ORIGINAL ARTICLE

TO DETERMINE THE ACCURACY OF AXILLARY ULTRASOUND IN THE ASSESSMENT OF METASTATIC AXILLARY NODES IN BREAST CANCER PATIENTS AT A TERTIARY CARE CENTER IN PAKISTAN

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ABSTRACT

BACKGROUND: Ultrasound evaluation of the axilla and guided core biopsy of the suspicious axillary lymph nodes play a pivotal role in breast cancer staging. Correct preoperative diagnosis of axillary nodal status spares the patient from a second operative procedure. **OBJECTIVE:** To determine the accuracy of axillary ultrasound in the assessment of metastatic axillary nodes in breast cancer patients at a tertiary care center in Pakistan. **METHODOLOGY:** This descriptive study was conducted in the Department of Radiology, The Aga Khan University Hospital, Karachi from January to December 2019. Patients with known breast cancer and clinically negative axilla who underwent axillary ultrasound were selected. Patients who had benign-appearing lymph node son ultrasound underwent sentinel lymph node biopsy and patients who had suspicious axillary lymph nodes were subjected to ultrasound-guided core needle biopsy. The results of SLNB and histopathology were compared with ultrasound findings and sensitivity, specificity, positive and negative predictive values for axillary ultrasound were calculated. **RESULT:** A total of 217 patients underwent axillary ultrasound, out of which 139 had suspicious lymph nodes and were subjected to ultrasound core needle biopsy, whereas 80 patients had normal-appearing lymph nodes were subjected to SLNB procedure. The calculated sensitivity, specificity, PPV, NPV and accuracy were 83.51%, 51.58%, 55.47%, 95% and 65% respectively. **CONCLUSION:** This study shows that axillary ultrasound has high sensitivity and negative predictive values for the evaluation of axillary lymph nodes in breast cancer patients. Core needle node biopsy as a sampling technique is a safe, easy, and accurate method. It should be used to avoid unnecessary axillary dissection.

Keywords: Breast cancer, Core needle biopsy, sentinel lymph node biopsy.

Introduction

Sentinel lymph node biopsy (SLNB) has to a greater extent supplanted axillary lymph node dissection (ALND), as the standard of care for axillary node staging in breast cancer. This is supported by the results of multiple observational studies, meta-analyses, and extensive literature encompassing all aspects of the procedure.[1,2,3] The literature supports that, patients with a negative SLNB don t need ALND, because the rate of axillary local recurrence after a negative SLNB is only 0.3%.[4] The literature also supports that disease-free status and overall survival are not affected by doing ALND in addition to SLNB, and the morbidity of SLNB is less than that of ALND. The combination of ultrasound with ultrasound-guided

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node biopsy (UNB) for assessment of the axilla in women with newly diagnosed breast cancer has been evaluated for many years[5,6] and has also been included in guidelines in recent years. The use of preoperative ultrasound and UNB to assess axillary node status has been partly due to the buildup of evidence on this methodology,[5] and partly due to the efficiency, practicality, relative easiness, and modest cost of this staging strategy. Extension of ultrasound scanning of the breast to include the axilla in cases with suspected breast cancer is relatively quick, and UNB skills are easy to develop extrapolating on experience (and established technical logistics) of ultrasound-guided biopsy of the breast in general.

Ultrasound evaluation and guided core biopsy play a pivotal role in breast cancer staging. Correct preoperative diagnosis of axillary nodal status spares the patient from a second operative procedure. There is no agreed standard for accuracy, but several groups have published their results.[8,9,10] Therefore, it is difficult to draw any conclusion from studies done on the diagnostic accuracy of axillary ultrasound because different studies have given a wide range of sensitivity and specificity of this diagnostic procedure where the sensitivity range is from 26% to 94% and the range is 52% to 98% for specificity.[11,12,13,14]

The objective of this study is to determine the accuracy of axillary ultrasound for the identification of metastatic lymph nodes in patients with known breast cancer at our hospital.

Material and Methods

This descriptive study was conducted at The Radiology Department of the Aga Khan University Hospital. The study period was from January 2019 to December 2019. Convenience sampling was used and all patients with operable breast cancer who had clinically negative axilla were included. The breast and axillary ultrasound were performed in our department and patients underwent ultrasound-guided core biopsy (CNB) if abnormal lymph nodes were found, and all patient with normal lymph nodes on ultrasound underwent SLNB. The data for malignant lymph nodes which were subjected to ultrasound-guided core biopsy and the data of lymph nodes which were reported as normal on ultrasound and patient underwent SLNB was recorded (Fig.1). It was a retrospective study and included a review of patient charts therefore, the exemption was taken from the hospital ethical review committee.

