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## **Role of ultrasonography and mammography in breast disease**

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**Abstract**---Background- Breast diseases are most common among females. Around 200,000 cases are diagnosed annually of breast diseases. It is any abnormal change in breast which make up of number of conditions. The increasing incidence rate of breast cancer is a major health problem. Its early diagnose directly help the treatment. Non-invasive technique such as mammography is a well-defined and widely accepted radiological procedure to evaluate clinically suspected breast lesions. And ultrasonography is used; especially in patients with dense breasts and it also help to characterize an undetected abnormality on mammography. Therefore, this study aims to assess the role of ultrasonography and mammography in diagnosing breast diseases. Objective- The aim of the study is to evaluate and compare the result of ultrasonography and mammography in diagnosis of breast diseases. Method- Study population consisted of 50 patients of age more than 30 years. Result- The result showed that 50 patients with breast diseases underwent combined mammographic and sonographic evaluation. 30 (60%) of the 50 palpable abnormalities had benign assessment, 18(60%) of the benign lesions were visible both on mammography and sonography, 11 (36%) of the 20 benign lesions were mammographically occult and identified at sonographic evaluation. 1 lesion was sonographically occult (4%) and visualized on mammography. In 10(20%) of the 50 cases, imaging evaluation resulted in a suspicious assessment 10(20%) of the 50 palpable abnormalities had negative assessment.

The sensitivity and negative predictive value for combined mammographic and sonographic assessment were 100%; the specificity was 90.91%. Conclusion- Breast ultrasonography is more accurate than mammography in women who are young. In women with dense breast, ultrasonography appeared to be superior to mammography and the accuracy of mammograms increased with fatty breast in older age group. The result showed that accuracy of lesion location, lesion type, and size was more in ultrasonography than mammography. Also false positive result of mammography was fetched during ultrasonography. Combining both of the modalities (ultrasonography 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**---ultrasonography, mammography, breast disease.

## Introduction

Breast diseases are most common among females. It is any abnormal change in breast which make up of number of conditions. It includes inflammatory, benign and malignant conditions. Around 200,000 cases are diagnosed annually of breast diseases. Among benign, malignant and inflammatory diseases, benign breast diseases are more common and it can be further divided in epithelial and stroma proliferation neoplasm and development anomalies. In cases of benign diseases fibroadenoma occurs in greater frequency. Breast cancer is termed as most common cause of death in women as it rapidly occurs cancer and now a days it become a major health risk for public. The most common breast problem which the patient consults with doctor are breast pain, nipple discharge, palpable masses and inflammation of breast. [1]

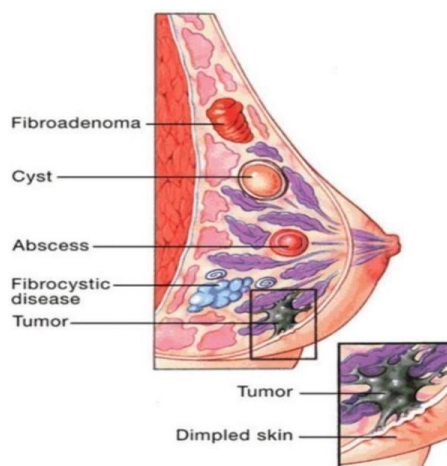


Fig 1. shows breast diseases

All detected breast lesions are not malignant and all the benign masses do not progress to cancer; nevertheless, the precision of final diagnosis can be greatly

increased by radiological imaging (mammography and ultrasonography). Mammography is a well-defined and widely accepted technique to evaluate clinically suspected breast lesions and screening for breast diseases. Sonography is also an useful modality and helps characterizing a mammographically detected palpable abnormality, especially in patients with dense breast. Sensitivity and specificity of sonography and mammography is higher if both of these modalities are combined. The present study is to evaluate the breast lesions by using two different radiological procedure (non-invasive method).

