

ROLE OF SENTINEL LYMPH NODE BIOPSY IN EARLY-STAGE BREAST CANCER

Sajjad Ali^{*1}, Zahid Mehmood², Ali Muhammad³, Yasir Mengal⁴, Soha Nazeer⁵, Sonia Rani⁶

^{*1,3,5,6}Postgraduate Trainee, Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan

²Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan

⁴Junior Registrar, Bolan Medical Complex Hospital, Quetta, Pakistan

^{*1}dr.sajjadyalanzai@gmail.com, ²dr.zmpk@yahoo.com, ³alimrahuja@gmail.com,
⁴yasirmengal786@gmail.com, ⁵sohanazeer61@gmail.com, ⁶channarsonia@gmail.com

DOI: <https://doi.org/10.5281/zenodo.18617234>

Keywords

Sentinel lymph node biopsy, early-stage breast cancer, axillary lymph node dissection, diagnostic accuracy, postoperative complications.

Article History

Received: 12 January 2025

Accepted: 25 February 2025

Published: 10 March 2025

Copyright @Author

Corresponding Author: *

Sajjad Ali

Abstract

Objective:

To evaluate the diagnostic accuracy and clinical outcomes of sentinel lymph node biopsy (SLNB) in patients with early-stage breast cancer at a tertiary care hospital in Pakistan.

Study Design:

Descriptive cross-sectional study.

Place and Duration of Study:

Department of Surgical Oncology, Jinnah Postgraduate Medical Centre (JPMC), Karachi; conducted over six months after approval from CPSP and the Ethical Review Committee.

Methodology:

A total of 54 female patients aged 18–70 years with clinically and radiologically node-negative early-stage breast cancer (Stage I or II) were enrolled through non-probability consecutive sampling. Sentinel lymph node identification was performed using blue dye and/or radiocolloid or indocyanine green techniques, followed by histopathological analysis. Axillary lymph node dissection (ALND) was performed in patients with positive sentinel lymph nodes. Postoperative complications, including seroma, lymphedema, and infection, were recorded. Diagnostic accuracy of SLNB was determined by comparing sentinel node histopathology with final axillary status.

Results:

The mean age of patients was 49.2 years, and the average tumor size was 2.6 cm. Sentinel lymph nodes were successfully identified in 100% of cases. Of the 54 patients, 18 (33.3%) had positive SLNs and underwent ALND. Postoperative complications included seroma (7.4%), lymphedema (3.7%), and infection (1.8%). SLNB demonstrated high sensitivity and specificity in detecting axillary metastasis.

Conclusion:

SLNB is a safe and accurate technique for axillary staging in early-stage breast cancer. It minimizes the need for extensive dissection, reduces postoperative complications, and maintains diagnostic reliability. Its broader implementation in surgical oncology practice in Pakistan is recommended.

INTRODUCTION

Worldwide, breast cancer which accounts for a great many cancer-related deaths, is largely found in women. Research from 2020 led by GLOBOCAN estimates that breast cancer leads to 685,000 deaths and is linked to 2.3 million new cases annually, becoming more common in countries like Pakistan¹. Because of better screening and awareness, more cases of early-stage breast cancer (ESBC) have been discovered at I or II levels and without distant metastases². Properly determining the spread of cancer in the armpit still influences prognosis and the decision on treatment in ESBC. Previously, surgeons would do ALND to stage the axilla which can cause lymphedema, pain, tingling and loss of shoulder movement^{3,4}. Everyone who undergoes this cancer procedure in recent years can be thankful for the less incursive approach it now takes and the lower complication risk⁵. Cancer most often ends up in the sentinel lymph node which is the nodal area where lymph drains out of a tumor⁶. If the results of the sentinel node testing are negative, sometimes further axillary surgery isn't necessary. Several trials and studies have demonstrated that in patients without known nodal disease from early breast cancer, SLNB is a useful method for detecting damage to lymph nodes^{7,8}. Now, improved imaging tools and intraoperative methods using radioactive particles, dyes or indocyanine green help make sentinel node detection much easier⁹. Both the NCCN¹¹ and ASCO guidelines now include SLNB as part of managing breast cancer. Despite major breakthroughs globally, there is a lack of local data about how accurate, safe and effective SLNB is in Pakistan. We plan to improve surgery in our clinic by looking at the effects of SLNB for early-stage breast cancer at a tertiary center¹²

