

## Role of Sentinel Lymphnode Biopsy in Carcinoma Breast Using Methylene Blue Dye

Dr. Jayasree Kasula<sup>1</sup>, Dr. Ramakrishna Prasad Ch<sup>2</sup>,

Dr. B. N. Uma Maheshwara Rao<sup>3</sup>, Dr. Syed Viquaruddin Masood<sup>4</sup>

(<sup>1</sup>Assistant professor, <sup>2</sup>Post Graduate, <sup>3</sup>Professor, <sup>4</sup>Professor and H.O.D, Department of General Surgery, Gandhi Medical College, Secunderabad, India).

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### Abstract

**Introduction:** When detected early, breast cancer is curable and normal life expectancy is expected. Routine detection of SLNB by adding radio colloid to the dye and detecting with gamma camera can be replaced by injection of methyleneblue dye near the lesion and identifying sentinel lymph node that is stained with Methyleneblue with naked eye which is more feasible, economical and practical in a developing country.

**Objectives:** To assess the accuracy of sentinel lymph node biopsy in detecting axillary metastasis in cases of clinically and sonographically node negative early breast cancer using methyleneblue dye.

**Methodology:** Prospective study of 15 cases of early breast cancer admitted in a tertiary care teaching hospital and referral cancer institute was done. SLNB was done after injecting Methyleneblue dye near the lesion. HPE of sentinel lymph node was done and if found positive, axillary lymph node biopsy and HPE were done.

**Results:** Sentinel node was successfully identified by blue dye in 86.7% of cases. The accuracy of the sentinel node as an indicator of axillary status was 92.3%. The sensitivity was 87.5%. The negative predictive value was 83.3%. Metastatic disease in sentinel nodes without involving axillary node was found in 37.5%.

**Conclusions:** SLNB using methyleneblue dye is an acceptable predictor of axillary nodal status in women with, early breast cancer.

**Keywords:** Early breast cancer, Methyleneblue, Sentinel lymph node biopsy.

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### I. Introduction

The Breast cancer has a major impact on the health of women. For nearly a century axillary lymph node dissection (ALND) has been considered an essential component of breast cancer management. The benefits of ALND include its impact on disease control (i.e. axillary recurrence and survival), its prognostic value, and its role in treatment selection. However, the anatomic disruption caused by ALND may result in lymphedema, nerve injury, and shoulder dysfunction, which compromise functionality and quality of life. ALND remains the standard approach for women who have clinically palpable axillary nodes or positive nodes confirmed by methods such as ultrasound guided fine needle aspiration.

The surgical approach to treating women who have clinically negative axillary lymph nodes with breast cancer is rapidly evolving. For these patients, sentinel lymph node biopsy (SLNB) is a method of nodal staging. SLNB offers its greatest advantage in nodal staging by allowing a more focused examination of the lymph node at greatest risk for metastatic disease.

The benefits of SLNB for breast cancer patients with histologically negative axillary nodes are now established.

Methyleneblue is a good and cheap alternate agent for SLNB mapping. Addition of radio-colloid mapping to blue dye does not achieve a sufficiently higher identification rate to justify the cost. Methyleneblue is therefore mentioned as the agent of choice for SLNB mapping in developing countries<sup>1</sup>.

However, SLN identification rate is influenced by, injection site, volume and choice of mapping agent, the metastatic load of the lymph node, location of the SLN, and importantly, the surgeon's skill at identifying SLN<sup>2</sup>. The American Society of Breast Surgeons recommends that, for competence, surgeons should perform 20 SLNB procedures either under supervised mentoring by an experienced colleague or followed immediately by completion ALND. It is also recommended that the false negative rate not exceed 5%<sup>3,4</sup>.

The present study intends to assess the efficacy of identifying the SLN using MethyleneBlue dye, for detecting SLN metastases in patients with early breast cancer.

### II. Objectives of the study

To assess the accuracy of sentinel lymph node biopsy in detecting axillary metastasis in cases of clinically and sonographically node negative early breast cancer using methyleneblue dye.

### III. Materials and methods

#### 3.1. Setting

The patients admitted between August 2011 and July 2013 to a referral Cancer Institute and a tertiary care teaching hospital in South India with primary diagnosis of early breast cancer.

