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## Role of Ultrasonography in Non-Palpable Breast Lesion and Its Correlation with Fine Needle Aspiration Cytology and Histopathology

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### Abstract

Breast cancer is one of the common malignancy affecting women in the age group of 30-50 years & tumor size remains an important predictor of its survival. Regarding detection of non-palpable breast lesions, mammography and breast ultrasonography are two most prominent and available modalities. In this study conducted in a tertiary care hospital 50 patients with age group  $36.1 \pm 12.05$  years with lesion of BIRADS-3, 4a, 4b & 5 were taken. The mean size of lesions detected by USG was  $10.72 \pm 1.67$ mm. 26 cases who had ultrasonographically BIRADS -3 & 4a lesion underwent US-guided FNAC and reveals 84.61% cases were benign, 11.53% borderline and 3.84% malignant. Accuracy of USG in categorization of benign lesion is 88.88% and in borderline lesion is 12.5% only. Two cases of breast tuberculosis presenting with diffuse lumpiness and mastalgia was diagnosed by USG-guided FNAC, & treated with antitubercular drugs. 24 cases of BIRADS -3, 4a, 4b & 5

*category underwent US-guided needle localization and lumpectomy followed by histopathological examination. 58.33% cases came out to be benign, 25% borderline & 16.66% malignant in final histopathological examination. The accuracy of ultrasound diagnosis was 71.42% for benign lesion, 30.76% for borderline lesion and 75% in cases of malignant lesion. US was found to be more accurate for diagnosing benign & malignant cases.*

*Key Words: Ultrasonography, Mammography, Breast cancer, Non palpable lump, Tuberculosis*

## INTRODUCTION

Globally, 1 million new breast cancer cases are diagnosed each year<sup>(1)</sup>. The current lifetime risk of a woman is 10%<sup>(2)</sup>. Most of the cases affect women in the age group of 30-50 years. In India breast cancer is the second commonest malignancy affecting all women next to cervical cancer<sup>(3)</sup>. India faces a potential breast cancer epidemic over the next decade as women adopt Western lifestyles by marrying and bearing children later in life, oncology experts say. The overall rate is now estimated at 80 new cases per 100 000 population per year<sup>(4,5)</sup>. Data from National Cancer Control Programme India, reveals a lower 5 year survival rate for breast cancer (49%) as compared to the United States (84%). The tumor size remains an important prediction of both disease free and overall survivals. The reported 7 year survival rate is decreased from 96.3% for tumor less than 2 cm to 45.5% for tumor greater than 5 cm<sup>(6)</sup>. So, there can be 20-30% reduction in mortality of cancer detected of smaller size and in earlier stage<sup>(7)</sup>. Among various tools for detection of non-palpable breast lesions, mammography and breast ultrasonography are two most prominent and

available modalities. Recent works reveals that the breast USG has comparable result to detect and predict malignancy in breast in an impalpable stage which are curable in 90% of cases<sup>(8)</sup>. Breast cancer affects Indian woman in younger age (45-54 years), an age where breast USG become more effective<sup>(8-11)</sup>. Though rare, infection like tuberculosis in breast sometimes mimic carcinoma of breast<sup>(12-14)</sup>, and to differentiate them, USG guided FNAC is a more reliable tool than mammography.

So, the present study was done

1. To identify impalpable breast lesion in patients presenting with various non-lump symptoms.
2. To characterize the nature of some of these lesion with cytology and histopathology and to compare them radiologically.
3. To exclude neoplasia and treat cases with infective etiology like tuberculosis presenting with similar clinical features with carcinoma.

## MATERIALS & METHODS

A cross sectional study was conducted with 50 cases in the department of Radiodiagnosis in

collaboration with the Breast Clinic in the department of Surgery, the department of pulmonary medicine ( as a significant number of patients with mastalgia present complaining of chest pain in chest OPD ) and the department of pathology in a tertiary care hospital for a period of January, 2006 to June, 2007. Patients with non-palpable breast lesion, presenting with mastalgia ( cyclical or non-cyclical) , diffuse lumpiness without any discrete lesion, nipple discharge, family history of Ca breast were selected. Patients with Ca breast were also taken in this study for screening of opposite breast. Cases were evaluated with ultrasonography using 8-14 mHz linear transducer (Toshiba, Core vision XARIO ). Breast imaging reporting and data system (BIRADS) for ultrasonography was used for reporting. BIRADS 3, 4, 5 lesions in imaging which are not clinically palpable were identified , recorded and selected for FNAC or needle localization followed by excision. Cytological and histopathological examination was done and findings were analysed. There was no ethical, legal, or financial controversies regarding this study.

