

To determine the role of targeted four node sampling (FNS) in axillary mapping in operable breast cancer

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Abstract

Aim: to determine the role of targeted four node sampling (FNS) in axillary mapping in operable breast cancer. **Methods:** The present analytical hospital based study was conducted among histopathologically and cytologically confirmed patients of operable breast cancer admitted to inpatient department of General Surgery, Sri Krishna Medical College and Hospital, Muzaffarpur, India July 2019 to February 2020. A total of 30 patients, node negative operable cases of carcinoma breast after 3 cycles of neoadjuvant chemotherapy, were enrolled. Lymph node mapping was done by injecting 3 - 5 ml of methylene blue dye, just before surgery. **Results:** The sensitivity, specificity, positive predictive value and negative predictive value of 83.12%, 90.27%, 72.31% and 94.25% respectively for four node sampling of axilla, among operable breast cancer patients having node negative axilla. **Conclusions:** Targeted four node sampling using methylene blue dye can be considered as an alternative method for sentinel lymph node. Further study should be conducted to establish it as a reliable method for axillary lymph node staging.

Keywords: Four Node Sampling, Breast Cancer, Diagnostic Accuracy.

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Introduction

Breast cancer is the most frequent cancer among women in the world with an estimated 1.67 million new cancer cases diagnosed in 2012 which constituted about 25% of all cancers. It ranks second overall among all cancers in the world. Women from less developed regions have slightly more number of cases compared to more developed regions[1].

Earlier cervical cancer was most common cancer in Indian woman but now the incidence of breast cancer has surpassed cervical cancer and is leading cause of cancer death, although cervical cancer still remains most common in rural India[2]. Since axillary lymph node involvement is the most important prognostic marker of outcome, and important prognostic factor for breast cancer till now, axillary lymph node addressal/dissection has been considered an essential component of breast cancer management[3-5]SNB is now widely used for the staging of clinically node-negative patients with breast cancer. It is highly accurate in predicting the status of both the axillary and the extra-axillary lymph nodes[6] The technique of

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four node axillary sampling was pioneered in the Edinburgh breast unit and relies on the theory that the axillary nodes most likely to be involved are those that are palpable intraoperatively[7,8] However, four node axillary sampling still seems to be an attractive method for minimally invasive axillary surgery because of no additional prerequisites, its possible usefulness in areas with limited sources. Hence the present study was conducted with the aim to determine the role of targeted four node sampling (FNS) in axillary mapping in operable breast cancer[9-11].

Materials and methods

The present analytical hospital based study was conducted among histopathologically and cytologically confirmed patients of operable breast cancer admitted to inpatient department of General Surgery, Sri Krishna Medical College and Hospital, muzaffarpur, Bihar, India from July 2019 to feb 2020. The study protocol was reviewed by the Concerned Ethical Committee and was granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained

Sample selection

The sample size was calculated using a prior type of power analysis by G* Power Software Version 3.0.1.0 (Franz Faul, Universitat Kiel, Germany). The minimum sample size was calculated, following these input

conditions: estimated prevalence of 40%, power of 0.80 and $P \leq 0.05$ and sample size arrived were 30.

Surgical technique

Operative technique of targeted four node sampling which was followed was, after draping the patient, 3-5 mL of methylene blue dye was injected intradermally in the peri areolar region followed by breast massage for 5 min. After raising the superior flap, axilla was dissected and blue nodes at level-I was picked up from within the anatomical boundaries of the defined quadrangle bounded by upper intercostobrachial nerve superiorly, chest wall medially, thoracodorsal pedicle laterally, lateral border of pectoralis major anteriorly, and lateral border of latissimus dorsi laterally. Blue nodes from the above-mentioned quadrangle were sampled and sent for histopathological examination. The final histopathology reports of rest of the axilla were compared with the sampled blue nodes to assess the sensitivity/specificity and positive predictive and negative predictive value of the technique.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages and means. The statistical test applied for the analysis was independent sample t-test. The confidence interval and p-value were set at 95% and ≤ 0.05 respectively.

Results

Table 1: demographic and clinical profile

Age (years)	56.16±2.89
Tumor type	
Not special type	21
Lobular	6
Tubular	3
Mean Number of Node	1.87±0.39
Mean Number of all axillary nodes	12.31±2.21

Table 2: diagnostic accuracy of four node sampling

FNS	Sensitivity	Specificity	PPV	NPV
	With total number of patients			
	82.45	80.13	53.62	93.41
With operable node negative patients				
83.12	90.27	72.31	94.25	

Discussion

The surgical management of axillary lymph nodes in early breast cancer remains controversial, although several maneuvers have been developed such as

axillary clearance, pectral node biopsy, four node sampling, triple node biopsy, and sentinel lymph node biopsy[5]. In the present investigation sensitivity of four node sampling method to diagnose the metastasis is found to be 82%, while specificity was observed to be

80%, with positive predictive value of 50% and negative predictive value of 93%. Chintamani et al, in their study found sensitivity of four node sampling as 89.5%, specificity of 100%, diagnostic accuracy of 93.3% and negative predictive value of 84.6% [6] RD Macmillan et al., in their study observed that 30% cases were positive for four node sampling, with sensitivity of 96% and FNR of 17%. They found PPV of 86% [7] Comparative Japanese study of 206 patients of operable breast cancer undergoing sentinel lymph node biopsy and four node sampling procedure (Edinburgh technique) showed that the accuracy and sensitivity of 4NAS (98% and 96%) was comparable to that of sentinel lymph node biopsy (99% and 98%), respectively. The study concluded that four node sampling can be considered an alternate safe and easy procedure for axillary staging [7,8] "Nottingham Breast Unit", studied 200 patients (T1-2/ N0) and directly compared sentinel lymph node biopsy using hot node technique (lympho-scintigraphy) with four node sampling (Edinburgh technique). Sentinel lymph node was identified in 191 patients (96%) and when compared with SLNB, four node sampling failed to

identify metastasis in one patient (2%). On the contrary, sentinel lymph node biopsy failed to identify metastasis in eight (14%) patients in whom four node sampling detected axillary lymph node metastasis and hence under-staged the axilla. They concluded that sentinel lymph node biopsy performed using radio labeled colloid has no advantage over four node sampling.

Conclusion

In the present study we have observed a sensitivity, specificity, positive predictive value and negative predictive value of 82.45%, 80.13%, 53.62% and 93.41% respectively for four node sampling of axilla amongst all the patients. Our study also observed a sensitivity, specificity, positive predictive value and negative predictive value of 83.12%, 90.27%, 72.31% and 94.25% respectively for four node sampling of axilla, among operable breast cancer patients having node negative axilla.

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