

## Role of Preoperative Ultrasound Guided Fine Needle Aspiration of Axillary Lymph Nodes in Early Breast Cancer Patients

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### Abstract

**Introduction:** There are many imaging methods with the help of which lymph nodes can be seen. Among all these techniques ultrasound has remain the most useful which help not only to detect local disease in the breast but also evaluate draining regional lymph nodes. It is usually difficult to differentiate the benign reactive changes and early signs of metastatic disease in breast. This may result in "suspicious" lymph node. Ultrasonographical examination of suspicious or metastatic-appearing axillary lymph nodes if followed by fine needle aspiration gives a more accurate diagnosis of disease compared to sonography alone.

**Aim:** To assess the role of preoperative ultrasound guided fine-needle aspiration cytology to diagnose axillary metastases in early breast cancer.

**Materials and Methods:** A prospective analytical study was conducted at Indraprastha Apollo Hospital, New Delhi. 60 patients admitted in Surgical Oncology wards from May 2013 till May 2015 with diagnosis of early Breast carcinoma were enrolled in the study. Preoperative ultrasonography with subsequent FNAC in patients with suspicious axillary lymph nodes was performed. All patients underwent surgery and followed by a level 2 axillary dissection. The axillary lymph node status was first determined by Ultrasound-guided FNAC in the preliminary staging process. This was compared with the final status of histopathological examination of the axillary lymph nodes that were removed in the axillary dissection.

**Results:** Suspicious lymph nodes were found in 50% of women who were enrolled the study. Of these 30 suspicious nodes that underwent FNAC, 60% of women were having metastatic disease. The sensitivity of US-FNAC was 75% and specificity was 100% with PPV and NPV 100% and 85.7% respectively.

**Conclusion:** Ultrasound guided FNAC has a decent sensitivity and a near perfect specificity to diagnose metastatic nodes in early breast cancer patients.

**Keywords:** Ultrasonography guided FNAC; Breast CA; Regional lymph nodes.

### Introduction

One of the most significant prognostic factor in patients suffering from primary breast cancer is metastatic involvement of axillary lymph nodes. Staging of these axillary lymph nodes is an important part of their treatment.<sup>1</sup>

Previously staging was done by dissection of axillary lymph nodes (ALND). In case of patients whose nodes were without disease, it did not offer any benefit but in some, it was associated with significant morbidity. Sentinel lymph node (SLNB) biopsy offers a less intrusive way of staging the axilla.<sup>2</sup> Sentinel lymph node if free of disease donot require further treatment and are spared

unnecessary axillary surgery. However, in patients with positive Sentinel lymph node, require further investigation. This is usually a delayed axillary lymph node dissection.<sup>3</sup>

Combinations of therapy including surgery, radiotherapy, and chemotherapy are used for the treatment of breast cancer patients. This depend upon extent of the primary tumor as well as the presence or absence of lymph node involvement. The process of staging involves a number of procedures including a thorough history and physical examination, ultrasound (US) of the breast and lymph node basins (axillary, internal mammary, infra-clavicular, and supraclavicular), computed tomography (CT) scan of the abdomen, bone scan, and a chest X-ray. The strongest prognostic indicator available for breast carcinoma is the presence or absence of axillary metastases.

As metastatic lymph nodes are often not palpable and reactive lymph nodes may be mistaken for metastases physical examination alone is neither a sensitive nor reliable way to ascertain lymph node status.<sup>4-6</sup> Many imaging techniques have been developed to visualize the lymph nodes. Ultrasound (USG) is the most useful techniques for the evaluation of local disease in the breast as well as in regional lymph nodes.<sup>2,3,5-7</sup> It detects alterations in the size, shape, and contours of the lymph nodes and also changes in the cortical morphology and texture that can reflect the presence of underlying metastasis. However, it has been seen that early signs of metastatic disease may resemble with those of benign reactive changes. This can result in a label of "suspicious" or "indeterminate" for some lymph nodes. Also sometimes lymph nodes may be regarded as "metastatic" appearing when sonography shows compression or displacement of hyper-echoic fatty hilum and lymph node enlargement.

Ultrasonographical examination of suspicious or metastatic-appearing axillary lymph nodes if supplemented by fine needle aspiration gives a more accurate diagnosis of disease compared to sonography alone. In our study we aimed to objectify the accuracy of Ultrasound guided FNAC (US-FNAC).

