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SENTINEL LYMPH NODE DETECTION AND BIOPSY AS A PREDICTOR OF AXILLARY NODAL BASIN METASTASIS IN CARCINOMA OF BREAST

Oncology

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ABSTRACT

INTRODUCTION: In Breast cancer the sentinel lymph node is the first lymph node to which cancer is likely to spread from the primary tumor.
MATERIAL AND METHODS: This study was conducted in the Department of Surgery, Government Medical College, Kolkata from January 2017 to March 2019, meeting specified Inclusion and Exclusion Criteria.
RESULTS: We found that the overall specificity, sensitivity and negative predictive values of our study were 100%, 94.73% and 90.9% respectively.
Identification Rates with Pre Operative Tru Cut Biopsy : 100%. The overall identification rate was 96.66%, the false negativity rate was 5.26%. For patients with upper inner quadrant tumours IR=85.71% and FNR=25% which were statistically significant. T2 size tumour had an IR &FNR of about 96% & 5.55% respectively .
CONCLUSION: It is done to test the validity of sentinel lymph node biopsy in predicting the axillary nodal metastasis in breast cancer.

KEYWORDS

Breast Cancer, Sentinel Lymph Node, Axillary Nodal Dissection, 1%Mythelene Blue Dye.

INTRODUCTION :

Sentinel lymph node biopsy is based on the idea that cancer cells spread in an orderly way from the primary tumour to the sentinel lymph node(s) , then to the other nearby nodes . [1,2]. Axillary nodal dissection is considered as a staging procedure and maintaining local control of the axilla . To identify the sentinel lymph node.(s) , the surgeon injects a radioactive substance or dissects the sentinel lymph node(s) stained with the dye . Once the sentinel lymph node(s) located , it is excised and removed through a small incision . The sentinel lymph node(s) is checked for the presence of cancer cells by pathologists either by a frozen section or imprint smear microscopy . If cancer is found , the surgeon will usually complete the axillary lymph node dissection in the same procedure or during a follow up surgical procedure .

MATERIALS AND METHODS :

In our department while conducting the study from January 2017 to March 2019, we included (n=30) female patients with confirmed microscopic evidence of breast cancer. All blue lymphatic channels are identified and dissected as the sentinel lymph nodes. The accuracy of Sentinel lymph node biopsy is technically feasible and highly accurate even in larger (T2 and T3) tumors .Previous breast surgery may disrupt the lymphatics from the tumor site to the axilla and this may lead to higher false negative results (3).

RESULTS AND ANALYSIS

Out of the 30 selected cases we could identify the sentinel node in 29 cases of which 18 showed metastasis in both imprint smear and histopathology and 11 cases had no metastasis .In total , 20 cases had axillary disease and remaining 10 cases were free from axillary spread. It was a prospective study, compiled all data , verify their accuracy and adequacy and , then to classify and tabulate as per the required.

Table 1 : Age Group Vs Identification Rate Of Sentinel Lymph Node (SNLB – sentinel lymph node biopsy)

Age	No . of patients with attempted SLNB	No. of patients with SLN detected	No. of patients with failed detection	Identification rate (%)
>50 years	13	12	1	92.3
<50 years	17	17	.0	100

Test of proportion shows that age>50 yrs has statistically significant low identification rate (p<0.01)[Statistical software used is Epi- Info version 3.4]

Table -2: Proportion of each study group of patients (n=30) .

S/L No	Specific groups	No of patients	Proportion (%)
1	AGE >50YRS	13	43.33
2	AGE<50YRS	17	56.61
3	PRE OP FNAC	17	56.61
4	PREOP EXCISIONAL BIOPSY	4	13.32
5	PREOP INCISIONAL BIOPSY	1	3.33
6	PREOP TRUCUT BIOPSY	8	26.64
7	UPPER OUTER TUMOUR	14	46.62
8	UPPER INNER TUMOUR	7	23.31
9	LOWER OUTER TUMOUR	6	19.98
10	LOWER INNER TUMOUR	2	6.66
11	CENTRAL TUMOUR	1	3.33.

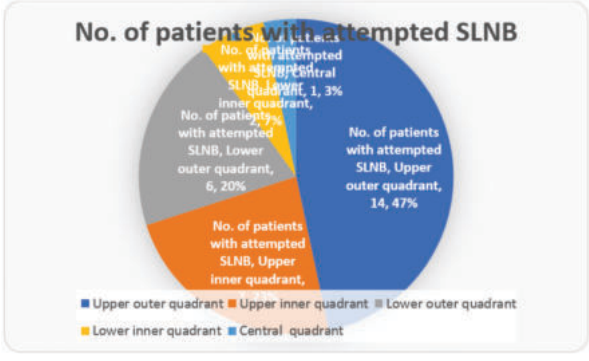

Fig 1: No. of patients with attempted SLNB

Maximum number of patient attempt in our study is in upper outer quadrant (47%) and least number is in central quadrant (3%).

