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A Study of Sentinel Lymph Node Biopsy in Early Breast Cancer using Methylene Blue in a Tertiary Care Hospital in South India

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Abstract:
Background: *Sentinel lymph node biopsy in early breast cancer performed by intraparenchymal or intradermal injection of blue dye and/or radioactive colloid remains a highly acceptable method of identifying sentinel nodes largely because of its success rate.*
Aim: *1. To assess the efficacy of sentinel lymph node biopsy in detecting axillary metastases in cases of node negative early breast cancer.*
Material and Method: *The study material consisted of 109 women with early breast cancer in stage T1/T2N0M0 who underwent modified radical mastectomy along with sentinel lymph node biopsy after subareolar injection of methylene blue dye at Dept. of General Surgery, SVRR Govt. General Hospital, Tirupati (AP).*
Results: *This study showed that this simplified technique of identifying the sentinel nodes has sufficiently high identification rate.*
Keywords: *Axillary lymph node dissection (ALND), Breast Cancer, Methylene Blue, Sentinel lymph node (SLN), Sentinel lymph node biopsy (SLNB), Subareolar injection.*

I. Introduction

In recent years, breast cancer treatment has gradually shifted from aggressive surgical treatment to minimally invasive surgical procedures. The introduction of mass screening and awareness programs has resulted in detection of breast cancer at an early stage. This made room for less aggressive treatment options along with addition of neo adjuvant and adjuvant chemotherapy and radiotherapy [1].

An excellent example of this shift in treatment is the sentinel node biopsy technique as an alternative to ALND for staging in breast cancer. All along axillary lymph node dissection remained an essential part of the treatment for staging, local regional control and as an indicator of the need for adjuvant therapy. In 30-40% of patients with curable breast cancer metastases in the axilla are found. Axillary clearance in this group provides regional tumor control. However, the morbidity of ALND is considerable with high percentages of chronic lymphoedema (6-56%), pain (16-55%), sensory disturbances (58-81%) and dysfunction of the shoulder and arm (14-32%) [2]. In patients with a tumour negative axilla, who make up 60-70% of all patients, lymph node dissection has no additional value. With SLNB, it is now possible to offer this group of patients an accurate staging without the morbidity of axillary clearance.

II. Aim of Study

To assess the efficacy of sentinel lymph node biopsy in detecting axillary metastases in cases of node negative early breast cancer.

III. Material and Methodology

The study material consisted of 109 female patients with primary diagnosis of early breast cancer with clinical stage T1/T2N0M0 admitted in Department of General Surgery, SVRR Govt. Gen. Hospital attached to S.V. Medical College, Tirupati (AP). This was a prospective study.

A pretested proforma was used to collect relevant information (patient data, detailed history, clinical examination, FNAC, USG breast and axilla, USG abdomen, mammography, chest x-ray, lab investigations etc.,) for selecting patients.

With all the required preoperative investigations, informed consent from all participating patients was taken after ensuring fitness for surgery. These patients were taken up for SLNB along with modified radical mastectomy.

Methylene blue dye (5 cc of 1% dye) was injected in subareolar region 20 minutes prior to surgery. The breast was then massaged for 5 minutes. Intraoperatively SLN were searched after raising superior flap. Dissection of axillary tissue to identify stained lymph nodes was done. All blue nodes and nodes receiving a

blue lymphatic channel were considered as sentinel nodes. After excising the stained lymph nodes, complete axillary clearance and removal of breast tissue was done.

Lymph nodes were divided into two groups i.e., the dye stained lymph node as sentinel node and the rest removed by axillary clearance. These along with breast specimen were subjected to histopathological examination.

The exclusion criteria included pregnant or lactating patients, clinically palpable nodes, breast lesions larger than 5 cms, multicentric and multifocal tumor, systemic metastases, previous breast surgery, radiotherapy or chemotherapy and allergy to methylene blue.