### Aim

To assess the role of preoperative ultrasound guided fine-needle aspiration cytology to diagnose axillary metastases in early breast cancer.

### Materials and Methods

A prospective analytical study was conducted at Indraprastha Apollo Hospital, New Delhi, after obtaining approval from Scientific and Ethics Committee of hospital. Patients admitted in Surgical Oncology wards with diagnosis of early Breast carcinoma were enrolled in the study from May 2013 till May 2015.

The sample size was calculated based on similar study done by Krishnamurthy S et al. in which overall sensitivity of US-guided FNAC was 86.4%.<sup>8</sup>

Sample size was calculated using formula

$$N = \frac{Z^2 (SN (1-SN))}{W^2}$$

Where

SN= 86.4% (0.86)

Z=Confidence Interval normal distribution value  
i.e. for 95% z=1.96

Allowable error = absolute error 10%

N=sample size

So sample size comes out to be 48. Considering non response rate it was rounded off to 60.

### Inclusion Criteria

1. Newly diagnosed cases of carcinoma breast based on tissue diagnosis.

### Exclusion Criteria:

1. Locally advanced carcinoma. (including T>5 cm)
2. Palpable axillary lymph nodes.
3. Patients who have received any treatment for the same in form of chemotherapy or radiotherapy.
4. Previous axillary surgery.
5. Patients not giving consent.
6. Male patients.

Informed written consent was taken from the patients after explaining them the purpose of the study. Approval for the study was obtained from the Institutional Ethical and Scientific Committee. A detailed history and general physical as well as local examination of the patients in the study was done. The clinical findings including size and location of the breast lumps were recorded.

Careful examination of the axillae was done to rule out any palpable lymph nodes. Baseline investigation including CBC, KFT and LFT were done. The histopathology of primary tumors based on core needle biopsy was recorded. Preoperative ultrasonography was followed by fine-needle aspiration cytology in case of suspicious lymph nodes was performed in all patients.

The sonography criteria for selecting suspicious lymph nodes were size > 10 mm, increased thickening and/or lobulation of the hypo-echoic lymph node cortex compared with other ipsilateral or contralateral lymph nodes, eccentric population of the hypo echoic lymph node cortex with compression of the adjacent hilar fat, and complete disappearance of the hilar fat, replaced by hypo echoic cortex.

All patients underwent surgery (either wide local excision or mastectomy). Sentinel lymph node biopsy was done in all cases (using a double dye technique) which was followed by a level 2 axillary dissection. The axillary lymph node status was first determined by Ultrasound-guided FNAC in the preliminary staging process. This was compared with the final status of histopathological examination of the axillary lymph nodes that were removed in the axillary dissection. Appropriate statistical tests were applied.

## Results

The youngest patient enrolled in this study was 23 years old and the oldest was 74 years old. The average age was 51.4 years. The median age was 53 years. Most patients were in the age group of 51-60 years (33%). The most common presenting symptom was a breast lump(80%) followed by Mammographic detection (10%), nipple discharge

(5%) and localized pain (5%). Majority of the lumps were 2 to 3 cm in size (30%). The average size of lump was 2.38 cm. Most lumps were situated in the upper outer quadrant (50%). A core needle biopsy was used for tissue diagnosis in all cases. Infiltrating ductal carcinomas was the most common pathology in 45 cases (75%). 10 cases had infiltrating lobular carcinomas. 5 cases had other variants.

**Ultrasound Findings:** Of the 60 women who underwent ultrasound, suspicious nodes were found in 30 patients and FNAC of the node was done in these patients.

Of the 30 suspicious nodes that underwent FNAC, 18 were positive for metastatic disease. The procedure of FNAC was well tolerated and only 5 patients had procedure related complications, all of which resolved conservatively. 2 patients had superficial skin erythema and 3 patients developed a hematoma. The overall morbidity was 8.3%.

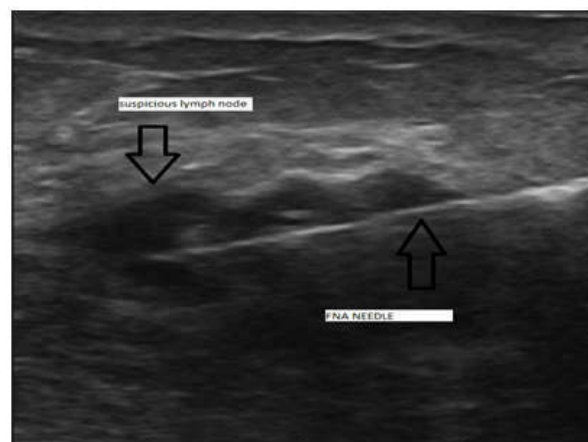
The accuracy of each method was then compared with the axillary dissection (ALND) which is the current gold standard for lymph node staging. Sensitivity (SEN), Specificity (SPE), Positive predictive value (PPV) and Negative Predictive value (NPV) of each method calculated.

