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Optimal Management of the Axilla: A Look at the Evidence

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Keywords

• Breast cancer • Axillary staging • Sentinel lymph node biopsy • Axillary dissection

Key points

- The development and validation of sentinel lymph node biopsy (SLNB) for early-stage breast cancer has challenged the primacy of axillary lymph node dissection (ALND) for staging the axilla.
- Randomized clinical trials established the role of SLNB alone as the standard of care for patients with negative SLN(s).
- Additional clinical trials have evaluated the use of SLNB alone in patients with limited SLN involvement and in those treated with neoadjuvant chemotherapy.
- These trials have helped to expand the role of SLNB (either alone or with axillary radiotherapy) for the majority of patients with early-stage breast cancer.

INTRODUCTION

The surgical management of the axilla in patients with operable breast cancer has undergone significant evolution during the past 30 years. Axillary lymph node dissection (ALND) was established as the undisputed standard of care at the end of the nineteenth century as part of the Halsted radical mastectomy and remained so for the better part of the twentieth century until its therapeutic role was challenged by a randomized clinical trial (National Surgical Adjuvant Breast and Bowel Project [NSABP] B-04) [1,2]. That trial showed that elective ALND or axillary radiotherapy did not improve long-term outcomes for patients with clinically negative axilla. However, even following publication of the results of the B-04 trial in the late 1970s, the procedure still remained the

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standard of care for axillary staging because of the need to obtain the prognostic information of pathologic nodal status and the need to identify candidates for adjuvant chemotherapy. In addition, ALND in patients with pathologically positive axillary nodes provided excellent control of the disease in the axilla [2].

Over the ensuing years, elective ALND remained the gold standard for staging the axilla because no imaging modality was shown to be as accurate as pathologic examination of the axillary nodes in predicting axillary nodal status. However, by the late 1980s, widespread use of screening mammography resulted in an increasing proportion of patients presenting without axillary involvement at the time of ALND. Such patients do not derive any therapeutic benefit from ALND but are at risk for its sequelae. The need to avoid the morbidity of ALND in these histologically node-negative patients without losing prognostic information led to the development of lymphatic mapping and sentinel lymph node biopsy (SLNB) [3,4].

DEVELOPMENT OF LYMPHATIC MAPPING AND SENTINEL LYMPH NODE BIOPSY

The sentinel lymph node (SLN) concept dictates that lymphatic drainage from the breast to the regional nodes follows an orderly pattern to a primary node or SLN and from there to secondary nodes or non-SLNs. Although it was initially thought that different parts of the breast may drain to different SLNs, recent data support the principle that different parts of the breast drain to the same SLNs [5,6].

Single-institution and multicenter studies of sentinel lymph node biopsy

Multiple single-institution series have evaluated SLNB plus ALND [7]. Most used a combination of blue dye and radiocolloid for lymphatic mapping. In general, the identification rates (IRs) were higher when radiocolloid was used either alone or combined with blue dye rather than when dye alone was used. The false-negative rate (FNR) varied widely (0%–19%) and tended to be higher when radiocolloid was not included in the mapping.

Several multicenter studies evaluated SLNB plus ALND in the mid to late 1990s [8–12]. Altogether, these studies included more than 3300 patients. Lymphatic mapping included blue dye, radiocolloid, or the combination of both. SLN IR ranged between 74% and 94% and FNR ranged between 4% and 13%. These studies provided information on the ability to successfully perform lymphatic mapping and SLNB in various clinical settings and by surgeons with different levels of experience with the procedure.

A meta-analysis [13] of 69 studies and more than 10,000 patients undergoing SLNB plus ALND showed a greater than or equal to 90% IR in about half of the studies and an overall FNR of 8.4%. Based on the information discussed earlier, the American College of Surgeons Oncology Group (ACOSOG) eventually conducted a multicenter study (ACOSOG Z-0010) that prospectively