ORIGINAL ARTICLE

Mammography and Sonography Co-Relation of Breast Lesions

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ABSTRACT

BACKGROUND AND OBJECTIVES: Ultrasound plays a vital role in diagnosis of breast lesions. It differentiates solid from cystic masses. However, in recent years, ultrasound as an adjunct to mammography has improved accuracy in the diagnosis of breast lesions. To study the role of mammography and sonography in diagnosis and management of various breast lesions. To provide a systematic and practical approach to image evaluation of palpable breast lesions. To establish the presence of mass and then evaluate its imaging characteristics which help in decision making by the clinician as to go for biopsy of lesion or follow up. **METHODS:** On average 30 patients a month visits LG hospital, radiology department for evaluation of breast lesions. Our study includes 500 patients who undergone mamo-sonography during period of December 2015 to June 2017. **RESULTS:** Out of 500 patients most of the patients had presented with mass and pain. breast lesions were observed predominantly in age group of 31-40 (58%), and 48% of the patients in this study had benign pathology. Out of 500 patients, total 160 patients had breast carcinoma from which, 120 patients showed positive family history. Sensitivity for detection of breast lesions for mammography was 87%, sonography was 95%, and combined was 100%. **CONCLUSION:** Combined use of mammography and sonography plays an important role in the management of palpable breast lesions.

Keywords: Sonography, Mammography, Breast Lesions

INTRODUCTION

Breast cancer is the leading cause of non-preventable cancer deaths among women. Great strides in early detection and improved treatment have decreased breast cancer related deaths. A palpable mass in a woman's breast represents a potentially serious lesion and requires evaluation by history taking, physical examination and mammography. Mammography is a well-defined and widely accepted technique to evaluate clinically suspected breast lesions and screening for breast cancer. In these patients, sonography is a useful adjunctive modality and helps characterizing a mammographically detected palpable abnormality, especially in patients with dense breast.[1] Sensitivity and specificity of sonography or mammography is higher if sonography and mammography are combined.

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MATERIALS AND METHODS

The study was conducted at our Hospital. We included women more than or equal to 30 years referred to us with breast lesions, during a period of 19 months from December 2015 through June 2017 who underwent a combined mammographic and sonographic evaluation of breast. Breast lesions included in the study had a variety of clinical descriptions, such as palpable mass, pain, nipple discharge, nipple retraction etc. In all patients studied, the breast lesions were of sufficient clinical concern to be referred for imaging evaluation. The following information was documented at the time of initial visit; Date of initial visit, Age of the patient, Site of the lesion and Description of the lesions, history of similar lesions of breast or malignancy of breast within family. All patients underwent diagnostic mammography, which included standard cranio-caudal and medio-lateral-oblique views. Later all patients were subjected to sonography of the breast. Mammography was performed with GE Alpha ST and

sonography was done with Wipro GE logiq P5 premium 3 with 7-10 MHz probe. Diagnosis was made on the basis of characteristics of lesions on mammography and sonography, age of the patient, clinical history. Diagnosis of inconclusive, Suspicious and malignant lesions were confirmed by histopathological evaluation. Like biopsy or FNAC.

Exclusion Criteria:

- Women below 30 years of age with palpable abnormalities of breast.
- Women with fungating mass per breast and mass adherent to chest wall where performing mammography was difficult.

OBSERVATIONS

In my study, out of 500 patients breast lesions were observed predominantly in age group of 31-40 (58%), most of the patients had presented with mass and pain. Other chief complains were nipple discharge and nipple retraction. The palpable abnormalities were reported in 270 patients (54%) in the right breast and 180 patients (36%) in the left breast and 50 patients (10%) involving both breast. Patients who had malignant lesions of the breast showed significantly positive family history. (120 out of 160 patients had positive family history of breast cancer) 48% of patients had fibroglandular density on mammogram as 58% of the patients were in age group of 31-40 years and fibroglandular tissue is predominant in younger age group. Most of the patients were between 31-40 age groups (290) and most of them were having benign breast lesions (200),18 % of patients had fibroadenoma (Figure:1) Out of 500 patients, 48% of the patients in this study were having benign pathology, followed by malignant pathology (32%). 30 patients had ductal papilloma (figure:2) & 10 patients had intraductal carcinoma with metastasis (Figure : 3)

