Conservative Axillary Surgery in Breast Cancer Patients Undergoing Mastectomy: Long-Term Results

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BACKGROUND: Recently, the American College of Surgeons Oncology Group Z0011 trial demonstrated that axillary lymph node dissection (ALND) could be safely avoided in selected breast cancer patients with limited nodal disease and having breast conservation therapy. However, for node positive (N+) mastectomy patients, full ALND remains the standard of care. Hypothesizing that omission of complete ALND is safe in many N+ breast cancer patients, a hybrid procedure called conservative axillary regional excision (CARE) was developed, consisting of removal of sentinel nodes and other palpable nodes (without intraoperative frozen section or reoperation for N+).

STUDY DESIGN: A retrospective review of patients undergoing mastectomy with CARE between 2002 and 2010 was performed. Data collected included demographics; staging; number of lymph nodes removed; adjuvant, antihormonal, and radiation therapies; recurrence; lymphedema; and survival data. Recurrence-free survival was estimated using the Kaplan-Meier method and compared using Cox proportional hazards.

RESULTS: Five hundred and eighty-seven patients underwent mastectomy with CARE. Mean follow-up was 5.1 years. A median of 8 nodes were removed. There were 7 patients with local recurrence, of which 3 were axillary recurrences. Lymphedema developed in 20 (3.4%) patients, 75% of which had neoadjuvant chemotherapy. Lymphedema development was associated with the number of lymph nodes removed ($p = 0.05$) and radiation therapy ($p = 0.004$).

CONCLUSIONS: Conservative axillary regional excision is an excellent model for understanding the role of limited axillary surgery in mastectomy patients. The locoregional recurrence rate among N1 patients having CARE is low (3.4%). Conservative axillary regional excision is also associated with low rates of lymphedema. These data support the use of limited ALND in selected N+ mastectomy patients. (J Am Coll Surg 2014;218:819−826. © 2014 by the American College of Surgeons)

The last 50 years have witnessed a steady decrease in the extent of radical surgical procedures for breast cancer.[1] Axillary lymph node dissection (ALND) was performed as a routine part of breast cancer surgery through the late 1990s, as it was believed to provide necessary staging information and long-term regional control, and was considered essential for guiding decisions about the use of adjuvant therapies[2] (reviewed in Rao and colleagues[3]).

Axillary lymph node dissection for breast cancer typically results in removal of 17 to 24 lymph nodes.[4-6] However, ALND has been associated with substantial rates of lymphedema, ranging from 12% to 28%, depending on the lymphedema definition criteria.[7] The greatest risk period for lymphedema development is in the first 24 months after ALND.[7] Concerns about the morbidity of ALND have therefore prompted efforts to reduce the extent of axillary lymph node surgery.

Axillary SLNB has been widely accepted as a less radical axillary staging procedure for patients with clinically node-negative (N−) invasive breast cancer.[8] The National Surgical Adjuvant Breast and Bowel Project 32 randomized trial demonstrated that ALND can be safely omitted in patients without evidence of metastatic disease involving sentinel lymph nodes (SLNs).[9] Sentinel

CME questions for this article available at http://jacscme.facs.org

Disclosure Information: Authors have nothing to disclose. Timothy J Eberlein, Editor-in-Chief, has nothing to disclose.

Presented at the Southern Surgical Association 125th Annual Meeting, Hot Springs, VA, December 2013.

Received December 15, 2013; Accepted December 17, 2013.

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Published by Elsevier Inc.