## RESULTS

Total 50 patients with impalpable lesion in the breast were taken up for this study. The age group of patients included in our study ranges from 20-72 years with mean age =  $36.1 \pm 12.05$  years. Mastalgia was the most frequent complaint (52%), followed by diffuse lumpiness (20%) & nipple discharge (14%). Screening of opposite breast (in case of Ca breast) done in 6% of cases. There was positive family history of breast carcinoma in 6% of cases. 2% of cases had past h/o infection . 48% of lesion was detected in upper outer quadrant, 14% of lesion in upper inner quadrant, 12% of lesion in lower inner and 26% in lower outer quadrant. 50% patients were recorded as BIRADS-3, 34% in BIRADS-4a, 8% in BIRADS -4b and 8% cases in BIRADS-5 category. The size of the non-palpable lesions in 50 cases range from 6mm to 15 mm with mean size =  $10.72 \pm 1.67$  mm. After US-BIRADS categorisation, USG- guided FNAC has been done in 52% cases and US-guided needle localization has been done in 48% of cases. FNAC reveals 84.61% cases were benign , 11.53% borderline and 3.84% were malignant and it was more sensitive and accurate for benign than borderline cases.

| Benign (84.61%)            | Borderline (11.53%)  | Malignant (3.84%) |
|----------------------------|--|-------------------|
| Fibroadenoma - 11          | Benign fibrocystic disease with complex proliferative change - 2 | DCIS - 1          |
| Benign breast disease- 7   | Atypical ductal hyperplasia - 1                                  |                   |
| Tuberculosis – 2           |  |                   |
| Inflammatory condition - 1 |  |                   |
| Galactocele - 1            |  |                   |

- Correlation between USG findings & FNAC

| Condition  | Sensitivity | Positive predictive value | Accuracy |
|------------|-------------|---------------------------|----------|
| Benign     | 88.88%      | 72.72%                    | 88.88%   |
| Borderline | 50%         | 14.28%                    | 12.5%    |

Regarding histopathological findings, 58.33% cases came out to be benign, 25% borderline & 16.66% cases were malignant.

| Benign (58.33%)                 | Borderline (25%)                                 | Malignant (16.66%)          |
|---------------------------------|--|-----------------------------|
| Duct ectasia – 2                | Atypical ductal hyperplasia – 2                  | DCIS – 2                    |
| Fibrocystic disorder / ANDI – 4 | Atypical lobular hyperplasia – 1                 | Invasive duct carcinoma – 2 |
| Fibroadenoma – 3                | Benign FCC with complex proliferative change - 1 |                             |
| Blue dome cyst – 1              | Juvenile papillomatosis - 2                      |                             |
| Ductal adenoma – 1              |  |                             |
| Chronic inflammatory - 1        |  |                             |
| Sclerosis – 1                   |  |                             |
| Fat necrosis – 1                |  |                             |
| Total – 14                      | Total – 6  | Total 4                     |

- Correlation between USG findings and Histopathology

| Condition  | Sensitivity | Positive predictive value | Accuracy |
|------------|-------------|---------------------------|----------|
| Benign     | 71.42%      | 35.71%                    | 71.42%   |
| Borderline | 57.14%      | 33.33%                    | 30.76%   |
| Malignant  | 75%         | 75%                       | 75%      |

The accuracy of ultrasound diagnosis was 71.42% for benign lesion, 30.76% for borderline lesion and 75% in cases of malignant lesion.

## DISCUSSION

Breast cancer is the commonest cancer in female worldwide & second commonest after cervical cancer in India<sup>(3)</sup>. Early detection and screening can reduce breast cancer mortality around 18-29%<sup>(6,7)</sup>. Breast ultrasonography plays a crucial role in this setting. It is more age specific than mammography for Indian scenario where breast cancer incidence is a decade younger than the western population<sup>(4,5)</sup>. It is more cost effective and also plays a huge role in identification of small impalpable lesion<sup>(15)</sup>. Sonography of breast is an accurate imaging test in women 45 years or younger with breast symptoms and may be an appropriate initial investigation<sup>(15-20)</sup>.