Table 1: Significance of Family History in Breast Disorders

BASIC PATHOLOGY	F/H YES	F/H-NO	TOTAL
Infective	O	40	40
Traumatic	O	20	20
Benign	80	160	240
Malignant	120	40	160
Normal	10	30	40

Table 2: Final Assessment After Combined Mammographic and Sonographic Evaluation of Breast Lesions

Basic Pathology	No Of Breast Lesions	Percentage
Infective	40	8.0%
Traumatic	20	4.0%
Benign	240	48.0%
Malignant	160	32.0%
Normal	40	8.0%
Total	500	100.0%

Table 3: Age Wise Distribution of Breast Lesions in Study Group

Age	Infective	Traumatic	Benign	Malignant	Normal	Total
31-40	40	0	200	30	20	290
41-50	0	20	30	70	10	130
51-60	0	0	10	30	10	50
61-70	0	0	0	30	0	30
Total	40	20	240	160	40	500

Table 4: Diagnosis of Breast Lesions

Diagnosis	Mammography	Sonography	Combined
Normal	90	60	40
Benign	300	290	300
Probably Benign	0	10	10
Suspicious	60	70	80
Malignant	50	70	70

Table 5: Final Diagnosis

NO	DIAGNOSIS	Frequency	Percent
1	**Breast Abscess**	20	4 %
2	**Cyst**	50	10 %
3	**Duct Ectasia**	20	4 %
4	**Duct Pappiloma**	30	6 %
5	**Ductal Carcinoma In Situ**	30	6 %
6	**Fat Necrosis**	20	4 %
7	**Fibroadenoma**	90	18 %
8	**Fibrocystic Disease**	60	12 %
9	**Galactocele**	20	4 %
10	**Invasive Ductal Carcinoma (Idc)**	50	10 %
11	**Idc With Liver Metastasis**	10	2 %
12	**Invasive Lobular Carcinoma**	10	2 %
13	**Lipoma**	10	2 %
14	**Mastitis**	20	4 %
15	**Phyllodes Tumor**	10	2 %
16	**No Abnormality**	50	10 %
	Total	500	100.00%

Figure 1: Fibroadenoma With Calcification: Mammography (left breast: cranio-caudal and oblique) and sonography image

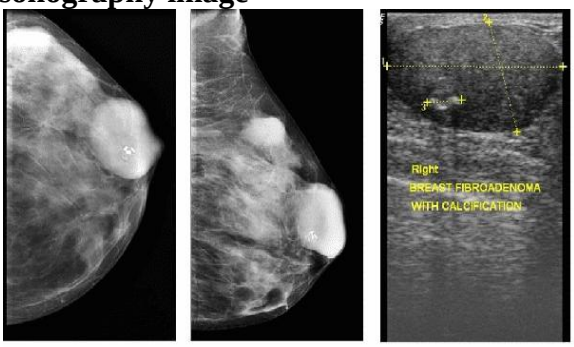


Figure 2: Duct Papilloma: Mammography (Right breast- cranio-caudal), sonography and histopathological image