**Ultrasound Alone (without FNAC):** The sensitivity of Ultrasound in detecting metastatic disease of breast alone was 75% and specificity 66.6%, with a PPV and NPV of 60% and 80% respectively as shown in Table 1. The diagnostic accuracy of US alone was 70%.

**Ultrasound Guided FNAC (US-FNAC):** The sensitivity of US-FNAC was 75% and specificity was 100% with PPV and NPV 100% and 85.7% respectively as clearly evident in Table 2. Also the diagnostic accuracy of US-FNAC came out to be 90% which was quite more than US alone.



**Photograph 1:** Philips Ultrasound equipment used for the study.



**Photograph 2:** FNA needle inserted into the suspicious node.

### Ultrasound Alone (without FNAC)

**Table 1:** Analysis of Ultrasound alone.

US alone	ALND Positive 24(n)	ALND Negative 36(n)	Total 60(n)	SEN	SPE	PPV	NPV
Positive	18	12	30	75%	66.6%	60%	80%
Negative	6	24	30				

(Chi-square = 10. P value = 0.001565)

### Ultrasound Guided FNAC

**Table 2:** Analysis of USG Guided FNAC.

US-FNAC	ALND Positive 24(n)	ALND Negative 36(n)	Total 60(n)	SEN	SPE	PPV	NPV
Positive	18	0	18	75%	100%	100%	85.7%
Negative	6	36	42				

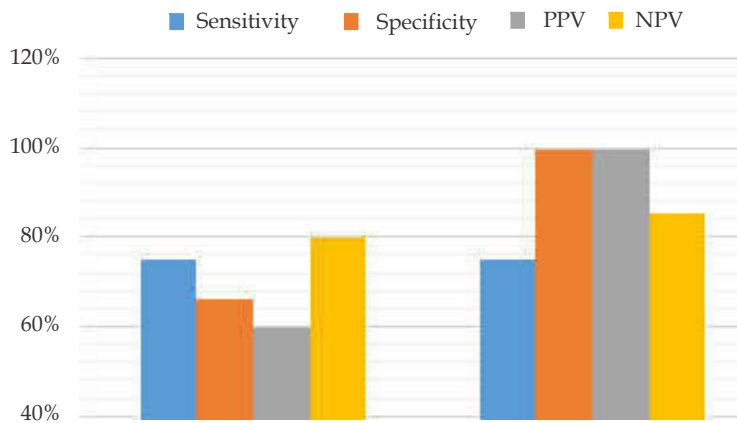
(Chi-square= 38.5714. P value < 0.00001)

\* Sen-Sensitivity

Spe- Specificity

PPV- Positive predictive value

NPV- Negative predictive value



**Fig. 1:** Comparison of validity of USG alone with USG guided FNAC.

## Discussion

The study was conducted to find the usefulness of preoperative USG guided FNAC of axillary lymph nodes in early diagnosis of metastatic breast cancer diagnosis.

In this study it was found that the overall sensitivity and specificity for axillary lymph node FNAs was 75% and 100%, respectively and the PPV was 100% and the NPV was 85.7%. Similar results were found in the study by Rajesh YS et al., in which the sensitivity of ultrasound-guided FNAC for lymph nodes ranges from 36% to 86.4%, the specificity ranges from 95.7% to 100%, the PPV ranges from 92% to 100%, and the NPV ranges from 67% to 70%.<sup>9</sup>

Sapino A et al. also studied the role of Ultrasonographically-guided fine needle aspiration of axillary lymph nodes in breast cancer. When histological diagnosis provided by axillary dissection or by SLNB was compared with that of cytological results it was found that FNAC was having relatively high sensitivity and absolute specificity as all positive cases were true positives.<sup>10</sup> Similar study done by Brancato B et al. son showed cytological sensitivity of 58.6%, specificity 100%. Thus the authors concluded that axillary lymph node cytology can save axillary dissections.<sup>11</sup>

Van Rijk megahertz et al. conjointly assessed the sensitivity of operative prenatal diagnosis supplemented by fine-needle aspiration biological science for detective work axillary metastases.