In a study conducted by Sunita Saxena et al<sup>(3)</sup> and a separate study by Amit Goel et al<sup>(10)</sup>, commonest age group incidence in Indian breast cancer patients was found to be in the age group of 45- 54 years. Tumor kinetics reveals 5-10 years time duration is required for a single tumor cell to grow to a stage of clinical manifestation. So Indian patients require screening at ages 35-45 years.

In our study 50 patients with age group  $36.1 \pm 12.05$  years with lesion of BIRADS-3, 4a, 4b & 5 were included<sup>(21-24)</sup>. However, it is not possible to find out the age groups from where screening should be started with this small hospital based study. To overcome this problem, multicentric population based study is required.

The signs and symptoms of occult breast lesion were found to be nipple discharge, mastalgia diffuse lumpiness of breast in our study<sup>(25-26)</sup>. Screening of contralateral breast was also done in case of Ca breast. Family history was the cause of presentation in 16% of our cases. Indeed, in young age group patients with breast cancers, family history is associated in 25% of cases<sup>(2,3)</sup>.

Commonest site for carcinoma of breast is upper outer quadrant of breast (60%)<sup>(2,5)</sup>. In our study, it is found that most of the lesion is in upper outer quadrant (48%), followed by lower outer (26%), upper inner (14%) & lower inner (12%).

In our study sonography done in all 50 patients and detected lesions are characterised by US-BIRADS category. BIRADS is a standard

reporting system, in a study of 1109 patients of nonpalpable breast lesions by Susan G Orel et al,<sup>(21)</sup> it was concluded that mammographic and sonographic lesions can be placed into BIRADS category for predicting the presence of malignancy. Sonographic BIRADS is an important system for describing and classifying breast lesion<sup>(21-24)</sup>.

In our study it has been found that 50% patients were in BIRADS-3, 34% in BIRADS-4a, 8% in BIRADS -4b and 8% cases in BIRADS-5. The mean size of lesions detected in our study was  $10.72 \pm 1.67$  mm.

In estimating accuracy of US- guided needle localization no cases of failed excision were recorded in our study. Specimen sonography was done in 66.67% of cases and depicted the lesion excised thus achieving 100% accuracy.

In our study 52% cases who had ultrasonographically BIRADS -3 & 4a lesion underwent US- guided FNAC and reveals 84.61% cases were benign, 11.53% borderline and 3.84% malignant. Accuracy of USG in categorization of benign lesion is 88.88% and in borderline lesion is 12.5% only.

No further investigation was done for BIRADS -3 & 4a lesion which were found out to be benign after US- guided FNA. Three borderline cases and one malignant case were undergone US- guided wire localization and excisional biopsy. It was found that histopathological findings were similar

to the findings of FNAC and findings of our study are supported by several other studies<sup>(25-31)</sup>.

7.7% cases of breast tuberculosis presenting with diffuse lumpiness and mastalgia was found in this study. USG guided FNAC revealed epithelioid cell granulomas and caseous necrosis. They were treated with category I anti tubercular regimen (2EHRZ/4HR). Thus, USG guided Fine needle aspiration cytology (FNAC) from the breast lesion continues to remain an important diagnostic tool of breast tuberculosis. The mammogram in breast tuberculosis is of limited value as the findings are often indistinguishable from carcinoma breast. Moreover, as breast tuberculosis is found in young women of 20-40 yr of age, dense breasts makes interpretation of mammogram difficult.<sup>(12-14)</sup>

48% cases of BIRADS -3, 4a, 4b & 5 category underwent US-guided needle localization and lumpectomy followed by histopathological examination. 58.33% cases came out to be benign, 25% borderline & 16.66% malignant in final histopathological examination. The accuracy of ultrasound diagnosis was 71.42% for benign lesion, 30.76% for borderline lesion and 75% in cases of malignant lesion.

In a study performed P.H.M. Peeters et al<sup>(32)</sup> on diagnostic accuracy of needle localized open breast biopsy for impalpable breast disease the sensitivity of needle localized open breast biopsy was 99% after 2 years follow up but dropped to 96% after 5 years. Another study of US - guided

intraoperative excision of non palpable breast mass also support our study<sup>(33)</sup>.

So, to conclude-

Ultrasound is an effective tool in detecting subclinical lesions of breast & can be used as first investigation in younger age group patients. It can be used to diagnose benign and malignant lesions more accurately than borderline cases. US-guided needle localization and lumpectomy is an accurate method to diagnose and treat early cases of breast cancer and as a screening procedure it is widely available, low cost, comfortable than mammography.

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