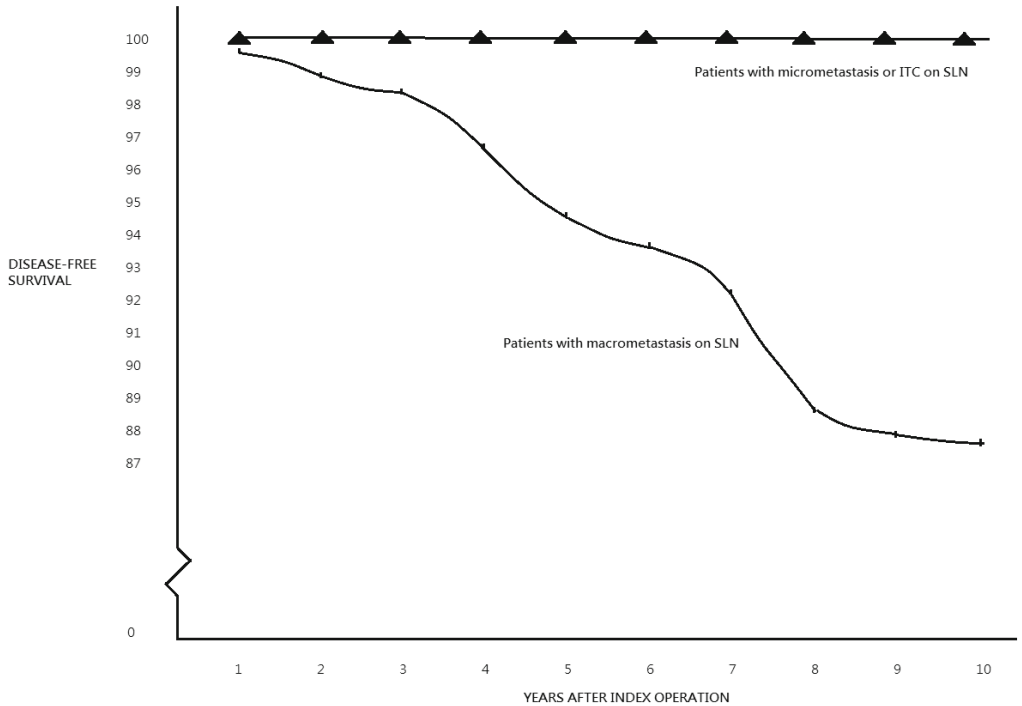
Objectives: Sentinel lymph node biopsy (SLNB) is now the gold standard in treating early breast cancers. It avoids unnecessary axillary dissection (AD) which can result in significant morbidities such as lymphedema or nerve injuries. Here we reviewed our 10-year results of patients receiving SLNB in our breast center.

Method: We reviewed our prospectively maintained database and included all node-negative breast cancer patients who received SLNB in our breast center from January 2011–July 2011. We exclude patients who received neoadjuvant chemotherapy from our study.

Results: Six hundred twenty-five patients underwent SLNB in our study, 161 (25.8%) of them had macrometastasis on frozen section (FS) requiring AD. Twenty-five (4%) and 14 (2.2%) of them had micrometastasis and isolated tumor cells (ITC), respectively; all patients decided to undergo AD subsequently.After mean follow-up period of 79.5 months in patients with macrometastasis (range, 15-120 months), 14 (2.2%) had chest wall recurrence with mean time interval to recurrence of 32.1 months (range, 15-120 months). Axillary recurrence occurred in 12 patients (1.9%), with mean time interval to recurrence of 40.8 months (range, 9-97 months). Relapse in terms of distant metastasis occurred in 41 patients (6.6%) after a mean time interval of 44 months postoperatively (range, 3-97 months).

After mean follow-up period of 71 months in patients with micrometastasis (range, 24-120 months) and 48 months in patients with ITC (range, 12-96 months); none of these patients develop locoregional recurrence or distant metastasis. The 5-year disease-free survival of patients with micrometastasis was 100% while that for patients with macrometastasis was 94.2%. (P value by log-rank test = <0.001).

Figure 1. Kaplan-Meier curves of disease-free survival (DFS) in patients who had micrometastasis/ITC on SLN vs patients who had macrometastasis with SLN



Conclusions: Significant difference in disease-free survival is observed between patients with macrometastasis and micrometastasis/ITC in sentinel lymph nodes. Locoregional relapse or distant metastasis after breast surgery and SLNB is extremely rare when SLNB contains only micrometastasis or ITC.

0078 Do We Need to Surgically Excise Flat Epithelial Lesions in the Breast?

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Objectives: Flat epithelial atypia (FEA) was first described in 2003. Since that time it has been reported in the literature that pure FEA on core needle biopsy may be upstaged to in situ or invasive cancer on a follow-up excision in 13% to 30% of cases. The purpose of this study was to evaluate the risk of an associated cancer with a diagnosis of FEA on core biopsy in our patient population. We also evaluated the radiologic findings associated with the pathologic diagnosis of FEA and its association with breast cancer.

continues

Method: After receiving IRB approval, our hospital pathology database was queried to produce a list of all patients who were diagnosed with FEA on a core biopsy from January 1, 2003, to December 31, 2010. Individual records (Epic) were reviewed in order to obtain imaging, operative, and pathology reports not contained in the database. All patients who had an excisional biopsy of the FEA were included in this study. Women who were diagnosed with FEA with an associated diagnosis of cancer, either invasive or noninvasive on core biopsy; women who had prior breast and/or chest wall radiation; and women with a prior history of breast cancer were excluded from the study.

Results: During the study period, there were 105 patients with pure FEA diagnosed on core needle biopsy with a mean age of 55.8 years (±10.21). Twenty-four patients were excluded from the study because they did not undergo surgical excision. Four patients (4.9%) were upstaged to either ductal carcinoma in situ (DCIS) or invasive cancer on subsequent surgical excision. Three patients (3.7%) were upstaged to DCIS at surgical excision and 1 patient (1.2%) was upstaged to grade I invasive lobular carcinoma. On mammography, FEA was associated with indeterminate calcifications in 92.4%, a mass in 2.9%, and a focal asymmetry in 1.9%. We were unable to determine any radiologic finding associated with presence of cancer upon surgical excision.

Conclusions: At our institution, 4.9% of patients found to have FEA on core needle biopsy were upstaged to either DCIS or invasive cancer following surgical excision. 3.7 % of patients were upstaged to DCIS and 1.2% of patients were upstaged to invasive cancer. Our results raise the question, should all FEA diagnosed on core needle biopsy be surgically excised? Given the low upstage rate and the fact that most of those were upstaged to DCIS, it may be reasonable to closely follow patients with FEA diagnosed on core needle biopsy. Further study is needed in this area to answer this question.

0085 Spect/CT Hybrid Imaging for Detection of Axillary Sentinel Nodes

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Objectives: Sentinel node biopsy has become a standard practice in the management of breast cancer, providing an accurate nodal status while avoiding unnecessary morbidity. The most common method for sentinel node localization is conventional lymphoscintigraphy. In the majority the sentinel node can be identified, but few cases remain undiscovered.The aim of this study was to report the results of hybrid imaging by SPECT/CT of sentinel node in breast cancer patients treated in a private Brazilian hospital.

Method: All patients with previously diagnosed early breast cancer (stages 0-IIA) eligible for sentinel node biopsy undergoing preoperative conventional lymphoscintigraphy followed by SPECT/CT for SNL detection were analyzed. The tracer injection site was periareolar. Only the radioisotope detection method was used (no blue dye was utilized). Data of 23 consecutive patients were retrospectively analysed.

Results: The median age was 46 (range, 30–71 years). Skin-sparing mastectomy was performed in 19 and breast conservative surgery in 04 patients. All cases were submitted to planar lymphoscintigraphy with subsequent SPECT/CT in the same day of surgery. A sentinel node was found in 100% of patients. A median of 2.2 nodes per patient (range, 1-6 lymph nodes), and a total of 65 sentinel nodes were detected and removed. The observed sentinel node metastases rate was 13%. In 1 patient, lymphoscintigraphy failed to detect a sentinel node, but in this case it was clearly visualized by SPECT/CT. Patients with more than 1 sentinel node were more easily identified with SPECT/CT.

Conclusions: SPECT/CT accurately detected preoperative sentinel node topography and enhanced diagnostic sensitivity of sentinel node imaging, improving surgical approach to breast cancer patients. The introduction of hybrid SPECT/CT in regular basis takes additional time and is related with extra costs. We believe that a larger clinical trial is needed to establish a positive cost-analysis. SPECT/CT can be a useful tool, especially for problematic cases.

0016 Do All Radial Scars and Complex Sclerosing Lesions Diagnosed on Core Needle Biopsy Need to Undergo Surgical Excision?

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Objectives: Radial scars (RS) or complex sclerosing lesions (CSL) are rare benign breast lesions that present a clinical management dilemma. These lesions are identical in their pathology and only differ in size. A CSL is defined as ≥10 mm and an RS defined as <10 mm. There is currently no agreement on whether these lesions should be excised due to their possible association with malignancy or if they can simply be managed by routine mammographic follow-up. The purpose of this study was to examine the management and outcomes of women diagnosed with a RS/CSL on core needle biopsy (CNB).

Method: A retrospective review of a single institutional pathology database between 2000 and 2011 identified 72 patients with an RS/CSL. Seventeen patients were excluded; 4 RS/CSLs were incidental findings, 12 patients were diagnosed with a RS/CSL diagnosed on excisional biopsy, and 1 patient was lost to follow-up. The final cohort consisted of a total of 55 patients with 66 RS/CSLs diagnosed on core needle biopsy (CNB). The majority of these lesions were diagnosed using a 14-gauge needle (54/66); with the remaining lesions using a larger needle (9/66) and 3 with an unknown biopsy needle size. Patients who had their RS/CSL diagnosed on CNB were evaluated for the presence of an undiagnosed carcinoma upon excision and the development of subsequent carcinoma with or without excision of the lesion.

Results: Of a total of 66 RS/CSLs diagnosed on CNB, 50 were subsequently excised. Forty-three (86%) of these biopsies were conducted with a 14-gauge needle with a range of 3-7 cores. Of the 21 excised RS/CSLs with atypia, there was 1 case of invasive carcinoma (4.76%) and 7 cases of atypical ductal hyperplasia (ADH) (33.3%) upon excision, while there was only 1 case of in situ carcinoma (3.45%) found on excision of the 29 RS/CSLs without atypia. Follow-up of these cases revealed that there was 1 case of subsequent cancer in 1 case with atypia on CNB (4.76%) and 1 case without atypia on CNB (3.45%). On univariate analysis, women who were black were more likely to have atypia associated with RS/CSL on CNB ($P < 0.05$). RS/CSLs with atypia were also more likely to have cancer or high-risk lesion upon excision ($P = 0.0016$). On multivariate analysis, there were no variables predictive of atypia associated with RS/CSL on CNB. There were also 16 RS/CSLs that were diagnosed on CNB but were not excised. Within this cohort, there was only 1 case of ADH found concurrently on biopsy (6.25%).

Conclusions: Using a 14-gauge core needle biopsy with a range of 3-7 core samples is adequate for diagnosing an RS/CSL. Black women were more likely to have atypia on CNB of RS/CSL. All RS/CSL with atypia diagnosed on CNB should be excised due to their higher incidence of associated carcinoma and ADH. However, if there is no atypia observed on CNB, our findings support previous findings that RS/CSLs may be followed by serial imaging.

0052 Management of Contralateral Axillary Sentinel Lymph Node Detected on Lymphoscintigraphy for Breast Cancer

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Objectives: Detection of a contralateral axillary sentinel lymph node (SLN) during lymphoscintigraphy for surgical management of breast cancer is rare, but is being described with increasing frequency in the literature. Its significance and management is unclear. Furthermore, the phenomenon may not be recognized, as many centers do not routinely perform lymphoscintigraphy. The purpose of this study is to review our experience and analyze our results together with similar patients described in the literature in order to identify their characteristics and outcomes, and propose a management strategy.

Method: A chart review was performed of all patients who had lymphoscintigraphy for breast cancer between 2000 and 2012 at our institution. Patients in whom a contralateral axillary node was identified were examined for tumor characteristics, history of prior surgery, management, and outcome. Additionally, a PubMed search was performed for articles with the key phrases “lymphoscintigraphy,” “breast cancer,” and “sentinel lymph node.” Articles describing patients in whom contralateral axillary drainage was identified on lymphoscintigraphy for breast cancer were reviewed.

Results: At our institution, 596 consecutive patients who underwent lymphoscintigraphy for sentinel node identification were identified. Of these, 2 (0.3%) were identified with contralateral axillary drainage. Twenty-one publications were found describing 66 patients with contralateral axillary drainage, which, when included with our 2 cases, comprised our study group of 68 patients. Lymphoscintigraphy uptake patterns varied depending on the

history and type of prior surgery (Table 1). The majority of patients (63%) had a prior history of ALND; however, there were 8 patients (12%) with no prior surgery, all of whom had bilateral axillary uptake. One of those 8 patients had a positive lymph node only on the contralateral side. Prior chest/axillary surgery was significantly associated with isolated contralateral uptake ($p < 0.05$). Contralateral SLN biopsy was attempted in 47 of 68 patients identified (69%) and was unsuccessful in 1 patient. Of the 46 successful contralateral SLN biopsies performed, 16 (33%) were positive for tumor. In 12 patients (26%), the contralateral node was the only positive sentinel lymph node.

Table 1. Lymphoscintigraphy Results for Patients With Contralateral Sentinel Lymph Nodes

Prior Treatment		**Bilateral Axillary Uptake N = 20 (29% of total)**	**Contralateral Axillary Uptake Only N = 48 (71% of total)**
Treatment	*N (% of total)*		
None	8 (12%)	8	0
Prior ALND	43 (63%)	6	37
Prior SLN biopsy	6 (9%)	3	3
Prior lumpectomy and axillary radiation	6 (9%)	0	6
Bilateral reduction mammoplasty	3 (4%)	2	1
Other chest surgery	2 (3%)	0	2

Conclusions: These findings suggest that contralateral uptake on lymphoscintigraphy, though rare (0.3%), is clinically significant and such nodes should undergo excision. The contralateral node was the only positive node in 26% of patients who underwent contralateral sentinel node excision. Since contralateral uptake is significantly associated with prior chest/axillary surgery, routine lymphoscintigraphy should be considered in this group, as it has potential to change disease stage and management.

0020 Genetic Counseling in a Comprehensive Community Cancer Center: Identification and Analysis of Individuals With Breast and Ovarian Cancer for BRCA I/II Genetic Testing

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Objectives: BRCA I/II genetic testing has significant potential to be a lifesaving tool in people with breast and ovarian cancer and their extended families. We sought to identify people previously treated for breast and ovarian cancer in our Comprehensive Community Cancer Center who meet current established criteria for BRCA I/II genetic counseling.

Method: All cases of breast and ovarian cancer from 2001-2011 from our 2 hospital cancer registries were selected for analysis. We applied the current criteria for genetic counseling from the National Comprehensive Cancer Network (NCCN) 2012v1 Genetic/Familial High Risk Guidelines to this data to select out potential candidates for intervention. People who had previously been counseled or tested were identified by cross-referencing with data from our genetic counseling program files and our dedicated breast cancer database. We analyzed this subset to identify patterns in counseling and testing within our institution. Lastly, we identified individuals who meet criteria, who have not received counseling or testing, and who are still surviving, for intervention using a program for genetic education, counseling and testing.

Results: Three thousand eight hundred ninety-two people with breast and ovarian cancer were identified from the 2 hospital registries in the 10-year study period. Three hundred eight (100%) of the ovarian cancer patients and 1326 (37%) of the breast cancer patients meet current criteria for genetic counseling. The majority (78%) of people with breast cancer who meet criteria for counseling were under the age of 50. Approximately 20% of people who meet current criteria for counseling have actually received it, with considerable differences noted between breast (23%) and ovarian cancer (5%), and between the 2 hospitals for people with breast cancer (40% vs 10%). Of those counseled, 92% of people received testing, demonstrating the effectiveness of professional genetic counseling and education. Of this group, 12% had positive tests, with the percentage of positive tests seen in the ovarian cancer group being twice that of the breast cancer group, 21% vs 11%, respectively. Finally, we identified 858 (65%) breast cancer survivors and 141 (46%) ovarian cancer survivors who are candidates for genetic counseling. We estimate approximately 127 people with BRCA I/II mutations will be identified in this group: 97 from the breast cancer survivors and 30 from the ovarian cancer survivor group.

Candidates for Genetic Counseling by NCCN Criteria
Breast & Ovarian Cancer 2001-2011

	ALL	Meet Citeria	%
Breast	3584	1326	37%
Hospital A	1479	547	37%
Hospital B	2105	779	37%
Ovary	308	308	100%
Hospital A	159	159	100%
Hospital B	149	149	100%
TOTAL	3892	1634	42%

Criteria For Genetic Counseling - Breast			%
Inclusion	Age> 50, Female, and:	Male Breast Cancer	1%
		Age <50	28%
		Triple Negative	2%
		ER/PR Neg. Her 2 unknown	7%
		Subtotal	37%
Exclusion	Age >50, Female, and:	ER/PR Positive	34%
		ER Positive/ PR Negative	6%
		ER Neg/ PR Positive	1%
		ER/PR Negative & Her 2 +	0%
		ER/PR Unknown	22%
		Subtotal	63%

BRCA I/II Genetic Counseling and Testing 2001-2011

	Meet Citeria	Counseling	%	Genetic Testing Performed	%	Positive Tests	%	Surviving and Not Tested	Est. w/ + Mutations
Breast	1326	299	23%	275	92%	31	11%	858	
Hospital A	547	221	40%	208	94%	22	11%	295	97
Hospital B	779	78	10%	67	86%	9	13%	563	
Ovary	308	15	5%	14	93%	3	21%	141	
Hospital A	159	10	6%	10	100%	2	20%	71	30
Hospital B	149	5	3%	4	80%	1	25%	70	
TOTAL	1634	314	19%	289	92%	34	12%	999	127

Conclusions: Review of our readily available cancer registry data has created several opportunities for intervention to improve identification of BRCA I/II mutations in people with breast and ovarian cancer. We have demonstrated a need for additional professional education regarding BRCA I/II testing at 1 institution specifically and for women with ovarian cancer in general. Our data provide the foundation to conduct an outreach program to offer genetic counseling to people affected by breast and ovarian cancer who meet current NCCN criteria but have not received this potentially lifesaving intervention. More than 100 people in this group will be positive for BRCA I or II gene mutations.

0089 Factors Associated With Eventual Mastectomy in Breast Conservation Candidates

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Objectives: Many breast cancer patients thought to be good candidates for breast-conserving surgery eventually have mastectomy. We aim to identify factors that may lead to eventual mastectomy following an initial attempt at breast-conserving surgery. With this information, we hope to better guide our patients in regard to their surgical management.

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Method: A retrospective review of a single-surgeon database was performed in which we queried all patients who had a lumpectomy or mastectomy from 1977-2012. Data was collected on age, race, height, weight, menstrual status, history of smoking, presentation, location of tumor, pathology, size of tumor, nodal status, receptor status, number of re-excisions, and whether or not the patient received chemotherapy and/or hormonal therapy. The data was analyzed using SPSS software (SPSS Inc., Chicago, IL).

Results: One thousand four hundred eight patients were potential candidates for breast-conserving surgery. Thirteen percent (181) of these patients were eventually treated with mastectomy. The 1227 patients treated with lumpectomy were compared with the 181 patients who required mastectomy in order to identify factors which could predict which candidates for breast conservation will eventually require mastectomy (see table). In univariate analysis, young age, lower body weight, larger tumor size, invasive lobular pathology, and increasing number of re-excisions were significant predictors of eventual mastectomy. In multivariate analysis among patients with invasive cancers, number of re-excisions ($P < 0.001$), invasive lobular pathology ($P = 0.002$), larger tumor size ($p < 0.001$), increasing number of involved nodes ($p = 0.011$), young age ($p < 0.001$) and low body weight ($P = 0.009$) were predictive of mastectomy. Among patients with ductal carcinoma in situ, large tumor size ($p < 0.001$), increasing number of re-excisions ($p = 0.004$), young age ($p = 0.014$) and Hispanic ethnicity ($p = 0.014$) were significant predictors of mastectomy.

Variables Significantly Associated with Eventual Mastectomy

Mastectomy Rates	**Invasive**	**Noninvasive**
Re-excisions		
0 to 1	12%	12%
2+	35%	44%
Involved nodes (invasive cancers)		
	0 to 1	12%
	2 +	27%
Age		
<57	18%	23%
≥57	10%	12%
Tumor size		
Lower than average	11% (mean, 17 mm)	10 % (mean, 10.4 mm)
Higher than average	19%	35%
Histology (invasive cancers)		
Lobular	22%	
Ductal		14%
Ethnicity (ductal carcinoma in situ)		
Hispanic		28%
Non-Hispanic		
Body weight (invasive cancers)		
<70 kg	15%	
≥70 kg	12%	

Conclusions: These results indicate that multiple re-excisions to obtain clear margins, younger age, and larger tumor size increase the likelihood of mastectomy for potential breast conservation candidates. Low body weight, lobular histology and increasing nodal involvement also increase the mastectomy rate for patients with invasive cancers, while Hispanic ethnicity increases the mastectomy rate in patients with ductal carcinoma in situ.

0133 Balloon-Based Accelerated Partial Breast Irradiation for the Treatment of Invasive and Noninvasive Breast Cancer in a Community-Based Private Practice Comprehensive Breast Center

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Objectives: Accelerated partial breast irradiation (APBI) has become an accepted adjuvant radiation treatment regimen for breast cancers at low risk of local recurrence. Balloon-based or intracavitary brachytherapy is the most common method for delivery of APBI. As an option for early breast cancer, APBI requires the input from a multidisciplinary team of physicians dedicated to the treatment of breast cancer. In this presentation, the experience of 1 community-based surgeon using balloon-based APBI to treat early breast cancer is discussed.

Method: Between September 1, 2006, and December 31, 2011, a total of 52 cases of early invasive ductal carcinoma (IDCA) and 32 cases of DCIS were treated by APBI and delivered by intracavitary brachytherapy. All of these cases were surgically treated by 1 surgeon, whereas multiple radiation oncologists were involved in the APBI. All cases were presented as part of a community-based multidisciplinary conference dedicated to treating breast cancer. Rates of tumor bed recurrence and of elsewhere recurrence were calculated.

