

HISTO-PATHOLOGICAL CORRELATION BETWEEN SENTINEL LYMPH NODE BIOPSY AND AXILLARY LYMPH NODE BIOPSY IN PATIENTS WITH CARCINOMA OF BREAST

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ABSTRACT

Introduction: The present study was aimed at mapping of lymphatic passage of sentinel lymph node in patients of carcinoma of breast and to correlate pathology of Sentinel lymph node biopsy (SLNB) and Axillary Lymph node Dissection (ALND). **Material and methods:** Patients presenting with palpable breast carcinoma without clinically palpable or suspicious axillary lymph nodes, potentially curable breast carcinoma (T1, T2 tumours) who were undergoing ALND and willing to participate in the study were included in the study. Patients with prior axillary operations, large & locally advanced invasive breast cancers, ductal carcinoma in situ, prior breast surgery, prior chemotherapy, distant metastases and pregnant women were excluded from the study. The histopathology of SLNB and ALND were correlated in the patients and sensitivity and specificity of SLNB was calculated. **Results:** 50 patients were included in the study. The blue staining sentinel lymph node was identified in 30 of 50 (60%) procedures. Of the 30 patients in whom SLN was identified, 1(3.33%) had histologically negative nodes and 29(96.66%) had histologically positive nodes; of 20 patients who had negative sentinel nodes, 19(95%) had histologically negative evidence of axillary metastasis, while 1(5%) showed histologically positive evidence of axillary metastasis. The sensitivity of sentinel lymph node status with comparison to the gold standard i.e., histopathology report, was 96.6% while the specificity was 95%. The overall positive and negative predictive values were 96.67% and 95%, respectively. **Conclusion:** Although further studies are required to confirm the findings of the present study, the SLN accurately reflects the status of axillary lymph nodes in most patients with breast cancer, and for those with early stage disease it is rapidly emerging as an alternative to conventional axillary dissection.

Key words: Carcinoma Breast, Histopathology, Mapping, Axillary Lymph node Dissection, Sentinel lymph node biopsy

INTRODUCTION

Breast cancer accounts for 32% of female cancer and is responsible for 19% of the cancer related deaths in women. In India [1, 2], it is second only to Ca cervix. The annual incidence of ca breast in India is 20.1 per 1, 00,000 women [3].

The prognosis of ca breast is difficult to express, but sentinel lymph node mapping has been a valuable tool in decreasing the morbidity that ensues breast surgeries especially modified radical mastectomy [4]. Sentinel lymph node (SLN) mapping [5,6,7] is a promising new medical technique that is gaining popularity before the medical community has had time to provide adequate training and put the procedure into practice in a safe and organised manner. SLN mapping [8,9] is minimally invasive and can reduce morbidity and cost.

It is able to provide the pathologist with a limited number of lymph nodes to allow a focussed analysis. It is the most accurate detection tool used in staging of breast cancer [6].

Sentinel lymph node (SLN) mapping and dissection is a more sensitive and accurate technique for nodal evaluation and has been applied to staging of axillary lymph nodes in patients with breast cancer, providing prognostic information, with less surgical morbidity than with axillary lymph node dissection (ALND) [10, 11].

In theory, a malignancy from primary breast cancer spreads to axillary lymph nodes (AXLNs) and progresses in an orderly fashion from primary tumour to the sentinel lymph node and subsequently to the other AXLNs [12-14]; therefore, SLN is the node most likely to contain metastatic tumour cells. If the SLN is not involved, then other ALND's should have a very low likelihood to be affected by metastasis [12, 15, 16]. However, sentinel lymph node biopsy requires validation by a backup ALND in a defined series of cases before becoming standard practice, to establish individual and institutional success rates and the frequency of false negative.

Sentinel lymph node biopsy may help in determining



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which patient can avoid axillary lymph node dissection and consequent morbidity due to unnecessary ALND. Sentinel node biopsy results in a significant reduction in physical and psychological morbidity when compared to axillary clearance. Such favourable consequences seem to apply equally in short and long term evaluation.

However at present there is no standard protocol for the localization for the histological of the sentinel lymph nodes. On this background, the present study has been undertaken.

Aims & Objectives

To study the mapping of lymphatic passage of sentinel lymph node in patients of carcinoma of breast presenting in Oncology Department, Pravara Rural Hospital, Loni. To study the pathological correlation of SLNB and ALND in patients of carcinoma of breast presenting in Oncology Department, Pravara Rural Hospital, Loni.

MATERIALS AND METHODS

Study design: Observational study

Ethics approval: The study was initiated after Ethics committee approval and informed consent was taken from the participants.

Study period: The study was undertaken during November 2015 to October 2017

Study location: Department of Oncology Department, Pravara Rural Hospital, Loni.

Sample size: Fifty were participated

Sample selection: It included 50 breast carcinoma patients satisfying the inclusion and exclusion criteria.