In their study it absolutely was found that patients with ultrasonographically suspicious lymph nodes and negative biological science, thirty first had tumor-positive lymph nodes. They over that the sensitivity of prenatal diagnosis and fine-needle aspiration biological science is twenty first, and supernumerary lymph node diagnostic test is avoided in 8 May 1945 of the patients. So improves the choice of patients eligible for lymph node diagnostic test and avoid lymph node diagnostic test typically.<sup>12</sup>

Altomare V et al. did an identical variety of study concerning the effectiveness of fine-needle aspiration biological science (FNAC) to spot pathologic process axillary lymph nodes within the pre-operative section. The sensitivity of FNAC was sixty eight, specificity 100 percent, PPV 100%, and NPV sixty fifth. They over that echo-guided FNAC of the axillary lymph nodes ought to so be enclosed among the regular diagnostic procedures of pre-surgical staging. Thus this cheap and minimally invasive technique makes it doable to avoid the extra value of a lymphatic tissue diagnostic test whereas conjointly scotch the patient the strain of undergoing a second surgery.<sup>13</sup>

Deurloo engineering et al. conjointly cited in their study that by exploitation US-FNAC habitually, it's doable to avoid SLNB in 15-45% cases.<sup>14</sup> Based on leads to our study conjointly. It will be over that lymphatic tissue diagnostic test might be avoided in 18(30%) cases. this will offer the advantage of not solely value reduction however radiation exposure conjointly that is needed during a Scintimammogram in serious trouble lymphatic tissue diagnostic test. In our study, only 5(8.3%) patients developed gentle complications because of the procedure including intumescence and skin erythroderma that resolved impromptu. Baruah BP et al conjointly found that US-FNAC had a sensitivity of 28.5 per cent and a specificity of a hundred per cent for detective work axillary nodal metastases. The sensitivity of US-FNAC had a correlation with invasive neoplasm size (odds magnitude relation 1.03) and grade (odds magnitude relation 2.80). The authors over operative US-FNAC avoided supernumerary SNB in 28.5% of node-positive patients and in 7.8 you look after patients overall.<sup>15</sup>

Popli MB et al. conjointly over that operative US-FNAC of axillary lymph nodes may be a straightforward, minimally invasive and simply on the market. so may be a reliable technique for the initial determination of ALN standing in patients with carcinoma. This will save extended in

operation time, particularly wherever facilities for lymphatic tissue diagnostic test (costly dye, gamma camera, medical specialty facilities) square measure restricted or not on the market.<sup>16</sup>

So in our study we've got shown that the specificity is approaching 100 percent and in cases wherever Ultrasound guided FNAC is positive, lymphatic tissue dissection will be safely avoided. This will so scale back the price incurred by resultant axillary dissection for the patients UN agency showed pathologic process SLN. However the sensitivity of USG guided FNAC is variable and observer dependent and can ne'er be compared to the gold customary, so it's not capable to rule out pathologic process implants once the check is negative.

### Summary and Conclusions

This was a hospital primarily based prospective study done to check the reliableness of varied fact-finding techniques to diagnose the pathologic process axillary nodes with special concentrate on Ultrasound guided FNAC. In our study we have a tendency to create the subsequent observations: Axillary lymphatic tissue dissection (ALND) dissection remains date the gold customary for staging of axillary lymph nodes in malignant neoplastic disease breast. Ultrasound guided FNAC encompasses a tight sensitivity (75%) for the detection of pathologic process nodes and a close to excellent specificity (100%). By habitually exploitation USG guided FNAC it's doable to avoid lymphatic tissue dissection in half-hour cases. The procedure of USG guided FNAC has minimum morbidity and is overall value effective because the value of lymphatic tissue is avertible in virtually common fraction of the cases. USG guided FNAC conjointly has the extra advantage of preventing supernumerary radiation exposure in cases wherever SNLB is avertible. Also USG-FNAC is related to minimum morbidity.

**Recommendations:** It is suggested that USG guided FNAC of the axillary nodes ought to be habitually tired all cases of early stage carcinoma with non-palpable nodes. In patients wherever USG guide FNAC is positive for metastasis, associate axillary dissection ought to be performed directly. In patients wherever USG guide FNAC is negative a SLNB ought to be performed during surgery.

**Conflict of interest:** Nil

**Source of Funding:** Nil

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