Results: Three (6%) of 52 of IDCA recurred with a median follow-up of 30 months. One (2%) of 52 was an elsewhere-IBTR and 2 (4%) were contralateral recurrences. No cases of DCIS recurred with a median follow-up of 23 months. All tumors met American Society of Breast Surgeons recommendations for treatment with APBI. All tumors were less than 3 cm in size, with the average size of invasive tumor 1.2 cm and the average size of DCIS 1.1 cm. All tumors had negative margins and all invasive tumors were node negative. No IDCA had an extensive intraductal component (EIC). Forty-five (87%) of 52 IDCA were ER+ or PR+. The average age was 65 for IDCA and 73 for DCIS.

Conclusions: Balloon-based APBI has a low recurrence rate similar to that for reported rates following whole-breast irradiation. No tumor bed recurrences have been identified. This is a small study of a single surgeon's experience, but this study, nonetheless, demonstrates that breast surgeons in private practice can successfully treat breast cancer with APBI when part of a multidisciplinary team dedicated to treating breast cancer. APBI delivered by intracavitary "balloon-based" brachytherapy is an oncologically safe alternative to standard whole-breast irradiation for early-stage IDCA and for DCIS that are at low risk for recurrence, as recommended by The American Society of Breast Surgeons.

0011 Temporal, Geographic, and Demographic Trends of Early Onset Breast Cancer in Hampden County

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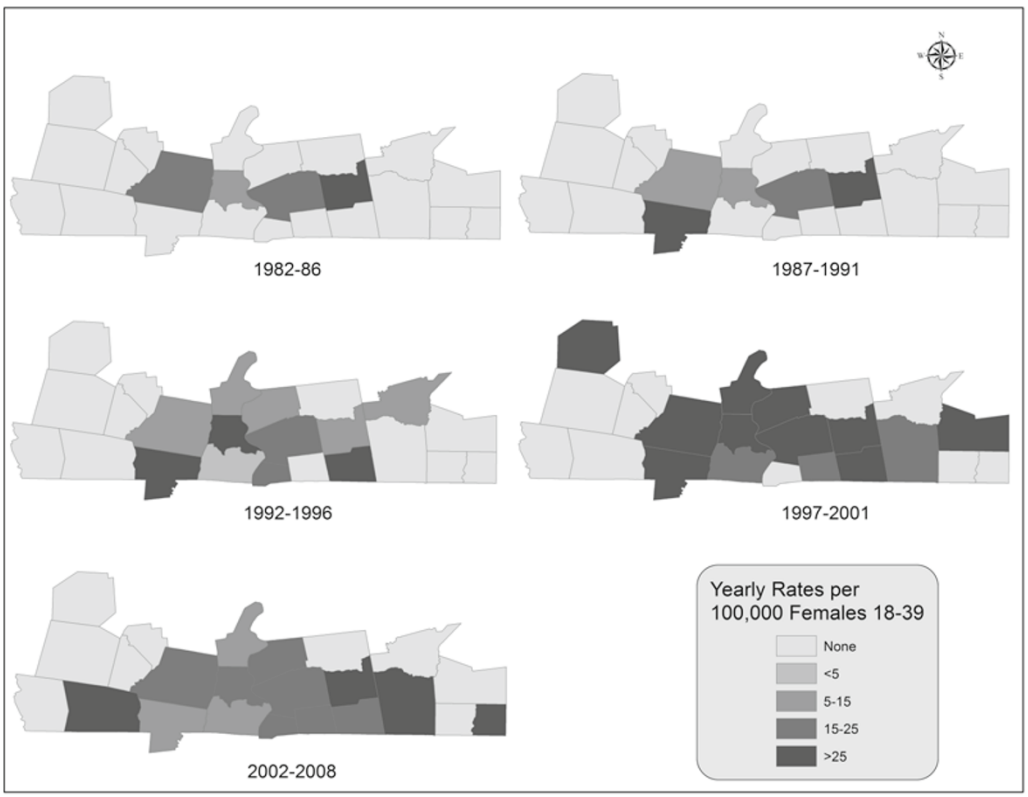
Objectives: The aim of this study was to ascertain the incidence and stage at presentation over time in the under-40 population in our region and to identify geographic and socioeconomic risk factors for "early age" breast cancer in Hampden County, Massachusetts.

Method: Data from 1982-2008 were obtained from the Massachusetts Cancer Registry and 2 medical center cancer registries. Early onset breast cancer (EOBC) was defined as a diagnosis of breast cancer in a woman before age 40.Thematic mapping using a geographic information system (GIS) was carried out to visualize (map) EOBC town incidence rates over time. Moran's I and the spatial scan statistic were used to test for geographic and temporal clustering of incidence rates over time. In the absence of clustering, simple linear regression was used to test for an increase in town EOBC rates over time. Multiple logistic regression was used to identify patient-level risk factors for EOBC

Results: Six percent of all patients were classified as EOBC. Figure 1 shows the geographic distribution of EOBC incidence rates by town for 5 time periods. The map shows a clear increase in EOBC incidence rates over time (Figure1).

continues

Figure 1. Incidence of early onset breast cancer by town over time.



While there was no clustering of rates in any individual geographic area in any time period, there was a significant linear increase in the rate of EOBC over time ($p = 0.005$) at an average increase of 1 per 100,000 cases of EOBC at each subsequent 5-year time period.Significant risk factors for EOBC on multivariable analysis were tumor grade ($p < 0.001$ and Hispanic ethnicity ($p < 0.001$).

Conclusions: We have been able to document through thematic mapping an increase in early onset breast cancer in our region. We have also been able to show that the Hispanic population has had a disproportionate increase in EOBC over the timeframe studied.

0169 Radiologic Findings Associated With Atypical Lobular Hyperplasia and Lobular Carcinoma In Situ Diagnosed on Image-Guided Core Biopsy and the Rate of Upgrade

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Objectives: Atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS) are proliferative lesions of the breast. When identified by percutaneous core biopsy, surgical excision is typically recommended due to the risk of co-incident ductal carcinoma in situ (DCIS) or invasive cancer. The aim of this study was to identify radiographic characteristics associated with an increased risk of upgrade to noninvasive or invasive cancer.

Method: A retrospective analysis was performed on 197 core biopsies with ALH or LCIS in 189 patients. Patient age, relevant history, imaging findings prompting biopsy, and core biopsy pathology were recorded. Follow-up was available for 191 core biopsies. Excisional biopsy was performed in 163 (85%) of 191 patients. One hundred thirty-five (83%) of 163 had complete imaging available. Excision was not done in 28 (15%) of 135 patients.

Results: Of patients with LCIS, 8 of 29 (28%) upgraded to malignancy—3 (37.5%) of 8 DCIS and 5 (62.5%) of 8 invasive lobular cancer (ILC). Twenty (69%) of 29 had complete imaging. Abnormal calcifications prompted biopsy in 14 (70%) of 20, and 5 (36%) of 14 were upgraded. Fourteen (10%) of 134 biopsies with ALH were upgraded. DCIS was identified in 9 (64%) of the 14. Invasive cancer was found in 5 (36%) of the 14: ductal cancer, 1 (20%) of 5 and ILC, 4 (80%) of 5. One hundred fifteen (86%) of 134 had complete imaging: 85 (74%) of 115 had biopsy performed based on abnormal calcifications; 10 (12%) of 85 were upgraded to DCIS or invasive cancer. A mass on imaging prompted biopsy in 18 (16%) of 115 cases, and 1 (6%) of 18 were upgraded. Other radiologic findings (ie, MRI enhancement) were noted in 7 (6%) of 115, of which 3 (43%) were upgraded. Calcifications or mass prompted biopsy in 99 and 20 of 135 cases (ALH or LCIS), respectively. Fifteen (15%) of 99 with calcifications and 1 (5%) of 20 with mass were upgraded overall ($p = 0.30$). There was a statistically significant association between the largest dimension of the lesion on imaging and upgrade rate. In the non-upgrade group, 113 had measurable lesions, and in the upgrade group, 18 had measurable lesions. The median size on imaging of non-upgraded lesions was 8 mm (range, 2-70 mm) vs 11 mm (range, 2-91 mm) for upgraded lesions ($p = 0.01$). No diagnosis of DCIS or invasive cancer has been made in the group of 28 that were not excised. Median follow-up was 5.6 years with a range of 0.5-12.5 years.

Conclusions: Core needle biopsies with ALH and LCIS are associated with notable rates of DCIS or invasive cancer on excisional biopsy. Excision of ALH and LCIS is important to diagnose and treat occult disease. The study does not elucidate a subgroup of patients with ALH or LCIS on core biopsy who, based on imaging characteristics, could forego surgical excision. Lesions with larger dimensions on imaging had an increased rate of upgrade; however, the clinical implication of this finding is not yet defined. Lesions described as focal lobular neoplasia on core pathology also have significant upgrade rates.

0065 Outcome Comparison Between Oncoplastic Reduction and Standard Lumpectomy for Breast Cancer

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Objectives: Oncoplastic reduction has been shown to be an effective local treatment for breast cancer in large-breasted women. However, there is little data comparing this technique to the standard lumpectomy cohort. The purpose of this study was to compare the outcomes with oncoplastic reduction to that of standard lumpectomy and to evaluate the early complications of this procedure and reoperative rates.

Method: An IRB-approved retrospective chart review of 82 large-breasted patients treated for breast cancer at a single institution between 2005 and 2012 was conducted. Using the modified Katariya model, breast volumes were determined using mammographic images to identify the large-breasted control group for comparison to the reduction oncoplastic group. Each group was evaluated for demographics and risk factors. The complications of the oncoplastic procedure were stratified into major and minor. A major complication, as defined by return to the operating room, included major wound dehiscence, necrosis of the NAC, and evacuation of hematoma. A minor complication, as defined by conservative treatment in the office, included minor wound dehiscence, partial nipple necrosis, and surgical site infections. We also compared the total number of surgeries between the study and control group, including reoperations for complications and re-excisions for positive margins.

Results: The 2 groups were found to be similar with regards to age, BMI, co-morbidities, and stage. The mean preoperative breast volumes were also similar between the groups with 1074 cm^3 for oncoplastic reduction and 986 cm^3 for standard lumpectomy. The group undergoing standard lumpectomy had minimum complications as expected. The total major and minor complication rates for the bilateral oncoplastic reduction group were 19.5% and 26.8%, respectively. Regarding the literature, our complication rate is consistent with the BRAVO study results. Two patients in the reduction oncoplastic group required re-excision due to positive margins and none of the patients required completion mastectomy. In contrast, patients treated with standard lumpectomy had re-excision rates significantly higher at 52% with a completion mastectomy rate of 17.1%. Despite the reoperative rate of 17% for complications, the study group required fewer additional procedures than the standard lumpectomy group who required subsequent operative interventions of 58%. (See Table 1)

continues

Table 1. Outcome Comparison Between Partial Mastectomy and Oncoplastic Reduction

	Standard Lumpectomy (N = 41)	Oncoplastic Reduction (N = 41)	P value
Demographics			
Mean age (yrs) (Range)	59.5 (33-80)	58.6 (44-74)	0.74
BMI	34.06	36.69	0.063
Mean comorbidities	1.39	1.41	
Mean breast volume (cm^3)	986	1074	0.061
Mean tumor size (cm)	1.16	1.88	0.05
No. of positive margins	19	2	<0.001
No.of re-excisions	18	2	<0.001
No. of completion mastectomy	6	0	
Minor Complications			
Wound dehiscence		5 (12.2%)	
Partial necrosis		4 (9.7%)	
SSI		2 (4.95%)	
Total		11 (26.8 %)	
Major Complications			
Wound dehiscence		3 (7.3%)	
Nipple necrosis		1 (2.41%)	
Hematoma evac		2 (4.9%)	
SSI		1 (2.4%)	
Total		7 (19.5%)	
Return to OR	24 (58.5%)	7 (17%)	

Conclusions: Large-breasted patients with breast cancer treated with bilateral oncoplastic reduction had complication rates similar to the reported incidence of complications in the literature for bilateral breast reduction. Due to the unexpected higher re-excision rate and completion mastectomy rate in the large-breasted control group, total reoperative rates were fewer for patients undergoing oncoplastic reduction.

0135 Upgrade Rate of Radial Scars Without Atypia Diagnosed by Core Biopsy

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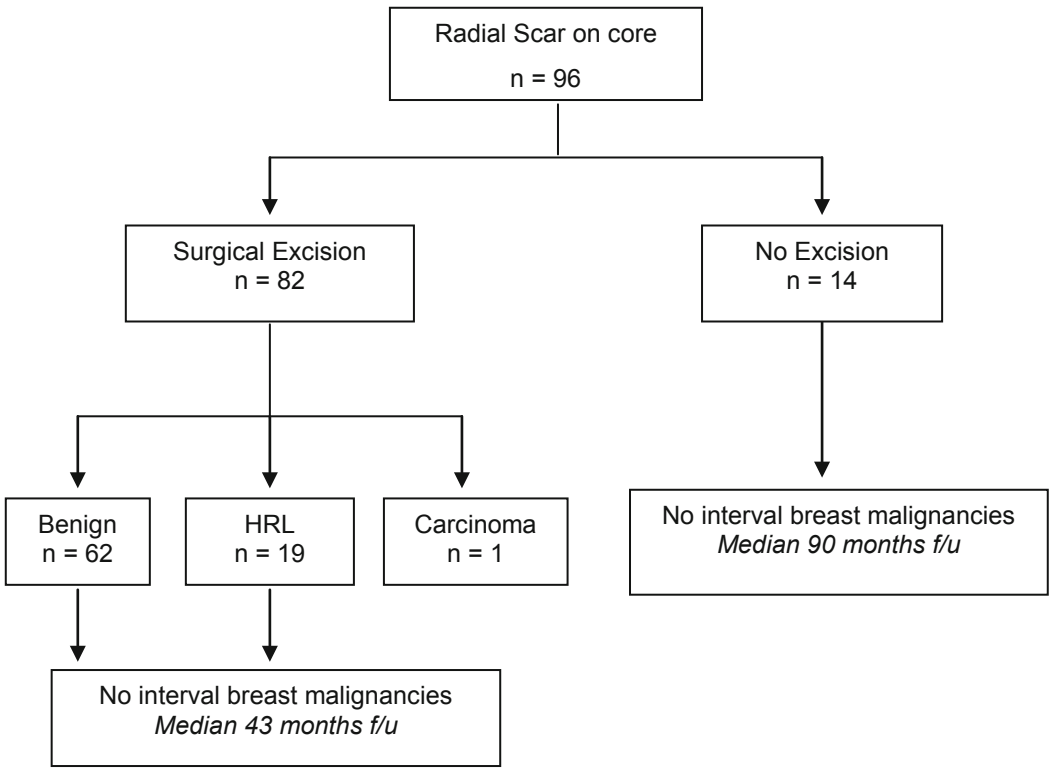
Objectives: The need for excision of radial scars without atypia diagnosed by core biopsy remains controversial. We sought to determine the outcomes of cases of radial scar without atypia diagnosed by core biopsy.

Method: We queried our pathologic database to identify patients who underwent core biopsy revealing radial scar between December 1997 and September 2012 and excluded biopsies accompanied by high-risk lesions, such as ADH, LCIS, ALH, or other atypia. Patients with radial scar without atypia who underwent subsequent surgical excision were grouped according to final pathologic findings: benign, upgrade to high-risk lesion, or upgrade to carcinoma. Clinical data and radiology reports were reviewed, and univariate analysis was performed to identify risk factors for upgrade to high-risk lesion or carcinoma.

Results: We identified 96 patients having radial scar without atypia diagnosed by stereotactic, ultrasound-guided, or MRI-guided percutaneous core biopsy. Initial patient presentation that led to a core biopsy which revealed radial scar without atypia was on screening mammography (76/96), screening MRI (9/96), chest CT (1/96), or change in self or clinical breast exam (10/96). Median radiologic size of palpable lesions was 0.9 cm (range, 0.4-1.8). Eighty-two (85%) of the 96 patients with radial scar without atypia underwent subsequent surgical excision. Surgical excision revealed benign findings in 62 (76%), high-risk lesions in 19 (23%), and carcinoma in 1 (1%) (Figure 1). For the 15 patients with radial scar by core biopsy who did not undergo excision, no interval breast malignancies were detected at a median follow-up of 90 months (range, 0–139). By univariate analysis, method of detection, menopausal status, history of breast cancer, and having prior breast biopsies was not associated with upgrade to high-risk lesion at surgical excision ($p > 0.05$ for all).

Figure 1.



Conclusions: Radial scar without associated atypia is relatively rare as the primary diagnosis after core biopsy and is uncommonly associated with an upgrade to carcinoma. The diagnosis, however, still warrants excision to identify patients with high-risk lesions which may help in stratifying a patient's future risk of developing breast cancer.

0096 Compatibility of Breast Size, Degree of Ptosis, Type of Reconstruction, and Incision Placement in Nipple-Sparing Mastectomies. Preliminary Analysis of the American Society of Breast Surgeons Nipple-Sparing Mastectomy Registry

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Objectives: The American Society of Breast Surgeons Nipple-Sparing Mastectomy Registry (ASBS NSMR) is a prospective, nonrandomized, IRB-approved, multicenter registry. This is a preliminary assessment of breast characteristics (assessed as cup size and degree of ptosis), type of reconstruction, and incision placement in nipple-sparing mastectomies (NSM).

continues

Method: Thirty-nine surgeons at 36 sites performed 386 mastectomies for cancer (163) or prophylaxis (223) on 225 patients. All patients underwent immediate reconstruction with either tissue expander, permanent implant, DIEP flap, TRAM flap, or latissimus dorsi flap. Breast characteristics included cup sizes A, B, C, D, or ≥E. Degree of ptosis included: none; pseudoptosis; grade 1, 2, or 3. Incisions utilized included inframammary, periareolar, ellipse/hemi-batwing, radial, radial with periareolar extension, previous lumpectomy scar, previous mastopexy scar, or Weiss pattern.

Results: Cup size, degree of ptosis, incision placement, and type of reconstruction were assessed (Table 1).

Table 1

Cup size Degree of Ptosis Incision type	Tissue Expander N = 219	Permanent Implant N = 104	DIEP Flap N = 22	TRAM Flap N = 1	Latissimus Dorsi Flap N = 2
Cup size					
Cup A	36	7	3		
Cup B	93	48	8	1	
Cup C	66	36	9		
Cup D	8	7			2
Cup ≥ E	2				
Unknown	3	6	2		
Degree of Ptosis					
Ptosis: none	100	45	3		
Pseudoptosis	5				
Grade 1 ptosis	70	41	10	1	
Grade 2 ptosis	25	10	4		2
Grade 3 ptosis	9	6	5		
Unknown	10	2			
Incision type					
Inframammary incision	50	77	2	1	
Periareolar ellipse/hemi-batwing	4	4	2		
Previous lumpectomy scar	3	2	1		
Previous mastopexy scar	4	1	1		
Radial	46	2	15		
Radial w/periareolar extension	55	15	1		
Weiss pattern	2				
Unknown	55	3			
***Unknown reconstruction type: 38**					

Free nipple transfer was performed on 7 mastectomies. One (0.2%) NAC was excised secondary to full-thickness necrosis. Four of NACs (1%) required debridement. Five (1%) tissue expanders/implants were removed/exchanged secondary to flap infection. Cosmetic outcome was evaluated by 169 patients as excellent (58%), good (36%), or fair (7%).

Conclusions: Patients undergoing an NSM had a wide variety of reconstruction techniques. The technique was not dependent on breast size or the degree of ptosis. The complication rate was low and there were too few complications to differentiate any differences based on size, ptosis, technique, or incision placement.

0183 Tumor Characteristics of Breast Cancer Cases Who Do or Do Not Yield Nipple Aspirate Fluid (NAF)

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Objectives: Nipple aspiration fluid (NAF) is a noninvasively acquired biosample that can provide a window of observation into the breast environment. If it is a reflection of the hormonal environment in the breast, cancers that occur in NAF yielders may differ in characteristics from those occurring in non-yielders. In a just-completed case-control study, we collected NAF from women diagnosed with in situ or invasive disease and matched controls. We present an analysis of the relationship between tumor size, grade, hormone receptor status, and the ability to produce NAF.

Method: Four hundred eight-two women with an age range of 31 to 71 years and a diagnosis of either in situ or invasive carcinoma consented to collection of NAF from the contralateral unaffected breast. Of the 482 cases, 278 (58%) yielded more than 2 microliters of fluid (yielders) and 204 (42%) yielded less than 2 microliters of fluid (non-yielders). We examined menopausal status, in situ vs invasive carcinoma, and tumor characteristics to determine if a relationship exists between the tumor characteristics of yielders and nonyielders.

Results: The mean age of yielders was 51 years and nonyielders, 54 years ($p = 0.000007$). Of the yielders, 41% were premenopausal, 16% perimenopausal, and 43% postmenopausal. Of the nonyielders, 34% were premenopausal, 8% perimenopausal, 58% postmenopausal. Differences in the menopausal status between the yielders and nonyielders was statistically significant ($p = 0.01$). Hormone receptor status was similar in yielders and nonyielders; specifically, 81% of yielders were ER positive and 71% were PR positive. Among nonyielders, 78% were ER positive and 72% were PR positive. Tumor size was evenly distributed in the 2 groups. Women who yielded nipple fluid were more likely to have grade 3 tumors than the nonyielders (39% vs 30%) and is of borderline statistical significance ($p = 0.07$).

Conclusions: Among breast cancer cases, the nonyielders are more likely to be older and postmenopausal than the yielders as expected from previous studies. However, the ability to yield NAF from the unaffected breast does not correlate with the hormone receptor status or size of the carcinoma. Therefore, studies of NAF biomarkers and cancer risk are not likely to be confounded by a relationship between cancer profile and likelihood of NAF yield.

0166 Current Management of Palpable, Solid, Benign-Appearing Breast Masses: A Retrospective Review

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Objectives: Our goal is to demonstrate that women 18-35 years of age presenting with a benign-appearing solid breast mass on physical exam and/or imaging, without a family history of breast or ovarian cancer, can safely undergo close interval follow-up without biopsy. This will prevent unnecessary procedures, as well as lower cost of health care.

Method: This is a retrospective review of all breast biopsy specimens of women 18-35 years of age during the years 2007 to 2008. Our inclusion criteria are female gender, age of 18-35, benign-appearing palpable breast mass identified by pathology. Pregnant or lactating women and women with a personal or family history (first or second degree) of breast or ovarian cancer were excluded from our study.

