



MAMMOGRAM AND ULTRASOUND EVALUATION OF BREAST LESIONS WITH FNAC CORRELATION

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**ABSTRACT**

**Objectives:** This research paper is to characterize mammographic and ultrasonographic features of breast lesion with FNAC correlation and to compare sensitivity of mammography with ultrasonography in diagnosing benign and malignant breast lesions. **Materials And Methods:** Cross-sectional study in 66 patients who were referred to the Department of Radiodiagnosis with breast lesions and having BIRADS 2 and above on imaging from January 2023 to December 2023. **Result:** Our data indicate that sensitivity and specificity of ultrasound was statistically significantly greater than mammography in patients with breast lesions for the detection of breast cancer and benign lesions particularly in dense breast women. **Conclusion:** The definitive features of benign and malignant lesions were correlating with FNAC, so if the lesion is found to be 100% benign (BI-RADS 2 category) in USG and mammography, FNAC may be avoided. Combined USG and mammography yielded the best result and can be used as a screening modality to detect malignancy earlier and to treat the patient earlier.

**KEYWORDS :** Biopsy, breast, mammography, palpable lumps, ultrasonography.

**INTRODUCTION :**

Only 6.3 million women of the total number of cases diagnosed with breast cancer in the past five years were alive, whereas in the year 2012, 1.7 million were diagnosed with breast cancer.

Its incidence since 2008 has risen by more than 20%, whereas there has been an increase of 14% in the mortality incidence. One of the most common causes of cancer related death among women is breast carcinoma accounting to approximately 522 000 in the year 2012.

In 140 of 184 countries worldwide it is the most frequently diagnosed cancer among women which now represents one in four of all cancers in women.

One of the leading cause of cancer death in the less developed countries of the world is breast cancer. This is partly because of clinical advances to combat the disease which are not reaching the women living in those regions and also because of a shift in lifestyle, which is causing an increase in its incidence.

All detected breast lesions are not malignant and all the benign masses do not progress to cancer; nevertheless the precision of the final diagnosis can be greatly increased by radiological imaging (mammography, ultrasonography)and pathological diagnosis.

The present study is to evaluate the breast lesions according to BI-RADS(Breast Imaging Reporting and Data System) by using two different radiological procedures (non-invasive method) with correlation of FNAC (invasive method).

**MATERIALS AND METHODS**

**Study Design**

Cross-sectional study.

**Study Period**

12 months (January 2023 –December 2023)

**Study Setting**

Department of Radiodiagnosis and Department of Pathology, Mamata medical college, Khammam

**Study Population**

Females more than 30 years of age with breast lesions and having BI-RADS 2 and above on imaging.

**Inclusion Criteria**

- Females more than 30 years coming for routine breast screening, found to have BI-RADS 2 and above.
- Females more than 30 years associated with or without lump or nodularity in the breast.
- Females more than 30 years with complaints of pain in the breast referred to Department of Radiodiagnosis.
- Females with history of nipple discharge.

**Exclusion Criteria**

- o Pregnant women
- o Bleeding disorders
- o Patients with known history of breast malignancy (BI-RADS 6).

**Sample Size**

Total 66 patients were included in the study.

**Equipments / Instruments**

Conventional mammography (Mammography System. Allengers mammography machine , Ultrasonography Sonoscape S 50 ,disposable needles (21-27 gauge) (Hindustan syringes & Medical devices Ltd), Spirit (Hy-Chem laboratories), fixative (95% ethanol).

**RESULT**

**Characteristics Of Breast Lesions On Mammography**

Out of the 66 patients, 33% had fibro-fatty breast tissue . 29 of the total breast lesions were in found in the upper outer quadrant. There was an equal distribution of round and oval shaped lesions on mammography. 44 of the 66 lesions had well defined margins while 9 of them were indistinct, 8

microlobulated and the rest (5) had spiculated margins.

Only a single lesion was fat containing, while 2 of the lesions had low density and the remaining 63 lesions had high density on mammogram.

84% of breast lesions had no calcifications seen on mammography.

The overlying skin was normal in 61 of the patients while 3 of them had skin retraction and 2 of them had skin thickening on mammography.

Only 4 of the patients with lesions had nipple retraction on mammography. On mammography, 45% of the patients had benign lesions (BI-RADS 2) in the breast, while it was 13.6% of the lesions were highly suspicious for malignancy (BI-RADS 5).

**Characteristics Of Breast Lesions On Ultrasonography**

Oval shaped lesions at 51.5% were more than round lesions at 48.5% when visualised in ultrasonography. The most common type of margin of lesion on ultrasonography was well circumscribed (54.5%) and the least common was spiculated margins (9%).

