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Research Article

MAMMOGRAPHIC AND SONOMAMMOGRAPHIC EVALUATION OF BREAST MASSES WITH PATHOLOGICAL CORRELATION

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Abstract

Background: Breast cancer is one of the most prevalent cancers in women. All palpable breast masses require proper work up, early diagnosis and management. Triple assessment includes clinical examination, imaging and fine needle aspiration cytology or core biopsy. **Aim:** To evaluate the role of mammography and sonomammography in diagnosing breast mass lesions individually and when combined, with pathological correlation. **Materials and methods:** 126 breast masses from 115 patients were evaluated with Sonography and mammography. The lesions were assessed based morphological criteria. Pathological correlation was done, which was taken as standard. Sensitivity, specificity were derived for Sonography and mammography individually and also combined. **Results:** overall sensitivity and specificity for mammography are 79.5 and 80.4 respectively. Sensitivity and specificity for diagnosing breast lesions with Sonography are 85.45 and 89.31. Combining the mammography and USG, sensitivity, specificity were 94.25 and 96.2 respectively. These results were significantly high than mammography or USG alone. **Conclusion:** Present study confirms the higher combined sensitivity, specificity and accuracy for ultrasonography and mammography for detection of breast masses than individual modality.

INTRODUCTION

Palpable breast masses, either self-detected or identified by clinical examination is common, often distressing for many women. Although most detected masses are benign, every woman presenting with breast mass should be evaluated to exclude or establish diagnosis of cancer.[1] Over 100,000 new breast cancer patients are diagnosed annually in India and according to WHO (2012) an estimated 70218 women died due to breast cancer.[2, 3, 4] Early detection of breast cancer in order to improve the cancer outcome and survival remains the cornerstone of breast cancer control.[4] The established management of palpable breast masses includes triple assessment, which includes clinical examination, imaging and fine needle aspiration cytology or core biopsy.[5] Mammography is the widely accepted and cost effective modality used for breast cancer screening in clinically suspected lesion.[6] The adjunctive modality to mammography is high resolution Sonography which helps in characterizing a mammographically not detected palpable breast abnormality especially in dense breast.[7] Though a definitive diagnosis is possible with imaging, for all the lesions histopathology and cytology are proven tools essential for obtaining confirm diagnosis.[8] The present study was undertaken to evaluate the role of mammography and sonomammography in diagnosing breast mass lesions individually and when combined with pathological correlation.

MATERIALS AND METHODS

Present study is prospective study conducted over period of 10 months. A total of 126 palpable or suspicious breast masses from 115 patients were evaluated with mammography and sonomammography. The lesions were assessed based on morphological criteria in mammography and sonomammography. Confirmation was done with FNAC or biopsy in appropriate cases and post-operative follow up in post-surgical cases. Informed consent was taken from the patients. Inclusion criteria were all patients with clinically palpable breast masses, Patients with no obviousclinical mass on palpation but presented with axillary lymphadenopathy, strong family history- First degree relatives with breast carcinoma, operated case of breast carcinoma for evaluation of contralateral breast. Exclusion criteria were age less than 35 years, very large and very tender breast, women with fungating mass and mass adherent to chest wall where performing USG and mammography is difficult, very apprehensive patients or

uncooperative patients, lactating and pregnant patients. Descriptive statistics were reported using mean and standard deviation for continuous variables, number and percentage for categorical variables. A correlation was done between mammography, sonomammography and pathology results individually and combined. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were computed for each outcome. A p value less than 0.05 was considered statistically significant.