Results: A total of 367 patients were identified, 67 of whom were excluded. The mean age of our cohort (n = 300) is 27 years. The physical exam findings noted, 96% were described as soft and mobile. Ultrasound was obtained in 243 (81%); solid, well-circumscribed and lobulated were the most commonly reported findings. Benign pathology was noted in 286 patients (95.3%), most commonly being a fibroadenoma (164 of 286). Malignant pathology was noted in 14 patients (4.7%).

continues

Statistics

		Age at diagnosis	Maximum dimension of mass
N	Valid	300	231
	Missing	0	69
Mean		27.41	1.990
Median		28.00	1.800
Std. Deviation		4.980	1.2371
Minimum		17	.4
Maximum		35	10.0

Count

		Surgical biopsy results		
		Malignant	Benign	Total
Physical exam findings	Soft	3	181	184
	Mobile	0	3	3
	Rubbery	1	3	4
	Fixed	1	0	1
	Rubbery and mobile	0	1	1
	Soft and mobile	0	5	5
Total		5	193	198

U/S Margins

		Frequency	Percent	Cumulative Percent
	Well circumscribed	201	67.0	82.7
	Irregular: likely malignant	17	5.7	89.7
	Lobulated	25	8.3	100.0
	Total	243	81.0	
	N/A	2	.7	
	Unknown	55	18.3	
	Total	57	19.0	
Total		300	100.0	

Count

		Surgical biopsy results		
		Malignant	Benign	Total
Patient follow-up	Excision	7	111	118
	Needle biopsy	2	161	163
	Needle biopsy and excision	5	12	17
Total		14	284	298

Conclusions: This retrospective review of 300 patients demonstrated that the majority (95.3%) of benign-appearing breast masses in women age 18-35 who lack a family history of breast or ovarian cancer were found to have benign pathology on core needle biopsy or surgical excision. Nonetheless, we noted a malignancy rate of 4.7%, which is higher than the expected rate of less than 2%. This result challenges our current management of benign-appearing nodules in young women. A prospective trial is needed to determine the optimum management of these women.

0137 Predicting the Onco*type* DX Score: Validation of an Inexpensive Estimation Tool

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Objectives: The Onco*type* DX Recurrence Score (RS) predicts the benefits of adding adjuvant chemotherapy to hormone therapy in early-stage, estrogen receptor (ER) positive breast cancer. It correlates with distant disease recurrence and survival; however, its international use is limited by cost, time, and logistics. We propose an inexpensive estimation tool to predict the Onco*type* DX score based on 5 routinely measured pathological parameters and aim to validate this model.

Method: From September 2008 to April 2011, patients who had the Onco*type* DX test performed were identified from our institution's prospective database. A total of 766 had HER2-negative, invasive ductal carcinomas with known ER status, progesterone receptor (PR) status, size, histologic grade, and nuclear grade. Through linear regression analysis, an Onco*type* DX RS estimation tool was developed using these 5 parameters. The predicted RS risk level was classified the same as the Onco*type* DX RS: low risk, RS < 18; intermediate risk, RS 18-30; or high risk, RS > 30. The predicted RS was compared to the actual Onco*type* DX RS. From April to December 2011, 299 patients met the above criteria and were used to validate this model.

Results: Overall, during development of the Onco*type* DX RS prediction tool, 67.6% of specimens were assigned to the same risk category as the Onco*type* DX score (Table 1). The coefficient of determination (R2) of model was 0.42. During validation of this model, 70.9% of samples were assigned to the correct category. All factors included in the model were significant; $p < 0.05$. One-unit increases in ER and PR status conferred small (0.11 and 0.21 point) drops in RS. Size >20 mm, histological grade 3, and nuclear grade >1 were associated with moderate (1.3-6.1 point) increases in RS. In the validation data, when the model predicted a low score, the actual Onco*type* score was high in 1.9% and intermediate in 23.1% of cases. A predicted Intermediate score was actually low in 20.7% and high in 19.5% of cases. One patient had a predicted high score and this was accurate.

Table 1. Predicted and Actual Onco*type* DX Recurrence Score Risk Levels

	Actual Onco*type* DX RS Risk Level							
	Development of Model					**Validation of Model**		
Predicted Recurrence Risk Level	**Low**	**Int.**	**High**	**Total**	**Low**	**Int.**	**High**	**Total**
Low (Row %)	345 (76%)	102 (22.5%)	7 (1.5%)	454 (100%)	162 (75%)	50 (23.1%)	4 (1.9%)	216 (100%)
Int. (Row %)	104 (35.5%)	158 (53%)	34 (11.5%)	296 (100%)	17 (20.7%)	49 (59.8%)	16 (19.5%)	82 (100%)
High (Row %)	0 (0.0%)	1 (6.2%)	15 (93.8%)	16 (100%)	0 (0.0%)	0 (0.0%)	1 (100%)	1 (100%)
Total	449 (58.6%)	261 (34.1%)	56 (7.3%)	766 (100%)	179 (59.9%)	99 (33.1%)	21 (7.0%)	299 (100%)

Conclusions: Our model, based on 5 routinely measured pathological parameters, correctly predicted the actual Onco*type* DX RS score category in 70.9% of patients in a validation dataset. We do not feel that the model can accurately replace the actual Onco*type* score; it may, however, be of some help in health care systems with limited resources.

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0079 Minimal Scar Oncoplastic Reconstruction After Partial Mastectomy: A Combination of Replacement and Displacement Techniques

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Objectives: Recently, oncoplastic surgery has become an important pillar in the treatment of breast cancer. It comprises either displacement techniques or replacement techniques. By combining both techniques, one can make use of their mutual advantages and, at the same time, avoid their drawbacks. We have investigated the technique, complications, and outcome of this procedure.

Method: From January 2008 to March 2009, 24 breast cancer patients underwent curative surgery by quadrantectomy through the doughnut (Benelli) incision followed by latissimus muscle reconstruction of the defect. Patient and tumor characteristics, technical details, complications, cosmetic results, and oncologic outcome were retrospectively evaluated.

Results: The mean age of the study population was 40.2 ± 8.7 years (range, 27-61) with a mean tumor size of 4.6 ± 2.3 cm (range, 2.7- 9.3), and the excised breast tissue showed a mean volume of 386.1 ± 105.8 mL (range, 122-655). The procedure lasted a mean duration of 5.1 ± 0.7 hours (range, 4-6.5) and the patients were discharged after a mean hospital stay of 1.4 ± 0.3 days (range, 1-4). Early surgical complications, such as skin or muscle flap necrosis, were not encountered. One patient developed breast hematoma. Patient satisfaction with their cosmetic appearance was rated as excellent in 12 patients, good in 8, satisfactory in 3, poor in 1, and very poor in 0. The most common delayed complication was loss of symmetry between both breasts and was seen in 3 patients, while keloid scarring occurred in 1. The patients were followed up clinically and radiologically for a mean period of 31 ± 7.7 months (range, 22-45). Fat necrosis and microcalcifications developed in 4 patients (16.7%). Local recurrence occurred in 1 patient at 39 months, while rib metastases occurred in another patient at 17 months.

Conclusions: The combination of the Benelli incision with the latissimus dorsi muscle reconstruction for major breast resections in small to moderate non-ptotic breasts usually gives very good cosmetic results and is not associated with serious complications. Nevertheless, it is a tedious procedure that requires long training and good patient selection.

0050 Accuracy of Intraoperative Assessment of Sentinel Node Metastasis by Measuring Intranodal Pressure

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Objectives: Many breast surgeons abide by the published ACOSOG Z0011 findings and don't advocate complete axillary lymph node dissection (CALND) following lumpectomy, sentinel lymph node (SLN) biopsy, irradiation, and systemic therapy for T1 and 2/ cN0/ pN1 invasive breast cancer. CALND is still usually recommended for patients undergoing mastectomy when the SLN is positive. CALND can be done during mastectomy or later when formal pathologic diagnosis is available. Frozen section confirmation of a positive SLN during mastectomy would be ideal but there is a high false-negative rate when the SLN is not obviously abnormal on palpation. Following our initial promising observations that intranodal pressure (INP) rises with increasing SLN metastasis size we set out to determine if intraoperative INP measurements and frozen section of the node to document pN1 SLN disease would aid the decision to do a CALND during mastectomy and avoid a second procedure.

Method: INP was measured in 235 (SLN #1 N = 235; #2 N = 70) new breast cancer patients with T1/2, cN0 disease undergoing SLN biopsy. Level of suspicion (LOS) was assigned a score by clinical palpation of 0 = benign; 1 = slightly suspicious for metastasis; 2 = obvious metastasis in the SLN #1 (109) and SLN #2 (13) patients. The SLN pathology was assessed by intraoperative frozen-section only in patients undergoing mastectomy if the INP was higher than 18 mmHg, even when the LOS was zero or not recorded. CALND was done if the frozen section confirmed metastasis. Statistical analysis was performed to compare INP and SLN histology and: SLN metastasis (met) size (Spearman rank correlation coefficient); T grade, histology (Kruskal-Wallis); ER, PR, HER2-neu, LVI (Wilcoxen Mann-Whitney); frequency of SLN positivity among 6 groups combining LOS/INP (Fisher exact test); relationship of SLN positivity to LOS (GEE logistic regression).

Results: SLN met size correlated with INP ($r = 0.373$; $p < 0.001$). INP in controls (prophylactic mastectomy, N = 9; mastectomy for DCIS, N = 17) was significantly different ($p = 0.013$) from invasive cancers (7.4 ± 5.2 vs 7.6 ± 4.7 vs 13.2 ± 10 mmHg, respectively). Lymphovascular invasion (LVI) with positive SLNs exhibited the highest INP (22.9 ±

14.2 mmHg; p < 0.009). Six groups created by combining LOS 0, 1, and 2 with INP >18 or ≤18 mmHg showed a significant (p < 0.001) correlation with SLN histology; LOS = 2/INP >18, N = 7, were all (100%) positive with no negative SLNs; LOS = 0/INP < 18, N = 78, had 4 (5%) SLNs positive all ≤4 mm in size. An important group is LOS = 0/IN > 18, 4 (44.4%) of 9 SLN positive. LOS alone was correct (p < 0.001) in negative and positive SLN prediction (90% and 100%, respectively, for LOS = 0 or 2). INP >24 mmHg correctly predicted SLN positive in 16/22 (73%) patients and INP < 10 correctly predicted negative SLNs in 108/110 (98%).

Conclusions: INP and LOS were both good at predicting pN1 in cN0 patients. When used together they were good at predicting negative nodes. In a small number of cases, when LOS = 0, an elevated INP prompted intraoperative frozen section during mastectomy and proved metastasis. Pathologic documentation of SLN metastasis by immediate frozen section during mastectomy may justify a CALND where a second operation can be avoided.

0062 Benign Breast Disease and BMI – Is There a Correlation?

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Objectives: Breast cancer is the leading cancer affecting women in America. BMI is a known risk factor for the development of breast cancer. The relationship of BMI to benign breast disease is less clear. In addition, certain benign pathologies are associated with an increased risk of cancer. We sought to measure the incidence of benign pathologies and to correlate these findings with BMI and age.

Method: All patients undergoing breast biopsy at our center from 2000-2005 were identified (n = 1717). Age, BMI, family history, sex, and diagnosis were determined. Patients were grouped into BMI, age, and intervention groups. Chi-square ($p < 0.05$) was used to identify statistical significance.

Results: Fibrocystic disease and fibroadenoma were seen with a lower incidence for >55 yoa patients, while pathologies requiring further surgical intervention were seen in higher proportions in patients >55 yoa. All pathologies were noted to decrease with increasing BMI, except for fibroadenoma, which peaked in BMI group 25-29.9. The presence of benign pathologies was associated with age as expected.

Table 1. Comparison of 1,717 Patients for Pathological Diagnosis as It Relates to Age

Pathological Diagnosis	Fibroadenoma	Apocrine Metaplasia	Fibrocystic Disease	Atypical Hyperplasia	Non-Atypical Hyperplasia	Multiple Diagnoses (2+)	Surgical Intervention	Total
Age <45	69	0	88	2	7	107	83	356
45 - 55	45	0	99	5	6	147	195	497
>55	35	3	123	6	8	216	473	864
Total	149	3	310	13	21	470	751	1717
P-value	0	0	3.4^-5	0.72	0.31	2.5^-4	0	

Table 2. Comparison of 1717 Patients for Pathological Diagnosis As It Relates to BMI

Pathological Diagnosis	Fibroadenoma	Apocrine Metaplasia	Fibrocystic Disease	Atypical Hyperplasia	Non-Atypical Hyperplasia	Multiple Diagnoses (2+)	Surgical Intervention	Total
BMI <24.9	35	2	120	6	8	139	238	548
25 – 29.9	40	1	98	2	7	149	243	540
30 – 34.9	33	0	54	3	3	97	162	352
35 – 39.9	17	0	24	2	3	45	61	152
>40	24	0	14	0	0	40	47	125
Total	149	3	310	13	21	470	751	1717
P-value	3.1^-6	0	3.6^-5	0	0	0.53	0.36	

continues

Conclusions: Interestingly, although BMI is associated with increased risk of breast cancer, increasing BMI was not associated with benign pathologies that are associated with increased risk of breast cancer. Further study of this area is warranted.

0071 Evaluation of Cosmetic Results After Breast-Conserving Surgery and Related Factors: An Iranian Experience

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Objectives: Breast conservation surgery (BCS) and subsequent radiotherapy is the standard method for early-stage breast cancer and many studies have shown that the survival of these patients is same as the mastectomy. Several factors can affect the cosmetic results of BCS and recognition of these factors can improve the results. The aim of this study was to evaluate the cosmetic results of breast-conserving surgery in Breast Cancer Research Center (BCRC) and to determine factors' impact on the final results.

Method: Photographs were taken from 103 breast cancer patients submitted to breast conservation surgery with consequent radiotherapy and were followed up in BCRC.Three different clinicians evaluated the cosmetic results based on multi-item score system. Demographic characteristics and clinical data were extracted from patient records. Univariate and multivariate regression analysis were used to evaluate the correlation between total cosmetic score and the patient,tumor and treatment factors.

Results: The mean age of the patients was 46.8 years and the mean body mass index was 28.1. Thirty-seven patients (35.9%) were classified as good-excellent results, 36 as fair (35%), and 30 as bad results (29.1%).Symmetry of the breasts appear the worst rating with a score of 1.01 of 2. In the univariate analysis, only BMI, volume of tissue removed, and the cup size D had significant correlation with total cosmetic score. In multivariate analysis between these 3 factors, BMI ($p = 0.022$) and cup size D ($P = 0.040$) remained as significant factors for cosmetic results.

Conclusions: Both patient and treatment-related factors place women at risk for poor esthetic outcomes after breast-conserving surgery. Oncoplastic and reconstructive options and symmetrization should be considered for those at a higher risk such as overweight patients and those with large cup size.

0095 Surgical Algorithm for Idiopathic Granulomatous Mastitis

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Objectives: Idiopathic granulomatous mastitis (IGM) is a benign breast disease first described by Kessler and Wollochin 1972. It is a rare chronic inflammatory disease of the breast which can mimic breast carcinoma. IGM is often misdiagnosed and mistreated. The clinical manifestations of IGM are similar to those of mammary carcinoma and because of its inflammatory origin resulting in both bad cosmetic outcome and poor cure rates, the diagnosis remains always challenging. Reviewing the literature, many treatment approaches were described, with surgery being described as first line of treatment; corticosteroids and topical corticosteroids also were described .The objective of this work is to highlight the best approach in treatment of IGM cases based on the available clinical evidence of the patients' response.

Method: Forty-eight patients with IGM were reviewed at 2 hospitals in Egypt, between 10/2007 and 10/2012. The preoperative clinical, radiological, and available pathological data, as well as surgical reports and postoperative pathology reports and postoperative followup sheets, were carefully reviewed. The data were analyzed and a literature search was carried out to review relevant cases.

Results: All patients were females and their age ranged between 24 and 45 years. The most common clinical presentation was a palpable tender mass. Fifty percent of the cases were misdiagnosed and treated as acute breast abscess before being presented to our multidisciplinarybreast clinic. Our treatment approach was either conservative or surgical. Conservative treatment by anti-inflammatory drugs of the newly discovered cases showed complete subsidence of the symptoms, while cases that were mistreated, resulting in multiple scarring, needed excisions with reconstruction.

Conclusions: IGM is a rare, benign inflammatory breast disease that is usually misdiagnosed and mistreated, however, we believe that any breast inflammation not related to the perilactational period is IGM until proven otherwise, we also believe that close follow-up, medical treatment "anti-inflammatory" and minimal surgical intervention results in better cosmetic and higher cure rates. Cases presenting with extensive scarring and bad cosmetic outcome due to previous mismanagement are better treated with extensive excisions followed by immediate partial- or whole-breast reconstruction. Implant-based immediate reconstruction is not recommended in IGM.

0012 Clinical, Imaging, and Cytopathological Characteristics As Predictive Factors for Benign or Malignant Breast Disease in Patients Presenting Nipple Discharge

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Objectives: Nipple discharge is a distressing symptom because of its association to breast cancer. Ninety-five percent of patients have a benign cause. Its characteristics associated with imaging and cytology may classify patients among low- or high-risk groups for malignancy. There is contradictory information about the value of each characteristic and its association with final diagnosis. This study tries to establish epidemiologic, clinical, imaging, and cytopathological characteristics of nipple discharge patients as predictive factors for breast pathology, and find sensibility, specificity, positive, and negative predictive values (PPV, NPV) of imaging and cytology.

Method: Database was retrospectively searched from 2003 to 2011 for patients presenting nipple discharge, finding 142 females. Diagnoses were divided into Low Risk, High Risk, and Malignant groups. Clinical, mammography, ultrasonography, and cytopathology findings were analyzed for each diagnosis. Data was analyzed on a univariate model using the X^2 test, significance = $p \leq 0.05$. Results were divided by groups for significant variables. Significant data were analyzed by forward stepwise logistic regression, to assess the joint effect of all potentially predictive variables associated with each risk group. Significant variables were then analyzed in a multivariate model to obtain the predictive effect of each, adjusted to the presence of the other significant variables (adjusted odds ratio, OR). Sensibility, specificity, PPV, and NPV was established for mammography, ultrasound, and cytology findings.

Results: Age, discharge type, lump association, mammography, ultrasound, and cytology findings were significant. Following logistic regression and multivariate analysis, OR for each was obtained, all being significant, except for discharge type, which was later analyzed obtaining its OR for low-risk and high-risk/malignant groups.

Benign condition strongest predictor was benign mammographic findings, OR 27.7 For this low-risk group, negative cytology was the second strongest predictor with OR 21.06, age > 40, tumor association and ultrasound findings were weaker with OR of 0.09, 0.198, 0.060, respectively. For high-risk patients, a high-risk ultrasound finding was the strongest predictor, OR 18.83, followed by mammography, OR 12.72. For malignant disease group, mammographic high-risk findings were the highest predictor of malignant disease, OR 27.7. Ultrasound, cytology, and age had an OR of 12.55, 13.16, and 11.5, respectively; tumor presence had an OR of 5.05. Discharge characteristics analyzed by merging high-risk and malignant group, had an OR of 8.10, p = .0002, making it an important predictive factor for high-risk lesions, but less important than imaging.

Sensitivity, specificity, PPV, and NPV for mammography, US, and cytology were assessed by low-risk and high-risk/malignant groups. The most sensitive study for high-risk group was US with 92.3%; NPV, 95.2%. Highest specificity was obtained by mammography with 92.2% with the highest PPV of 73.3%.

Conclusions: Patients with nipple discharge can be classified by risk group based on clinical, imaging, and cytology findings. Mammography and ultrasound are the most important factors for predicting patient´s final diagnosis. Discharge type lacks specificity because of a high proportion of patients presenting with suspicious discharge and benign findings. Cytology has a secondary place on final diagnosis being even less important than specific discharge type.

0121 Breast-Conserving Surgery Without Oncoplastic Techniques: The Importance of an Experienced Comprehensive Breast Center

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Objectives: To study the factors affecting cosmetic outcome (CO) in breast-conserving surgery (BCS) without oncoplastic techniques in our center with a BCS rate higher than 60% and more than 1,000 breast cancer surgeries a year.

Method: Two hundred and eighty-four patients who underwent BCS without oncoplastic techniques were included in this study. Surgeries were performed by 2 experienced breast surgeons with more than 25 years of experience in breast surgery. These patients were followed in our established Wellness Clinic postoperatively. The CO is evaluated according to the *"Harvard Breast Cosmesis Grading Scale"* by a breast surgeon who did not participate in the patient's surgery. The correlation among patient factors (age, preoperative breast volume, menopausal status), tumor factors (size, location, distance to areola), treatment factors (excision volume, excision volume %, skin excision, axillary surgery, adjuvant chemotherapy, radiation therapy), and CO were evaluated.

Results: The mean age was 57.6 (range: 33-98) years in the successful CO group and 58.2 (range: 34-85) years in the unsuccessful CO group ($p > 0.05$). The mean follow-up time was 37.9 (range: 24-84) months. The CO was successful in 88.7% (n: 252) of the patients. Tumor size, retroareolar location of the tumor, adjuvant chemotherapy administration, and whole-breast radiation therapy (WBRT) were correlated with a poorer CO ($p < 0.05$). Seventeen patients were treated with MammoSite and all were in the successful CO group. Statistically no significant correlation was found between other factors and CO.

Conclusions: Detailed multidisciplinary assessment including extensive evaluation of the breast images by specialized breast radiologists preoperatively and consideration of the best CO possible by choosing the incision based on cosmesis and oncologic safety are the reasons for a successful CO in approximately 90% of patients. Oncoplastic techniques added to surgery for tumors of larger size and retroareolar location and, in selected patients, choosing MammoSite will also have positive effects on CO.

0034 Experience With Partial Breast Irradiation for Treatment of Breast Cancer at a Community-Based Cancer Center

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Objectives: Our community cancer program, which services a large catchment area, spanning rural areas to metropolitan areas, began offering partial breast irradiation (PBI) to the community in 2003. With the recent controversy on outcomes with PBI we reviewed our experience to evaluate outcomes.

Method: A retrospective review of all patients treated with PBI from March 2003 to December 2011. The patients received high-dose-rate brachytherapy twice daily for 10 fractions in 5 days, to a dose of 34 Gray. Most patients' breast tissue was evaluated with breast-specific gamma imaging or MRI prior to proceeding with PBI. We followed institutional IRB instruction.