IV. Observations and Results

In this prospective study on 109 female patients, the SLN was identified and biopsied in 100 cases and in 9 cases, SLN could not be identified. MRM was done in the same operative setting along with ALND. The efficacy of SLNB was analysed using diagnostic validation tests in terms of sensitivity, specificity, false negative rate, positive and negative predictive value tests.

Table 1 Tumour Characteristics in Patients in whom SLN was identified

Breast Carcinoma	**No. of Cases**
SIDE	
RIGHT sided tumor	51 (51%)
LEFT sided tumor	49 (49%)
QUADRANT	
OUTER quadrants	80 (80%)
INNER quadrants	15 (15%)
CENTRAL	5 (5%)
TUMOUR stage	
T1 tumours	20 (20%)
T2 tumours	80 (80%)
TUMOUR Histology	
Invasive ductal carcinoma	85 (85%)
Invasive lobular carcinoma	12 (12%)
Mucinous carcinoma	01 (1%)
Tubular carcinoma	02 (2%)
Hormone Receptors	
ER/PR Positive	89 (89%)
Negative	11 (11%)
HER2neu Positive	13 (13%)
Negative	87 (87%)

- Among 100 cases in which SLN was identified, 51 cases (51%) had right sided tumour while 49 cases (49%) had left sided tumour. In 80% of cases, tumours were located in outer quadrant, 15% in inner quadrant and in 5% in central or subareolar position.
- On clinical staging, 20 cases (20%) had tumors in T1 stage and in 80 cases (80%) tumours were in T2 stage. In none of the cases, axillary lymph nodes were clinically palpable and there was no evidence of distant metastases.
- On histopathological examination of excised tumour, infiltrating ductal carcinoma was found in 85 cases (85%), lobular carcinoma in 12 cases (12%), mucinous carcinoma in 1 case (1%) and tubular carcinoma in 2 cases (2%).
- Hormone receptor ER/PR was positive in 89 cases (89%) while Her2neu was positive in 13 cases (13%).

Table 2 Tumour Characteristics in Patients in whom SLN was not identified

Breast Carcinoma	**No. of Cases**
SIDE	
RIGHT sided tumor	06 (66.66%)
LEFT sided tumor	03 (33.3%)
QUADRANT	
OUTER quadrants	02 (22.22%)
INNER quadrants	07 (77.77%)
TUMOUR stage	
T1 tumours	05 (55.55%)
T2 tumours	04 (44.44%)
TUMOUR Histology	
Invasive ductal carcinoma	05 (55.55%)
Invasive lobular carcinoma	02 (22.22%)
Mucinous carcinoma	01 (11.11%)
Tubular carcinoma	01 (11.11%)

Hormone Receptors	
ER/PR Positive	08 (88.88%)
Negative	01 (11.11%)
HER2neu Positive	02 (22.22%)
Negative	07 (77.77%)

- Among the 9 cases in whom SLN could not be identified 6 cases(66.66%) had right sided tumour and 3 cases(33.33%) had left sided tumour.In 2 cases(22.22%) tumours were located in outer quadrant and in 7 cases(77.77%) in the inner quadrants.
- On clinical staging 5 cases (55.55%) were found to be in T1 stage and 4 cases (44.44%) were in T2 stage. In none of the cases axillary lymph nodes were clinically palpable and there was no evidence of distant metastates.
- On histopathological examination of excised tumour, invasive ductal carcinoma was seen in 5 cases, lobular carcinoma in 2 cases and 1 each of mucinous and tubular carcinoma.
- Hormone receptor ER/PR was positive in 8 cases (88.88%) and Her2neu was positive in 2 cases (22.22%).