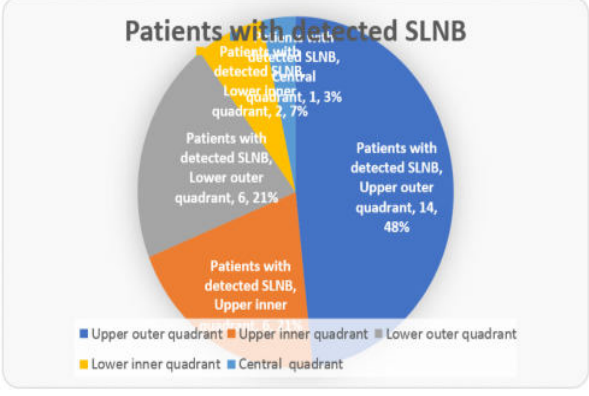

Fig 2 : Patients with detected SLNB

Synteneal lymph node is maximum in upper outer quadrant(48%).

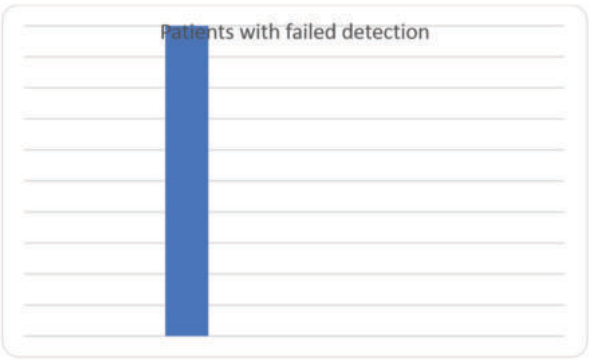

Fig 3 : Patient with failed SLNB detection

Failed detection of SLNB, upper inner quadrant is maximum number.

Table 3 : Tumor Size Vs Identification Rate Of Sentinel Lymph Node

Tumor size	No. of patients with attempted SLNB	Patients with detected SLNB	Patients with failed detection	Identification rates of SLNB(%)
T 1 (p T 1)< 2 CM	5	5	0	100
T2 (p T2) 2-5cm	25	24	1	96
T3 (p T3) >5cm	0	0	0	0

Total patients (n=30),divided based on tumor size

Chi-square test shows that there is no statistically significant difference between the groups (p=0.83)

[Statistical software used is Epi- Info version 3.

Table 4 : SLNB vs Axillary disease

	Axillary disease present (a)	Axillary disease absent (b)
SLNB positive (c)	18	0
SLNB negative (d)	1	10

WILOXON SIGNED RANKS TEST shows that sentinel lymph node status and axillary nodal status are significantly associated (p=0.001. z value=-4.243).

[Statistical software used is Epi- Info version 3.4]

Table 5 : SLN status vs ALN status for patients with pre operative Tru-cut biopsy

	ALN disease present	ALN disease absent
SLN disease present	7	0
SLN disease absent	1	0

Test of proportion shows that tumours with pre operative Tru cut biopsy have significantly higher false negative rate than other types.(p<0.01).

DISCUSSION:

The primary aim of our study was to validate the role of sentinel lymph node biopsy to predict the axillary metastasis. In sentinel lymph node biopsy, one or few lymph nodes are removed . Previous breast surgery may disrupt the lymphatics from the tumor site to the axilla and this may lead to higher false negative results [3]. Depending on this the present thinking is to spare the axillary surgery while doing a breast cancer surgery in appropriate cases. Axillary sparing can help the patients by avoiding the dreadful complications of axillary dissection without deteriorating the overall survival from the disease after treatment.

The sensitivity and specificity of our study have been 94.73% and 100% respectively .The positive predictive value was 100% and negative predictive value was 90.9%. The Wilcoxon Signed Ranks Test also shows that sentinel lymph node status and axillary nodal involvement are strongly associated (p=0.001) This clearly shows the strong predictability of sentinel lymph node biopsy of on the axillary disease in breast carcinoma. An Indian study by Deo et al [4] from AIIMS reported an identification rate of 90.4% a sensitivity and specificity of 84.2% and 100% respectively with a false negative rate of 8%.Hence it is encouraging to think that on the basis of our study we can go further to organize well furnished similar studies with adequate sample size or meta analysis to get a clear picture of the efficacy of sentinel lymph node biopsy in Indian perspective.