RESULTS

In present study 206 breasts were examined amongst which 126 cases were included, rest of the cases were normal and failed to follow-up and refused for consent. 126 cases were evaluated clinically and radiologically (mammography and sonomammography). Age of patients ranged from 35 to 82 years with mean age of 49±4.2 years. There were 45 malignant and suspicious for malignant cases. Pathologically these were atypical ductal hyperplasia, ductal carcinoma in situ, infiltrating ductal carcinoma, lobular and papillary carcinoma. There were total of 79 benign cases, fibroadenoma being the commonest followed by fibrocystic disease, simple cysts, duct ectasia, mastitis, galactocele and least being phylloides. On pathological examination2 benign cases turned out to be malignant. A case of seroma and tubercular mastitis were misdiagnosed as malignant. A normal ultrasound and mammographic case had metastatic axillary lymph node underwent mastectomy turned to be lobular carcinoma. The sensitivity, specificity and accuracy of individual modality and combined are given in table1. There was no significant difference between Sonography and ultrasonography in detecting breast disease (p value-0.06). There is significant difference between individual modality and combined(mammographyvs. combined p value=0.01 and ultrasonography vs. combined p value=0.007)

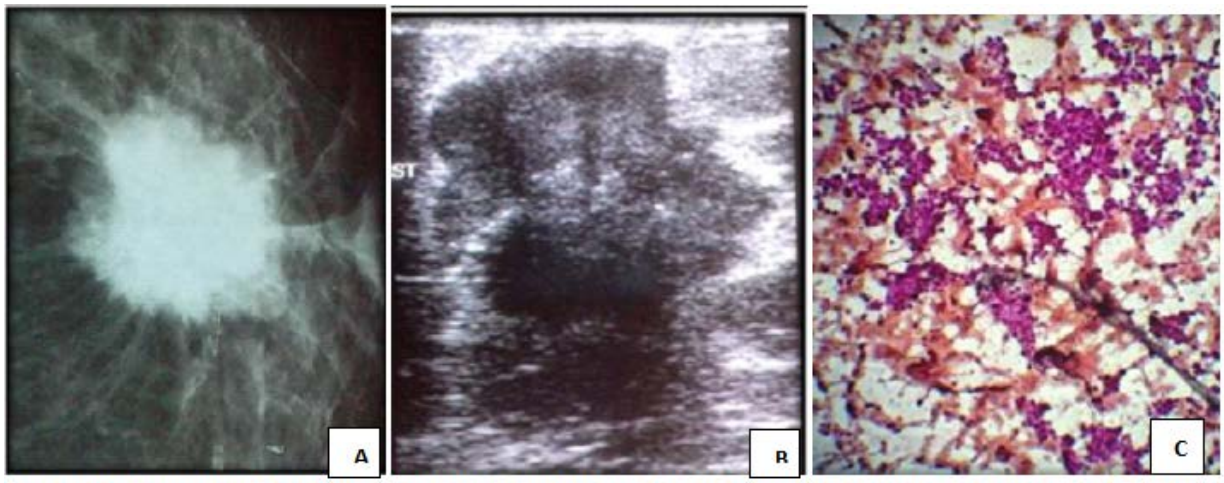

Fig 1: Mammography(A), sonography(B) and cytology(C) images of infiltrating duct carcinoma.

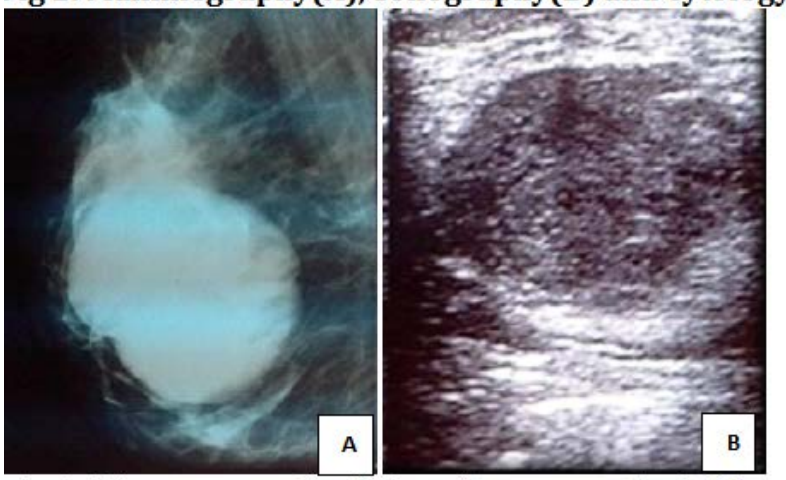

Fig 2: Mammography (A) and sonography(B) images of phylloides tumour

Table 1: Sensitivity, specificity, accuracy of mammography, Sonography and combined modality.