Inclusion criteria: Patients presenting with palpable breast carcinoma without clinically palpable or suspicious axillary lymph nodes, potentially curable breast carcinoma (T1, T2 tumours) that were undergoing ALND and willing to participate in the study were included in the study.

Exclusion criteria: Patients with prior axillary operations, large & locally advanced invasive breast cancers, ductal carcinoma in situ, prior breast surgery, prior chemotherapy, distant metastases and pregnant women were excluded from the study.

Patients with potentially curable breast carcinoma who were undergoing ALND as part of their standard treatment were evaluated.

Methodology

Sentinel lymph nodes were identified by the methylene blue dye. The method involves injecting methylene blue dye peritumorally or subdermally or periareolar region. During the operation the blue dye [5,7, 10] was injected in the breast tumor to help identify the first node. Sentinel lymph node was identified and sent for histo-pathological examination separately. Standard axillary dissection was done after mastectomy and rest of the axillary lymph nodes were sent for histo pathological examination along with sentinel lymph node.

In view of the institutional protocol ALND was performed in all patients though tracing was done for sen-

tinel nodes.

The sentinel lymph nodes identified and the remaining axillary lymph nodes were examined by standard histology. The fibrous-fatty tissue surrounding the lymph node was carefully removed without breaking the capsule. The lymph node was then bisected along its major axis. Both halves were embedded in medium used for freezing the tissues with cut surfaces up and tissues frozen in isopentane cooled with liquid nitrogen. Lymph nodes less than 5 mm were embedded and frozen uncut. If two or more sentinel lymph nodes were sent all were examined.

Tumours were classified histologically according to the world health organisation histological classification of breast tumours as modified by Rosan and Obermann [17]. The other axillary lymph nodes were isolated from fat tissue without freezing or preservation and examined by standard technique. Lymph nodes greater than 0.5 cm were bisected lymph nodes smaller than 0.5 cm were fixed and embedded uncut. Three sections were obtained from each lymph node at different levels (100-500 um apart) and stained with HE.

The sensitivity and specificity of these tests were calculated according to the following formula:

Sensitivity= True Positives / True Positives + False Negatives

Specificity = True Negatives / True Negatives +False Positives

RESULTS

50 women underwent intra operative lymphatic mapping and sentinel lymphadenectomy immediately before modified radical mastectomy or breast conserving surgical treatment of primary breast carcinoma. The age of patients ranged from 35 to 80, with more number of patients in the age group of 41 to 50 years.

Of the 26 patients whose had clinically palpable, axillary lymph node, 13 (50%) had histologically negative nodes; of 14 patients with clinically negative axillary nodes, 11 (78.57%) had histological evidence of axillary metastasis.

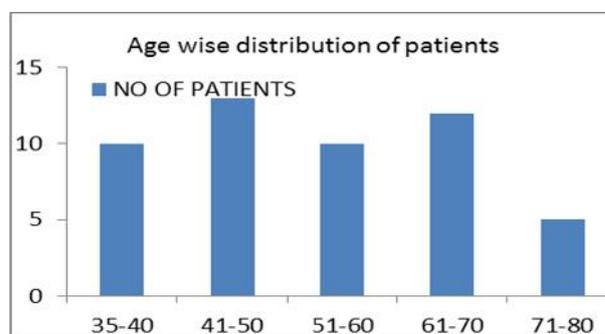


Figure 1: Age distribution of patients with carcinoma breast

With respect to grading of tumour, 32 patients (64%) had T2, while the rest had T1 grade carcinoma. Of the 50 patients, 26 (52%) were post menopausal while 24 were pre menopausal.

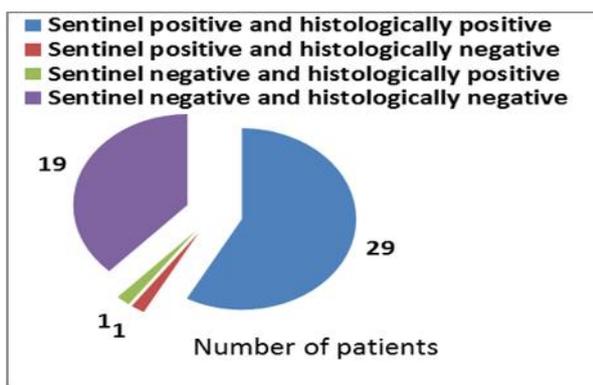


Figure 2: Histological correlation between sentinel lymph node and other axillary lymph nodes.

The blue staining sentinel lymph node was identified in 30 of 50 (60%) procedures. Of the 30 patients in whom SLN was identified, 1 (3.33%) had histologically negative nodes and 29(96.66%) had histologically positive nodes; of 20 patients who had negative sentinel nodes, 19(95%) had histologically negative evidence of axillary metastasis, while 1 (5%) showed histologically positive evidence of axillary metastasis.