38 of the lesions were hypoechoic on ultrasound followed by 21 anechoic lesions, 5 complex cystic lesions and lastly followed by a single hyperechoic lesion and a single isoechoic lesion.

32 of the lesions showed no posterior echo intensity on ultrasonography.

Most lesions (57.6%) showed a normal longitudinal versus anteroposterior diameter ratio. 89.4% showed no skin retraction while 9.1% of the lesions showed skin retraction and a single lesion had thickening of the overlying skin on USG.

There was no infiltration of muscle and chest wall structures in 64 of the cases whereas infiltration was seen in 2 of the cases. Ultrasonography showed 57.6% of patients had benign lesions (BI-RADS 2) in the breast while 12.1% had lesions highly suspicious for malignancy (BI-RADS 5).

**Comparison Of Mammographic & Ultrasonographic Findings With FNAC**

FNAC showed that out of the total 66 lesions, 50 of them were benign and 16 were positive for malignant cells. The positive predictive value (PPV) of mammography was 76% and the negative predictive value (NPV) was 24% for benign lesions while the PPV was 61.5% and the NPV was found to be 38.4% for malignant lesions.

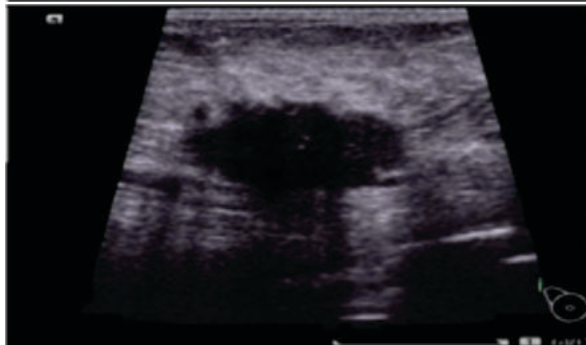
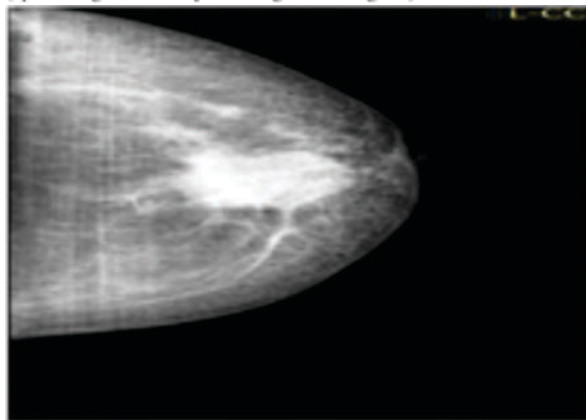
The positive predictive value of ultrasonography was 97.1% and the negative predictive value was 2.9% for both benign and malignant lesions. Combining both the modalities had a sensitivity of 94.2% for benign lesions and 96.4% for malignant lesions. The specificity after combining both modalities was 97.1% for benign lesions and 92.2% for malignant lesions.

Age	Benign		Malignant	
	Number	Percentage (%)	Number	Percentage (%)
30-40 years	26	52.00	3*	18.75
41-50 years	20	40.00	6*	37.50
51-60 years	2	04.00	5	31.25
61-70 years	2	04.00	2	12.50
Total	50	100.00	16	100.00

(\*p<0.05 significant compared benign with malignant)

Density	Benign		Malignant	
	Number	Percentage (%)	Number	Percentage (%)
High density	47	94.00	16*	100.00
Low density	2	04.00	0	00.00
Fat containing	1	02.00	0	00.00
Total	50	100.00	16	100.00

(\*p<0.05 significant compared benign with malignant)

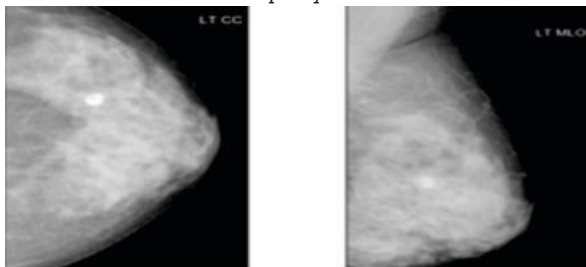


USG of patient shows an ill-defined, spiculated, hypoechoic, taller than wide mass lesion -BIRADS V