Results: There were 294 patients who received 298 treatments from March 2003 to December of 2011. The average follow-up was 42.5 months. Initially, 40 patients had multicatheter therapy, 241 patients had single-catheter balloon therapy, and 17 patients multichannel single-catheter therapy. By current *ASTRO* criteria we classified 101 patients as suitable for PBI, 142 patients cautionary for PBI, and 52 patients unsuitable for PBI.

Table 1. Recurrence Local, Elsewhere, and Metastatic Breast Reoccurrence

Breast Reoccurrence	Mean follow-up, 42.5 months (N = 294)	Minimum follow-up, 24 months (N = 294)
True Local- 3	1.0%	1.2%
Elsewhere- 4	1.3%	1.6%
Ipsilateral - 7	2.4%	2.8%
Contralateral-4	1.3%	1.6%
Metastasis -7	2.4%	3.8%

Table 2. Recurrence Stratified by Risk

ASTRO Criteria	Suitable (N = 101)	Cautionary (N = 142)	Unsuitable (N = 295)	All (N = 295)
Local	0	2	1	3
Elsewhere	1	3	0	4
Contralateral	3	1	0	4
Metastasis	3	3	3	9
Unrelated death	3	1	3	7
Total	10	10	7	27

Conclusions: Outcomes after treatment with partial breast irradiation were excellent, even in patients that were given pre-irradiation scores of "cautionary" by current *ASTRO* criteria. PBI is a viable, safe alternative and may be safely offered to patients with less than suitable criteria who have barriers to whole-breast radiation.

0114 Outcomes for Accelerated Partial Breast Irradiation With a Strut-Based Brachytherapy Applicator: 320 Patients With 3-Year Median Follow-up

Kerri Perry[1], Deanna Attai[2], Ben Han[3], Robert Hong[4], Robert Kuske[5], Maureen Lyden[6], Sudha Mahalingam[7], Constantine Mantz[8], Serban Morcovescu[9], Stephen Nigh[10], Jondavid Pollock[11], Jay Reiff[12], Daniel Scanderbeg[13], Jon Strasser[14], Catheryn Yashar[13]

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Objectives: A multi-institutional research group, The SAVI Collaborative Research Group (SCRG), was formed to study the long-term outcomes of those treated with APBI using strut-based applicators. As of October 2012, we present follow-up data on women enrolled in this retrospective study, whose treatments were completed at least 24 months before their latest follow-up.

Method: Patients (n = 320; 230 invasive, 90 DCIS; median age, 63 yr, range, 40-88 yr), accrued at 12 institutions, were treated with accelerated partial breast irradiation using the strut-based brachytherapy device with conventional dose and fractionation (3.4 Gy x 10 fractions BID). Treatment planning goals for the planning target volume (PTV) were: V90 > 90%; V150 < 50 cc & V200 < 20 cc. Patients were followed regularly and graded on disease status, cosmesis, and subcutaneous toxicity based on the CTCAE v3.0 (common terminology criteria for adverse events, version 3.0).

Results: All patients successfully completed treatment without serious adverse events during treatment. Median follow up was 35 months (range, 23-59 months). Most patients were postmenopausal (87%), ER+ (88%), received hormone therapy (69%), and had a median tumor size of 12 mm. Treatment planning parameters (median values) were: V90 = 97.4%; V150 = 28.0 cc & V200 = 14.2 cc. Toxicity at any time post treatment (Grade ≥2) was low: hyperpigmentation = 0.3%, telangiectasia = 2.2%, seroma = 2.5%, fat necrosis = 0.9%, breast asymmetry (radiation therapy) = 3.8%. For all patients in the database with follow-up (n = 989), local control was excellent: TR/MM = 0.61%.

Conclusions: Toxicity rates were low in incidence and low in grade. As a result, there were few statistically significant associations between treatment variables and toxicities. For these 320 patients with more than 2 years of total follow-up (median 35 months), strut-based brachytherapy appears to be a well-tolerated, effective treatment with minimal acute and few adverse late toxicities.

continues

0150 Accurately Predicting a Negative Axilla After Positive Sentinel Node Biopsy

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Objectives: Historically, nearly all breast cancer patients with a positive sentinel lymph node (SLN) biopsy underwent subsequent axillary lymph node dissection (ALND). However, up to 70% of these patients had negative non-sentinel lymph nodes, and thus, nomograms were developed to predict the likelihood of remaining positive non-sentinel lymph nodes. The utility of an ALND has been the focus of debate recently, as the ability to identify patients at low risk for residual metastatic lymph nodes becomes increasingly important. Here, we sought to evaluate the significance of SLN gamma counts following injection of a radiolabeled tracer with subsequent ALND.

Method: Our pathology database was queried for women diagnosed with invasive breast cancer who underwent breast surgery and SLN biopsy with radiolabeled tracer injection from 1/1/2010 to 7/11/2012. During the SLN biopsy, the axilla was evaluated using a gamma probe to identify and remove “hot” lymph nodes. Once a node was removed, the average gamma count for that particular node was assessed. Lymph node identification was repeated until no significant activity remained. The lymph nodes were then labeled in descending order according to their respective gamma counts (ie, the node with the highest count was labeled SLN#1, second highest count was labeled SLN#2, etc.), and were sent to pathology for further evaluation. Women with at least 1 positive and 1 subsequent negative SLN who proceeded with an ALND were identified, and only those with recorded gamma counts were included.

Results: There were 10 patients with at least 1 positive and 1 subsequent negative SLN (with corresponding gamma counts), who proceeded with an ALND. All of the women, ages 40-71 (median, 57 years), were diagnosed with invasive ductal carcinoma and 2 had bilateral disease. Surgical treatments included 5 ipsilateral mastectomies, 3 bilateral mastectomies, and 2 breast-conserving operations. Histopathology revealed 2 grade I tumors, 6 grade II, and 2 grade III. Lymphovascular invasion was noted in 2 specimens. Further analysis demonstrated 8 ER/PR+ tumors and 3 HER2+. Tumor size ranged from 0.15 to 3.7 cm (median, 1.85 cm). SLN biopsies included 2-4 lymph nodes (median, 2), and only 1 was frequently positive (range, 1-2; median, 1). SLN#1 was associated with the first identification of metastases in 8 of 10 patients, while SLN#2 was first positive in the other 2 women ($p < 0.05$). SLN#3 was negative for all 4 patients where SLN#2 was positive. Completion ALND removed 4-26 lymph nodes (median, 14), and none of them were positive for metastases. In contrast, various nomograms predicted a 7-32% likelihood of additional metastases in non-sentinel lymph nodes.

Conclusions: In women with invasive breast cancer, SLN#1 is most often the first metastatic node identified on biopsy. However, if 1 positive SLN is identified, the absence of metastases in the lymph node with the lowest gamma count predicts a high probability of complete metastatic lymph node resection (100% accuracy in this study). As such, patients with an overall decreased risk of residual metastatic lymph nodes are not likely to benefit from subsequent ALND.

0173 The Fate of DCIS After Neoadjuvant Treatment for Invasive Breast Cancer

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Objectives: It is commonly thought that neoadjuvant chemotherapy has little effect on the noninvasive component or ductal carcinoma in situ (DCIS) accompanying invasive breast cancers. However, this may not be true for DCIS in HER2 overexpressing cancers. The purpose of this study is to evaluate and compare response to neoadjuvant treatments in HER2+ and HER2-invasive breast cancers with a DCIS component (DCIS-IC). We hypothesized that neoadjuvant therapies would not eliminate DCIS and that anti-HER2 agents would not augment the DCIS response in HER2+ DCIS-IS.

Method: Patients receiving neoadjuvant chemotherapy for nonmetastatic breast cancer were identified through the institutional Cancer Registry database. The study cohort was limited to cases where a DCIS component was present on diagnostic core needle biopsy. Institutional review board approval was obtained to review the medical records. Cancers were categorized by HER2 status. Tumor size, neoadjuvant regimens, and radiographic characteristics were noted. The primary endpoint was reporting of residual DCIS on final pathological examination. Fisher exact test was used for statistical analysis.

Results: From 2006 to 2011, a total of 66 breast cancers with DCIS-IS were identified among 64 women. Of these, 25 were HER2+ DCIS-IC and 41 HER2- DCIS-IC, 21 of which were triple negative. HER2 positivity in these cases was performed by FISH (11 of 25) or by IHC (14/25). The staining of DCIS component was not addressed in the pathology reports available for review. The systemic regimens utilized for HER2+ disease were anthracycline-taxane-anti-HER2 (16) and taxane-anti-HER2 [trastuzumab and lapatinib] (9). For HER2- disease, anthracycline-taxane (26) and platinum-based/PARP inhibitor (14) combinations were used. Average age in the HER2+ group was 46.7 years (26-73) and 50 years (32-74) in the HER2- group. A total of 10 (40%) of 25 of HER2+ vs 14 (34.1%) of 41 HER2- had no evidence of DCIS on pathological examination of definitive post-treatment surgery (p value = 0.18). The same proportions were seen when the HER2- group were analyzed as triple-negative vs non-triple-negative breast cancers. Notably, no residual carcinoma was seen in 6 (24%) HER2+ vs 6 (14.6%) HER2- breast cancers (p = 0.62). Residual invasive cancer without DCIS was recorded in 4 (17%) of HER2+ and 8 (19.5%) of HER2- tumors (p = 0.50).

Conclusions: DCIS completely disappeared in at least one third of cases undergoing neoadjuvant chemotherapy for DCIS-IS. Although, a larger proportion of HER2+ cancers achieved a complete pathological response, this did not significantly increase the DCIS response. It is difficult to ascertain in this analysis whether anti-HER2 agents do not indeed exert a therapeutic effect in DCIS, as we do not have HER2 expression data on the DCIS.

0181 Should Surgeons Interpret Breast Intraoperative Digital Specimen Radiographs? We Can All Identify a Clip, But Margins Are a Different Question

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Objectives: Surgeons interpret radiographic studies in many clinical situations, based on experience, rather than formal training. Breast specimen radiography is a prevalent imaging modality for surgeons and is now visualized by immediate intraoperative digital specimen radiography (IDSR). IDSR is a tool that has been shown to decrease operative time and potentially decrease subsequent breast re-excisions. We propose surgeons are as accurate as radiologists in the interpretation of IDSR for margin evaluation. The goal was to compare the successful capture of the targeted lesion and the adequacy of surgical margins

Method: After institutional review board (IRB) approval, we prospectively compared breast cancer IDSR interpretations by both a board certified radiologist and surgeon. We compared 30 consecutive breast cancer excisions using a Bioptics piXarray, IDSR interpretation. After IDSR, the surgeon recorded a tentative conclusion based on the images as to success of excision and whether to extend the margins. The same images were then electronically transmitted to a radiologist where the definitive interpretation was made. Specimens were then sent for histological interpretation. We compared the success of identification of the targeted lesion and assessment on the surgical margins. The final pathology report served as a control

Results: There was complete concordance in the recognition of the targeted lesion and adequacy of clinical margins between the surgeon and radiologist. All 30 targeted lesions were present in the pathologic specimen (successful excision). Based on final pathology, there were 3 histological positive margins (10%) ultimately requiring surgical re-excision. All subsequent re-excisions resulted in clear margins. All 3 margin failures were interpreted as image-negative margins by both the radiologist and surgeon.

Conclusions: Surgeons with their experience in imaging analysis can as successfully interpret digital breast specimen radiographs as a consulting radiologist. We propose that excision completeness and IDSR margin reinterpretation by a radiologist is both unnecessary and cost ineffective.

0110 Intraoperative Electron Radiation Therapy (IOERT) and Oncoplasty: A Perfect Marriage of Technique and Technology

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Objectives: To demonstrate that delivering Intraoperative electron radiation therapy to the target tissues through oncoplastic surgical approaches provides optimal surgical bed preparation safely and effectively without compromising cosmetic results.

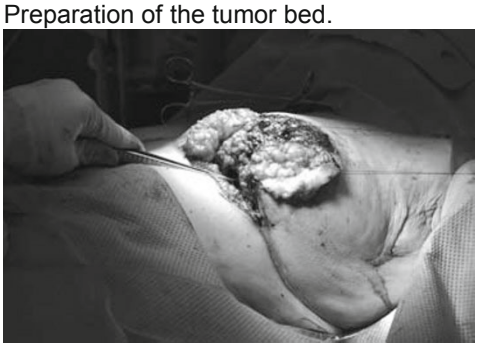
Method: Thirty-two patients were enrolled in an international multicenter clinical trial to deliver an IOERT boost of 10 Gy using the Mobetron mobile linear accelerator (Intraop Medical Corp) followed by hypofractionated whole-

breast radiation (2.7 Gy in 15 fractions for a total of 40.5 Gy). Independent of that trial, a single breast surgeon at our institution used the following techniques to prepare the target tissues for IOERT: vertical, medial, lateral, Benelli and inverted-T mammoplasty. When appropriate, a contralateral mammoplasty for equalization was performed at the time of the original surgery. Photographs were obtained before and after surgery/IOERT and before and after whole-breast radiation.

Results: Surgeries were performed from May 2011 to October 2012 using an oncoplastic approach to deliver the IOERT boost to targeted breast tissue. Mean follow-up time is 9.3 months. Of the 32 cases, only 3 required the assistance of a plastic surgeon to perform a breast reduction procedure. The oncoplastic approaches allowed placement of cones up to 7 cm in diameter over the target tissue without compromising surgical results. To date, there have been no significant complications or adverse effects associated with the use of oncoplastc surgery in combination with IOERT.

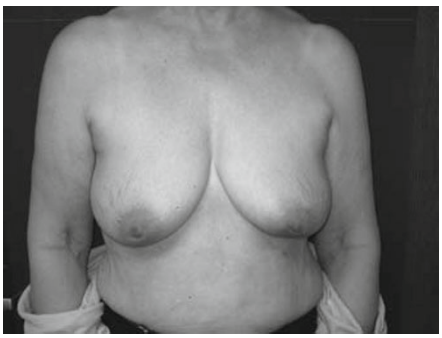
Inverted-T mammoplasty

Preparation of the tumor bed.

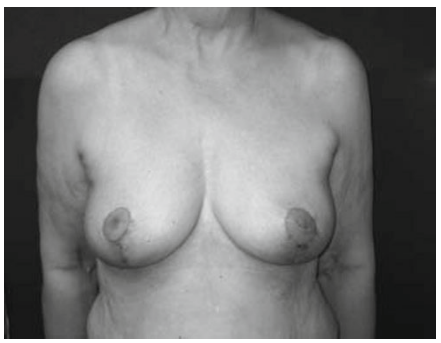


With Mobetron applicator

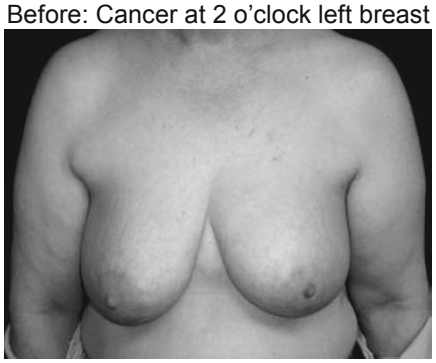
Before: Cancer at 6 o'clock left breast



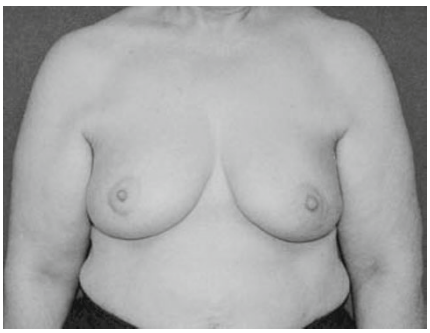
After: With inverted T mammoplasty



Before: Cancer at 2 o'clock left breast



After: With Bennelli mammoplasty



Sample photographs—over 45 full-color, high-resolution images available

Conclusions: To our knowledge, this is the first report of a series of surgeries utilizing the large incisions involved in an oncoplastic approach for the delivery of IOERT. This approach offers the advantage of easy access of the IOERT device while preserving good cosmesis.

0124 Regional Characteristics of Triple-Negative Breast Cancer at a Single Institution in Cook County, Illinois

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Objectives: Triple-negative breast cancer (TNBC) represents a growing percentage of breast cancer subtypes in the United States. It is comprised of a wide array of genotypes with varying phenotypic expression, treated with several differing regimens of agents based upon its inherent characteristics. The purpose of this study is to define the epidemiology and patient characteristics of TNBC diagnosed within various ethnicities from the regional population of Southern Cook County and treated at a single institute.

Method: We performed a retrospective review of all patients diagnosed with TNBC between January 2010 and August 2012. TNBC was defined as estrogen receptor (ER) and progesterone receptor (PR) immunohistochemical (IHC) staining <1%, and Her2-neu expression as negative by IHC and/or fluorescent in situ hybridization (FISH) analysis. Identification and comparison of TNBC characteristics were performed for each ethnicity using non-parametric Wilcoxon test, Mann-Whitney *U*, and Fisher exact test.

Results: A total of 1,072 newly diagnosed breast cancers were treated during this time period. Only complete records were included, with identification of 700 Caucasians, 240 African Americans (AA), 39 Hispanics, and 9 Asians. A total of 182 (17%) cases of TNBC were identified, 65 AA and 102 Caucasian, comprising the study cohort included for analysis. Hispanic and Asian cohorts were excluded due to small sample size. Among AAs, we identified 27% as TNBC vs 14.6% for Caucasian ($p < 0.0001$), with AA's more likely to present at a younger age; 54 years old vs 60 years old for Caucasians ($p = .030$). Menopausal status was similar, with only 23% of AAs and 22.5% of Caucasians identified as pre-menopausal. AAs presented with more advanced stages (ie, stage 3 and 4) 38.6% vs 24% of Caucasians ($p = 0.004$). There was no significant difference between ethnic groups who received neoadjuvant chemotherapy (NAC); 35.4% of AAs vs 36.3% of Caucasians. The overall pathologic complete response rate (pCR) was 18.5%, with a pCR of 15% for AAs, compared to 21.9% for Caucasians. This was not statistically significant. Genetic testing for BRCA1/2 mutations was performed for 18.5% of AAs vs 16.7% of Caucasians. Identification of a mutation in either gene was found to be higher in Caucasians vs. AAs (35.3% vs 8.3%), but was not statistically significant. Caucasians (54.1%) were more likely to report a family history of breast cancer vs AAs (46%) ($p = 0.362$).

Conclusions: Detailed examination of a single regional population of TNBC patients treated over a 2½-year period reveals a higher incidence of TNBC in AAs compared to Caucasians. African Americans also presented at a younger age and with a more advanced stage at the initial diagnosis. Overall, TNBC was more common among postmenopausal patients, with Caucasians more likely to report a family history of breast cancer and test positive for a BRCA1/2 gene mutation.

0127 Contralateral Breast Cancer: A New Incidence Pattern?

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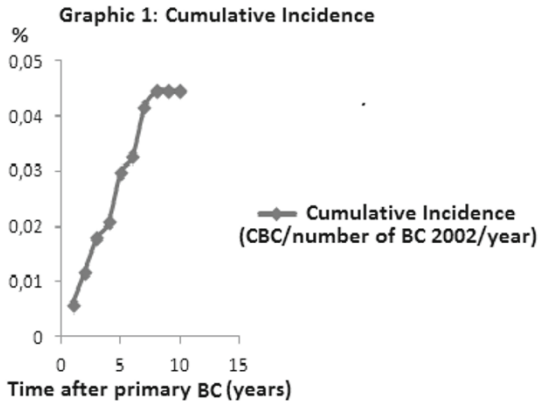
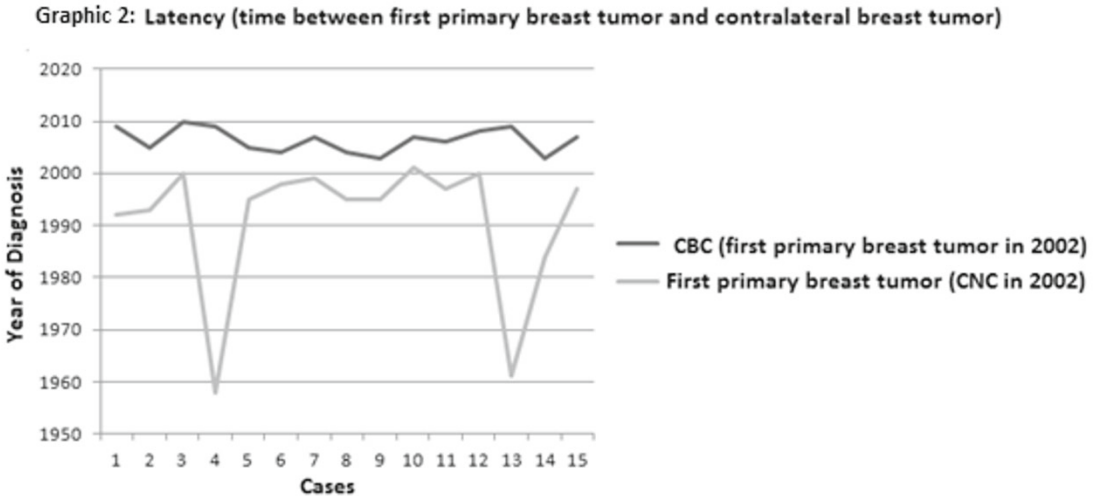
Objectives: The study of contralateral breast cancer (CBC) is becoming an important health issue because of the increased incidence of first primary breast cancer (BC) and improved survival.The incidence of CBC is traditionally described as constant 1%/year. However, available studies retrospectively analyze patients treated before 1990. The last two decades introduced new approaches to BC, especially the hormonotherapy and the large implementation of magnetic resonance in clinical practice.In this study we asked if those modifications changed the incidence and the latency time between first primary BC and CBC.

Method: We studied a cohort of patients diagnosed with the first primary invasive BC during the year of 2002. CBC was defined as an invasive BC diagnosed in the opposite breast 12 months or more after the first invasive BC. The period of follow-up was 10 years. Demographic and tumor characteristics included year of diagnosis, age at diagnosis, breast cancer risk factors, tumor stage, and histological characteristics and treatment. CBC incidence and the latency time between first and second BC were determined. Multivariate analysis was used to find demographic or tumor characteristics associated with CBC.To validate our results, we also analyzed the incidence and latency time of a series of patients, treated before 2002, and with the diagnosis of CBC in 2002. Statistical analysis was performed using SPSS 19.0.