Table 3 Salient Features of SLN

SENTINEL LYMPH NODE CHARACTERISTICS	**No. of Cases**
No. of SLN identified	
1	53
2	37
3	05
4	05
Total no. of SLN identified	162
Mean no. of SLN identified	1.62
DISTRIBUTION OF METASTASIS IN SLN AND NON SLN	
Cases with positive axillary nodes	68
Only SLN positive	10
Both SLN & other axillary nodes positive	48
Cases with negative SLN & positive axillary nodes (false negative)	10
Cases with negative SLN & negative axillary nodes	32

- SLN was identified in 100 out of a total of 109 cases in whom procedure was performed with an identification rate of 91.74%.
- The mean no. of SLN detected was 1.62.
- Total no. of cases with positive axillary nodes was 68.
- Among these 68 cases with positive axillary nodes, SLN was the only positive node for metastasis in 10 cases (14.70%), both SLN and rest of the axilla also being positive for metastases in 48 cases (70.59%) and SLN was negative for metastases in 10 cases (false negative rate of 14.70%). Total no. of cases with negative axillary nodes was 32. In all these 32 cases, SLN was also negative for metastases.
- With above mentioned results, the overall sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of SLNB in predicting axillary node status was 85.39%, 100%, 100% and 76.19% respectively. A false negative rate of 14.71% was observed. The overall accuracy was 90%. All the patients are on regular follow-up.

V. Discussion

The disease status of the axillary lymph nodes is the most significant prognostic factor for patients with early stage breast cancer. Predictors of node metastases include tumour size, lympho vascular invasion, tumour grade and patient's age. Receptors status DNA content, tumour location, method of detection and presence of calcifications on mamography have some predictive value. However no combination of predictors has replaced surgical resection and histopathologic examination of the lymph nodes.

Sentinel lymph node biopsy has been widely accepted as a minimally invasive alternative to axillary dissection for nodal staging of breast cancer so that patients with negative nodes can be identified accurately and surgical morbidity associated with axillary dissection can be decreased.

In all 9 cases in which SLN could not be identified, axilla was positive for nodal metastases. This may be attributed to surgeon's inexperience with SLNB as most of these cases occurred in the initial period of study.

Though the identification rate of 91.74% in our study is comparable with the studies of McMasters et al [3] and Yu et al [4], a false negative rate of 14.71% is a matter of concern. Among numerous factors affecting the false negative rate, increasing surgeons experience with the procedure along with careful selection of patients, selecting appropriate technique of SLNB and finally meticulous pathological examination of sentinel nodes may help to bring down the high false negative rate to an acceptable minimum.

VI. Conclusion

Our results show that this simplified technique of identifying the sentinel nodes by using subareolar methylene blue has sufficiently high identification rate (91.74%). The results of the present study describe our initial experience with the SLNB technique. Both the increased false negative rate (14.71%) and decreased negative predictive value (76.19%) are modifiable variables.

Diagnostic validation tests were performed to assess the efficacy of SLNB. Out of 109 patients SLN was successfully identified in 100 patients (91.74%) with a mean of 1.62 SLN being identified in each patient (162 SLN were found in 100 patients). This study showed a high false negative rate of 14.71% and a negative predictive value of 76.19%. The overall sensitivity and specificity of SLNB in this study is 85.39% and 100% respectively with an accuracy of 90%.

Routine application of this procedure along with completion ALND in carefully selected patients will provide an opportunity for both surgeon and pathologist to gain expertise and hence reduce the false negative rate to an acceptable minimum.

References

[1]. Louwman WJ et al, the rising trends of incidence and prognosis for breast cancer patients, 1975 – 2004: a long-term population-based study in southeastern Netherlands. Cancer Causes Control 2008; 19:97-106.
[2]. Schijven M, Rutten H, Roumen R. Implementation of the sentinel node biopsy: a survey among surgeons in the Netherlands. Eur J Surg Oncol 2000; 26:431-432.
[3]. McMasters K, Tuttle T, Carlson D, Brown CM et al. Sentinel lymph node biopsy for breast cancer: A suitable alternative to routine axillary lymph node dissection in multi institutional practice when optimal technique is used. J Clin oncol, 2000, 18:2560-2566.
[4]. Yu JC et al. Sentinel lymph node biopsy in early breast cancer in Taiwan. World J Surg, 2002, 26:1365-1369.