#### 3.2. Method of collection of Data (including sampling procedures if any)

Female patients who are admitted with primary diagnosis of early breast cancer, clinical stage T1/T2N0M0, based on detailed history, clinical examination, FNAC/Trucut biopsy, USG breast and axilla, USG abdomen, mammography and chest x-ray were selected for this study.

Informed consent for sentinel lymph node biopsy, axillary clearance, MRM, BCS was taken.

These patients were subjected to the required preoperative investigations. After ensuring fitness for surgery, these patients were taken for modified radical mastectomy or quadrantectomy.

A total of 15 cases with the following inclusion and exclusion criteria were selected for the study.

#### 3.3. Inclusion criteria

- All the female patients more than 19 years of age with pathologically (FNAC/Trucut biopsy) proven early breast carcinoma without clinically and sonographically detectable nodes, with clinical stage T1/T2 N0 M0.

#### 3.4. Exclusion criteria

- Pregnant/lactating patients.
- Patients with clinically palpable nodes.
- Patients with primary breast lesions clinically larger than 5cm.
- Patients with multi-centric and multi-focal lesions
- Patients with systemic metastasis.
- Patients with previous breast surgery that may interfere with the lymphatic drainage.
- Patients with previous radiotherapy and/or chemotherapy.

A pretested proforma was used to collect relevant information (patient data, clinical findings, lab investigations, etc.) from all the selected patients.

Sonomammography, FNAC of the lesion, Ultrasound examination of abdomen and standard surgical profile were performed on all patients.

#### 3.5. Technique of sentinel lymph node biopsy

5ml of methylene dye was infiltrated peri-tumorally subcutaneously within 0.5cm of the tumour radius in patients with palpable lumps followed by 5 minutes of massage. 20 minutes later surgery was performed.

For cases posted for MRM, sentinel lymph node was searched for after raising the upper flap, whereas in BCS, sentinel lymph node was searched for through a separate axillary incision.

Table 1: Master Chart

Se.no	Age In years	Stage	Type of Carcinoma	Type of surgery	SLNB Successful	Axillary LN	HPE of Sentinel LN
1	40	Ila	DCC	MRM	Successful	-VE	+VE
2	45	Ila	DCC	MRM	Successful	+VE	-VE
3	50	Ila	LCC	MRM	Successful	-VE	-VE
4	38	I	DCC	BCS	Successful	-VE	+VE
5	43	I	DCC	BCS	Successful	+VE	+VE
6	50	Ila	DCC	MRM	Unsuccessful	NA	NA
7	23	I	DCC	BCS	Successful	-VE	-VE
8	33	I	DCC	BCS	Unsuccessful	NA	NA
9	65	Ila	DCC	MRM	Successful	-VE	-VE
10	60	Ila	LCC	MRM	Successful	-VE	+VE
11	55	Ila	MED	MRM	Successful	-VE	-VE
12	58	Ila	LCC	MRM	Successful	-VE	-VE
13	63	Ila	MED	MRM	Successful	+VE	+VE
14	75	Ila	DCC	MRM	Successful	+VE	+VE
15	25	Ila	DCC	MRM	Successful	+VE	+VE

All blue stained lymph nodes at any level were excised and sent in a separate container labelled 'sentinel lymph nodes'.

After excising the stained lymph nodes, complete axillary clearance and removal of breast tissue was done.

Specimens were sent for histopathological assessment using Haematoxylin & Eosin staining. SLNB was considered successful when there were no visible blue staining nodes in the axilla.

#### IV. Observations and results

The peak age incidence of early stage breast cancer was in the age group of 35-65 years. 12 out of 15 cases were in the age group of 35-65 years constituting 80%.

Table2: Age distribution of patients

Age group(years)	No. of patients	Percentage
20-35	2	13%
36-50	6	40%
51-65	6	40%
66-80	1	7%

Table 3: Quadrant wise distribution of carcinoma

Quadrants	Observed cases	Percentage
Left Upper & Outer	06	39.4%
Right upper & Outer	04	26.6%
Left Lower & Inner	02	13.8%
Right Lower & Outer	01	9.6%
Left Upper & Inner	02	7.4%

Duration of symptoms widely varied from 1 month to 1 year with majority of patients presenting within 6 months.