METHODOLOGY

This descriptive cross-sectional study was performed over six months at the surgical oncology department at Jinnah Postgraduate Medical Centre (JPMC), Karachi. The Institute's Institutional Review Board gave ethical approval and CPSP gave early approval for the research to

be conducted. After learning about the study's main objective, what activities would be part of the trial and their privacy rights, each participant then signed an informed consent form. Women diagnosed with Stage I or II breast cancer, aged 18 to 70, were among those studied. Modified radical mastectomy with sentinel lymph node biopsy (SLNB) or breast-conserving surgery was planned for all node-negative axilla patients who had no signs of breast cancer on examination and scans. The trial did not include people with advanced cancer, those who had already had neoadjuvant chemotherapy or radiation, those who had surgery under their arms before and those who refused consent. A non-probability sequential plan was used to recruit the patients. She had a complete review of her health history, an exam and imaging (ultrasound or mammography) performed. Draining nodes were found during the operation using a blue dye, radiocolloid or indocyanine green (ICG) method. The removed and forwarded sentinel lymph nodes were stained with hematoxylin and eosin (H&E) to study in the pathology department. Hospital protocol called for a complete dissection of the axillary lymph nodes (ALND) in patients whose sentinel nodes turned out to be positive. All cases of seroma, lymphedema, infection or hematoma noticed after the operation were recorded during postoperative follow-up. All patient information, type of tumor, number of sentinel nodes examined, sentinel node status and relevant pathological facts were added to the special template. All data analysis was carried out with SPSS version 26. Cases were described by counts and percentages for categorical variables and mean and standard deviation for continuous measurements. Sensitivity, specificity, PPV and NPV were determined by comparing the outcome of the SLNB to the final axillary status.

RESULTS

The study included 54 women with breast cancer in its early stages. The average age of the study group was 49.2, and the tumours were roughly 2.6 cm in size. Every patient had a sentinel lymph

node biopsy (SLNB) using either the radiocolloid technique or blue dye. In every instance, sentinel nodes were correctly located (100% identification rate). Of the 54 patients, 36 (66.7%) had negative sentinel lymph nodes and 18 (33.3%) had positive sentinel lymph nodes.

Axillary lymph node dissection (ALND) was subsequently performed on all patients with positive sentinel nodes. One to three sentinel nodes were excised from each patient. There were extremely few post-operative problems. Four patients (7.4%) had seroma development, two

patients (3.7%) had lymphedema, and one patient (1.8%) had a surgical site infection. Hemostasias, wound dehiscence, and other associated sequelae were prevented by all patients. The results of the axillary status were correlated with the pathological review of SLNB specimens. The findings demonstrate that SLNB has a high degree of accuracy in identifying early-stage breast cancer. You will find the demographic and clinical summary in Table I (see below).

Table 1. Summary of Patient and Clinical Characteristics

Variable	Value
Mean Age (years)	49.2
Mean Tumor Size (cm)	2.6
Total Patients	54
Sentinel Node Positive	18 (33.3%)
Sentinel Node Negative	36 (66.7%)
Patients Underwent ALND	18
Postoperative Seroma	4 (7.4%)
Postoperative Lymphedema	2 (3.7%)
Postoperative Infection	1 (1.8%)