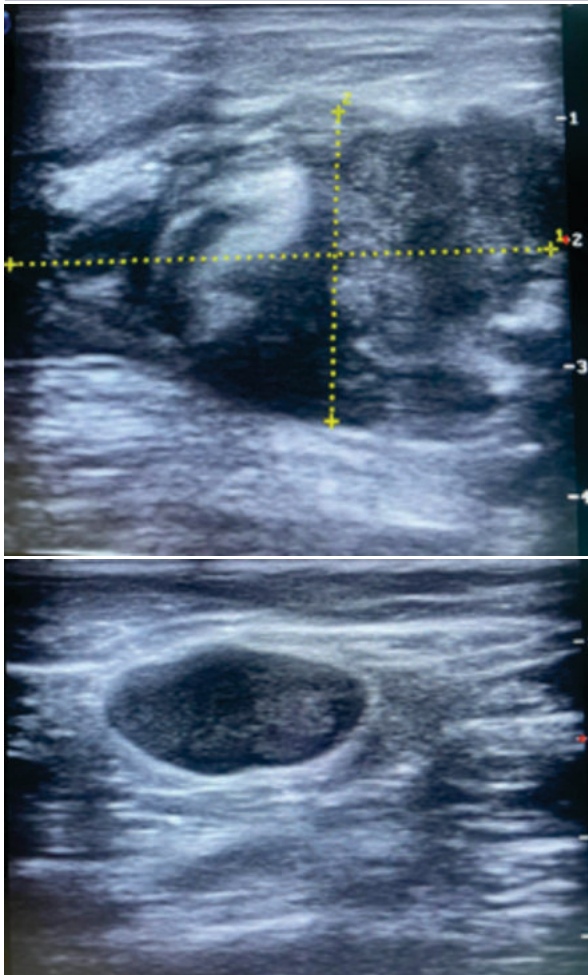
FNAC - positive for malignant cells from ductal carcinoma - intermediate nuclear grade.



A well defined, rounded anechoic lesion seen with posterior acoustic enhancement - simple cyst BIRADS 2.



Calcified fibroadenoma is noted in the upper outer quadrant of left breast - BIRADS II.



USG showing a BIRADS V lesion with metastatic axillary lymphnode.

**DISCUSSION :**

In our study, the positive predictive value was 76% and the negative predictive value was 24% for benign lesions while the PPV was 61.5% and the NPV was found to be 38.4% for malignant lesions on mammography.

Mammographic BI-RADS with FNAC was 81% sensitive and 71% specific for benign lesions, while the sensitivity was 75.7% and the specificity was 59% for malignant lesions.

Positive predictive value (PPV) was 97% for ultrasonographic categorization of BI-RADS lesions with FNAC correlation for both benign and malignant lesions. Ultrasonographic BI-RADS with FNAC was 86% sensitive and 95% specific for benign lesions, while the sensitivity was 95% and the specificity was 86% for malignant lesions.

This is comparable with several other studies where PPV of BI-RADS 4 lesions ranged from 16-52.7% and PPV of BI-RADS 5 ranged from 68-100%. Taplin et al. described a PPV of BI-RADS category 4 as 16.7% and a PPV of BI-RADS category 5 as 68.4%. Another study by Zonderland et al. reported PPV of BI-RADS category 4 as 52.7% and a BI-RADS category 5 as 100% in a screening population. In a recent study by Timmers et al., PPV of BI-RADS 4 was 39.1% and of BI-RADS 5 was 92.9%.

Phurailatpam et al. had described in women > 30 years of age the mammographic evaluation with FNAC was 92.3% sensitive, 91.8% specific, 85.7% was the positive predictive value and 95.7% was the negative predictive value. Whereas the result with ultrasonographic evaluation with FNAC was 80.7% sensitive, 100% specific, 100% was the positive

predictive value and 90.7% was the negative predictive value. The combination of the imaging modalities of mammography and ultrasonography gave a sensitivity of 92.3%, specificity 100%, positive predictive value 100% and 96% was the negative predictive value.

**CONCLUSION :**

Breast ultrasound is more accurate than mammography in women who are young.

In women with dense breasts, ultrasound appeared to be superior to mammography and could be used as an appropriate initial imaging test in those women.

The accuracy of mammograms increased with fatty breasts in older age group.

The definitive features of benign and malignant lesions were correlating with FNAC, so if the lesion is found to be 100% benign (BI-RADS 2 category) in USG and mammography, FNAC may be avoided.

All the lesions which were detected as BI-RADS 5 in either USG or mammography or both were found to be 100 % malignant. USG could detect almost all the malignant lesions except in three of the cases.

Combined USG and mammography yielded the best result and can be used as a screening modality to detect malignancy earlier and to treat the patient earlier.

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