The inclusion criteria were all females with histologically diagnosed breast cancer who had clinically negative axilla and suspicious axillary lymph nodes reported on ultrasound. The criteria for suspicious lymph node on ultrasound included eccentric/ thickened cortex (≥3 mm) or lobulation with a displacement of hilum, (Fig.2A) absent hilum or irregular borders, hypoechoic echotexture, spherical node, and perinodal vascularity.[15,16,17] All patients who had normal nodes (Fig.2B) on axillary ultrasound underwent SLNB and were also included. Patients with known breast cancer with palpable axillary nodes, patients planned for neoadjuvant chemotherapy, and patients who were pregnant or lactating, were excluded. All patients with incomplete medical recordwere also excluded.

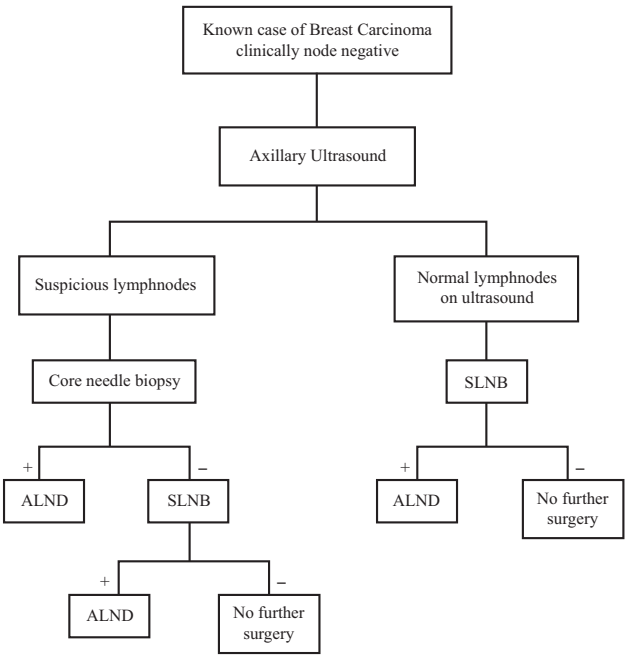

Figure 1:

Axillary ultrasounds and axillary lymph node biopsies were performed by experienced radiologists with more than 10 years of experience in breast imaging. Biopsy of suspicious lymph nodes was performed by using an automated gun and a10cm 18 Gauge needle. Three to 5 cores were taken from the most suspicious

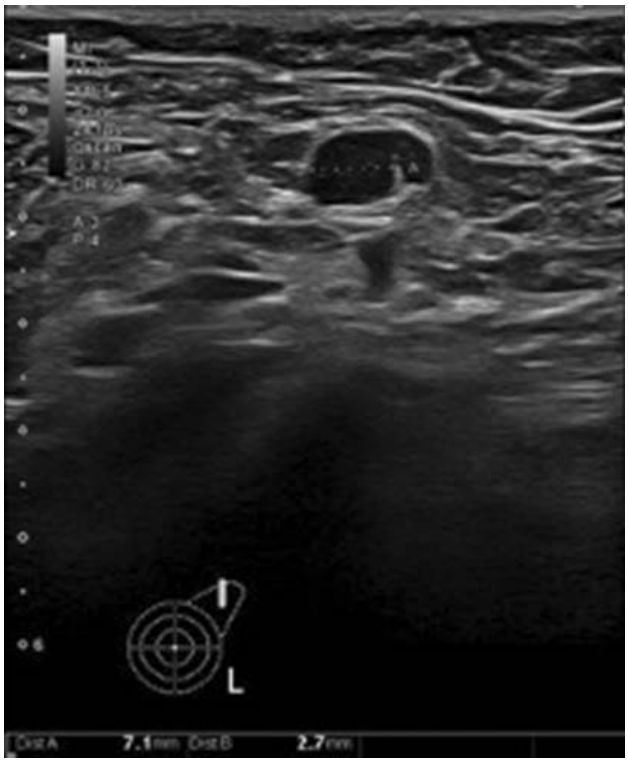

Figure 2A: Left axillary ultrasound shows eccentrically thickened cortex measuring 7.1mm and displaced hilum

Figure 2B: Left axillary ultrasound shows benign appearing lymph node with cortical thickness measuring 2.7mm

appearing node/part of the lymph node. The patient whose lymph node biopsy was negative were subjected to SLNB. Data was collected and analyzed using SPSS 22 (IBM Corp., Armonk, NY). Descriptive variables like age, side, quadrant of breast most affected were expressed as relative frequencies and percentages. Sensitivity, specificity, positive and negative predictive values, and accuracy were calculated by comparing the results of axillary ultrasound (US), US-guidedcore biopsy, and final histological findings (SLNB and/or ALND).

Results

A total of 217 patients underwent axillary ultrasound at our department during the period. Among these patients,137 had suspicious lymph nodes on axillary ultrasound and were subjected to an ultrasound-guided core needle biopsy, whereas 80 patients had normal-appearing lymph nodes on axillary ultrasound and were subjected to SLNB procedure.