The sentinel node accurately identified axillary nodal status in 30 of 50 cases (60%). In 1 of 50 cases (2%), the sentinel node was histologically negative, i.e., no tumor was identified in the sentinel node, but at least one non sentinel node harbored metastasis.

Of the total sentinel lymph nodes examined, 29 cases were histologically positive, 1 case was histologically negative. Thus, it was highly unlikely that uptake of dye by an involved node was a result of chance alone.

The sensitivity of sentinel lymph node status with comparison to the gold standard, ie, histopathology report, was 96.6% while the specificity was 95%. The overall positive and negative predictive values were 96.67% and 95%, respectively. The overall accuracy of the tests done by me was found to be 47.5%.

Table 1: Complications following axillary lymph node dissection

Complications		No of cases
Immediate	Wound dehiscence	2
	Infection	7
	Haemorrhage	1
	Lymphatic collection	3
Late	Lymphedema	1
	Neuralgia	2
	Restricted movement	1
Total		17

Complication after the axillary lymph node dissection was seen in 17 patients (34%), most common of which was infection.

DISCUSSION

ALND remains the standard of care for patients with

locally advanced breast cancer or inflammatory breast cancer, for those with a positive SLN who are planned for mastectomy, and for those with a positive sentinel node after neoadjuvant chemotherapy.

SLNB is less invasive than ALND and facilitates more accurate staging but as per our institutional protocol all patients underwent ALND after initial sentinel node tracing. Research has indicated that 25% of patients with sentinel node micro metastases had residual axillary disease whereas patients with a single sentinel node micro metastasis and more than four disease-free sentinel nodes were unlikely to have axillary disease [8,9,18].

Determination of axillary nodal status is essential for the staging of breast cancer. However, the extent of axillary dissection required for accurate staging is controversial. Total dissection of the axilla has the highest morbidity, but offers the greatest staging accuracy. The accuracy of limited dissections or sampling procedures is unclear partially because these procedures often are ill defined and partially because of the methods used to evaluate their accuracy. Differences in staging techniques are well defined by Kinne [19].

Forrest et al [20]. demonstrated an 8% false-negative rate in specimens with three to four lymphnodes, and Steele et al [21] suggested that removal of at least four nodes from the lower axillary fat pad near the tail of the breast was as accurate as ALND.

Giuliano's [5, 13, 14, 20] work reflects the developmental stage of blue dye SLN mapping for breast cancer, with successful SLN localizations increasing from 65% to 93% over a personal experience of hundreds of cases. Most false-negative results occurred in earlier patients.

Krag et al's [22, 23] multicenter validation study, 15 which reports on isotope-guided SLN biopsy for breast cancer as performed by 11 surgeons at 11 different institutions, is more discouraging. Although SLNs were found in 93% of 443 cases (range 82% to 98%), false-negative results occurred in 11.4% of 114 node-positive cases (range 0% to 28.6%). The false negative percentage is much lower in our study. In the present study, of the 30 patients in whom SLN was identified, 1(3.33%) had histological negative nodes and 29(96.66%) had histological positive nodes; of 20 patients who had negative sentinel nodes, 19(95%) had histological negative evidence of axillary metastasis, while 1(5%) showed histological positive evidence of axillary metastasis. This variation could be due to difference in the population or a smaller sample size. Also in these studies, successful SLN localization was more frequent for high-volume surgeons, as expected, but the false-negative rate was unrelated to surgical experience: indeed, one of the three highest-volume surgeons also had the highest false-negative rate (28.6%).

The false negative rate for SLN surgery ranges from 0 to 10% as reported in NSABP B-32 trial [24]. Patients who present with clinical palpable lymph nodes should be

evaluated with axillary ultrasonography and FNAB of the nodes. If axillary metastasis is confirmed patients can proceed directly to standard axillary lymph node dissection or be considered for neoadjuvant chemotherapy. If axillary metastasis is not confirmed by FNA biopsy then patients can proceed to SLN surgery for staging.

Fisher et al [25, 26] have suggested that ALND offers no survival advantage and that level I and II dissection would accurately stage most patients with breast cancer. In this study, the majority of breast cancer patients with axillary disease had metastases limited to level I nodes. Because the survival benefit of ALND is unclear, the necessary extent of axillary dissection may be determined best by staging accuracy and local control.

CONCLUSION

The SLN accurately reflects the status of axillary lymph nodes in most patients with breast cancer, and for those with early stage disease it is rapidly emerging as an alternative to conventional axillary dissection. Although SLNB for early breast cancer may be considered state of the art in experienced hands, information on credentialing for this new procedure is scarce. The experience indicates that intraoperative lymphatic mapping can accurately identify the sentinel node i.e., the axillary lymph node most likely to contain breast cancer metastases in some patients. The technique could enhance staging accuracy and with further refinements and experience, might alter the role of ALND.

Conflict of interest : Nil

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