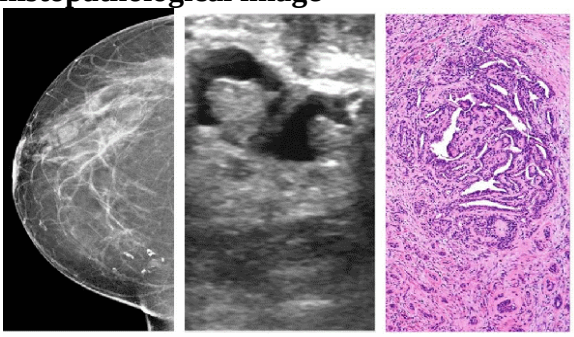
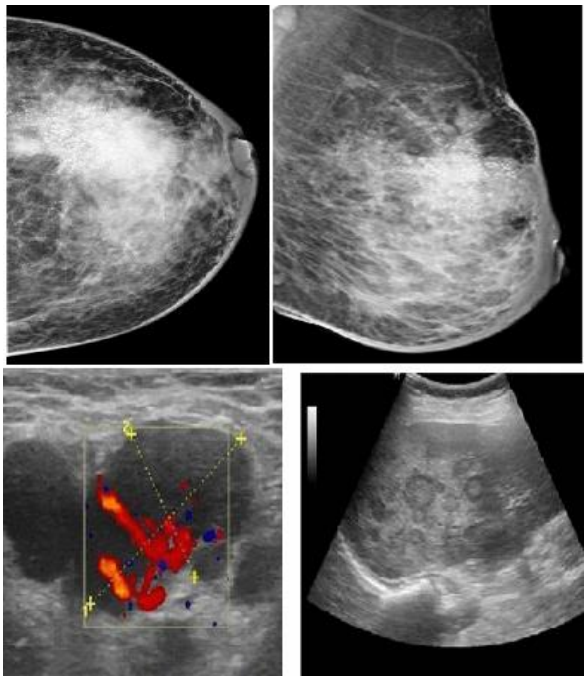


Figure 3: Invasive Ductal Carcinoma: Mammography image (Left breast - cranio-caudal and oblique) and sonography image shows axillary lymph node and liver metastasis



DISCUSSION

Because of the low sensitivity of the mammography in younger women due to dense breast tissue and also low incidence of breast carcinoma in women less than 40 years[2], in our study we had included women only who are 30 and over 30 years of age with breast lesions. The role of mammography in patients with breast lesions is to show a benign cause for palpable abnormality of the breast and to avoid further intervention, to support earlier intervention for a mass with malignant features, screen the remainder of the ipsilateral and contralateral breast for additional lesions, and to assess the extent of malignancy when cancer is diagnosed.[3]

Digital Mammography:

It allows images to be enhanced and transmitted electronically. The ability to alter contrast and brightness permits further evaluation of abnormal areas, to identify features diagnostic of benign and malignant disease. Cancer detection rate is similar in screen field and full field mammography; screen-field imaging has better image quality and fewer artifacts & requires fewer patient recalls. Potential new techniques include three-dimensional imaging, lower dose radiation, dual energy subtraction, contrast-enhancement imaging & computer assisted diagnosis

Technique:

Compared to radiographic studies of other parts of the body, mammography places particularly stringent demands on equipment and image quality. To meet the requirements, mammography requires special tubes that produce particularly low energy radiation. Over the last 70+ years the technique has been developed and refined through the use of dedicated units, compression, Molybdenum targets, standardized techniques movable grids, automatic exposure control, high resolution films , rare earth screens automatic film processing and even greater attention to quality control

Definition of Mammographic Lesion:

The sensitivity of mammography is initially determined by the relative composition of the breast parenchyma. The denser the breast the less sensitive it is to the detection of small masses. The mammograms are initially evaluated for the presence of masses, architectural distortion, asymmetric parenchyma, calcifications and skin changes

mammograms. Ultrasonography is also useful in the guidance of biopsies and therapeutic procedures. Sonography may obviate the need for intervention by showing benign causes of palpable abnormalities such as cysts, benign intra mammary lymphnodes, extravasated silicon and superficial thrombophlebitis or Mondor's disease of the breast.