The age range was 15 to 81 years for the CNB group and 21 to 88 years for the SLNB group, with a mean age of 52 –14.27 and 57 – 13.3 years respectively.The final histopathology (n=217) of primary breast cancer was ductal carcinoma in situ in 51 cases, invasive ductal carcinoma in 110 cases, lobular carcinoma in 25 cases, and mixed tumors in 31 patients.The left breast was affected more commonly in both groups with 54.7% in the biopsy group and 52.4% in the SLNB group. In both groups, the left upper outer quadrant was most affected by primary cancer with 32.8% in the CNB group and 35.4% in the SLN group followed by 29.2% in the CNB group and 20.3% in the SLNB group in the right upper outer quadrant. There were 76 true positive (n= 137), 61 false positive (n=137), 65 true negative (n= 80) and 15 false negative (n= 80). The calculated sensitivity, specificity, PPV, NPV and accuracy were 83.51%,51.58%,55.47%, 95% and 65% respectively.

Discussion

About twenty years back, the preoperative axillary staging was based on palpation and physical examination, and this had a very low sensitivity of

34% to 76%.[18,19] Secondly, it cannot differentiate between metastatic and reactive lymph nodes. Ultrasound is currently the most usefull and non-invasive imaging modality for the evaluation of axillary nodal status. It is cheap, widely available, and does not use ionizing radiation. There is no discomfort to the patient and all lymph nodes in the axilla are accessible for evaluation, at the same time ultrasound can be used to do guided biopsies from the most suspicious part of the lymph node.

Breast ultrasound at our institution also includes an examination of the axilla as part of the protocol, and we use internationally set criteria as mentioned in methodology for assessment of lymph nodes in the axilla. Axillary ultrasound plays a major role in determining the disease burden in lymph nodes.

This is combined with ultrasound-guided core needle biopsy of lymph nodes which appear suspicious according to set criteria. This helps in proper planning for further management. None of the local studies have reported core biopsy as a sampling method for axillary lymph node biopsy although the method of FNAC has been reported earlier.[20] In a meta-analysis, the authors have reported that the CNB showed higher sensitivity than US-FNAC (0.849 vs. 0.760), however, there was no difference in specificity between US-FNAC and CNB (0.997 vs. 1.000).[21]

Patients with positive lymph nodes on CNB undergo ALND directly and patients with normal axillary lymph nodes on ultrasound undergo the SLN procedure. Thus, saving the patient from a two-stage procedure in case of positive lymph nodes on CNB. In the present study, the sensitivity and specificity of ultrasound for axillary lymph node status in breast cancer patients was 83.51 % and 51.47% respectively. In literature sensitivity and specificity of axillary ultrasound ranges from 26% to 94% and 53% to 98% respectively.[22,23] The wide variation in the range of sensitivity and specificity in different studies is likely due to different criteria used at ultrasound for the identification of suspicious lymph nodes. In literature, some suggest that the experience levels of examiners and the criteria used for sonographic evaluation of axillary nodes may also affect the results.[23]

In 1997 Bonnema et al.[19] conducted a study including 148 patients. The inclusion criteria were histologically proven breast cancer and absence of suspicious lymph nodes on palpation, the sensitivity and specificity of their study were 87% and 56% respectively. This is comparable to our study showing high sensitivity and lower specificity. A study done by Nori et al.[23] with 132 cases and a study done by Van Rijk et al.[24] with 726 patients both these studies showed rather low sensitivity of 45.2% and 35% and relatively high specificity of 86.8% and 82% respectively. The above studies results show that the relationship between sensitivity and specificity is inverse so if the sensitivity is high the specificity will decrease automatically and vice versa. In our opinion, the increased sensitivity of the present study is because the abnormal lymph nodes on ultrasound showed benign reactive changes on histopathology and three patients also showed granulomatous infection in lymph nodes. This is likely due to the high prevalence of infection and granulomatous disease in our population. The other causes could be due to the higher disease stage in our study and differences in patient selection. Patients with normal lymph nodes who had positive nodes on SLNB, showed micro metastasis on histopathology with ranged in size from 0.2 to 0.5 mm. This is one of the limitations of ultrasound as it cannot detect micro metastasis. This is the main reason behind the false-negative rate which has reduced the PPV.

There are a few limitations of the study. One is the selection bias due to the retrospective nature of the study. It is a single-center study, so our recommendation is to do multicenter studies in the future to set a standard criterion for lymph node assessment by ultrasound. In addition, more prospective studies should be done so patient selection criteria can be improved further. It is essential to standardize axillary lymph node ultrasound and develop reference ranges for sensitivity, specificity, positive and negative predictive values. The setting of reference standards allows one to improve practices and make it par with internationally set reference levels.

Conclusion

This study shows that axillary ultrasound is a recommended modality for the evaluation of axilla in a patient with breast cancer and has high sensitivity and negative predictive values of 83.51% and 95% respectively. Core needle node biopsy is a safe, easy,

and accurate sampling method done to confirm the nodal disease status. The SLNB can thus be avoided in those patients with metastatic lymph nodes on CNB and the surgeon can directly proceed to ALND.

Conflict of Interest: The authors declare no conflict of interest.

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