Results: From a cohort of 337 patients with the first primary BC diagnosed in 2002, we registered 15 cases of CBC, during 10Y of follow-up (Cumulative Incidence 4,45%). We find a latency period between first primary BC and

CBC of 5Y median (P_{25}:2,5Y; P_{75}:6,5Y). In the series of patients with CBC diagnosed in 2002, we also find a latency period between first and second tumor of 5Y median (P_{25}:2,5Y; P_{75}:7Y), after exclusion of the 2 cases treated to primary BC before 1980 (Graphic 2).





Conclusions: In a cohort of patients treated during the last decade, with a 10Y of follow up, we find a CBC incidence of 4,45%, which is in accordance to the declining of CBC. The median time of latency until CBC was 5Y. This pattern is different from the historical described constant rate of incidence over time. Unless the small number of cases, our findings are plausible because the analyze of a group of patients treated in 2002 for CBC, and diagnosed for the first primary BC after 1980 show the same tendency. Changes in treatment and staging of BC in the last decades might be modified the CBC incidence and pattern. We are collecting a large series with longer follow-up time to better clarify this subject.

0086 The Prognostic Value of Additional Malignant Lesions Detected by Magnetic Resonance Imaging vs Mammography

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Objectives: Nodal positivity has been correlated with a poorer prognosis in breast cancer (BrCA). The addition of magnetic resonance imaging (MRI) in BrCa evaluation has been shown to find additional lesions not seen on mammogram (MMG) in up to 15% of patients (pts). However, there is no clear data available comparing nodal

positivity in pts with multiple lesions vs single lesions found on MRI and MMG. Hence, a study was composed to compare nodal positivity in pts with single versus multiple lesions found on MRI and MMG.

Method: A retroprospective study of BrCa pts undergoing MRI and MMG was performed. The main objective was to compare nodal positivity in pts with additional invasive lesions found on MRI vs single invasive lesions found on MRI or MMG. All pts underwent sentinel node mapping with 1% methylene blue.

Results: A total of 425 pts were included in the study. The average number of sentinel lymph nodes in patients with single lesions was 2.46 versus 2.42 in patients with multiple lesions. The overall nodal positivity among invasive lesions was 23.8%. The pts with single malignant lesions had a nodal positivity rate of 21.2% vs 31.2% in pts with multiple lesions (Table I). MRI detected multiple lesions in 107 pts, 80 (18.8%) of which were not detected by MMG. Of these 80 pts, 36 (45%) were invasive, 36 (45%) were benign, and 8 (10%) were in situ lesions. The nodal positivity in pts with additional malignant lesions detected by MRI was 47.2%. Contralateral malignant lesions were detected in 25 patients by MRI only with 20% nodal positivity. Comparing pts with single malignant lesions to pts with additional malignant lesions detected by MRI only, nodal positivity increased from 21.2% to 47.2% (p value < 0.006).

	Single vs Multiple Lesions			
	Single Breast Lesions Detected by Both MRI and Mammogram	**Detected by Both**	**Detected by MRI only**	**Total**
Number of Patients	318	27	80	107
DCIS	49	6	8	14
Nodal Positivity	21.2% (57/269)	28.6% (6/21)	31.9% (23/72)	31.2% (29/93)
	Single Lesions	Ipsilateral Lesions	Contralateral Lesions	Total
Total Number of Patients	269	68	25	93
Nodal positive	57	24	5	29
Nodal positivity	21.2%	35.3%	20%	31.2%
Additional lesions Detected by MRI only				
	DCIS	Benign	Malignant	Total
Number of patients	8	36	36	80
Nodal Positivity	0	20.7% (6/36)	47.2% (17/36)	31.9% (23/72

Conclusions: Our study confirms that additional invasive lesions found on MRI had significantly higher nodal positivity compared with those with single invasive lesions. Hence, addition of MRI in early-stage breast cancer may have prognostic value due to increased detection of nodal positivity.

0168 Methods for Quantification of Lymphedema Development Following Treatment for Breast Cancer: A Comparison

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Objectives: The rate of breast cancer related lymphedema (BCRL) varies widely from < 5% to > 60%, according to a recent series review, depending on type and extent of surgery and radiation therapy. The American College of Surgeons Oncology Group (ACSOG) defined lymphedema (LE) as ≥ 2 centimeter (cm) change in arm circumference. However, inconsistencies in the literature exist as there is no standard protocol for determining if LE exists. The purpose of this study is to compare 3 different commonly employed definitions of LE with regard to the ACOSOG recommendation. The goal is to determine an accurate, yet efficient, clinical tool for defining LE in our patient population.

continues

Method: The study sample includes 48 patients treated at the University Medical Faculty Associates. All subjects had previously been enrolled in an IRB-approved research study. Subjects consented to have circumferential arm measurements recorded preoperatively and postoperatively at 3, 6, 12, and 24 months to evaluate for the presence of lymphedema. These measurements were taken at 2 locations on the arm, 10 cm above and 10 cm below the olecranon process. For this study, BCRL was defined in 1 of 3 ways: (1) LE = (I f/u – I b) – (C f/u – C b) where I = ipsilateral, f/u = postoperative circumference, b = preoperative circumference, and C = contralateral., (2) comparison of preoperative to postoperative measurement of the ipsilateral arm, (3) comparison of postoperative arm circumference to the contralateral, or control, arm. A subject was determined to have LE if a ≥ 2 cm circumference increase was recorded at either of the 2 locations on the arm. Statistical analysis of the LE rates was conducted using Fisher exact test and the phi coefficient to determine association of these 3 definitions.

Results: The rate of LE was 12.5% using the first definition (LE1), 31.25% using the second (LE2), and 10.42% using the third (LE3). Using the phi coefficient, the association between LE1 and LE2 was found to be moderately strong (*phi = 0.289*) and statistically significant using Fisher exact test (*p = 0.059*). The association between LE1 and LE3 was found to be moderately strong (*phi = 0.284*), but not statistically significant (*p = 0.101*).The association between LE2 and LE3 was found to be weak (*phi = 0.064*), and was not statistically significant (*p = 0.335*).

Conclusions: Although comparing postoperative and preoperative circumference of the ipsilateral arm (LE2) is the most inclusive definition of LE, it appears that LE1 has the strongest association with the other definitions (LE2 and LE3). Comparing both pre and postoperative measurements (LE1) of both arms is the least inclusive, but possibly most accurate. Larger studies are necessary to determine accurate, yet efficient methods to quantify LE.

0185 The Prognostic Role of Human Epidermal Growth Factor Receptor 2 Overexpression/Amplification in Women with Node-Negative Breast Cancer

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Objectives: Overexpression/amplification of human epidermal growth factor receptor 2 (HER-2) is associated with a poorer outcome in node-positive breast cancers, but the results are conflicting in node-negative disease. With a significant cost and long duration of antiHER-2 treatment in developing counties, we evaluated the prognostic impact of HER-2 overexpression/amplification in node-negative breast cancers.

Method: All patients with node-negative breast cancer were identified among a population of 571 patients who underwent HER-2 testing at Songklanagarind hospital from 8/2005 to 12/2009. Age, menopausal status, operative procedures, tumor characteristics, and adjuvant therapy were compared between patients with HER-2 positive and HER-2 negative cancers. We estimated relapse-free survival (RFS), distant relapse-free survival (DRFS), breast cancer-specific survival (BCSS), and overall survival (OS) in the 2 groups.

Results: We identified 152 patients with node-negative breast cancer who underwent HER-2 testing. Of those, 35 (23%) patients had HER-2 positive and 108 (77%) had HER-2 negative cancers. Overall median patient age was 50 (range, 32-89). More than half (63%) of the HER-2 positive cohorts were younger than 50 and most of them (71%) were premenopause, whereas 44% of the HER-2 negative cohorts were younger than 50 and 56% were premenopause. No difference between the operative procedures performed between the 2 groups. Median tumor size was 2 cm (range, 0.2-7.0) in both groups. Most of the patients in the 2 groups had stage I (57% vs 52%) invasive ductal carcinoma (94% vs 81%). However, more than 80% of the HER-2 positive group had grade 2-3 tumors compared with 56% in the HER-2 negative group (p = 0.005). Approximately one third of the patients in each group had ER-negative tumors. Almost all the patients (94%) in the HER-2 positive group received adjuvant chemotherapy and over half received adjuvant hormonal therapy. Median time to follow-up was 52 months (range, 1-83). There were trends to decrease RFS and DRFS in the HER-2 positive compared with the HER-2 negative group (RFS: HR 2.46, 95% CI 0.75-8.06; DRFS: HR 2.38, 95% CI 0.64-8.88). There were no differences in BCSS (76% vs 79%) and OS (78% vs 81%) between the 2 groups. In HER-2 positive patients, there were trends to decrease RFS and DRFS in patients younger than 50 (RFS: HR 2.57, 95% CI 0.29-23.00; DRFS: HR 1.78, 95% CI 0.18-17.15) and those who had ER-positive tumors (RFS: HR 3.61, 95% CI 0.39-33.65; DRFS: HR 2.71, 95% CI 0.27-27.10). Adjuvant chemotherapy and hormonal therapy were independent factors to improve RFS (HR 5.11, p = 0.03) and DRFS (HR 5.61, p = 0.02). Regardless of adjuvant chemotherapy and hormonal therapy, HER-2 positive patients were likely to have shorter time to recurrence (HR 7.80, p = 0.05).

Conclusions: Patients with node-negative HER-2 positive breast cancer have a trend to increase risk of recurrence at 5 years of follow-up, particularly in younger and ER-positive patients. Adjuvant chemotherapy and hormonal therapy effect survival outcomes.

0017 Internal Titanium Bra Mastopexy Against Breast Ptosis

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Objectives: A titanium mesh basket will act as an internal bra lending the breast more support, shape, and a better anterior projection, which also permits a long-lasting support of the breast by counteracting gravity. The author developed a technique to implant tissues of titanium mesh under the breasts. These are then attached to the patient's rib cage, sternum and pectoralis muscle. The effect is claimed to be instant, youthful looking with visible lift. For almost 6 years the author has successfully inserted an internal bra out of titanized polypropylene--a mixed mesh called TiMesh® that is mainly used in inguinal and abdominal hernia repair.

Method: Compared to other mesh grafts, the inert TiMesh® shows no foreign body reactions, such as the scar tissue formation and infections seen with all other plastic material implants. The surgery is performed in a semi-sitting position. Incisions are made at the submammary fold and at the areola. The two incisions are connected by undermining the skin, leaving a 1-cm thick layer of subcutaneous adipose tissue attached to the dermis, which preserves the subdermal blood supply responsible for skin viability, and at the same time buries the mesh implant. The author sutures the titanium mesh to the pectoralis muscle, to the periosteum of the ribs, to the breast tissue, and to the sternum. A fixation directly under the nipple has to be avoided which may pull the areola downwards.In recent years, there has been a dramatic increase in the number of patients presenting the bottoming out of one or both breast implants. By inserting a titanium bra, the implants are repositioned at a higher level and closer together, creating better cleavage, a more anatomical shape, and improved fullness in the upper pole of the breast.

Results: Fifty-two patients (104 breasts) were treated with this technique from February 2003 to July 2012. In our series of 52 patients, 10 patients (19.2%) have undergone an internal titanium mesh implantation as a single procedure of periareolar mastopexy and 39 patients (75%) had the titanium mesh combined with a vertical scar breast reduction surgery. The remaining 3 patients (5.8%) have undergone surgery in order to support their inferiorly sagging breast implants inferiorly with a titanium mesh. Patient satisfaction was very high overall, particularly regarding the expected anterior projection. The complication rate was low; two patients (3.8%) had scar hypertrophy and only 1 (1.9%) developed a nipple necrosis of the both breasts.

Conclusions: Today's mastopexy techniques have greatly reduced the complications, but satisfactory long-term results are still missing. By anchoring the breast tissue to the muscle and chest, the breast shape is improved and sagging is eliminated for a long time. According to the author's opinion, the internal titanium bra mastopexy has proven itself to be a valued benefit to patients suffering from mild forms of breast ptosis.

0155 Oncologic Outcomes Following Neoadjuvant Chemotherapy (NACT) and Breast-Conserving Therapy (BCT) for Breast Cancer: A Single Institution Experience

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Objectives: NACT is commonly administered to women with stage II/III operable breast cancer to downsize the tumor, allowing for BCT in about 30% of patients. Whether BCT is associated with an increase in local recurrence rate (LRR) in properly selected patients has been debated. We evaluated outcomes of women who underwent BCT, including rate of lumpectomy and LRR.

Method: We have previously established an algorithm for multidisciplinary treatment recommendations for women receiving NACT at the Medical Institutes. We performed a retrospective chart review of patients who underwent a lumpectomy following NACT from 1999-2011. Clean margins were defined as no evidence of cancer within 2 mm of the inked margin. Descriptive analyses are performed on baseline variables and tumor outcomes following NACT. Time to recurrence is defined as the time from diagnosis to the first of any recurrences. LRR is defined as in-breast recurrence, axillary recurrence, or chest wall recurrence.

Results: Of 189 women identified in the database, BCT following NACT was attempted in 56 (29%). Median age at diagnosis was 48 years, median tumor size was 2.95 cm, with 16.1% of the tumors being T1, 73.2% T2, and 10.7%

T3. Of the 56 breast cancers, 42 (75%) were single tumor focus, 9 (16.1%) were multifocal and 5 (8.9%) were multicentric. Thirty-two (57.1%) cases were ER pos, 9 (16.1%) were Her2 pos, and 18 (32.1%) were triple negative. The majority (67.9%) of the lumpectomies were done with wire-localization. Pathologic complete response was achieved in 17 (30.4%) patients. Median clinical and pathologic tumor size in women with residual disease following NACT was 1.05 cm and 0.45 cm, respectively. Negative margins were observed in 43 (76.8%) patients. Of 12 patients with positive resection margins, re-excision was successful in 6, while 6 additional patients required a mastectomy. Thus, BCT succeeded to resect the tumor in 89.3%. All patients received radiation therapy post surgery. With a median follow-up of 41.7 months, LRR in the 50 patients with successful lumpectomy was 10.6%, with 7 in-breast tumor recurrences, 3 chest wall recurrences, and 4 nodal recurrences. Median time to recurrence is 8 years. Distant metastasis occurred in 15 patients.

Conclusions: NACT is being increasingly used in the management of breast cancer. Lumpectomies performed after downsizing the tumor were thought to be associated with a higher recurrence rate. This can be avoided by appropriate patient selection and radiologic investigation at the end of NACT. Local recurrence after a mastectomy or an adequate lumpectomy is mainly influenced by the biology of the tumor rather than the extent of surgery.

0043 Complete Excision and Reexcision Rates Following Percutaneous Biopsy Using the Intact Breast Lesion Excision System and the Mammotome

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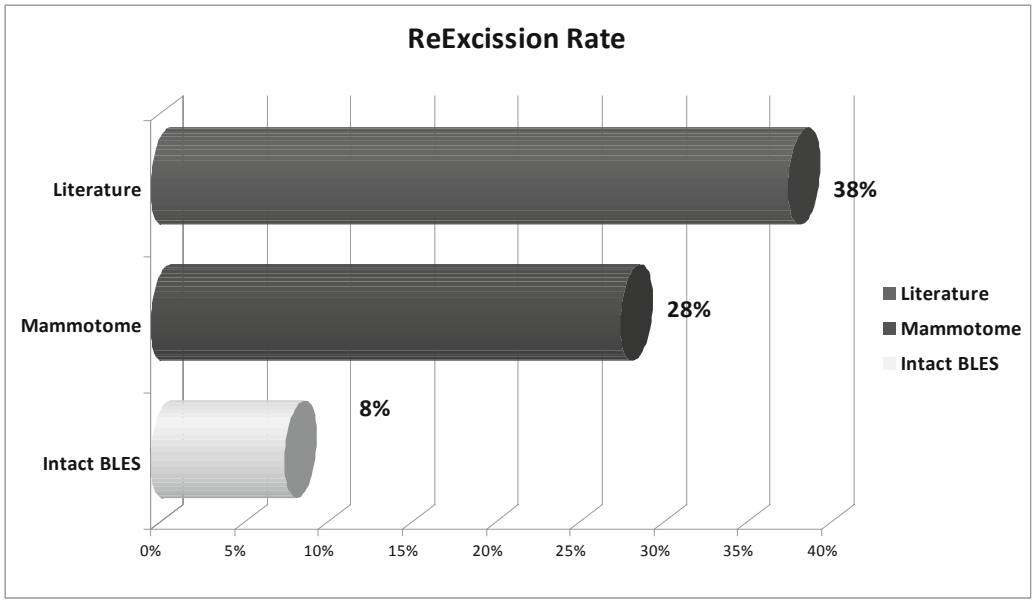
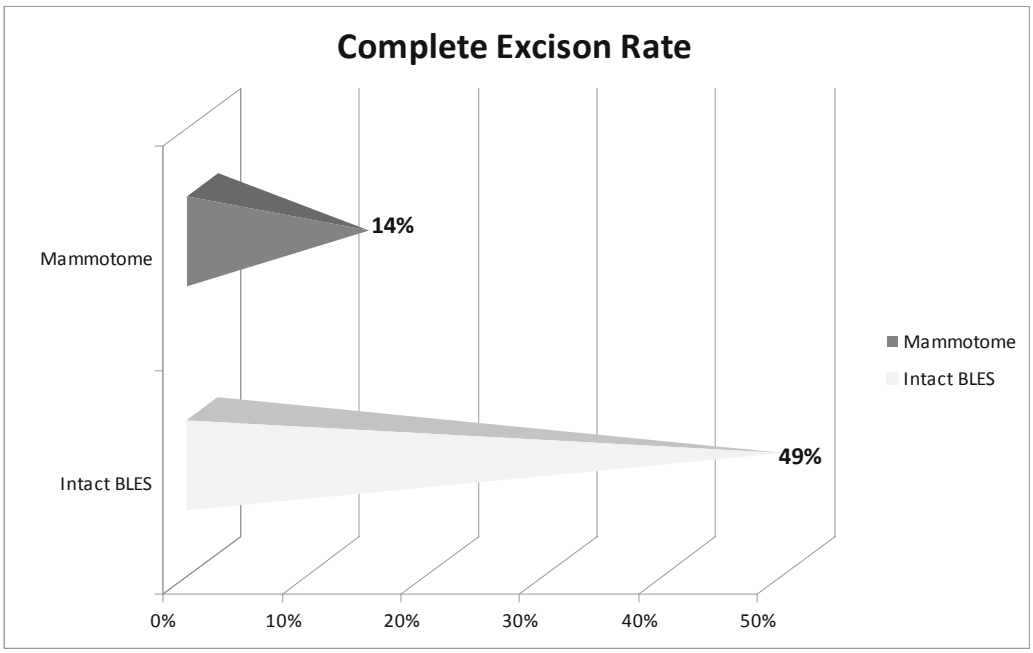
Objectives: The objective was to compare reexcision rates for a percutaneous biopsy procedure performed with the Intact Breast Lesion Excision System (BLES) and the Mammotome. This included identifying tumor type, tumor size, margins associated with complete excision, determining the incidence of complete excision at initial biopsy, reexcision rates following needle localization for breast conservation therapy and evaluating the significance of lymphatic vessel invasion seen at biopsy.

Method: This study was a retrospective analysis of all patients with breast cancer identified on mammography who underwent a needle localization procedure for breast conservation therapy (BCT) from 2007–2011. Patients diagnosed with cancer had an initial biopsy performed using the Intact BLES or Mammotome. All patients who underwent needle localization were included except those that met the exclusion criteria. Exclusion criteria included any patient that underwent mastectomy due to the large size of tumor, multifocal/multicentric disease, previous lumpectomy with radiation, as well as multiple needle wire localizations for a single lesion. Relevant data were abstracted from pathological, radiological, and operative reports. Tumors were classified as intraductal, lobular, ductal carcinoma in situ, mucinous, and tubular. The incidence of complete excision by percutaneous biopsy procedure was calculated for both the BLES and Mammotome. Among patients who underwent complete excision of their cancer resulting from their percutaneous biopsy, margin status, and tumor size on initial biopsy were noted. Following needle localization, re-excision was performed for any margin less than 2 mm. The re-excision rate was calculated for all patients who underwent breast conservation therapy with needle localization.

Results: Of 51 BLES procedures reviewed, 37 proceeded to needle localization; of these, 49% had no residual tumor. Reexcision was required in 8% of BLES procedures vs 38% in the literature. Of 52 Mammotome procedures reviewed, 41 proceeded to needle localization; of these, 14% had no residual tumor. Reexcision was required in 28% of Mammotome procedures vs 38% in the literature. Of the 23 BLES procedures with negative lymphatic vessel invasion, 18 sentinel nodes were negative at surgery, a 78% predictive value. The Mammotome group was unable to determine LVI on any of their biopsies.

Conclusions: Complete removal occurred in 49% of patients for whom the BLES had been used for biopsy and in 14% of patients for whom the Mammotome was used. The reexcision rate with the BLES was 8%, lower than that of both the Mammotome (28%) and the literature (38%). These findings suggest that in a preponderance of cases, the BLES permitted either total excision or removal of a substantial portion of the cancer at the time of the percutaneous procedure. The findings also suggest that using the Intact biopsy will give the physician greater information at the time of biopsy. In seeking ways to reduce reexcision rates, investigators should consider all potential factors, including the initial biopsy device used.


