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Clinical Science

Measuring the impact of the American College of Surgeons Oncology Group Z0011 trial on breast cancer surgery in a community health system

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Axillary lymph node dissection;
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Z11;
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Abstract

BACKGROUND: The American College of Surgeons Oncology Group Z0011 trial has been lauded as practice changing. We sought to identify its impact on breast cancer surgery in the community hospital setting.

METHODS: A retrospective review was performed from 8 community hospitals identifying patients with invasive breast cancer meeting the Z0011 criteria. The primary outcome measures were the rate of completion axillary lymph node dissection (ALND) and performance of intraoperative sentinel lymph node (SLN) analysis over time.

RESULTS: A total of 1,125 lumpectomies with SLN biopsies were performed with 180 subjects meeting inclusion criteria. Performance of ALND ($P < .0001$) and intraoperative SLN analysis ($P < .0001$) declined during each time period. Patients more likely to undergo ALND included those with extracapsular extension (odds ratio [OR] 12.8, 95% confidence interval [CI] 2.5 to 67.1) and those who underwent reoperative surgery (OR 10.8, 95% CI 2.6 to 44.4) or intraoperative SLN analysis (OR 5.1, 95% CI 1.2 to 21.9).

CONCLUSION: American College of Surgeons Oncology Group Z0011 trial has been rapidly practice changing in the community hospital setting.

The treatment of breast cancer has traditionally centered around excision of all gross disease in the absence of distant metastasis. This consists of lumpectomy or mastectomy for removal of the primary tumor with staging of the axilla via sentinel lymph node (SLN) biopsy.[1] In the presence of axillary lymph node metastases, completion

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Table 1 Cohort characteristics

	n (%)
Age	61.4 ± 11.6
Race	
Asian/Pacific Islander	1 (1)
Black	5 (3)
Hispanic	4 (2)
White	170 (94)
Time period	
Pre-Z0011	110/180 (61)
Post-Z0011	70/180 (39)
Histology	
Ductal carcinoma	158 (88)
Lobular carcinoma	13 (7)
Other	9 (5)
Grade	
1	44 (24)
2	83 (46)
3	53 (29)
Hormone receptor positive	162 (90)
HER2 positive	17 (9)
Triple negative	12 (7)
T-stage	
1a	6 (3)
1b	29 (16)
1c	86 (48)
2	59 (33)
N-stage (final)	
1 mi	59 (33)
1	108 (60)
2	12 (7)
3	1 (1)
SLN examined	2.7 ± 1.5
Margins	
Negative	76 (42)
Close (≤2 mm)	55 (31)
Positive	49 (27)
Lymphovascular invasion	65 (36)
Extracapsular extension	46 (26)
Re-excision lumpectomy	53 (29)
Completion mastectomy	28 (16)
Intraoperative SLN analysis	149 (83)
Axillary dissection	
None	59 (33)
Intraoperative	73 (41)
Delayed	48 (27)

Data are expressed as mean ± standard deviation.
SLN = sentinel lymph node.

axillary lymph node dissection (ALND) has been the standard of care.[2] Unfortunately, ALND has been associated with a 10% to 20% risk of lymphedema.[3]

Large randomized studies in breast cancer, such as those sponsored by the National Surgical Adjuvant Breast and Bowel Project, have greatly influenced modern breast cancer care. National Surgical Adjuvant Breast and Bowel Project B-04 compared outcomes among radical mastectomy, total mastectomy, and total mastectomy with radiation.[4] The primary aim of this study was to identify whether surgical treatment less extensive than the Halsted radical mastectomy could provide adequate oncologic outcomes. The lack of survival or locoregional recurrence benefit when comparing radical mastectomy with total mastectomy with radiation in patients with positive lymph nodes, however, provided insight into a potential lack of therapeutic benefit of ALND.

The American College of Surgeons Oncology Group subsequently sought to evaluate the impact of ALND with the Z0011 trial. This trial recruited patients undergoing breast conserving therapy with 1 to 2 positive axillary SLNs, randomizing them to SLN biopsy alone or ALND.[5] The study found no difference in survival between the 2 groups at 5-year follow-up. Z0011 was met with mixed reception. Many have lauded its results as practice changing, allowing surgeons to avoid the morbidity of ALND without adversely affecting their survival.[6–9] Critics have pointed out that the study was initially closed because of slow accrual and that the follow-up period has not been sufficient to adequately address locoregional recurrence or survival.[10,11]

Survey studies indicate a shift in thought regarding approach to the axilla following Z0011.[12,13] Other studies have examined the hypothetical impact of applying the study criteria across different populations.[14–16] Despite these findings, only one study from MD Anderson Cancer Center has been published to date evaluating the actual impact of this study on clinical practice.[17] The practice patterns outside large academic institutions have not been investigated. We sought to accomplish this goal by examining patients undergoing breast cancer surgery in a multi-institutional community health system before and after the publication of Z0011.

Methods

The study was designed as a retrospective review of patients with invasive breast cancer meeting the "Z0011 criteria." These criteria included the following: (1) plan to undergo lumpectomy with adjuvant radiotherapy; (2) primary tumor 5 cm or less; (3) clinically negative axilla; and (4) an SLN containing metastatic disease. Patients were excluded if they had 3 or more positive SLNs, only isolated tumor cells identified by immunohistochemistry in the SLN, or if they received neoadjuvant therapy. Additionally, we excluded patients who underwent preoperative axillary ultrasound with fine-needle aspiration. The use of staging axillary ultrasound and subsequent management of patients based on these findings remains controversial. We elected to include patients with extracapsular extension to determine the impact of this finding on the performance of ALND despite patients with "gross extranodal disease" being excluded from Z0011.

The study was conducted in a hospital system consisting of 8 hospital facilities, 2 of which are university-affiliated teaching hospitals. Approval was obtained from the