Value of Internerve Tissue Dissection During Axillary Lymphadenectomy for Early Breast Cancer

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ABSTRACT

Background: Breast cancer is one of the most commonly occurring malignancies in females in the Eastern Mediterranean Region. Axillary clearance is an integral part of the surgical treatment of breast cancer. Precise analysis of lymph node involvement for proper staging and adjuvant therapy is therefore necessary. During axillary dissection, lymph nodes at levels I, II and III are removed, while the important axillary structures (axillary vein, long thoracic and thoracodorsal nerves) are preserved. The latter two structures are particularly vulnerable to injury when dissecting the tissue between them (the internerve tissue).

Patients and Methods: This study evaluates the necessity of dissecting the internerve tissue during axillary dissection in breast cancer surgery by reviewing the lymph node yield and metastasis rate in this tissue. This is a prospective non-randomized study, conducted on 50 female patients, who underwent axillary lymphadenectomy for breast cancer. The internerve tissue was excised separately after a routine axillary dissection.

Results: Twenty eight (56%) of the 50 internerve specimens contained lymph nodes; the internerve nodes were positive for carcinoma in 5 patients (10%). In those 5 patients, metastasis was also found in some other axillary lymph nodes. There was no incidence of isolated metastasis in the internerve tissue nodes in absence of metastatic disease to other lymph nodes in the axilla.

Conclusions: There is a significant incidence of lymph nodes (56%) and axillary node metastases (10%) in the tissue lying between the long thoracic and thoracodorsal nerves. Therefore, meticulous dissection and excision of this internerve tissue is strongly recommended in order to optimize decision making regarding adjuvant treatment and outcome in women with operable breast cancer.

Key Words: Breast cancer – Axillary lymphadenectomy – Internerve tissue.

INTRODUCTION

The current standard of surgical management of invasive breast carcinoma with palpable axillary lymph nodes is the complete removal of the primary tumor with complete axillary lymph node dissection [1]. Axillary lymph node status is the best single prognostic indicator in patients with operable breast cancer. Numerous studies have demonstrated that the values of axillary dissection are to stage the disease, to assess the prognosis and to help treatment decisions regarding adjuvant treatment, but without impact on overall survival [2,3,4]. Studies have also emphasized the potentially therapeutic value of axillary dissection by ensuring adequate locoregional control [5,6,7]. Unfortunately, clinical judgment of axillary lymph node status proved to be inaccurate in one third of cases. Twenty five percent of the palpable nodes will be uninvolved, while 30% of clinically negative axillae will harbor metastatic nodal disease [8].

The clinically negative axillae are currently being assessed by the sentinel lymph node biopsy (SLNB) [9,10]. However, in patients with clinically palpable axillary lymph nodes and in patients with clinically negative axillae but with positive SLNB axillary lymph node dissection still remains the only reliable method to determine the lymph node status.

Nevertheless, axillary lymph node dissection is associated with significant morbidity, including lymphoedema, shoulder dysfunction, pain and numbness in the axilla and arm, in addition to the risk of nerve injury [11]. This emphasizes the importance of determining and resecting
the whole of the potentially involved groups of axillary lymph nodes to optimize the surgical procedure, while minimizing its morbidity.

The aim of this study is to examine the lymph node yield and metastasis rate within the tissue between the long thoracic nerve and thoracodorsal nerve (the internerve tissue) and consequently to determine whether this tissue can be left in situ to minimize the risk of nerve injury without compromising the oncologic procedure.

**PATIENTS AND METHODS**

A prospective non randomized clinicopathological study was conducted on 50 female patients who underwent surgery for operable breast cancer at the National Cancer Institute (NCI), Cairo University, Egypt, between June 2006 and March 2008. Patients with locally advanced or metastatic disease and those who received neoadjuvant chemotherapy were excluded from the study. All patients were subjected to proper history taking, clinical examination, routine laboratory investigations, bilateral mammography and breast ultrasound. Histological diagnosis of the primary tumor was obtained either by FNAC, or by core biopsy. TNM staging [12] was then assigned for every patient.

Forty three patients (86%) underwent breast conserving surgery and 7 patients (14%) underwent modified radical mastectomy. Two surgical specimens were excised and sent separately to the pathology laboratory. The first specimen consisted of the breast (or the wide local excision specimen), together with the axillary contents, while the second specimen consisted of the internerve tissue, which was dissected separately.

In the Department of surgical pathology, the two specimens were examined. The breast tissue was processed routinely; the tumor was examined for size and margin status. It was then examined microscopically for histological type, grade and lymphovascular invasion. Axillary contents were also examined to determine the lymph node status regarding the number of excised lymph nodes, presence or absence of metastasis and capsular invasion. The internerve tissue was examined separately for the presence of lymph nodes and their number. Step sectioning was done every 20 microns for the detection of the exact incidence of lymph node metastasis.

Statistical package for social sciences (SPSS) version 14 was used for data base construction and analysis. Quantitative variables were summarized using mean and SD, median minimum and maximum values. Qualitative data were summarized using frequencies and percentage. Association between two independent qualitative variables was done by Chi² test or Fisher's exact whenever appropriate. Differences were considered significant when \( p \leq 0.05 \) and highly significant when \( p \leq 0.01 \) [13].