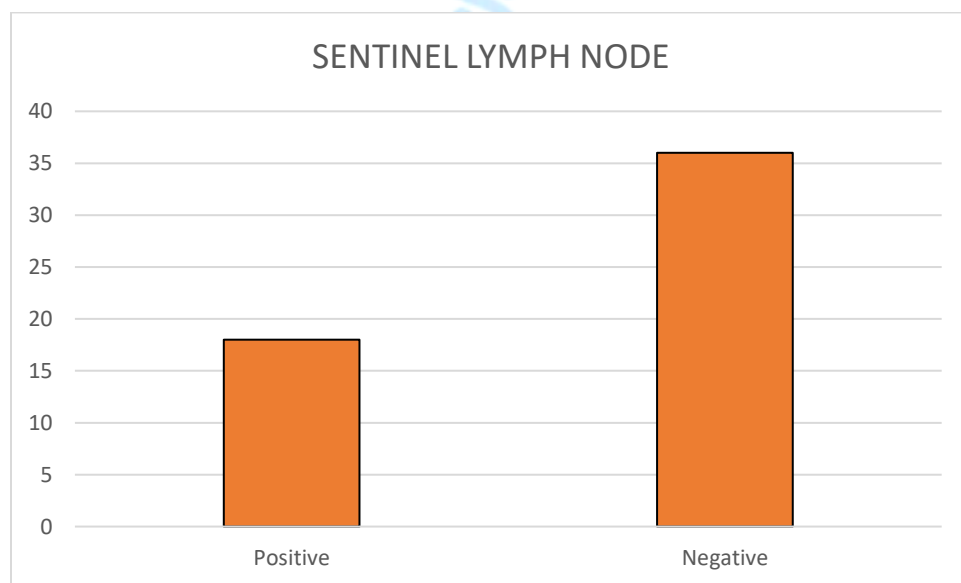


Figure 1. Sentinel Lymph node

DISCUSSION

SLNB in patients with early-stage breast cancer was assessed clinically and as a tool for diagnosis at a tertiary facility in Pakistan. Because SLNB

reliably detects sentinel nodes and causes few problems after surgery, we think it is an excellent way to stage patients. All patients showed that a sentinel lymph node was involved, like results in

international literature. Out of all our study participants, 33.3 percent had sentinel node metastases, like results found in previous studies of early breast cancer without visible node involvement. It proves that SLNB can detect hidden metastases and assist in picking the right additional treatment for the axilla. Surgeons performed ALND only in those who tested positive for sentinel lymph nodes. The National Comprehensive Cancer Network's (NCCN's)¹¹ latest advice is to perform ALND when sentinel node involvement has been fully confirmed in the patient. For some of these patients undergoing breast-conserving surgery and post-surgery radiation, the guidelines suggest that ALND may not be needed if their imaging shows low nodal activity⁸. The recovery from the surgery was acceptable as seroma occurred in 7.4% of patients, lymphedema in 3.7% and an infection in 1.8%. In cases where only ALND is done, the risk of lymphedema can be up to 30%, far higher than the rates we find here. This shows that using SLNB helps to maintain good quality of life and reduce problems that can follow surgery⁴. The main benefit of the study is its prospective design and its use of familiar surgical and pathological methods. Also, since this study used a small number of people at one facility, the results should not be used far beyond its context. The country needs more multicenter studies to form national standards for SLNB and improve its usage.

Conclusion:

SLNB is a valuable approach for early-stage breast cancer, thanks to its lead role in safely and accurately locating cancer in the armpit, our investigation confirmed. Using SLNB, less dissection in armpits is performed, postoperative outcomes are better and the test is equally accurate.

REFERENCE

Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2021;71(3):209–249.

- Iqbal J, Ginsburg O, Rochon PA, et al. Differences in breast cancer stage at diagnosis and cancer-specific survival by race and ethnicity. *JAMA*. 2021;325(20):2053–2064.
- Giuliano AE, Ballman KV, McCall L, et al. Locoregional recurrence after sentinel lymph node dissection with or without axillary dissection in patients with sentinel lymph node metastases. *JAMA*. 2020;323(6):553–563.
- Smoot B, Wong J, Cooper B, et al. Upper-extremity function in women after breast cancer surgery: a prospective cohort study. *J Cancer Surviv*. 2020;14(1):20–30.
- Hieken TJ, Boughey JC, Jones KN, et al. Trends in axillary surgery for breast cancer: a population-based study. *Ann Surg Oncol*. 2020;27(2):571–578.
- Amin MB, Edge SB, Greene FL, et al. *AJCC Cancer Staging Manual*. 8th ed. New York: Springer; 2018.
- Goyal A, Dodwell D. Optimizing axillary surgery in breast cancer. *Br J Surg*. 2021;108(2):145–146.
- Galimberti V, Cole BF, Zurrada S, et al. Axillary dissection versus no axillary dissection in patients with sentinel node metastases: a randomized clinical trial. *Lancet Oncol*. 2019;20(4):576–585.
- Benson JR, Wishart GC. Sentinel lymph node biopsy in breast cancer. *BMJ*. 2020;371:m2376.
- Sugie T, Kinoshita T, Masuda N, et al. Sentinel lymph node biopsy using indocyanine green fluorescence in early-stage breast cancer: a multicenter study. *Ann Surg Oncol*. 2020;27(3):759–766.
- National Comprehensive Cancer Network (NCCN). Clinical Practice Guidelines in Oncology: Breast Cancer. Version 1.2023. Available from: <https://www.nccn.org>
- Irfan M, Mirza T, Sadaf M, et al. Sentinel lymph node biopsy in early breast cancer: experience from a tertiary care hospital in Pakistan. *Pak J Med Sci*. 2022;38(1):31–35