Original Article

Clinical Utility of Ultrasound Guided Core Needle Biopsy of Axillary Lymph Nodes with Radio-pathological Correlation: A Medical Audit of Tertiary Care Breast Imaging Unit

Nasreen Naz[1], Sheeza Imtiaz[2], Ayesha Walid[3], Anila Rahim[4]

[1]Chairman Radiology/Director Dow Institute of Radiology, [2]Fellow Women Imaging and Consultant Radiologist,
[3,4]Assistant Professor Radiology
(Dow University of Health Sciences, Karachi)

Correspondence: Dr. Sheeza Imtiaz
Fellow Women Imaging and Consultant Radiologist.
Dow Institute of Radiology, Dow University of Health Sciences.
Email: dr.sheeza.imtiaz@gmail.com

Abstract

Objective: To evaluate the results of core needle biopsies, its effectiveness in preoperative assessment and to improve the standards of clinical care and efficient utilization of resources.

Methodology: A retrospective audit of core needle biopsy of axillary lymph nodes was done in Dow Institute of Radiology of Dow University of Health Sciences, OJHA campus from January 2021- December 2021 was done. All the patients who came to Breast Unit of Dow Institute of Radiology for diagnostic ultrasound guided core needle biopsies of suspicious axillary lymph nodes in already diagnosed and in suspected breast cancer were included in the study. Patients who were lost to follow up or with non-availability of laboratory data were excluded from the study.

Results: On histopathology, out of the 154 lymph nodes, 34 (22.07%) were found to be benign, 17 (11.03%) were reactive to inflammation, 95 (61.68%) were metastatic and four patients had atypical foci and inadequate sample respectively. Most common metastatic lymph nodal involvement was seen in infiltrating ductal carcinoma followed by invasive lobular carcinoma. Mean age of the patients were calculated to be 45 years with a range of 16-76 years.

Conclusion: Core needle biopsy is an effective, less invasive and cost effective method for preoperative axillary staging.

Keywords: Axillary lymph node, Axillary staging, Core needle Biopsy, Metastasis, Audit

Cite this article as: Naz N, Imtiaz S, Walid A, Rahim A. Clinical Utility of Ultrasound Guided Core Needle Biopsy of Axillary Lymph Nodes with Radio-pathological Correlation: A Medical Audit of Tertiary Care Breast Imaging Unit. J Soc Obstet Gynaecol Pak. 2022; 12(4):324-327.

Introduction

Breast cancer is the most common cancer diagnosed worldwide in women accounting for about 21% of cancers in women.[1] Breast cancer is on rise in Pakistan and 1 in 9 women are at risk of developing breast cancer which is the highest rate among Asian countries.[2] Core needle biopsy is minimally invasive, safe and cost-effective method for preoperative assessment of axillary staging and has replaced fine needle aspiration and cytology (FNAC) in most of the countries. Assessment of axillary lymph nodes has become routine practice in breast imaging units. Axillary lymph nodes status is an important prognostic factor in determining the management of breast cancer patients. Suspicious lymph nodes must undergo histopathological correlation using Fine needle aspiration or core needle biopsy. It will help in patient selection for either sentinel lymph node biopsy or axillary nodal clearance. It will save a lot of patients from second axillary clearance surgery. It also helps in reducing patient's anxiety and multiple hospital admissions.[3]

Core needle biopsy (CNB) is minimally invasive, safe and cost-effective method of diagnosing breast lesions. It shows higher sensitivity and accuracy in characterization of benign and malignant lymph nodes than fine needle aspiration and cytology (FNAC). It is an accepted standard method and has replaced FNAC.[4, 5]

Authorship Contribution: [1]Substantial contributions to the conception or design of the work; or the acquisition, Final approval of the version to be published, [2,3,4]Drafting the work or revising it critically for important intellectual content,

Funding Source: none
Conflict of Interest: none

Received: Sept 21, 2022
Accepted: Dec 13, 2022

It provides adequate amount of tissue for sampling and aids in accurate histological diagnosis. In uncertain cases and when the diagnosis is difficult, core needle biopsy is mandatory. It can help saving lot of expenses avoiding unnecessary surgical procedures in patients. The use of core needle biopsy also lessens the propensity of complicated surgical procedures and minimizes patient stress. [6]

