

SENTINEL LYMPH NODE BIOPSY IN THE MANAGEMENT OF AXILLARY INVOLVEMENT IN BREAST CANCER

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ABSTRACT

Objective: To know the efficacy of sentinel lymph node biopsy in the management of axillary involvement in breast cancer.

Material and Methods: This study was conducted in Surgical "A" unit of Post Graduate Medical Institute, Lady Reading Hospital, Peshawar. A total of 30 patients with operable breast cancer diagnosed on fine needle aspiration cytology (FNAC) and clinically non-palpable lymph nodes in the axilla were studied. While on the operation table for modified radical mastectomy, one ml of sterilized solution of methylene blue was injected subdermally under the areola of the diseased breast. After 5-10 minutes sentinel lymph nodes were harvested via a small incision over the axilla, marked as 'blue nodes' or blue lymphatics leading to a node.

Results: All the patients were females with mean age 45 ± 13.48 years. Mean tumor size was 3.7 ± 1.60 cm. The tumor was present in upper and outer quadrant in most (63.33%) of the patients. No complications were noted related to the procedure. The sensitivity of the method was found to be 85.7% and false negative rate was 7.1%.

Conclusion: Sentinel lymph node biopsy with methylene blue is safe and cheaper and accurately predicts the axillary lymph node status in most of the patients.

Key Words: Sentinel Lymph Node Biopsy, Fine Needle Aspiration Cytology, Axillary Lymph Node Dissection (ALND).

INTRODUCTION

The carcinoma breast, a common disease of adult females, is frequently encountered problem in surgical department. It usually presents with a palpable lump in the breast with or without axillary nodes metastases.

As the incidence of axillary nodal involvement in clinical stage I and II breast carcinoma is only 4-37%, the routine axillary dissection at the time of primary surgery in all the patients can render 63-96% of the patients to undergo unnecessary axillary dissections, hence causing prolonged operation time, increased hospital stay and other complications like numbness, arm edema, brachial plexopathy and seroma formation¹. So if the lymph node status in the early breast cancer is known before surgery, the patients with no evidence of axillary involvement can be spared from unnecessary axillary dissection, and hence prevent its sequelae.

MATERIAL AND METHODS

The study was conducted in the Surgical "A" unit of PGMI, LRH, Peshawar from 1st January 2003 to 31st December 2003. A total of 30 patients were included in the study with FNAC (fine needle aspiration cytology) proven operable breast cancer with clinical stage T1-3, N0, M0. These patients were admitted through OPD and were scheduled for modified radical mastectomy and axillary clearance as the surgical treatment.

The patients with metastatic or inoperable disease, tumor size T4, clinically palpable axillary nodes, those with any history of previous breast surgery for benign lesions, patients medically unfit or those unwilling for mastectomy were excluded from the study.

After initial assessment and baseline investigations and informed written consent the patients were shifted to operation theatre.

Routine skin preparation was performed

and in all the cases 1ml of sterilized solution of 1% methylene blue was infiltrated with a 23 G needle attached to the syringe, in the sub-dermal region of areola in the diseased breast. A gentle massage was done for about 1-2 minutes and then within five to ten minutes a transverse or vertical incision was made in the axilla and search was made for blue node or blue lymphatics (as sentinel lymph node was defined as blue node or blue lymphatics leading to a node in the axilla).

A correlative axillary nodal dissection was also performed as in routine modified radical mastectomy with up to level II axillary dissection. The harvested Sentinel node (blue) labeled as specimen A; and rest of the mastectomy with axillary clearance specimen, specimen B, were sent for histopathology examination separately. The reports of histopathology in two specimens were analysed.

RESULTS

Maximum number of patients (21/30 i.e. 70%) were of the age range of 31 - 60 years. Only 3 patients (10%) were between 20-30 years. The frequency of tumor was constant in the rising age until the sixth decade of life where the incidence was slightly lower (6/30= 20%). The mean age was calculated to be 45 ± 13.48 years. (Table-1)

AGE OF THE PATIENTS (n=30)

Age in Years	Patient's Number
20 - 30	3
31 - 40	7
41 - 50	7
51 - 60	7
61 - 70	6

Table 1

Most of the patients came with tumor size less than 3cm indicating their early response to a 'lump in the breast' . But still there was a large number (12/30=40%) who did not seek medical advice until the tumor had reached the size of 4-5 cms. The mean tumor size was calculated to be 3.7 ± 1.60 cm (Table-2)

The histological type of tumor was infiltrating ductal carcinoma in all the cases. (Fig_1)

SIZE OF THE TUMOR (n=30)

Size in centimeters	Number of patients
03 cm or less	14
4 - 5 cm	12
> 5 cm	4

Table 2

HISTOLOGICAL TYPE OF BREAST CANCER

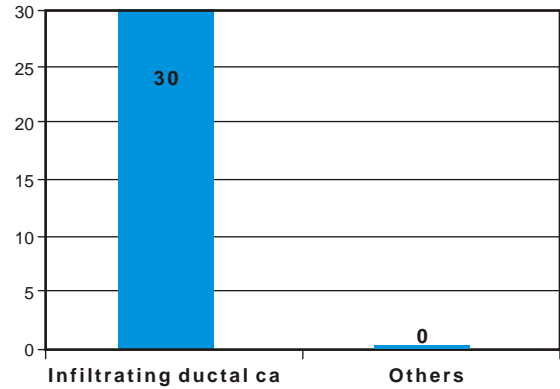


Figure-1

Out of thirty cases , the sentinel lymph nodes were positive for tumor metastasis in 28 cases (Fig-2).