Modality	Sensitivity (%)	Specificity (%)	Accuracy (%)
Sonography	85.45	89.31	82.7
Mammography	79.5	80.4	83.4
Combined	94.25	96.2	97.4

DISCUSSION

Breast cancer is one of the most prevalent cancers in the world among women. Breast carcinoma has been reported in only 4% of patients with breast symptoms and even among palpable lesions undergoing biopsy, a large number of lesions turned out to be benign. [9] Mammography, the primary method of detection and diagnosis of breast disease has proven sensitivity of 85-95%. However, additional diagnostic imaging like USG, MRI of breast often becomes necessary in view of its low specificity. False negative rate of mammography for breast cancer in patients with palpable abnormalities of breast has been reported to be as high as 16.5%. Mammography sensitivity for breast cancer decreases to as low as 30-48% in patients with radiographically dense breasts.[9, 10] Breast ultrasound is perfect adjunct to the mammography since both the modalities are easily available, relatively cheaper and takes relatively less time. Ultrasound is also useful in guiding FNAC or biopsies and more reliable in evaluation of dense breasts. [8, 11] Though reliable diagnosis is possible with non-invasive imaging procedures, for most lesions fine needle aspiration

cytology/biopsy are necessary for obtaining definitive results.[12]Sensitivity of sonomammography in detecting benign lesions were high because small cysts and fibroadenomas are better seen even in dense breasts and USG differentiates cyst from solid lesions. Specificity of USG in detecting malignant lesions was less as microcalcifications were not well seen in USG. Overall, sensitivity of USG was 85.45% with specificity of 89.31%.These results correlate with other studies. (Table2) Sensitivity of mammography is low for benign lesion especially in dense breasts and very small lesions. Sensitivity and specificity for malignant lesions are high because microcalcifications are better appreciated in mammography. Overall, sensitivity for mammography was 79.5% with specificity of 80.4%. Comparison of mammographic results are illustrated in Table.3

Combining the mammography and USG, sensitivity, specificity were 94.25 and 96.2 respectively. These results were significantly high than mammography or USG alone. Present study is in accordance with previous study which is given in table 4.

Table 2: Comparison of sonomammographic results

Study	Sensitivity (%)	Specificity (%)	Accuracy (%)
Texidor HS et al (1977)[13]	95.7	89.2	-
Gonazaga MA et al (2010) [14]	57.1	62.8	-
Sabine M et al(2000)[7]	89.1	79.1	83.4
Berg WA et al (2004)[15]	83.0	73.5	67.8
Taori K et al (2013[8])		86.9	92.7
Present study(2016)	85.45	89.31	82.7

Table 3: Comparison of mammographic results

Study	Sensitivity (%)	Specificity (%)	Accuracy (%)
Sabine M et al, (2000[7])	83.7	68.5	77
Barlow WE et al(2002)[16]	85.8	87.7	-
Berg WA et al (2004)[15]	67.8	75	70.2
Cavert MM et al (2009)[5]	56.6	99.4	
Taori K et al (2013)[8]	-	78.2	87.9
Present study(2016)	79.5	80.4	83.4

Table 4: Comparison of results for combined mammography and sonomammography

Study	Sensitivity (%)	Specificity (%)	Accuracy (%)
Sabine M et al (2000)[7]	94.6	92.1	93.2
Shetty MK et al (2003)[17]	100	80.1	-
Berg WA et al (2004)[15]	91.5	23	70.2
Taori K et al (2013)[8]	-	97.8	98.8
Present study(2016)	94.25	96.2	97.4

CONCLUSION

Present study confirms the higher combined sensitivity, specificity and accuracy for ultrasonography and mammography for detection of breast masses including malignancies. USG is better in cystic lesion ectasia, inflammatory lesions, dense breast evaluation and pregnancy, whereas mammography is better for evaluation of microcalcifications, spiculated masses, for early detection of occult malignancies.

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