In this study, 300 (60%) of the 500 lesions were categorized as benign (including 8% infective & 4% traumatic) after a combined mammographic and sonographic evaluation, clearly showing the value of imaging in helping avoid unnecessary biopsies. In these patients Sonography was able to categories palpable lesions obscured by dense tissue on mammograms.Moss et al[4] reported that sonography increased cancer detection by 14% in symptomatic patients who were evaluated with both mammography and sonography. were mammographically occult.[1]

BREAST LESIONS	MY STUDY	SHETTY MK, SHAH YP- STUDY
OCCULT ON MAMMOGRAPHY DETECTED ON SONOGRAPHY	50 (10%)	66(16%)
TOTAL	500	411

In My study, 50 (10%) of the 500 lesions (2-FIBROCYSTIC DISEASES, 2-MASTITIS, 1-FIBROADENOMA) were mammographically occult and were seen only on ultrasound. One lesion was wrongly diagnosed as benign on mammography which was interpreted as suspicious on sonography and turned out to be malignant on biopsy. Sonography therefore is complimentary to mammography in patients with breast lesions; its superiority over mammography

Ultrasonography:

Like Mammography, US has also been playing an increasingly important role in the evaluation of breast diseases. US is useful in the evaluation of palpable masses that are mammographically occult, in the evaluation of clinically suspected breast lesions in women younger than thirty years of age and to further evaluate many abnormalities demonstrated on

is in being able to show lesions obscured by dense breast tissue and in characterizing palpable lesions that are mammographically visible or occult. Mammography is complimentary to sonography because of its ability to screen the reminder of the ipsilateral and contra lateral breast for clinically occult lesions. In my study 2 lesions (fat necrosis, DCIS) were sonographically occult and was visualized only on mammography Combined imaging evaluation leads to fewer unnecessary biopsies. Perdue et al. reported that only 11.1% 623 excisional biopsy specimens of palpable breast lesions revealed carcinoma.[6] In my study 240 out of 500 patients underwent biopsy and 160 of them showed malignancy. One lesion which was benign on mammography and suspicious on sonography was turned out to be malignant on biopsy. This clearly shows importance of biopsy. In my study 80 patients had shown benign findings both on combined mammography and sonography, but underwent biopsy on the grounds of clinical suspicion and all of them turned out to be benign. This clearly shows importance of combined imaging. In a review article, Donegan stated that most of the breast cancers appear as palpable masses, usually found by the patient.[7] However not all palpable abnormalities represent discrete masses. This is especially true in women younger than 40 yrs in whom normal glandular nodularity may be mistaken for dominant masses.[8]In my study of 500 patients who presented with palpable abnormalities, 40 patients showed negative findings on both combined mammographic and sonographic

examination. Out of 411 palpable abnormalities studied by Shetty MK and Shah YP, 186 cases showed negative findings, clearly showing the importance of imaging. A small number of palpable masses detected on physical examination are malignant; in this study 32 % of the palpable lesions that underwent combined mammographic and sonographic imaging were malignant (16% suspicious & 14% highly suggestive of malignancy), compared with 5% in a series of 123 cases of palpable breast thickening reported by Kaiser et al, 5% in 605 patients younger than 40 years reported by Marrow et al, 17 % in 750 breast lesions reported by A.T. Stavros et al.

Study	Kaiser et al.	Marrow et al.	A.T. Stavros et al.	My study
Malignancy %	5%	5%	17%	32%

The value of combined mammographic and sonographic imaging in symptomatic patients has been studied previously. Moss et al reported sensitivity of 94.2% in 368 patients.[24] Shetty MK and Shah YP reported a sensitivity of 100%. Barlow et al reported a sensitive of 87%.

Sensitivity Of combined evaluation	Shetty MK and Shah YP	Moss et al	Barlow et al	My study
Percentage	100%	94.2%	87%	100%

In my study sensitivity for detection of breast lesions for mammography was 87%, sonography was 95%, and combined was 100% clearly shows the importance of combined evaluation of this two modalities for breast lesions.

CONCLUSION

Combined use of mammography and sonography plays an important role in the management of palpable breast lesions. Its applications are:

- Characterizes the palpable mass lesion.
- Avoids unnecessary interventions in which imaging findings are unequivocally benign.
- Negative findings on combined mammographic and sonographic imaging have very high specificity and are reassuring for the patients.

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