**RESULTS**

The median age of the patients was 48 years (range 27–78 years). Twenty nine patients (58%) were premenopausal and 21 (42%) were postmenopausal. The tumor was located in the upper outer quadrant in 27 patients (54%), in the lower outer quadrant in 3 patients (6%), in the upper inner quadrant in 2 (4%), in the lower inner quadrant in 2 (4%). It was retroareolar in 8 patients (16%) and multifocal in 8 patients (16%). The median tumor size was 3cm (T2 in 44 patients, 88%). Table (1) shows the stage categories of the patients according to the AJCC staging system. Twenty five patients (50%) were staged as II B. The commonest histological type was invasive duct carcinoma (47 patients, 94%) and mostly grade II (90%), followed by invasive lobular carcinoma, mucoid carcinoma, and atypical medullary carcinoma (2% each).

The total number of lymph nodes analyzed per patient (excluding the internerve tissue lymph nodes) ranged between 6 and 40 (median 17 lymph nodes). Among the 50 patients, 32 (64%) showed metastasis to axillary lymph nodes (other than the internerve lymph nodes), and 18 patients (36%) had no lymph node deposits.

The internerve tissue lymph nodes were recovered in 28 out of 50 patients (56%). The mean number of lymph nodes recovered per specimen was 1.36 (range 1–5) (Table 1). The internerve tissue lymph nodes represented about 20% of the total number of lymph nodes in these patients. Among the 32 patients with axillary lymph node metastasis, the internerve lymph nodes were recovered in 17 patients.
(53%), five of them had internerve node metastasis. In pathologically negative axillae (18 patients), the internerve tissue lymph nodes were recovered in 11 patients (62%) (Table 2).

Five out of 50 patients (10%) were found to have metastatic disease in the internerve tissue lymph nodes. In those 5 patients, metastatic disease was also found in other axillary lymph nodes. There was no incidence of isolated metastasis in the internerve nodes in absence of metastatic disease to other lymph nodes in the axilla.

The 5 patients with internerve tissue node metastasis were not statistically distinguished by the tumor site, tumor size, or the pathological status of other axillary lymph nodes (Table 3). The percentage of the affected internerve tissue lymph nodes to the total number of the affected axillary lymph nodes ranged from 10% to 40% (Table 4).

Finally, none of the 50 patients had injury of either of the two nerves, the long thoracic or the thoracodorsal nerves.

Table (1): Stage categories and the number of the recovered internerve tissue nodes in 50 breast cancer patients.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage:</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>8 (16)</td>
</tr>
<tr>
<td>IIa</td>
<td>17 (34)</td>
</tr>
<tr>
<td>IIb</td>
<td>25 (50)</td>
</tr>
<tr>
<td>Total</td>
<td>50 (100)</td>
</tr>
</tbody>
</table>

| No. of internerve tissue nodes: |       |
| One      | 7 (25) |
| Two      | 9 (32) |
| Three    | 6 (21) |
| Four     | 5 (18) |
| Five     | 1 (4)  |
| Total    | 28 (100)|

DISCUSSION

Axillary lymph node dissection (ALND) remains a standard in the surgical care of breast cancer patients. Although the introduction of the sentinel lymph node biopsy (SLNB) has allowed for the decreased use of the ALND in early breast cancer, it is still performed for axillary staging, and locoregional control of the disease in patients with clinically palpable axillary lymph nodes and in patients with clinically negative axillae, but with sentinel lymph node metastasis.

Although long considered a safe surgical procedure, ALND is associated with the risk of complications, including nerve injury [14]. Great
care must be exercised to avoid injury to the long thoracic and thoracodorsal nerves, as traction or transection injuries of these nerves are associated with well recognized specific muscular deficits and their resultant physical deformities. The two nerves are particularly vulnerable to injury when dissecting the tissue between them (the internerve tissue). Therefore, as previously stated, it is tempting to leave this tissue in situ [15].

This study was conducted to determine the lymph node yield and metastasis rate in the internerve tissue lymph nodes and consequently to evaluate the necessity of dissecting this tissue. The results of this study showed that the internerve tissue contains lymph nodes in the majority of cases (56%) and that the lymph nodes contain metastatic disease in 10% of cases. These results are in accordance with the only previous study that reported similar findings [15].

Axillary lymph nodes are grouped into 3 levels in relation to the pectoralis minor muscle. Level one is defined as the nodes between the latissimus dorsi and the lateral pectoralis minor; while level two is posterior to the pectoralis minor muscle [16]. Furthermore, axillary lymph node metastasis from carcinoma of the breast follows an orderly progression from proximal (level I) to distal (level III); with skip metastasis being rare (1 to 3%) [17]. Accordingly, to ensure complete axillary dissection, the internerve tissue lymph nodes should be dissected and removed, being a part of level two group against the chest wall between the long thoracic and the thoracodorsal nerves.

In addition, the number of lymph nodes recoverable from axillary dissection reliably predicts the axillary lymph node status [17]. Although the current guidelines suggest that at least 10 axillary lymph nodes should be excised for proper staging and further therapy planning [18,19], a more recent study [20] recommended a minimum of 16 nodes as a target to ensure a high level of confidence that the axilla is free from metastasis. Therefore, In view of the results of the current study, excision of the internerve tissue is strongly recommended in order to optimize the lymph node yield and decision making regarding adjuvant treatment and prognosis in patients with operable breast cancer.

**REFERENCES**