ReExcission Rate
Literature
Mammotome
Intact BLES
38%
28%
8%
0%
5%
10%
15%
20%
25%
30%
35%
40%
Literature
Mammotome
Intact BLES


Complete Excison Rate
Mammotome
Intact BLES
14%
49%
0%
10%
20%
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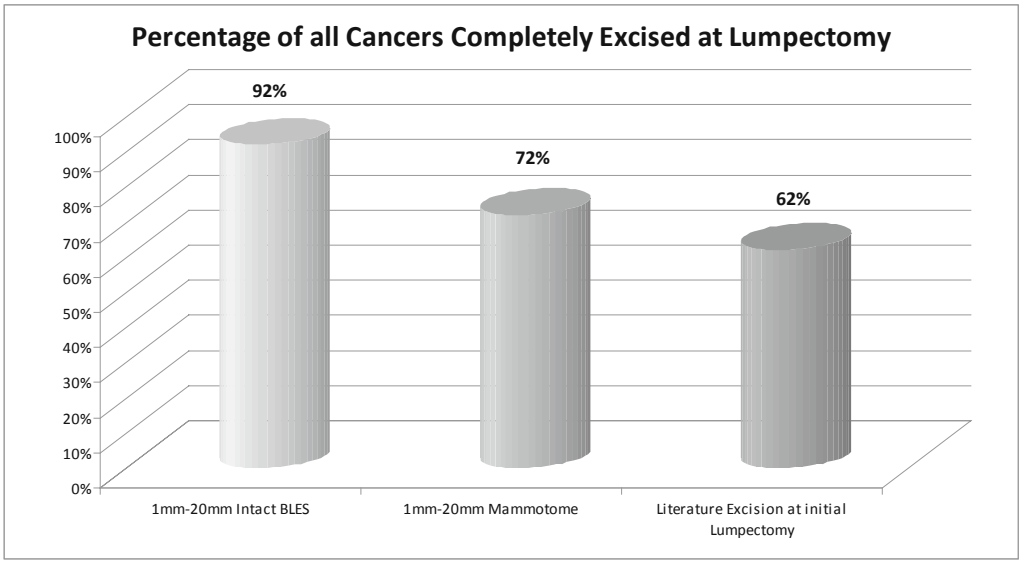

Exclusion Criteria	Intact # of patients	Intact		Mammtome # of patients	Mammtome
Mastectomy					
Multifocal disease	5	41.7%		2	8.0%
Bilateral cancer	1	8.3%		4	16.0%
Personal choice	1	8.3%		4	16.0%
Sub-Total Mastectomy	7	58.3%		10	40.0%
Discordance					
ADH	-	0.0%		8	32.0%
Papilloma	-	0.0%		2	8.0%
Sub-Total Discordance	-	0.0%		10	40.0%
Other					
BRCA+	-	0.0%		3	12.0%
Breast Reduction	-	0.0%		1	4.0%
NL > 1	2	16.7%		-	0.0%
No follow up	1	8.3%		1	4.0%
Treatment with Intact alone	2	16.7%		-	0.0%
Sub-Total Other	5	41.7%		5	20.0%
Total Excluded Patients	12	100%		25	100%

0081 The Use of Breast MRI for Surveillance of Patients at High Risk for Breast Cancer Secondary to a Previous Diagnosis of Atypical Proliferative Lesions and/or Lobular Carcinoma In Situ

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Objectives: Atypical proliferative lesions and lobular carcinoma in situ (LCIS) are associated with an increased risk of breast malignancy. As a result, more aggressive breast cancer surveillance strategies are often recommended. The utility of breast magnetic resonance imaging (MRI) in this cohort of women has not been previously established. The objective of this study was to investigate outcomes of breast MRI surveillance in this subgroup of high-risk patients, numbers of second-look imaging studies performed, biopsies recommended, and rates of occult malignancy detection.

Method: We performed a retrospective review of women diagnosed with atypical proliferative lesions (atypical ductal hyperplasia, atypical lobular hyperplasia, papillomatosis, mixed proliferative changes) or LCIS who also underwent at least 1 breast MRI from April 2005 to December 2011. Patients with BRCA mutations were excluded from analysis. We collected information on age, Gail model lifetime risk assessment for women with atypical proliferative lesions, number of second-look imaging studies recommended following breast MRI, number of biopsies performed, and pathologic outcomes.

Results: One hundred seventy-nine patients met the inclusion criteria, including 131 (73%) with previous atypical proliferative lesions (median age, 45; range, 18-67) and 48 (27%) with previous LCIS (median age, 46; range, 22-76). The median Gail lifetime risk score was 21.6% for the atypical proliferative lesion cohort (range, 7.3-45.8), Gail lifetime risk scores were not calculated for the LCIS cohort due to lack of validation for this subgroup of patients. Second-look imaging was recommended for 31 of 131 (23.7%) patients in the atypical proliferative lesion cohort and 8 of 48 (16.7%) in the LCIS cohort. Ten biopsies were performed in the atypical proliferative lesion cohort (7.6%) with 2 revealing a malignancy (PPV of 20%). In the LCIS cohort, 5 biopsies were performed (10.4%) with 1 revealing a malignancy (PPV of 20%).

Conclusions: The benefit of breast MRI surveillance in patients with previous atypical proliferative lesions or LCIS has not been clearly delineated previously. Our data demonstrate that the use of breast MRI in this high-risk cohort results in second-look imaging +/- biopsy in one fifth of patients, but a positive predictive value for biopsy of suspicious lesions of only 20%. Large, prospective studies would be needed to determine whether breast cancer outcomes differ between patients undergoing conventional breast screening vs those undergoing conventional breast screening plus breast MRI surveillance.

0056 Intraoperative Radiation Therapy for Treatment of Early-Stage Breast Cancer: Short-Term Results from a Single-Institution Clinical Trial Using Electronic Brachytherapy With a Disposable Balloon Applicator

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Objectives: Intraoperative radiation therapy (IORT) has gained increasing acceptance as an alternative to post-operative whole-breast radiation therapy (WBRT) or accelerated partial breast irradiation (APBI) for treatment of early-stage breast cancer. This study evaluates the use of electronic brachytherapy with a disposable balloon applicator for IORT delivery at a single institution in an IRB-approved clinical trial setting.

Method: Women who were ≥40 years of age having a single focus of biopsy-proven infiltrating ductal carcinoma measuring ≤2.5 cm were eligible for this clinical trial. Preoperative work-up included a mammogram, ultrasound, and bilateral breast MRI. Axillary lymph nodes were cleared radiographically and by examination. Once in the operating room, each patient was first subjected to a sentinel lymph node (SLN) biopsy with intraoperative touch prep cytology confirmation that the SLNs were cancer free. This was followed by a lumpectomy with radiographic and gross evaluation of margins. Those patients with cancer-free SLNs and adequate margins by intraoperative evaluation were treated with IORT. The disposable balloon applicator was placed into the lumpectomy site along with a chest wall shield. The cavity was closed leaving ≥1-cm distance between the balloon surface and the skin. Electronic brachytherapy was used intraoperatively to deliver a single 20-Gy fraction. The balloon and shield were then removed and the operation completed in a standard fashion. The patients have been seen in follow-up and have received postoperative mammograms and ultrasounds at prescribed intervals.

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Results: Forty-four women, average age 63.3 years, with a single focus of infiltrating ductal carcinoma (average size, 1.04 cm) were enrolled in a 1-year period beginning on November 1, 2011. All patients were taken to the operating room with the intent to receive IORT. One patient did not undergo IORT due to technical difficulties. Four patients who had positive SLNs intraoperatively were not treated with IORT. The remaining 39 patients received IORT as a single 20-Gy fraction with an average delivery time of 516 seconds. The procedure averaged 1 hour and 35 minutes. Two patients were found to have positive margins on final pathology and required re-excision. Two patients had positive SLNs on final pathology and required WBRT. Thirty-five (79.5%) patients were successfully treated with IORT and are being followed. Postoperatively, 6 of these patients were treated with chemotherapy on the basis of tissue prognostic markers. Three patients had infections requiring prolonged antibiotics. Four patients had postoperative seromas documented by serial ultrasound. Thirty-three of the 35 patients treated with IORT rated their cosmetic result as good to excellent. There have been no recurrences in an average follow-up of 7 months.

Conclusions: Early IORT experience using electronic brachytherapy with a disposable balloon applicator have been favorable. Long-term follow-up is needed to document the safety and clinical efficacy of this treatment.

0182 Idiopathic Granulomatous Mastitis and Response to Treatment: A Series of 22 Cases

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Objectives: Idiopathic granulomatous mastitis (IGM) is an uncommon chronic inflammatory breast lesion, characterized histologically by noncaseating granulomatous inflammation. While IGM is a benign process, it presents a challenging clinical scenario as it can mimic breast carcinoma on imaging and physical exam. The etiology, clinical course, and optimal treatment of this disorder remain unclear. A possible autoimmune etiology has been proposed in the literature, and associations with pregnancy, lactation, and oral contraceptive use have been observed. Here we evaluate our experience with 22 patients with histologically confirmed IGM and their response to treatment modalities.

Method: Our radiology database was reviewed for all instances of “granulomatous mastitis” and “chronic mastitis” demonstrated on core needle biopsy, and clinic records were reviewed for “granulomatous mastitis” and “chronic mastitis.” Charts were reviewed for basic demographic information, history (gravid/para, menopausal status, history of breastfeeding, time from last live birth to presentation of IGM, oral contraceptive use, smoking history), clinical data (presenting symptoms, size/location, presence of skin changes, clinical impression on presentation, initial BIRADS status, review of pathology, cultures, exclusion of tuberculous disease), and treatment data (courses of therapy, use of steroids/antibiotics/surgery, number of clinic visits/ER visits, time followed or time to resolution of process, status of disease at last follow-up).

Results: IGM was identified in 22 women (mean age, 33.5; 82% premenopausal). Ninety-five percent were Hispanic, 73% multiparous, with 59% having had a child within 5 years of diagnosis of IGM. Forty-one percent had a recent history of breast feeding identified in chart review; 50% had documented use of oral contraceptives. Smoking was not associated with IGM in this population. Five patients had wound cultures; in all cases, the cultures were sterile with an inflammatory infiltrate seen on Gram stain.

Ninety-one percent of patients presented with a palpable mass, with associated skin changes (55%), pain (55%), and nipple discharge (23%). Sixty-eight percent of patients had a mass greater than 3 cm on exam or imaging, with median BI-RADS score of 4 on initial imaging. Treatment modalities included antibiotics (50%), oral steroids (41%), aspiration (27%), surgery (18%), and topical steroids (5%). Forty-four percent of courses of antibiotics had at least partial clinical response documented, vs 79% with oral steroids. All instances of aspiration or operative procedure had at least partial response documented on clinical follow-up. At mean follow-up of 1.1 years, 11 patients had no evidence of disease vs 11 patients with stable disease. Of the 4 patients who received surgery, 75% had clinical resolution at mean follow-up of 2.2 years.

Conclusions: IGM remains a difficult clinical entity to define as well as treat. Clinical course of patients with IGM is often prolonged. Exclusion of malignancy, as well as specific causes of granulomatous mastitis, is essential before pursuing medical therapy for idiopathic granulomatous mastitis. Surgery is an option for refractory cases of granulomatous mastitis.

0038 The Use of BIS to Monitor Response to Treatment Interventions With BRCL

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[1]Washington University School of Medicine, Saint Louis, MO, USA, [2]Michigan Healthcare Professionals, Farmington Hills, MI, USA, [3]Virginia Commonwealth University, Richmond, VA, USA, [4]Medical Center of Plano, Plano, TX, USA, [5]Advanced Breast Care Specialists of Orange County, Mission Viejo, CA, USA, [6]Texas Breast Specialists, Dallas, TX, USA, [7]Dallas Surgical Group, Dallas, TX, USA, [8]Nashville Breast Center, Nashville, TN, USA, [9]Biostat, Inc., Tampa, FL, USA

Objectives: Currently, limited tools are available to help clinicians assess response to therapy in patients with breast cancer-related lymphedema (BCRL). Therefore, the purpose of this study was to evaluate bioimpedance spectroscopy's (BIS) ability to detect and monitor extracellular fluid accumulation of the upper limb as it relates to treatment interventions for BCRL.

Method: A total of 125 patients with breast cancer from 4 clinical practices were evaluated with BIS at baseline and following treatment for BCRL. In order to assess the ability of BIS to detect subclinical changes following modality, the change in L-Dex score was tracked from baseline to elevation following loco-regional therapy, and finally after intervention for BCRL.

Results: The mean age of the cohort was 55 years with 68 patients (54.4%) undergoing sentinel lymph node (SLN) sampling and 57 (45.6%) undergoing an axillary dissection (ALND). At the time of the analysis, 44 patients (35%) had been diagnosed with BCRL and offered postoperative interventions for lymphedema. L-DEX was measured pre- and post-intervention in a 20-patient subset with 65% (n = 13) of these patients, demonstrating a downward trend in L-DEX values following intervention. Of these, 7 patients had multiple measurements demonstrating a consistent decrease while 6 patients had only one post-intervention assessment.

Conclusions: The mean age of the cohort was 55 years with 68 patients (54.4%) undergoing sentinel lymph node (SLN) sampling and 57 (45.6%) undergoing an axillary dissection (ALND). At the time of the analysis, 44 patients (35%) had been diagnosed with BCRL and offered post-operative interventions for lymphedema. L-DEX was measured pre- and post-intervention in a 20-patient subset with 65% (n = 13) of these patients, demonstrating a downward trend in L-DEX values following intervention. Of these, 7 patients had multiple measurements demonstrating a consistent decrease while 6 patients had only 1 post-intervention assessment.

0104 Sternal and Radical Chest-Wall Resection for Apparent Isolated Breast Cancer Recurrence

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MD Anderson Cancer Center, Houston, TX, USA

Objectives: Sternal or full-thickness chest wall (SCW) breast cancer recurrence after definitive therapy often predicts poor outcomes. Potential oncologic benefit from SCW resection is not well defined. This study was performed to identify factors associated with survival after SCW resections.

Method: From 1992 to 2012, 36 patients underwent SCW resection for breast cancer recurrence. Clinicopathologic and treatment characteristics were analyzed and recurrence and survival data were compared using the Kaplan-Meier method.

Results: Median time to SCW recurrence was 2.3 years (range: 0.08-17.4 years). Therapy was given prior to SCW resection in the majority of patients (89% chemotherapy, 22% radiation, 43% endocrine). One patient had complete radiologic response prior to resection whereas 54% had either partial response or stable disease prior to resection. Type of resections included total (22%), subtotal (5%), partial sternectomy (38%), and chest wall resection (35%). Unsuspected additional disease in other structures/organs found at surgery (N = 9) resulted in significant decreased overall survival and disease-free survival on univariate analysis (P = 0.006), but not on multivariate analysis. Postoperative morbidity occurred in 14 patients (38%), but there were no postoperative deaths. For the entire cohort, disease-free survival and overall survival (OS) at 5 years was 31% and 32%, respectively. At last follow-up, disease-specific mortality was 51% with a median time to death of 1.4 years. After chest wall or sternal resection, additional locoregional recurrence occurred in 41% with a median time recurrence of 3.6 mo. OS was significantly shorter for patients with an ER-negative recurrence (N = 19, 5-year OS = 15%) compared with ER-positive recurrence (N = 18, 5-year OS = 54%, Figure).

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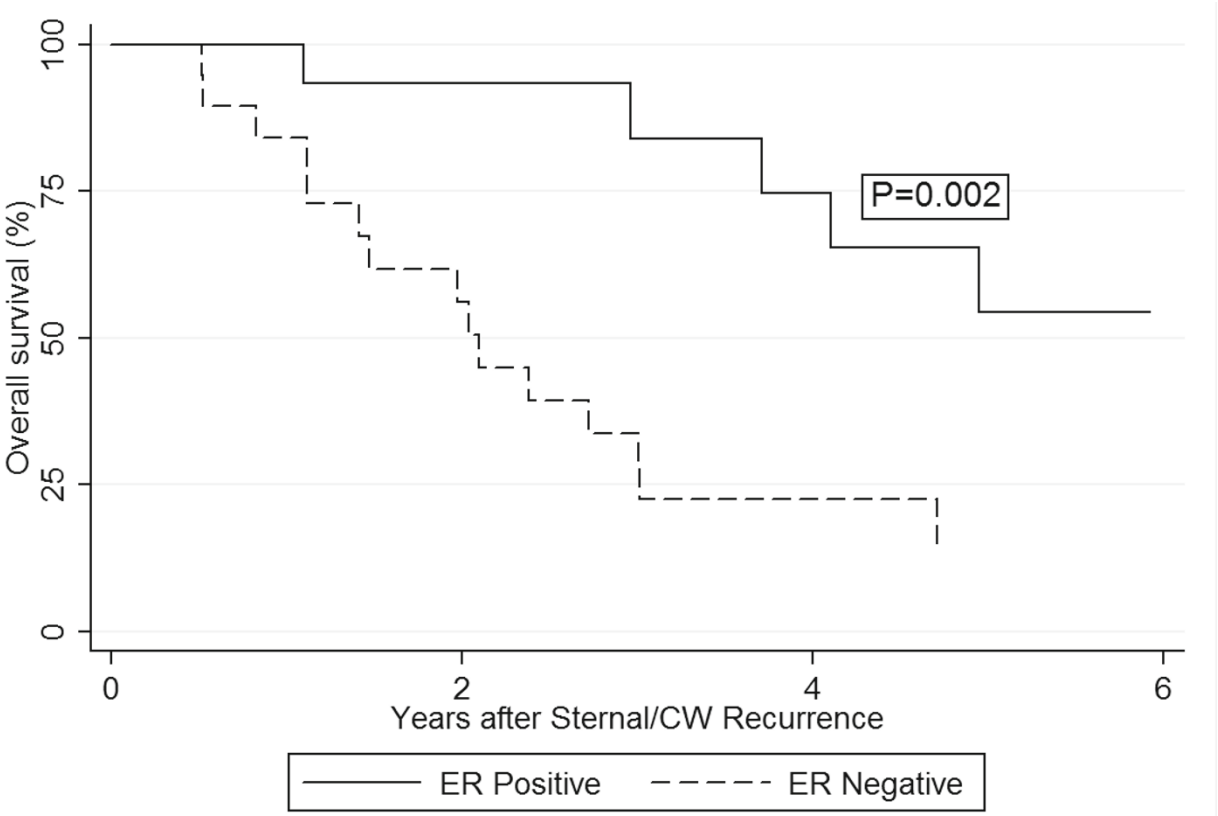

Conclusions: Chest wall or sternal resection for recurrent breast cancer can be performed without significant morbidity. Patients with ER-positive disease are significantly more likely to survive than those with ER-negative disease suggesting greater benefit to an aggressive surgical approach in these patients.

0067 Role of Surgical Excision for Flat Epithelial Atypia

Christopher Shubert, Tina Hieken, Sejal Shah, James Jakub, Amy Degnim, Judy Boughey
Mayo Clinic, Rochester, MN, USA

Objectives: The appropriate clinical management of flat epithelial atypia (FEA) found on core needle biopsy (CNB) is not well established. FEA is an abnormality of the breast terminal duct lobular units histologically characterized by columnar epithelial proliferation with low-grade nuclear/cytologic atypia. Currently, surgical excision is recommended for all patients with FEA on CNB to exclude associated malignancy.The goals of this study were to review our institutional experience with surgical excision of FEA to evaluate rates of upstaging to malignancy and to assess impact of findings at surgical excision on patient management. Our hypothesis was that surgical excision is not required when FEA is the highest risk lesion found on CNB.

Method: We reviewed our prospectively maintained breast surgery database for patients with CNB confirmed FEA who proceeded to surgical excision. Cases were excluded if CNB demonstrated atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), or malignancy. Pathology from CNB and surgical excision was reviewed along with clinical data including clinical management after surgical excision.

Results: Twenty-eight patients were identified with FEA alone (no concomitant ADH or ALH) on CNB who underwent surgical excision between March 2009 and June 2012. Mean patient age was 52.1 (range, 40-79 years). All cases presented due to abnormalities on screening mammography; calcifications in 82.1% (23/28 patients) and focal asymmetry in 17.9% (5/28 patients). CNB was performed using stereotactic guidance in 82.1% (23 patients) and ultrasound guidance in 17.9% (5 patients). At surgical excision none of the patients were upstaged to DCIS, LCIS or invasive breast cancer (0%). Five patients (17.9%) were found to have ALH at surgical excision, 1 of whom was found to have both ALH and ADH (3.5%). These 5 patients would therefore be candidates for consideration of chemoprevention for risk reduction. Of these, 2 patients (7.1%) elected to take chemoprevention.

Conclusions: Upstaging of FEA to malignancy at surgical excision is uncommon. In our series, 0 patients were upstaged to malignancy. Information gained from surgical excision impacted patient management in only 7.1% and risk stratification in an additional 10.8%. These data suggest that patients with pure FEA on CNB may be managed with observation and do not require surgical excision.

0107 Predictive Factors and Patterns of Recurrence in Patients With Triple-Negative Breast Cancer

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Objectives: Triple-negative breast cancer [(TNBC) = estrogen receptor (ER) negative, progesterone receptor (PR) negative, and Her2 nonamplified] is a unique subtype of breast cancer that generally portends a poorer prognosis. We sought to describe the outcomes of patients with TNBC in order to determine the patterns of recurrence, time to recurrence, and the impact on overall survival. In addition, we investigated whether certain patient and/or tumor factors were predictive of recurrence.

Method: We retrospectively reviewed our prospectively maintained database and identified 484 patients with initial stage I-III TNBC who were treated between January 2002 and December 2009. Data included patient and tumor characteristics; surgical, systemic, and radiation treatment received; and breast cancer-specific survival. Patients were divided according to whether or not they experienced a recurrence (either local or distant or both). Data were compared using chi-square, Fisher exact test, and logistic regression. A p value <0.05 was considered significant.

Results: The study cohort included 484 patients with a mean age of 53.3 + 12.6 years and a mean follow-up of 29 + 21 months. Of 484 patients, 349 (72%) had no evidence of recurrence while 135 (28%) had recurrent disease, including 26 (19%) with locoregional recurrence, 76 (56%) with distant recurrence, and 33 (24%) with both locoregional and distant recurrence. Of the 59 total locoregional recurrences, 23 (39%) were in the ipsilateral regional nodes, 23 (39%) in the ipsilateral breast, and 13 (22%) in the chest wall post-mastectomy. Of the 109 patients with distant recurrences, lung was the most common site (n = 58) followed by bone (n = 49), liver (n = 48), and brain (n = 40). The mean time from completion of curative-intent therapy to disease progression was 21 months (range, 6 weeks–56 months); there was no difference in disease-free survival interval between those patients experiencing a locoregional recurrence only vs those with distant recurrence only or distant and locoregional recurrence ($p > 0.05$). Factors significantly associated with recurrence included race (African American & other), increasing tumor size, positive pathologic nodal status, increasing stage, and type of surgical therapy (mastectomy) ($p < 0.05$ for each). Age, tumor grade, histology, receipt of radiation, and timing of chemotherapy were not significantly associated with recurrence ($p > .05$). After controlling for all potential confounders in multivariate stepwise regression, only race and increasing pathologic stage were independent predictors of recurrence ($p < 0.05$ for each). At study follow-up, only 7 (5%) of the 135 total patients with recurrence were alive.

Conclusions: Nearly 30% of all patients with a TNBC experienced either a locoregional and/or distant recurrence, and African-American patients were at the highest risk. The onset of disease progression was within 3 years for 90% of patients who recurred. Although bone metastases were common in patients with TNBC, they were more likely to occur with visceral metastases as well. Locoregional and/or systemic recurrence in our cohort of patients with TNBC resulted in 95% breast cancer-specific mortality. The lack of targeted therapy for this aggressive breast cancer subtype likely contributed to this finding.