SLNB "POSITIVE" VS "NEGATIVE" (N=30)

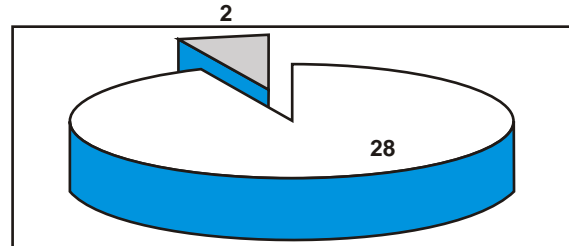


Figure-2

□ SNLB +VE
 ■ SNLB -VE

STATISTICAL ANALYSIS OF THE STUDY

Identification rate	93.4%
Sensitivity	85.7%
Specificity	71.4%
Positive Predictive Value	75.0%
Negative Predictive Value	83.0%
False Negative Rate	7.1%

DISCUSSION

The sentinel lymph node is defined as the first node in the lymphatic basin into which the primary tumour drains. Therefore, if the sentinel lymph node (SN) is not involved with metastatic disease, the remainder of the lymph nodes should also be negative. Likewise, if the SN is positive, there is a risk that higher order nodes may be involved with metastatic disease.

Sentinel Node Biopsy is emerging as a minimally invasive alternative to axillary dissection in the staging of patients with breast carcinoma. It has the potential to identify those patients most likely to be helped by axillary dissection (i.e. those with positive nodes) and to spare node-negative patients.

Numerous studies have reported identification of the SN in more than 90% of breast cancer patients, with false-negative rates for prediction of axillary nodal status of less than 10%^{2,3}.

Sentinel Lymph node has successfully been identified using the blue dye alone in 66-98%, with radio active traces alone in 82-98% and with combination of both 90- 94%⁴. Edward⁵ and Zerwes⁶ et al have showed a 100% identification using methylene blue alone.

In the present study the identification rate was 93.4% (28/30). The reason for failed localization of sentinel lymph node in the axilla in the remaining cases may be due to high body mass index (more than 30), tumor in the inner half of the breast, multifocality of the tumor like in invasive lobular carcinoma⁷, previous breast biopsies in which lymphatics were disturbed or the faulty technique of the procedure or blockade of lymphatics by extensive tumor infiltration⁸.

The tumor size does not seem to affect localization but the skip metastasis does⁹. The sentinel lymph node may be present among the level III nodes of the axilla instead of level I or II, or it may be present in the internal mammary chain (1-6 %). In the present study the patients with non identified sentinel lymph node had the tumor in the inner quadrant of the breast.

The overall identification rate was 93.4% in our study by using methylene blue alone. In the literature there is 5% - 10% rate of undetected sentinel lymph nodes using blue dye and radio-isotope method individually or in combination.

The accuracy of a method mapped by the "false negative rate", was 7.1% in our study. The reported causes for the this are multifocal lobular carcinoma or the excessive tumor infiltration of the primary node causing re-routing of lymph fluid to non-sentinel nodes.

The sensitivity of the procedure reported in the literature ranges from 85%-92%^{6,10,11}. It is 85.7% in the present study which is however acceptable and lies within the above range.

The negative predictive value is 83.3% as compared to 88-100% in the literature^{4,12,13}. Although slightly lower, but reflects our initial experience in this experimental study.

The positive predictive value in the literature is 40%-65%¹¹. It is 75% in the present study. As our study was a Phase-I study (learning phase), we observed the protocol of performing sentinel lymph node biopsy followed by Axillary Lymph Node Dissection (ALND) in all the cases.

The phase-II trial (in which Sentinel

Lymph Node Biopsy is performed and ALND done in only those patients having positive sentinel lymph nodes) can be recommended only when a surgeon has achieved the success rate of 90-95% in finding the SLN and 0-1% of false negative results in the initial phase.

Numerous studies have reported identification of the SN in more than 90% of breast cancer patients, with false-negative rates for prediction of axillary nodal status of less than 10%^{2,3}. Patient factors shown to increase the likelihood of not finding the SN include increasing age and body mass index^{14,15}, but no factors other than surgeon experience have been found to influence the false-negative rate.

It is evident from the international data that there is a definite learning curve for sentinel node biopsy^{15,16}. This curve can be decreased by standardized training programme of in-house operative training³.

There is no universal standardization of the technique but with on site monitoring by an adequately skilled person the surgeons should perform minimum of 20 cases in phase I. In order to achieve a statistical certainty of low false negative rate of <5% , minimum of 300 cases would be required¹⁷. Only after documentation of a successful localization rate of = 90% and false-negative rate of = 10% , should full ALND be omitted for patients with negative sentinel nodes.

CONCLUSION

1. The use of sub areolar injection of methylene blue dye is feasible, safe, cheaper and readily available method to perform sentinel lymph node biopsy.
2. Sentinel lymph node biopsy reliably predicts the axillary lymph node status.
3. SLNB is able to provide the pathologist with a limited number of lymph nodes to allow a focused analysis.
4. Sparring of axillary nodal dissection on the basis of negative sentinel lymph node should only be considered after the successful learning of phase 1 of the study.

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