An audit is a tool to measure the quality of a medical practice in order to improve the quality of health care and improve its effectiveness with better utilization of the resources. The purpose of a medical audit is to provide feedback and to improve the overall quality. Auditing does not only give an idea about the performance of the diagnostic practice but also points out any need for corrective action. [7]

The main aim of this study is to determine the clinical utility of routine assessment of axillary lymph nodes through core needle biopsy with histopathological correlation in patients with suspected breast cancer metastasis. To improve the standards of clinical care and efficient utilization of resources.

Methodology

A cross-sectional retrospective audit of a consecutive series of ultrasound-guided CNB of axillary lymph nodes from January 2021- December 2021 was done. All the patients who came to Breast Unit of Dow Institute of Radiology for diagnostic ultrasound guided core needle biopsies of suspicious axillary lymph nodes in already diagnosed and in suspected breast cancer were included in the study. The inclusion criteria for suspicious axillary lymph nodes were presence of one or more of these features 1) cortical thickness of >3mm, 2) rounded contour, 3) loss of fatty hilum, 4) hypoechoic lymph node, 5) spiculated/ irregular shaped. Patients who were lost to follow up or with non-availability of laboratory data were excluded from the study.

Core biopsy was performed by a Women Imaging Radiologist with more than five years of experience. Pre procedure coagulation tests were performed. The targeted lymph node should be clearly visualized on ultrasound. Color Doppler was used to determine the location of axillary vessels and to determine the best approach to avoid injury to the major vessels and nerve. A local anesthetic 25% lidocaine was then injected superficially using 5ml syringe. The appropriate semiautomated biopsy needle (16 or 18 gauge) was then advanced under ultrasound guidance. Two to three cores were taken and fixed in formalin bottles and sent for histopathology. Local pressure bandage were applied post procedure and analgesics were advised. A documented report with an image showing biopsy needle within the axillary lymph node is given to the patient.

The study variables include clinical data (age); biopsy data (needle gauge, type of device used, immediate and late complications) and histological data of the CNB. All the data was retrieved using HMIS and PACS and was recorded in a Performa. Statistical analysis was done using SPSS version 22.

Results

Initially, 167 patients were included, out of which 6 patients were lost to follow up and 7 patients had no laboratory data available, so they were excluded from the study. So, a total of 154 patients were included in the audit. Mean age of the patients were calculated to be 45 years with a range of 16-76 years. Semi-automated biopsy guns were used for core needle biopsies without any immediate or late complications in all the patients. 16G needles were used in 69 (44.8%) and 18G in 85 (55.1%) of patients. Core needle biopsies were performed in 62 (40%) of the patients in right axilla and 92 (60%) in left axilla. In (87) 56% of the patients with known breast cancer, only biopsy of the axillary lymph node was performed and in (67) 44% of the patients, biopsy of the suspicious breast lesion was also performed along with suspicious axillary lymph node. Four patients had inadequate sample and rebiopsy was then done.

On histopathology, out of the 154 lymph nodes, 22 (22.07%) were found to be benign, 17 (11.03%) were reactive to inflammation, 95 (61.68%) were metastatic, 4 had atypical cells and 4 patients had inadequate sample and rebiopsy was then done. (Figure 1).

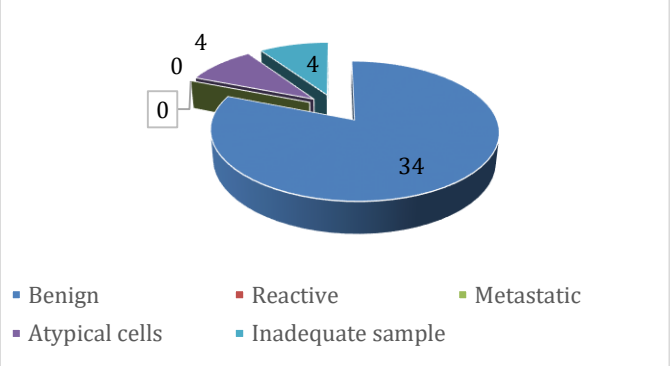

Figure 1. Core Needle Biopsy Results

Further distribution of histopathological results of core needle biopsy of axillary lymph nodes are described in Table I.