The two most important criteria taken into consideration to judge the efficacy of sentinel lymph node biopsy by any method are the false negative rates and the identification rates. Sentinel lymph node identification rate is, like the false negative rate , subjected to axillary nodal metastatic load (patient selection) but also to the injection site , volume and choice of the mapping agent, location of the sentinel lymph node and importantly, the surgeons skill at dissecting the axilla . Being more susceptible to technical failure , sentinel lymph node identification rate , seems to be a more reasonable target for learning curve analysis than the false negative rate [5].

The only case where we failed to identify the sentinel lymph node was in the early period of our study(5^{th} case). She was a 52 yrs old lady with a upper inner quadrant tumour of T2 size and had previous FNAC to prove malignancy. Western studies have shown that age may be contributing factor for unidentified sentinel lymph node. Ng et al [6]suggested that age related changes in lymphatic tissues may result in failure to identify sentinel lymph node in women >50 yrs age. Besides, tumour location , previous large volume excision biopsy or breast surgery may also contribute to the low identification rate. However the results of various studies are conflicting. [7,8,9,10].With our previous experience with isosulfan blue dye used in some other projects we feel that 1% mythelene blue produces a fainter staining of the lymphatic tissue . Chao et al [9] and McMaster[7] studied with radiocolloids , showed low identification rates for upper quadrant tumours. We believe that the initial inadequate surgical experience and skill with the procedure is the major factor responsible for our failure. Yet an identification rate of around 96.66% is quite encouraging to proceed with this technique. In one case we found that the sentinel lymph node biopsy was negative for metastasis in histopathology and imprint smear but the axilla had metastasis. This accounted for a false negative rate of 5.26%

It has been shown that injection of blue dye alone is responsible for low identification rates and a trend towards a high false negative rates. Although axillary drainage is the principle drainage pathway of breast, extra-axillary drainage basins are also reported such as internal mammary nodes in approx.6%-26%and others like supraclavicular, interpectoral or intramammary in around 2%-7% [11,12], particularly seen after peri or intra tumoural injection of dye [11,13].This may be responsible for missing node or wrong identification of sentinel nodes, leading to false negative results. It has been also hypothesized that if the lymphatics and lymph glands become progressively infiltrated with tumour cells , e.g larger tumours , alternative pathway of lymph drainage can occur, which contributes to false negative sentinel lymph node biopsy.[14]. Alternatively, histopathological examination taking serial sections at regular intervals increases the cancer detection rates in sentinel lymph node by about 10% [15]. The exact number of step sections or step size is unknown for detecting all metastastatic deposits, but a section interval of 0.25mm is proposed for all practical purposes [16,17].

In this study we have tried to deduce the role of specific clinico-pathologic factors on the efficacy and accuracy of the procedure, such as the patient age, tumour size (pT), tumour location and previous biopsy techniques.T1size tumours accounted for 17% and T2 size around 83% of the total tumours of our study. The identification rates were 100% for T1 and about 96% for T2 tumours. The study shows no statistically significant differences between the two groups (p>0.05). The false negative rate of the test in T2 tumours was 5.55% while 0%for T1tumours. This is also statistically not significant(p=0.65).

The main argument favouring a low detection of the sentinel lymph node after excisional biopsy is that it causes a disruption of the natural breast lymph drainage pathway. We have seen excisional biopsy , incisional biopsy or corebiopsy producing similar identification rates equal to 100%. Though the identification rate for cases having FNAC procedure is lower, approx.94.11%,it is mainly due to the unidentified sentinel lymph node .Whatsoever there is no statistically significant difference between the groups(p>0.05). We have got a significant false

negative rate of 12.5%(p<o.o1) for sentinel lymph node biopsy in patients having pre -operative tru-cut biopsy.

In this study we found that the identification rates of sentinel lymph node for upper outer, upper inner, lower outer and central quadrant tumours are equal i.e.100% while for lower inner quadrant it is approx.86% which is statistically significant(p<0.001).The false negative rate for this group is also significantly low (p<0.001).

CONCLUSION:

Breast screening facilities are needed for early detection of these patients to test the feasibility of sentinel lymph node biopsy and axillary surgery in Indian perspective.Our study demonstrates that the sentinel lymph node biopsy can be performed by using 1%methylene blue dye with acceptable identification rates, in our hospital setting though a well planned training programme.

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