0015 Segmental Resection and Partial Breast Irradiation – The Ideal Treatment in Rural America

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Objectives: While mastectomy and segmental resection with accompanying whole breast radiation are proven to have the same cure rate and similar low rates of recurrence, the availability of linear accelerators is an issue in rural populations. This leads many women to choose mastectomy when breast-conserving therapy would give a similar end result and allow the patient to keep her natural breast. Partial breast irradiation in selected patients has been shown to have comparable recurrence rates as whole-breast treatment. Partial breast radiation should be offered to

women who would otherwise be limited in their treatment options, with the result that recurrence rates will be similar with much less morbidity and the added benefit of being an outpatient procedure.

Method: Women who would be candidates for breast-conserving therapy or mastectomy were given the choice of either therapy. Partial breast radiation was also given as an alternative to patients who met appropriate criteria. In an outpatient setting, these women underwent segmental resection, sentinel node biopsy, and partial breast irradiation using the Intrabeam single-dose delivery applicator as described in the recently published Targit trial. Patients were selected based on factors of age, tumor size, tumor histology, consistent with the Targit criteria.

Results: Eighty-five women have undergone outpatient treatment over the last 4 years. There have been only 2 recurrences in the post-op ipsilateral breast. Only 1 was at the excision site. The second was in a distant quadrant and was considered a second primary. Morbidity has been minimal. Erythema and seroma are the principal complications. Infection has been rare. Patient satisfaction has been universally positive. Follow-up mammograms and physical exams have consistently shown a naturally appearing breast.

Conclusions: Breast-conserving therapy is underutilized in rural America. Partial breast irradiation using the 1-dose Intrabeam technique in combination with segmental resection and sentinel node allows many more rural women to preserve their breasts with comparable survival and recurrence rates as standard whole-breast therapy.

0164 MRI As a Screening Tool in Young Women: Does MRI Correlate With Mammographic Findings of Malignancy?

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Objectives: A recent study in the *British Medical Journal* described an increased risk of breast cancer in BRCA1/2 carriers younger than 30 years of age that was directly attributable to screening mammogram. The authors concluded that MRI may be a safer screening alternative for these women, but whether mammogram detects cancers that are missed by MRI in young women is unknown. We sought to determine whether breast cancer was seen only on mammogram but not on breast MRI in young women.

Method: All women age 35 or younger at time of diagnosis treated at the hospital between 2001 and 2011 were evaluated. Women were retrospectively selected from a prospective, IRB-approved, single-institution database. Of the 229 women initially screened, 42 had undergone pre-therapy MRI and mammogram and were included in the analysis.

Results: Forty-two women were included in the study group. The average age at diagnosis was 31 years (range, 26-35). The median T stage was T2. The median stage was IIA. All 42 women underwent both diagnostic MRI and mammogram prior to initiation of any surgical or medical therapy. All 42 women had positive tumor identification by MRI and 38 had positive identification by mammogram. There were no tumors that were seen on mammogram but not on MRI.

Conclusions: In our retrospective analysis we demonstrate that no patients had tumors that were only seen on mammogram but not on MRI. This initial evaluation suggests that MRI only (without mammogram) could be used as a screening tool in order to reduce radiation exposure for young women with BRCA1/2 mutations who are subject to frequent lifetime screening.

0035 Comparing Outcomes in 2-Staged, Implant-Based Breast Reconstruction After Nipple-Sparing vs Skin-Sparing Mastectomy: A 3-Year Experience

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Objectives: In response to patient dissatisfaction with nipple-areola reconstruction, breast surgeons are increasingly performing nipple-sparing mastectomies instead of traditional skin-sparing mastectomies. Several studies validate that the nipple-sparing mastectomy is an oncologically safe procedure in selected patients. Although there is a trend in clinical practice to treat patients with nipple-sparing mastectomy, no study has compared the complications of breast reconstruction after nipple-sparing and skin-sparing mastectomies. We hypothesize that there is little difference in the rate of complications between the 2 procedures despite the significantly longer skin flaps in nipple-sparing, compared with skin-sparing mastectomy.

Method: All patients who underwent immediate reconstruction with tissue expanders after mastectomy between January 2007 and December 2009 by the senior authors (MT, AS) were reviewed. Patients with single-stage or autologous tissue reconstruction were not included. Patients were divided based on mastectomy technique (skin-sparing or nipple-sparing). Postoperative complications throughout the expansion period were then identified and categorized. Categorical variables were compared by a 2-tailed Fisher exact test and continuous variables compared with a 2-tailed Student *t* test.

Results: One hundred ninety-five single-breast mastectomies (106 skin-sparing and 89 nipple-sparing) were included in the study. The average follow-up period was 8 months. There was no difference between the nipple-sparing and skin-sparing mastectomy groups in the rate of seroma or hematoma formation, infection, pigmentation change, epidermolysis, wound dehiscence, or implant loss. Predictably, the nipple-sparing group showed a statistically significant increase in the rates of nipple necrosis (partial and full), as well as nipple malposition ($p < 0.05$).

Conclusions: This study demonstrates that nipple-sparing and skin-sparing mastectomies have similar complication rates following breast reconstruction, except for those pertaining directly to the nipple since the nipple is not preserved in a skin-sparing mastectomy. These results combined with the knowledge that nipple-sparing mastectomy is oncologically safe and leads to increased patient satisfaction should allow surgeons to feel comfortable encouraging selected patients to choose nipple-sparing mastectomies.

0120 Microcomputed Tomography vs Mammography and Ultrasonography for Assessment of Breast Cancer Tumor Size

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Objectives: Accurate assessment of tumor size is essential in breast cancer management. Limitations of pre-operative and intraoperative imaging of breast cancers contribute to high lumpectomy re-excision rates. The 2-dimensional images produced by preoperative and specimen mammography and ultrasound may fail to identify maximum tumor size and may not identify tumor borders accurately. Microcomputed tomography (micro-CT) is a promising modality for imaging lumpectomy specimens which can accurately determine breast tumor size in 3 dimensions in intact lumpectomy specimens. We compared the accuracy of tumor size measurement on specimen micro-CT with preoperative mammography and ultrasonography (U/S) measurements.

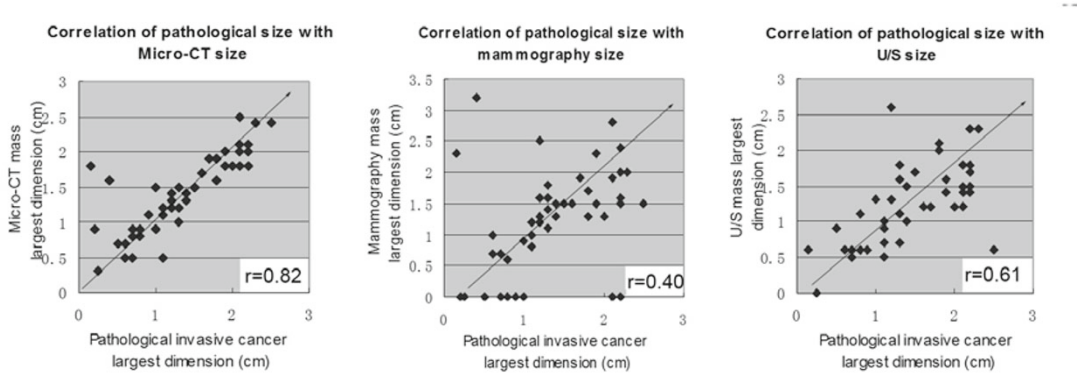
Method: With IRB approval and patient consent, a tabletop micro-CT, Skyscan® 1173 (Skyscan, Belgium) was used to image breast lumpectomy specimens. Tumor mass size on specimen 3-dimensional reconstructed micro-CT images was compared with tumor mass size as determined by preoperative mammography and U/S. Mammography images were retrospectively reviewed by a dedicated breast radiologist and micro-CT images were reviewed by a trained physician. Both measurements were blinded to the pathology results and to each other. U/S mass size was collected from U/S reports. Pathology assessment of invasive cancer size was used as the reference to determine the accuracy of imaging assessments. Tumor sizes were compared by the largest single dimension and correlations assessed by Pearson correlation coefficient.

Results: Fifty breasts with invasive cancers diagnosed by core biopsy had both preoperative mammography and specimen micro-CT imaging performed. Of these, 42 patients also had U/S tumor measurements. No patient received neoadjuvant chemotherapy. Table 1 shows patient and tumor characteristics. Mean pathology tumor size was 1.34 ± 0.68 cm. Mean tumor size by micro-CT, mammography, and U/S were 1.41 ± 0.61 cm, 1.23 ± 0.89 cm, and 1.25 ± 0.65 cm, respectively. The maximum tumor dimension was within 0.2 cm of the pathology tumor size in 41 (82%) micro-CT cases, 24 (48%) mammography cases, and 14 (33%) U/S cases. Maximum tumor dimension was within 0.5 cm of pathology tumor size in 45 (90%) micro-CT cases, 35 (70%) mammography cases, and 32 (76%) U/S cases. When compared with tumor size as determined by pathology assessment, micro-CT measurements had the best correlation coefficient ($r = 0.82$, $p < 0.01$) followed by U/S ($r = 0.61$, $p < 0.01$) and mammography ($r = 0.4$, $p < 0.01$) (Figure 1). Mammography tended to underestimate tumor size in this data set.

continues

Table 1 Characteristic of Study Patients and Tumors

Characteristic	Median (range) or n (%)
Median age (years)	63 (33-82)
Tumor types	
Pure IDC	8 (16%)
IDC + DCIS (within)	14 (28%)
IDC + DCIS (within and beyond)	20 (40%)
ILC	6 (12%)
Others	2(4%)
Tumor stages	
T1	38 (76%)
T2	12 (24%)



Conclusions: Preoperative mammography frequently underestimates tumor size and may be inaccurate for guiding lumpectomy size. Tumor size as measured by specimen micro-CT was more concordant with pathology-determined tumor size than preoperative mammogram or ultrasound assessment. Micro-CT is a potentially useful tool for accurate, real-time assessment of tumor size to guide lumpectomy surgery.

0177 Breast Atypia: Questioning the Reliability of Diagnosis When Considering Therapeutic Intervention for Risk Reduction

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Objectives: The risk of breast cancer in women with atypical hyperplasia (atypia) is reported to be 5.3 times that in women with nonproliferative benign breast disease, making accuracy of the diagnosis critical to allow appropriate therapeutic intervention.However, there is an element of subjectivity in the identification of atypical hyperplastic lesions, as absolute criteria are not well defined. Rather than relying on pathognomonic criteria, the diagnosis of atypical ductal hyperplasia (ADH) or atypical lobular hyperplasia (ALH) is applied to lesions in which the criteria for ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS), respectively, are not fully met. This lack of well defined criteria leads to the potential of high interpathologist variability when diagnosing atypia. The objective of this study is to determine the potential magnitude of diagnostic variability with regards to the diagnosis of breast atypia over the past 2 decades.

Method: After receiving IRB approval, we reviewed our institution's history regarding the diagnosis of breast atypia (ADH and/or ALH). We conducted a retrospective cohort study of women with an original diagnosis of ADH or ALH to identify risk factors for predicting a clinically significant subsequent event, such as another diagnosis of atypia or subsequent malignant disease. Using the nonspecific ICD-9 code of 610.8/.9 (other specified or unspecified benign breast disorder) as a guide, we screened 31,921 patients with this code identified between 1/1995 and 12/2010. Repetitive diagnoses from multiple visits were excluded, reducing the sample size to 7,502 unique patients. After

elimination of non-breast disease, non-atypical benign breast disease, and in situ/invasive malignancy, the study population consisted of 370 breasts with a principal diagnosis of atypia involving 360 patients. As part of a forthcoming study, 246 of the 370 cases originally classified as atypia (ADH and/or ALH) were submitted to a single breast pathologist, blinded to the original diagnosis, for formal review of the histology using current pathological standards.

Results: Of the 246 cases originally classified as atypical ductal hyperplasia and/or atypical lobular hyperplasia, the diagnosis of atypia changed in 114 (46.3%), which was highly significant (p = 0.000). Of the 114 diagnoses that changed, 76 were downgraded to usual ductal hyperplasia (UDH), while 38 were upgraded to DCIS.

Conclusions: In addition to tremendous interpathologist variability, the pathological threshold for diagnosing atypia has significantly evolved over the past 2 decades. These data suggest that the diagnostic reliability of breast atypia is too poor to base therapeutic intervention decisions, such as medications or prophylactic surgery, both with potentially serious side effects. This highlights the need for identification of prognostic biomarkers for more effective risk stratification after a principal diagnosis of breast atypia to predict a subsequent clinically meaningful event, such as further atypia, in situ or invasive malignancy.

0112 Tumor Distance From Skin—A New Variable That Improves Nomogram Performance When Predicting Nodal Positivity in Patients With Clinical T1/T2 Breast Cancer

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Objectives: Prediction of nodal positivity can guide surgical planning in breast cancer patients. Both Memorial Sloan Kettering Cancer Center (MSKCC) and MD Anderson Cancer Center (MDACC) have established nomograms to predict risk of sentinel node positivity. We propose that the addition of a new variable—the distance of tumor from the skin—can improve their performance.

Method: With IRB approval, women with clinical T1/T2 tumors who underwent pre-biopsy ultrasound from 02/2009 to 12/2011 were reviewed. Ultrasounds were re-reviewed to measure tumor distance from the skin. MSKCC and MDACC nomogram predictions were calculated and the AUC-ROC for each model calculated. The additional utility of adding the tumor distance from the skin variable was then examined using multiple logistic regression and by comparison of AUC-ROC values.

Results: Four hundred one breast cancers with clinical T1 (85%) or T2 (15%) tumors in 398 patients met eligibility criteria, of which 79 (19.7%) of 401 were found to be node positive. The mean distance of the tumor from the skin was 0.94 cm and the range was 0.10 to 2.80 cm. Node-positive cases had tumors significantly closer to the skin (mean distance from skin = 0.78 cm) compared to node-negative cases (mean distance from skin = 0.98 cm, p = 0.009). Tumors located within 1 cm of the skin were more likely to be node positive [61/251 (24%)], compared to tumors more than 1 cm from the skin, where only 12% (18/150) were node positive (p = 0.002). The MSKCC and MDACC nomograms each demonstrated good discrimination between node-positive and node-negative patients with AUC-ROC values of 0.71 (95% CI: 0.64-0.77) and 0.74 (95% CI: 0.68-0.81), respectively. When tumor distance from the skin ≤1 cm was added to the MSKCC nomogram, it contributed significantly (odds ratio, 2.23; p = 0.006) to the prediction of node positivity and improved the AUC-ROC to 0.73 (95% CI: 0.67-0.79). Similarly, tumor distance from the skin ≤1 cm was significant (odds ratio, 1.94; p = 0.03) when added to the MDACC nomogram and improved the AUC slightly to 0.75 (95% CI: 0.69-0.81). Within nomogram probability categories, the proportion with positive nodes was consistently higher in the subgroup with distance from skin ≤1 cm (Table).

continues

Table. Proportion With Positive Nodes in Subgroups Based on Nomogram Predicted Probabilities and Distance From Skin

MSKCC Nomogram-Predicted Probability	Distance From Skin	N (%) With Positive Nodes
<25%	≤1cm	26/164 (16%)
<25%	>1cm	7/102 (7%)
25-49%	≤1cm	27/70 (39%)
25-49%	>1cm	9/40 (23%)
≥50%	≤1cm	8/17 (47%)
≥50%	>1cm	2/8 (25%)
MCACC Nomogram-Predicted Probability	**Distance From Skin**	**N (%) With Positive Nodes**
<25%	≤1cm	41/216 (19%)
<25%	>1cm	16/140 (11%)
25-49%	≤1cm	17/31 (55%)
25-49%	>1cm	2/10 (20%)
≥50%	≤1cm	0
≥50%	>1cm	3/4 (75%)

Conclusions: Tumor distance from the skin is associated with nodal positivity. When added to established nomograms, it improves the prediction of node positivity. This variable should be considered when estimating nodal positivity to guide treatment planning for breast cancer.

0113 Combining B-Mode Ultrasound and Opto-Acoustic Imaging to Evaluate Breast Lesions

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Objectives: The purpose of this study is to present data from a feasibility study performed to evaluate a novel emerging imaging technology that combines B-mode ultrasound and opto-acoustic imaging (Imagio™).

Method: Breast lesions were imaged using high-resolution ultrasound coupled with visual data generated by short pulses of laser energy at 2 distinct frequencies. One frequency excites oxygenated hemoglobin while the other excites deoxygenated hemoglobin. The data is captured, color-coded (green = oxygenated hemoglobin, red = deoxygenated hemoglobin), and co-registered with the B-mode ultrasound image. This allows the reader to not only describe the morphology of the lesion but also address the relative concentrations of oxygenated hemoglobin, which suggests the benign process, or deoxygenated hemoglobin, which suggests a malignant process. Total blood flow representing the presence or absence of neo-vascularity is colored yellow. The feasibility study evaluated 79 patients recommended for biopsy based on screening mammography and breast ultrasound from 2 clinical sites. The population underwent opto-acoustic imaging with the Imagio technology. A panel of 5 independent readers, blinded to the biopsy results, retrospectively reviewed all imaging studies. Traditional breast imaging studies (mammography, ultrasound) were compared with integrated B-mode ultrasound/opto-acoustic imaging (Imagio) and the probability of malignancy (POM) was determined across all BI-RADS categories. The imaging findings were then correlated with the subsequent lesion pathology.

Results: Of the 79 biopsies, 6 were removed from the study for technical reasons. Of the remaining 73, there were 39 benign cases and 34 malignant cases that were completely evaluated and make up the analysis.There were no adverse events related to the technology. Calculating the POM at greater than 2% across all BI-RADS categories, comparing Imagio images to the original mammography and B mode ultrasound revealed the following:

1. Imagio was accurate in detecting >98% of all malignancies.
2. Imagio diagnosed BI-RADS 4B cases 30.2% more accurately then the combination of conventional mammography and ultrasound

3. Imagio diagnosed BI-RADS 5 malignancies 10% more accurately than the combination of conventional mammography and ultrasound
4. Imagio potentially spared 23.7% of patients from biopsy.

Conclusions: Information obtained from the Imagio dual modality opto-acoustic/ultrasound system is encouraging and may aid in the differentiation of benign vs malignant breast lesions. An ongoing study is being conducted to further evaluate the accuracy of this technology. Other potential applications include: assessment of the response to neoadjuvant chemotherapy, intraoperative real-time evaluation of surgical margins, and the evaluation of blood flow to the nipple areola complex during nipple-sparing mastectomies.

0083 Inconsistent Selection and Definition of Local and Regional Endpoints in Breast Cancer Trials

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Objectives: Breast cancer studies concerning the value of axillary treatment following positive sentinel lymph node procedure are currently of great interest. Completion axillary lymph node dissection seems no longer essential for excellent regional control in a selected group of breast cancer patients. However, there are concerns about the ACOSOG-Z0011 results, partly because previous studies have shown varying outcomes. These differences can occur due to, for instance, variations in study population and treatment. Another cause might be inconsistent selection and definitions of endpoints, which is crucial for transparency of study outcomes. The aim of this study is to determine which local and regional endpoints are used in breast cancer trials, and how these endpoints are defined.

Method: A PubMed search was conducted for original research on all types and stages of breast cancer in humans, published from January - July 2011, in *Annals of Surgery, Annals of Surgical Oncology, British Journal of Surgery, Journal of the American Medical Association, Journal of Clinical Oncology, Lancet, Lancet Oncology,* and *New England Journal of Medicine*. Papers with endpoints referring to local or regional events or with endpoints of which 1 of the components included local or regional events were included.

Results: Eighteen articles were included, resulting in 9 separate endpoints. Local and regional events were reported either separate (as a synonym), or as part of a composite endpoint (see Tables 1 and 2). In 17 articles, either local recurrence (n = 8), or locoregional recurrence (n = 9) was used, of which only 2 articles provided a clear definition. Both included recurrences in chest wall, local skin, operative scar, and the ipsilateral breast. Four of the 17 studies specifically included invasive tumors only, and consequently excluded carcinoma in situ. Of the remaining 13 studies, it is unknown which elements are included or excluded (see Table 3). Regional events were described in 16 articles, as the endpoints regional recurrence (n = 5), axillary recurrence (n = 2), or locoregional recurrence (n = 9). Eleven articles provided no definition of regional events, 3 gave a limited definition (disease recurrence in “lymph nodes”), and 2 fully defined it as recurrence in the ipsilateral axilla, internal mammary, supraclavicular or subclavicular lymph nodes. None of the papers elaborated on parasternal or contralateral nodes.

Table 1. Separate endpoints.

Local recurrence	n = 8
Regional recurrence	n = 5
Axillary recurrence	n = 2
Locoregional recurrence	n = 9

Table 2. Composite endpoints.

Disease-free survival (DFS)	n = 11
Locoregional recurrence-free survival (LRRFS)	n = 2
Recurrence-free survival (RFS)	n = 4
Event-free survival (EFS)	n = 1
Progression-free survival (PFS)	n = 1

continues

Table 3. Carcinoma In Situ Included?			
	Local recurrence	Locoregional recurrence	**Total**
Yes	0	0	0
No	2	2	4
Unknown	6	7	13
Total	8	9	17

Conclusions: Local and regional events are not clearly defined in the majority of the breast cancer trial articles. As the absence of clinically relevant differences cannot be guaranteed, results may not be readily comparable. Uniform use of endpoints with precise definitions is indispensable for transparency of future breast cancer trial outcomes.

0158 Implementation of a Breast Cancer Multidisciplinary Clinic Program

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Objectives: In order to demonstrate the impact of multidisciplinary care in the community oncology setting, we evaluated treatment decisions following the initiation of a dedicated breast multidisciplinary clinic (MDC).

Method: In the effort to improve patient care, a breast MDC was created at the health system with the goals of providing patients with a comprehensive multidisciplinary evaluation and consensus treatment recommendations in a single visit. Surgeons, radiologists, radiation and medical oncologists, along with a full spectrum of ancillary support staff, all participate at this comprehensive initial evaluation. The impact of the multidisciplinary clinic was evaluated by comparing quality measures, such as initiation of radiation within 1 year for patients who underwent breast-conserving therapy, initiation of appropriate hormonal therapy within 1 year for hormone receptor positive patients, and initiation of adjuvant chemotherapy within 120 days after diagnosis for hormone receptor negative patients between the RO patient database and the MDC patient database. Several other factors including time from diagnosis to first treatment, enrollment in clinical trials, breast-conserving therapy vs mastectomy, and referral to genetic counseling were also examined.