Table I: Histopathological results of core needle biopsy of axillary lymph nodes.

	N	%
Benign	34	22.07%
Reactive	17	11.03%
Chronic Inflammation	9	5.84%
Tuberculosis	8	5.19%
Metastatic	95	61.68%
Invasive Ductal Carcinoma	86	78.10%
Invasive Lobular Carcinoma	4	3.63%
Malignant Phyllodes	1	0.90%
Paget's Disease	1	0.90%
T cell lymphoma	1	0.90%
Invasive carcinoma	1	0.90%
Ovarian carcinoma	1	0.90%
Atypical cells	4	3.63%
Inadequate sample	4	3.63%

Discussion

Imaging of axillary lymph nodes in women with already diagnosed breast cancer or with suspicion of breast carcinoma has developed overtime. For the preoperative assessment of axillary lymph node status, noninvasive imaging modalities are used such as ultrasound, Computed tomography (CT) and Magnetic resonance imaging (MRI). Of these, ultrasound is the primary imaging modality used widely that can also assist in image guided biopsy. In order to exclude unnecessary axillary lymph node clearance, preoperative ultrasound examination for axillary staging is routinely performed in all newly diagnosed breast cancer patients with reported specificities of 100%. Characterization and identification of metastatic spread to the axillary lymph nodes prior to surgery using US-guided fine needle aspiration (FNA) cytology or core needle biopsy (CNB) is of great importance for accurate staging and for reducing the need for SLNB.[8] The need for SLNB can be decrease from 21% to 70% after proper pre-operative staging.[9] Alvarez et al. reported a specificity of 80.4 to 97.1% and sensitivity of 54.7 to 92.3% respectively.[10]

It is usually recommended to evaluate the lymph node status on ultrasound. Depending upon the described parameters, if it appears normal on ultrasound and further on CT, MRI or PET CT, then patients will be selected for SLNB. If the lymph nodes are negative on ultrasound but suspicious on CT, MRI or PET CT, repeat ultrasound and then go for SLNB. If the ultrasound features are suspicious for metastatic involvement, biopsy of the lymph node should be performed. If on histopathology it turned out to be benign, then repeat ultrasound to reassess and then go for SLNB. If on histopathology it turned out to be metastatic, proceed with axillary nodal clearance with neoadjuvant / adjuvant chemotherapy. (Figure 2)