ISSN 1072-7515/14/$36.00
http://dx.doi.org/10.1016/j.jamcollsurg.2013.12.041

Abbreviations and Acronyms

ALND = axillary lymph node dissection
AR = axillary recurrence
CARE = conservative axillary regional excision
LN = lymph node
LR = locoregional recurrence
SLN = sentinel lymph node

lymph node biopsy has since also been demonstrated to be safe and accurate in patients undergoing neoadjuvant therapy for breast cancer.[10,11]

Recently, the American College of Surgeons Oncology Group's Z0011 clinical trial has suggested that completion ALND can be safely avoided in selected patients having breast conservation surgery with low-volume axillary disease confined to 1 or 2 SLNs that are treated with adjuvant medical therapy and whole breast radiation therapy.[4] In addition, data from Z0011 demonstrated that completion ALND in patients with involvement of 1 or 2 SLNs did not substantially affect overall or disease-free survival of patients. It has been postulated that the use of modern adjuvant medical and radiation therapy effectively controls otherwise occult axillary disease in SLN-positive breast cancer patients in whom ALND is omitted. The results of this trial have prompted many to adopt the omission of complete ALND in selected patients undergoing lumpectomy for breast cancer with 1 or 2 positive axillary SLNs.[12,13]

Patients undergoing mastectomy for breast cancer were not included in the American College of Surgeons Oncology Group's Z0011 trial and complete ALND remains standard practice for patients having mastectomy and metastasis involving any axillary lymph nodes.[14] Modern data on the omission of complete ALND in patients having mastectomy with low-volume axillary node disease are limited.[15-17] Milgrom and colleagues[15] demonstrated low rates of locoregional recurrence (LR) for SLN-positive mastectomy patients in whom completion axillary node dissection was omitted. However, most patients (91%) in this series had only micrometastatic disease or immunohistochemical-only positive disease in SLNs. Crawford and colleagues reported low rates of LR in SLN-positive mastectomy patients in whom ALND was omitted.[16] It is noteworthy in this series that many patients (47%) had micrometastatic disease in SLNs and a mean of 7 axillary nodes were removed in these patients who had SLNB and no ALND. Spiguel and colleagues[18] reported no axillary failures among SLN-positive mastectomy patients in whom completion ALND was omitted. Similar to Milgrom and colleagues and Crawford and colleagues, this series also had a high proportion (67%) of patients with micrometastatic disease.

Hypothesizing that omission of complete ALND is safe in many node-positive (N+) breast cancer patients, in 2002 a single surgeon (JPC) at our institution developed a hybrid procedure called conservative axillary regional excision (CARE). Conservative axillary regional excision is the excision of SLN(s) with additional axillary dissection limited to include only excision of other adjacent or palpable nodes, including additional nodes in the same anatomic region. The consistent practice of CARE in mastectomy patients for an extended period of time reported here provides a unique model to study the impact of limited axillary dissection on outcomes in mastectomy patients with axillary nodal metastasis.

METHODS

Conservative axillary regional excision procedure

Conservative axillary regional excision uses methylene blue dye injected into the breast at the time of operation, followed by several minutes of breast massage. The dye is diluted to ½ strength and approximately 5 mL is injected in 2 sites in a subareolar location. A standard incision is made at the inferior axillary hairline in patients having skin sparing or nipple sparing mastectomy or CARE can be performed through the lateral aspect of a standard mastectomy incision. After the clavipectoral fascia is incised, the nodal packet is mobilized below and above the intercostobrachial nerves. Care is taken to identify the course of any blue lymphatics that enter the area to guide the extent of dissection of the nodal packet. During dissection, individual lymph nodes (LNs) are not separated from the surrounding fat but are used to define the boundaries of the nodal packet (Fig. 1A, B). This packet is then excised en bloc, including any blue and palpable LN (Fig. 1C). Only for additional grossly abnormal palpable LN or obvious blue dye tracking would the dissection be carried cephalad to the level of the axillary vein. The thoracodorsal neurovascular bundle and the long thoracic nerve are not routinely dissected during the CARE procedure. Intraoperative frozen section of the sentinel node(s) is not performed. Patients found to have LN involvement on final pathology are not taken back to the operating room for completion axillary node dissection. The technique of CARE procedure was the same in patients who received and did not receive neoadjuvant chemotherapy. Pathologic analysis of axillary LN was performed using standard techniques and did not change after the initiation of CARE.

Conservative axillary regional excision technically differs from full ALND in few ways. A traditional ALND is anatomically based and removes all tissue between the anterolateral latissimus dorsi muscle and the chest wall

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