Results: From May 2008 to March 2011, a total of 171 patients were evaluated in the MDC at the breast care center. These patients were compared to the RO patient database of 664 patients from the same time period. Several quality-of-care measures were compared between the 2 groups. ASCO 1 examines the initiation of hormone therapy within 1 year in hormone receptor positive patients who are stage I – III. In the MDC patient population, 89.0% of patients were compliant with ASCO1 recommendations, compared to 72.7% of patients in the RO database. The ASCO 2 guideline recommends radiation therapy within 1 year of diagnosis for patients who are stage I – III and undergo breast-conserving therapy. 97.5% of patients evaluated in MDC met the ASCO 2 guideline, compared with 89.5% of RO patients. Patients seen in the MDC were started on adjuvant chemotherapy within 120 days of diagnosis as per ASCO 3 guidelines in 90.4% of cases vs 93.8% of cases in RO. Breast-conserving therapy was chosen in 49.0% of MDC patients, compared to 55.8% of the RO patients. The number of patients enrolled in a clinic trial from the MDC was 22%. Forty- eight (48/171) patients were referred to genetic counseling. The average time from diagnosis to first treatment for a patient seen in the MDC was 39.6 days.

Conclusions: Establishment of the breast MDC did provide improved adherence to the NCCN guidelines ASCO 1 and ASCO 2. The ASCO 3 adherence was greater in the RO database, but the difference between the 2 was not as notable. In an era where there is increased monitoring of measurements of quality of care, adherence to set guidelines is becoming increasingly important. The MDC may help physicians accomplish these goals with greater ease as a complete plan of care can be developed and coordinated among the multiple disciplines in a single day.

0055 Likelihood of Having a BRCA1 or BRCA2 Mutation Based on Age of Cancer Diagnosis

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Objectives: Women with a BRCA1 or BRCA2 mutation are more likely to be diagnosed with breast and ovarian cancer than women who have not inherited these mutations. These cancers are often diagnosed at younger ages than the general population, highlighting the importance of early identification of these women. Myriad Genetics Laboratories, Inc, has offered clinical testing for the BRCA1 and BRCA2 genes since 1996. To understand more about the phenotype of BRCA1 and BRCA2 mutation carriers, we queried Myriad's laboratory testing database.

Method: We screened the testing database from 2006 to 2012 for all women affected with breast and/or ovarian cancer at the time of their testing, regardless of their family history. Women were then grouped by the age of their earliest reported cancer diagnosis and we determined the BRCA1 or BRCA2 mutation rate in each age group.

Results: Among women diagnosed with breast cancer (including DCIS), the younger the age of the breast cancer diagnosis, the more likely the woman had a BRCA1 or BRCA2 mutation. Women diagnosed with breast cancer in their 20s had a 16.4% (peak) mutation rate. Women diagnosed in their 30s, 40s, or 50s had mutation rates of 12.3%, 6.4%, and 5.8%, respectively. Women with ovarian cancer had a 15.1% mutation rate and those diagnosed in their 40s and 50s were the age groups most likely to have a BRCA1 or BRCA2 mutation (20.6% mutation positive rate for both of those decades). Women diagnosed in their 60s had a 13.6% BRCA1 or BRCA2 mutation rate and even for women diagnosed in their 70s it was still 7.8%. Finally, women with both breast and ovarian cancer diagnoses had a BRCA1 or BRCA2 mutation rate of 23.8%. Age was less important in this diagnostic group as women at all ages had a high likelihood of having a mutation. A peak mutation rate of 37.8% was observed in women diagnosed with their first cancer in their 30s.

Conclusions: These data support the current NCCN recommendations for BRCA1 and BRCA2 testing of women with early breast cancer and women with ovarian cancer at any age. The identification of women who have BRCA1 or BRCA2 mutations after their first cancer diagnosis can lead to the prevention or early identification of a second cancer because of chemoprevention, prophylactic surgery, or screening.

0162 Incidence and Predictors of Neuropathic Pain Following Breast Surgery

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Objectives: Neuropathic pain following breast surgery extends morbidity in the postoperative period. The incidence and etiology of postoperative neuropathic breast pain remains unclear and underreported in literature. This study aims to define the incidence of neuropathic pain following breast surgery and to identify patient characteristics that are predictors for developing postoperative neuropathic pain.

Method: All female patients undergoing breast resection surgery over a 3-year period (January 2009 to January 2012) with 1-year minimum follow-up were included in this single-center observational study. Retrospective chart review was performed to identify patient demographics, associated co-morbidities, type of breast resection (mastectomy vs partial mastectomy), inclusion of axillary surgery (sentinel lymph node biopsy or axillary node dissection), adjuvant radiation/chemotherapy, and development of postoperative neuropathic pain. Data was analyzed using univariate logistic regression.

Results: One hundred fifty-three patients were identified for study inclusion. Mean patient age at time of surgery was 50.2 ± 1.4 years. Sixty-four percent (98/153) of the patients included in this study were Caucasian, 32% (49/153) were African-American, 3% (4/153) were Asian, 1% (1/153) was Hispanic. The incidence of postoperative neuropathic pain was 12% (19/153). Average time to onset of neuropathic pain was 3.1 ± 0.7 months following breast surgery. Fifty-three percent (10/19) of patients developing postoperative neuropathic pain underwent mastectomy, while 47% (9/19) underwent partial mastectomy. Significant predictors for the development of postoperative neuropathic pain include total mastectomy ($p = 0.045$) and taxane chemotherapy ($p = 0.002$). Odds ratio of developing neuropathic following total mastectomy was 2.71 (95% confidence interval [CI] 1.02-7.17). Odds ratio following taxane chemotherapy was 9.52 (95% CI, 2.31-39.3). Additional predictors for development of postoperative neuropathic pain that did not reach statistical significance include African-American ethnicity, partial mastectomy of lower-outer quadrant, and intercostal-brachial nerve transection during axillary node dissection ($p = 0.16$, 0.07, 0.10, respectively). Odds ratios associated with African-American ethnicity was 2.0 (95% CI, 0.77-5.22),

continues

partial mastectomy of the lower-outer quadrant was 4.68 (95% CI, 0.87-25.2), and intercostal-brachial nerve transection was 3.83 (95% CI, 0.76-19.2).

Conclusions: The development of neuropathic pain is a significant risk following breast surgery. Mastectomy and taxane-based chemotherapy significantly increase the risk for development of neuropathic pain following breast surgery.

0130 Increasing Patient Safety and Professional Communication With Flight Plans

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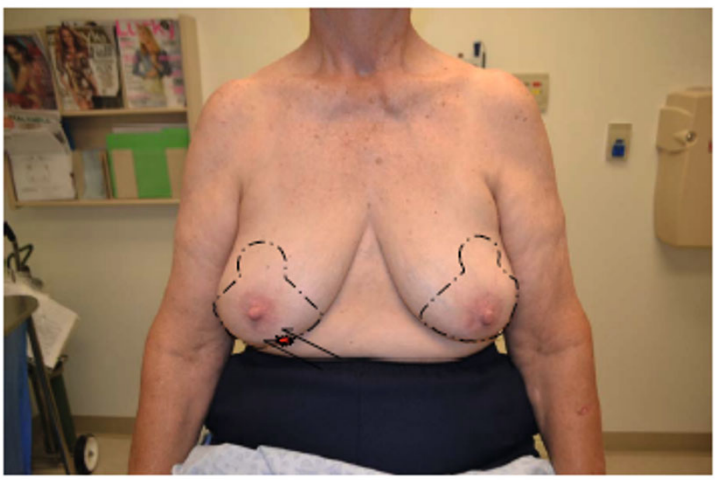
Objectives: Reducing surgical errors has become a focus on a national level with increasing attention directed toward preventing wrong-site surgeries. The Joint Commission considers wrong-site surgeries to be a sentinel event and has listed both process and system factors as causes for these events. The majority of these catastrophic events are secondary to a breakdown in communication that can occur anywhere along the multi-disciplinary chain. Surgeries that involve more than 1 possible location and multiple specialists are especially prone to error. Breast surgery is particularly susceptible due to the involvement of several subspecialists (eg, radiologists, breast surgeon and plastic surgeon). To optimize communication with the other members of the multidisciplinary team and to prevent wrong-site surgeries, we instituted a “flight plan.”

Figure 1. Example of a flight plan.

Jane Doe
123-45-678
November 7, 2012

Diagnosis: RIGHT Breast Intermediate Grade Invasive Ductal CA, SBR 7/9, ER Pos, PR Neg, HER2 Neg, Ki67 = 10%. Spans 15 mm on mammography. 4:00 Position Right breast, 4 cm from nipple.



1. Wire Directed Excision of Right Breast Invasive CA using a reduction pattern
2. RIGHT sentinel node biopsy with additional nodes if positive
3. Contralateral LEFT breast Reduction with Dr. Smith
4. Intraoperative Radiation Therapy with Dr. Williams
5. Plastic Surgeon: Dr Smith 949-555-5555, 11/9/2012 @ 3 pm
6. Medical oncologist: Dr Jones 949-555-4444, 11/10/2012 @ 10 am.
7. Radiation Oncologist: Dr. Williams 949-555-333, 11/10/2012 @ 2 pm

Amanda M. Woodworth, M.D.

Results: From January 1990 until October 2012, 3739 patients have been seen with flight plans generated and subsequently operated upon. Of these patients, there have been no wrong-site surgeries and no incorrect procedures.

Conclusions: The patient flight plan increases patient safety by preventing wrong site surgery and/or incorrect surgery on the correct breast. It allows the patient to leave the surgeon's office with a clear understanding of the surgical plan as well as consultations needed. The patient has an easy-to-understand sheet of paper which is used as an efficient communication tool among all providers and patient. We believe if flight plans were universally adopted, we could eliminate wrong-site surgeries while increasing patient understanding of their planned surgical procedure.

0129 Breast Cancer Biomarker Discordance Between Primary and Sites of Metastasis – A Systematic Review

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Objectives: Systemic treatment choices for breast cancer patients with recurrent disease are usually based on the ER/PR/HER2 biomarker status of the primary cancer. Biomarker discordance between the primary and metastatic sites is well recognized and could have important therapeutic implications. A systematic review was conducted to assess the extent of biomarker discordance between the primary cancer and metastasis, and whether is influenced by the site of metastasis.

Method: An electronic search of multiple literature databases implemented by an information scientist was conducted to identify studies reporting outcomes of ER/PR/HER2 receptor stability between primary site and recurrent disease. Two reviewers independently screened the abstracts and full text articles, which were identified according to pre-defined selection criteria. The same reviewers performed data collection from all included studies. Studies that were identified reported on receptor conversion between primary sites of breast cancer and various sites of metastasis, including lymph node, liver, brain, lung, skin, GI sites, and bone marrow.

Results: Preliminary results from eligible studies consistently demonstrated discordance between the primary and metastatic sites. When discordance occurred, the general trend was for loss of hormone receptor. ER hormone status was more stable (discordance, 10.2-32.5%) than PR (discordance, 25.5-40.7%). HER2 was found to have lower rates of discordance (2.6-14.5%). In general, higher ER/PR discordance was found in bone (40-68%) and liver (0-54%) when compared to other sites, including brain (36%), lung (9-18%), skin (6-22%), and GI (15-40%). In a prospective study, biomarker discordance led to change in patient management in up to 20% of the patient population.

Conclusions: Our results demonstrate that biomarker discordance between primary and distant metastases does occur in breast cancer and occurs more frequently with PR, and the extent of discordance is influenced by the site of metastasis. Further research is required to have a better explanation about the pathophysiology of the biomarker status change and its clinical implications.

0057 Resident-Performed Oncoplastic Surgery. Comparative Analysis With Standard Breast-Conserving Surgery

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Objectives: Oncoplastic breast-conserving surgery (OBCS) is increasingly used to facilitate breast conservation, and has gained significant momentum over the past decade. However, evidence with regard to the oncological safety and morbidity of OBCS remains limited, especially when surgical residents perform the procedure. The aim of this study was to compare morbidity and positive margin rate for resident-performed OBCS with resident-performed standard breast-conserving surgery (SBCS) within a single institution.

Method: Retrospective analysis of all patients who underwent SBCS or OBCS from January 2007 to December 2011 was performed. Both SBCS and OBCS were performed by surgical residents with supervision of a single attending breast surgeon. Oncoplastic procedures were limited only to volume displacement techniques and volume replacement techniques were excluded. Patient and tumor characteristics, morbidity, and positive margin

rates were analyzed. Positive margin was defined as tumor spread within 2 mm of cut-edges. Chi-square analysis and Student *t* test were performed to determine relationships between independent variables.

Results: A total of 202 SBCS and 120 OBSS were included in this study. Four types of oncoplastic techniques (reduction mammoplasty, round block technique, lateral mammoplasty and rotation flap) were identified. The operations for OBCS group took significantly longer than the operations for SBSC group (mean, 87 vs 124 min, P< 0.001). Median tumor size and specimen weight were 15 mm and 33 g for SBCS group and 25 mm and 71 g for OBCS group ($p < 0.001$). Positive margin rate was 16.3% for SBSC group and 13.3% for OBCS group (p = n.s.). Severe complications did not occur in both groups, and morbidity rate was not statistically significant (15.8% vs 13.3%). At a median follow-up of 24 months, there was no local recurrence in both groups.

Conclusions: Resident-performed volume-replacement-type OBCS did not increase positive margin rate and morbidity rate, compared with resident-performed SBCS despite marked increase in specimen volume. Early follow-up data suggests OBCS can be safely adopted in a surgical resident training program.

0116 Survival Outcomes of Pregnancy-Associated Breast Cancer in Younger Women at a Pakistani Cancer Center. A Case Control Study

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Objectives: We conducted this study to review the survival outcomes of pregnancy associated breast cancer (PABC) and compare them with its non-PABC counterpart.

Method: We retrospectively reviewed 40 patients with nonmetastatic PABC <45 years of age treated at the hospital from January 2003 to August 2007 and compared the outcomes with age-matched 1:2 control group of 80 patients with non-PABC. Primary outcomes were overall survival (OS) and disease-free survival (DFS). Overall survival (OS) and disease-free survival (DFS) were estimated by the Kaplan–Meier method, and univariate analysis was done to assess the association between OS, DFS, and variables like symptoms at presentation, tumor stage and biology, and treatment given.

Results: The mean age was 32 + 4 years (range, 23-45 years) for both groups. Twenty-seven (68%) patients with PABC were ER/PR –negative, compared with 41 (51%) for the controls. Most of the cases had stage III disease (58%) on presentation, compared to stage II disease in majority of controls (58%). Forty-seven percent with PABC received neoadjuvant chemotherapy, compared to 46% in the control group. More patients 30(75%) in PABC group had mastectomy, compared with 38 (48%) breast conservations and 42 (52%) had a mastectomy in the control group. Kaplan-Meier analysis showed 75% probability of survival for: (1) disease-free survival (DFS) 25 months in cases and 33 months in controls; (2) overall survival (OS) 38 months in cases and 48 months in controls. At an alpha level of 0.05 the survival distributions were found significantly different from each other for OFS ($p = 0.03$), but not for DFS. On univariate analysis, none of the factors, including symptoms at presentation, tumor characteristics, such as stage of disease, tumor type, and ER/PR status, or treatment received (chemotherapy, radiation, and hormonal therapy) affected the outcomes significantly.

Conclusions: In our study population of breast cancer patients younger than 45 years, we demonstrate poorer survival for PABC group as compared to non-PABC patients.

0122 Breast Conservation Therapy in Locally Advanced Breast Cancer – Short-Term Results From a Developing Country

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Objectives: With a background of limited literature available in this regard from our part of the world, we analyzed our consecutive series of locally advanced breast cancer (LABC) patients to look at their outcome after a multi-disciplinary therapy (ie, breast conservation treatment (BCT) post-neoadjuvant chemotherapy) and compare them with LABC patients who underwent mastectomy.

Method: One hundred sixty-four patients, who presented with noninflammatory, locally advanced breast cancer from January 2007 to December 2009, with at least a complete 2 years' follow-up, were included. All received neoadjuvant chemotherapy, which was followed by surgery (modified radical mastectomy or BCT) and adjuvant radiotherapy and hormone therapy. Outcome in the form of local/regional recurrence was analyzed and compared between the BCT and mastectomy groups.

Results: Of 164 patients with LABC who underwent neoadjuvant therapy, 89 (54%) had BCT and 75 (46%) underwent mastectomy with axillary node clearance. Response to chemotherapy was higher (80%) in the BCT group as compared to 66% in mastectomy group, the rest being nonresponders and progressive disease. Local recurrence rate after BCT was 18%, as compared to 15% in the mastectomy group, the difference being not significant statistically. At a mean follow-up of 31 months, mean disease-free survival in the BCT group was 27+/13 months, compared to 25+/-16 months in mastectomy group, not found statistically significant according to Kaplan-Meier survival curve. Residual nodal disease, post-neoadjuvant chemotherapy was found the most important prognostic factor for local recurrence.

Conclusions: At one of the few centers practicing BCT for breast cancer in Pakistan, we found comparable results in terms of local recurrence rate and disease-free survival in patients with LABC undergoing BCT vs mastectomy, after neoadjuvant therapy.

0179 Three Single-Nucleotide Polymorphisms in the BUB3 Gene Are Not Associated With Breast Cancer Risk

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Objectives: The mitotic checkpoint is the major cell cycle checkpoint acting during mitosis to prevent aneuploidy, which is a common phenomenon in cancers. The BUB (budding uninhibited by benzimidazole) 3 gene is a key component of the mitotic checkpoint pathway. We investigated whether polymorphisms in the BUB3 gene had any bearing on individual susceptibility to breast cancer (BC). The included 3 loci haven't been previously investigated in relation to BC risk.

Method: A total of 462 consecutive BC cases and 529 cancer-free controls were enrolled between 2009 and 2011 from the hospital in this study. A 2 mL of peripheral blood sample and the characteristic data were collected from each subject. Genomic DNA was extracted from peripheral blood samples using the RelaxGene Blood System DP319-02 (Tiangen). The SNP, rs11248416, rs11248419, and rs6599657, were genotyped by the TaqMan SNP Assay using the 7900HT Fast Real-Time PCR System. Haplotype analyses were carried out using the SNP-HAP software. The Linkage Disequilibrium (LD) between each pair of the SNP loci was evaluated with the Haploview softw2are.

Results: The average age was 48.37 ± 9.62 years for cases and 49.03 ± 12.16 years for controls and no significant distribution difference (p = 0.345) was observed between cases and controls. The genotype distribution of the 3 SNPs rs11248416, rs11248419, and rs6599657, in the controls all followed Hardy-Weinberg equilibrium. Of the rs11248416 polymorphism, no significant difference was observed in distribution of the risk G allele compared to wild C allele between cases and controls (p = 0.472, after adjusted by age and menopause status). Compared with the CC genotype, the CG and GG genotypes didn't show an increased risk of BC (p = 0.216 for CG and p = 0.369 for GG). Negative results were also found under the dominant, recessive, and additive models (p = 0.259, p = 0.459, and p = 0.481, respectively). Neither of the other 2 SNPs revealed a significant association with the risk of BC (Table 1). Lastly, we performed a haplotype analysis within the BUB3 gene. The SNPs rs11248419 and rs6599657 were in high LD (|D| = 0.969, r^2 = 0.912), while the other 2 pair (rs11248416 and rs6599657, rs11248416, and rs11248419) were in low LD (|D| = 0.966, r^2 = 0.109 and |D| = 0.845, r^2 = 0.08, respectively). Haplotypes show no effect on BC risk (p = 0.879). None of any haplotypes among those with frequencies of more than 5% was identified with a significant association with BC risk (Table 2).

continues

Table 1. Genotype Frequencies of the 3 SNPs and Their Association With Risk of BC

SNP	Case (%)[a]	Control (%)[a]	OR[b] (95% CI)	*P*
rs11248416				
CC	392 (85.6)	463 (88.0)	1 (ref)[c]	
CG	64 (14.0)	58 (11.0)	1.27 (0.87-1.86)	0.216
GG	2 (0.4)	5 (1.0)	0.47 (0.09-2.44)	0.369
G/C	-	-	1.14 (0.80-1.61)	0.472
Dominant model	-	-	1.23 (0.85-1.79)	0.259
Recessive model	-	-	0.45 (0.08-2.36)	0.459
Additive model	-	-	1.13 (0.80-1.02)	0.481
rs11248419				
AA	166 (35.9)	208 (39.6)	1(ref)	
AG	216 (46.8)	229 (43.6)	1.18 (0.89-1.56)	0.243
GG	80 (17.3)	88 (16.8)	1.14 (0.79-1.65)	0.482
A/G	-	-	1.09 (0.91-1.31)	0.340
Dominant model	-	-	1.16 (0.90-1.51)	0.239
Recessive model	-	-	1.02 (0.86-1.20)	0.807
Additive model	-	-	1.08 (0.91-1.29)	0.351
rs6599657				
CC	169 (37.6)	207 (40.0)	1(ref)	
CT	206 (45.9)	225 (52.2)	1.12 (0.85-1.48)	0.427
TT	74 (16.5)	86 (16.6)	1.06 (0.73-1.54)	0.769
C/T	-	-	1.05 (0.88-1.26)	0.589
Dominant model	-	-	1.10 (0.85-1.43)	0.464
Recessive model	-	-	0.99 (0.84-1.18)	0.979
Additive model	-	-	1.04 (0.87-1.25)	0.625

a: Difference of sample size in individual comparisons was due to genotyping failure in study subjects.
b: adjusted by age and menopause
c: reference group

Table 2. Haplotype Distributions of the 3 SNPs in the BUB3 Gene

	Case	Control	OR (95% CI)	*P*
CCA	548 (59.31)	633 (59.83)	1(ref)[b]	0.879
CCG	15 (1.62)	12(1.13)	1.44 (0.66-3.11)	
CTG	298 (32.25)	335 (31.66)	1.03 (0.85-1.25)	
GTG	56 (6.06)	69 (6.52)	0.93 (0.64-1.35)	
Others[a]	7 (0.76)	9 (0.85)	0.92 (0.34-2.49)	

a: “Others” consists of haplotypes with a frequency <1%.
b: Reference group

Conclusions : The investigated SNPs in the BUB3 gene were not associated with BC risk in the Chinese population.