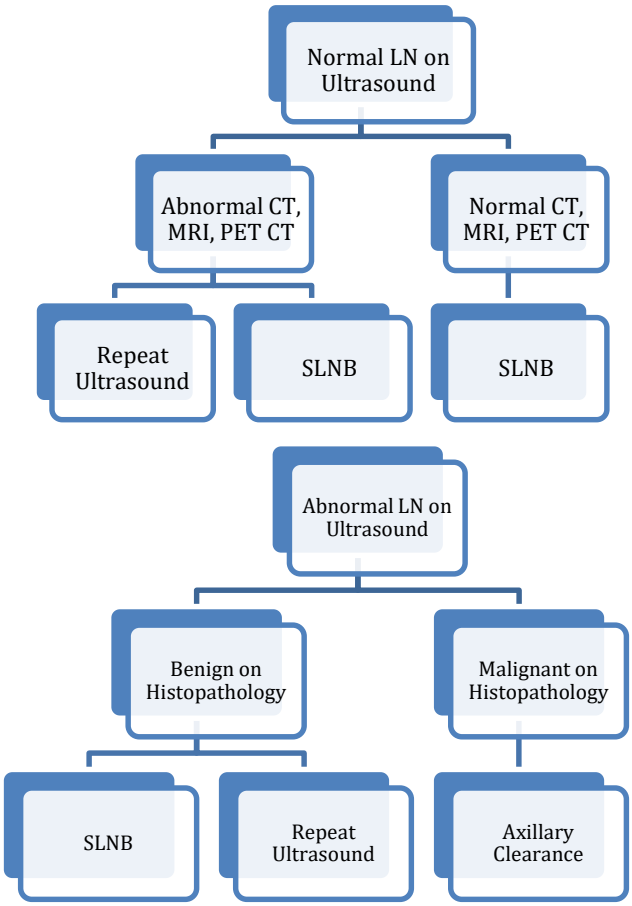

Figure 2. Axillary nodal staging flowchart

Core needle biopsy and fine needle aspiration both can be used as a method to assess the lymph node status, however, different studies have proposed higher sensitivity and diagnostic accuracy of core needle biopsy. Bhandari et al.[11] compared the two methods and reported higher accuracy of core needle biopsy (96.2%) as compared to FNAC (90.8%). As ultrasound is operator dependent, it may have false negative results but these are more likely related to the size of metastasis as it samples only a portion of lymph node. Rao et al. reported sensitivity of 82, Houssami et al. 83.3%, Rautiainen et al. 82.2% and Ganott et al. Reported 87.1% respectively.[12-15] A benefit of core biopsy is that additional studies may be readily performed. CNB may offer greater ability to evaluate the morphology and perform immunohistochemistry to determine the correct primary site. One drawback CNB is that it will not necessarily distinguish microscopic metastases from

metastatic deposits over 2 mm and may also “miss” sub 2 mm metastases and isolated tumour cells (ITCs). One large study indicated a sensitivity of 60.3% for detecting macrometastases on ultrasound core biopsy, but less than 30% for detecting micrometastases and only 12% (3 of 25) of nodal metastases were identified on CNB when the nodes were morphologically normal.[16,17]

In this study, we found that preoperative core needle biopsy is a simple, safe and well tolerated procedure. No significant early or late post procedure complications were recorded except for the mild local pain, bruise and ecchymosis at the site of needle puncture in few patients. Our results are in agreement with the previously documented results. Pre procedure coagulation tests were performed. However, pre procedure coagulation profiles are costly and cause extra financial burden on patients. No post procedure bleeding incidence was reported in this study. The risk of bleeding and nerve injury can be avoided by being aware that the nerves travel alongside the axillary vessels. So these should be kept in mind while performing the biopsy. Mostly16 and 18g needles were used. Only 4 cases (2%) were reported to have inadequate sample and rebiopsy was done.

34 (22.07%) patients had negative results on histopathology representing benign lymph nodes. Reactive lymph nodes were found in 17 (11.03%) cases showing chronic inflammation in 9 patients and tuberculosis in 8 patients. Most common metastatic lymph nodal involvement was seen in infiltrating ductal carcinoma 86 (78.1%) patients followed by invasive lobular carcinoma in 4 (3.63%) patients. One metastatic lymph nodal involvement was found in malignant phyllodes, invasive carcinoma, Paget’s disease and T cell lymphoma. One case of metastatic ovarian carcinoma was also encountered along with breast carcinoma.

Conclusion

Axillary lymph nodal status is an extremely important prognostic factor in preoperative assessment. It is therefore suggested to perform a CNB as the first line investigation of potentially abnormal axillary lymph nodes, wherever possible, in order to reduce the likelihood of the patient requiring a second procedure whilst also improving sensitivity and NPV. In most of the developed countries, core needle biopsy has replaced fine needle aspiration in preoperative axillary staging with increased sensitivity and specificity. Axillary US-guided CNB remains a valuable triage test for preoperative staging of the axilla as it helps to identify those patients unsuitable for SLNB.