Table 4: Duration of symptoms

Duration	No. of patients	Percentage
<6months	9	60
6-9months	4	27
>9months	2	13

Table 5: Stage of tumor

Stage	No. of patients	Percentage
In situ	0	0
I	4	27%
IIa	11	73%

Most of the patients presented with stage II.

Table 6: Type of Surgery performed

Type of surgery	No. of cases	Percentage
Breast conservation surgery (wide local excision)	4	27
Modified Radical mastectomy	11	73

Table 7: Distribution of histopathological varieties

HPE Report	No. of cases	Percentage
Invasive DCC	10	66.7%
Invasive LCC	3	20%
Medullary carcinoma	2	13.3%

Sentinel node was successfully identified by blue dye in 13 out of 15 cases (86.7%). The results for the 13 patients in whom sentinel node biopsy was successful comparing the results of the SLNB with those of axillary dissection are shown in Table VII. Of the 15 patients who met the inclusion criteria, the accuracy of the sentinel node as an indicator of axillary status was 92.3% (12 of 13). The sensitivity was 87.5% (07 of 08). The false negative rate was 12.5% (1 of 8 histologically positive nodes). The negative predictive value was 83.3% (5 of 6). Metastatic disease in sentinel nodes without involving axillary node was found in 37.5% (3 of 8).

Table 8: Results of histopathological examination of sentinel and axillary lymph nodes

Successful sentinel nodes	HPE result of metastasis in sentinel lymph nodes biopsied	Axillary nodal metastases (HPE)	
		negative	positive
07	Positive	03	04
06	Negative	05	01
13	Total	8	05

## V. Discussion

The concept of full axillary clearance is now not accepted for many patients with small breast cancers. However, several criteria like fitness for future post-operative irradiation and patient compliance for follow up are required to be met with to ensure the maximum efficiency of limited axillary surgery. SLNB is a well-established, minimally invasive method of axillary staging in patients with breast cancer with clinically negative axillary LN<sup>5</sup>. SLNB in early breast cancer aims at identifying as many truly node negative patients as possible, sparing them from unnecessary axillary dissection and related morbidity<sup>6, 7</sup>. Our findings support the hypothesis that the sentinel node is a reasonable predictor of axillary nodal status in women with early breast cancer though it is exceeding the 5% cut off recommended by the American Society of Breast Surgeons. In this study, using Methyleneblue dye was successful in revealing a sentinel node in 86.7% of cases which is comparable to previous studies reporting rates of sentinel node identification with methyleneblue dye ranging from 83% to 93%<sup>8-13</sup>. The remaining patients who did not show dye in the SLN showed involvement of these nodes with malignant deposits which also affected non-sentinel axillary nodes. The rate of false negative results defines the accuracy of SLNB as, if the negative sentinel node is removed while the positive node remains in the axilla, the disease will be under-staged, leaving the patient at risk for recurrence. When successfully identified, SLNB accurately predicts axillary node status in 92.3% (12 of 13) with false negative results in 12.5% (1 of 8), this is comparable with other series reporting 0-17% false negative results<sup>14, 15</sup>. These false negatives may be due to the inexperience of surgeons with SLNB procedure, as well as a result of extensive tumor infiltration of the primary node draining the tumor. Patients who will gain therapeutic benefit from axillary dissection are those with nodal metastases. In our study, 5 of 13 (38.5%) successful sentinel node biopsies had histologically negative for metastases. These patients could have been spared a complete axillary dissection. This agreed with Fenaroli et al who reported that SLNB can spare axillary dissection in approximately half of cases of early breast cancer<sup>16</sup>. Methyleneblue is a cheaper, easily available, easily sterilisable and easily administrable alternative to radio colloiddye mapping with gamma camera to identify sentinel node.

## VI. Conclusion

Conclusion of this study is that SLNB using methyleneblue dye is an acceptable predictor of axillary nodal status in women with early breast cancer. So, in cases of negative SLNB using methyleneblue, axillary dissection can be avoided while in positive cases ALND is performed.

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