References

1. Selvi Radhakrishna, Anu Gayathri, Deepa Chegu.: Needle Core biopsy for breast lesions: An audit of 467 needle core biopsies. Indian Journal of Medical and Paediatric Oncology. 2013;34(4)
2. Sohail S, Alam SN. Breast cancer in Pakistan-awareness and early detection; 2007. https://ecommons.aku.edu/cgi/viewcontent.cgi?article=1449&context=pakistan_fhs_mc_radiol
3. Mills P, Sever A, Weeks J, Fish D, Jones S, Jones P. Axillary ultrasound assessment in primary breast cancer: an audit of 653 cases. Breast J. 2010. 16(5):460-3.
4. Mahmoud OM, Khedrawy MEM, Megally HI et al. Fine needle aspiration cytology versus core needle lymph node biopsyin axillary staging of breast cancer. Egypt J Radiol Nucl Med. 2022. 53:219.
5. Le Boulc'h M, Gilhodes J, Steinmeyer Z, Molière S, Mathelin C. Pretherapeutic Imaging for Axillary Staging in Breast Cancer: A Systematic Review and Meta-Analysis of Ultrasound, MRI and FDG PET. J Clin Med. 2021 Apr 6;10(7):1543
6. Tchaou, M., Darré,T., Gbandé, P., Dagbé, M., Bassowa, A.,Sonhaye, L. and Agoda-Koussema, L.-K.(2017) Ultrasound-Guided Core Needle Biopsy of Breast Lesions: Results and Usefulness in a Low Income Country. Open Journal of Radiology. 2017. 7:209-18.
7. CJ. D. 2013 ACR BI-RADS Atlas: Breast Imaging Reporting and Data System, 5th edition. Am Coll Radiol. 2014. 537–53.
8. Vidya R, Iqbal FM, Bickley B. Pre-operative axillary staging: should core biopsy be preferred to fine needle aspiration cytology? Ecancermedicalscience. 2017. 7(11):724.
9. Afzal S, Masroor I, Munir A, Idress R, Khan P, Khan S. Preoperative Ultrasound-guided Core Biopsy of Axillary Nodes for Staging of Clinically Negative Axilla in Breast Cancer Patients - A Pilot Study. Cureus. 2020 Jan 21. 12(1)
10. Alvarez S, Añorbe E, Alcorta P, López F, Alonso I, Cortés J. Role of sonography in the diagnosis of axillary lymph node metastases in breast cancer: a systematic review. AJR Am J Roentgenol. 2006. 186:1342–48.
11. Impact of sentinel lymph node biopsy in newly diagnosed invasive breast cancer patients with suspicious node: a comparative accuracy survey of fine-needle aspiration biopsy versus core-needle biopsy. Bhandari A, Xia E, Wang Y, et al
12. Rao R, Lilley L, Andrews V et al. Axillary staging by percutaneous biopsy: sensitivity of fine needle aspiration versus core needle biopsy. Ann Surg Oncol. 2009. 16(50:1170-75.
13. Houssami N, Ciatto S, Turner RM et al. Preoperative ultrasound guided needle biopsy of axillary nodes in invasive breast cancer: meta analysis of its accuracy and utility in staging the axilla. 2011. Ann Surg. 254920:243-51.
14. Rautianen S, Masarwah A, Sudah M et al. Axillary lymph node biopsy in newly diagnosed invasive breast cancer: comparative accuracy of fine needle aspiration biopsy versus core needle aspiration biopsy versus core needle biopsy. 2013. Radiology. 269(1054-60.
15. Ganott MA, Zuley ML, Abrams GS, et al. Ultrasound guided core biopsy versus fine needle aspiration for evaluation of axillary lymphadenopathy in patients with breast cancer. 2014. International Scholarly Research Notices.
16. Raymond, W.A.; Kleinig, P. The Value of Fine Needle Aspiration Biopsy in the Pre-Operative Assessment of the Axilla in Breast Cancer Patients. J. Mol. Pathol. 2022. 3(4):228-42.
17. Britton, P.D.; Goud, A.; Godward, S.; Barter, S.; Freeman, A.; Gaskarth, M.; Rajan, P.; Sinnatamby, R.; Slattery, J.; Provenzano, E.; et al. Use of ultrasound-guided axillary node core biopsy in staging of early breast cancer. Eur. Radiol. 2009. 19:561–69.