### Mammography

It is the important imaging tool for detection of breast diseases. It leads to enable early treatment of breast cancer. Its areas of application include:

- **Screening:** It is performed periodically to find early cancer in asymptomatic path. It is a standardized procedure which includes 2 views or projections for each breast: CC (Crano- Caudal) and MLO (Medio Lateral Oblique).
- **Diagnostic:** This type of mammography is indicated as a diagnostic method in patients with symptoms of palpable lump, nipple discharge, dimpling over skin and nipple retraction. It also includes CC and MLO projection, but sometimes additional views may be required to visualize breast tissue more effectively.



Fig 2. shows mammography image

### Ultrasonography

It is also an important imaging modality to detect the lesion in breast and image guided biopsy. It can assess the internal structure, orientation, margins of lesion and also valuable in evaluating palpable breast masses. Breast masses which are hidden on mammogram in high resolution in fatty and dense breast, there is no radiation risk in this procedure and it is beneficial for younger and pregnant

patients. It uses linear probe for examination as it has high frequency. [4]

Table 1  
shows advantage and limitations of ultrasonography

Advantage	Limitations
To detect the type of lesion- cystic or solid.	fairly well-defined malignant masses can be labelled benign.
better used in tender breast and infective condition	the lesion can be obscured by fat and air.
dense breasts are evaluated better	microcalcifications can be missed
no radiation exposure better in pregnancy and lactation	sensitivity depends upon operator
it is real time and whole breast can be evaluated 'even in large breast.	multicentric lesion and isoechoic lesions can be missed

Table 2  
advantages and limitations of mammography

Advantages	Limitations
better detection of microcalcifications	not done in lactation and pregnancy
multiple lesions can be better made out with relation to each other	sensitivity decreases in dense breast and breast infections.
better in detection of speculated masses.	solid and cystic masses cannot be differentiated

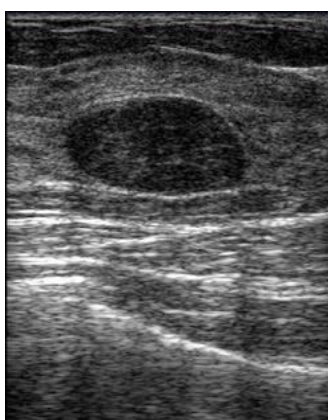


Fig. 3. shows ultrasound of breast

### Justification

The increasing incidence rate of breast cancer is a major health problem. Its early detection and improved treatment is required to decrease breast disease related deaths. The effective diagnosis and management of breast lesions involves multidisciplinary approach to their assessment. Non-invasive techniques such as mammography, is a well-defined and widely accepted radiologic procedure to evaluate clinically suspected breast lesions and as a tool to screen for breast

disease. However, the appearance of overlapping tissues on mammogram poses a significant obstacle to interpretation. Hence ultrasonography is used, especially in patients with dense breasts and it also helps to characterize an undetected abnormality on mammography. Combining both the modalities (mammography and ultrasonography) yields the best result. Additionally, these modalities are easily available and affordable for most patients. Therefore, this study aims to assess the role of ultrasonography and mammography in diagnosing breast diseases.

### **Methodology**

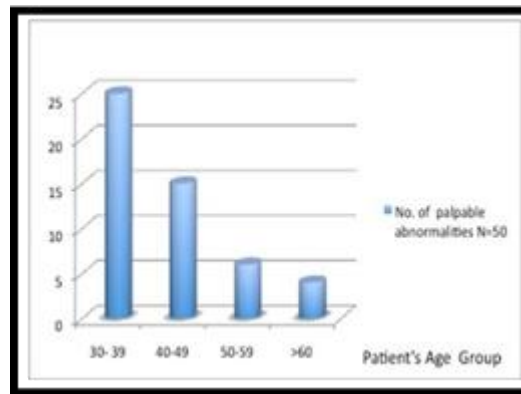
The study was conducted at SGT Hospital and Research Institute Gurugram. We included 50 women of age more than or equal to 30 years who underwent a combined mammographic and sonographic evaluation of the breast. All patients underwent diagnostic mammography, which included standard cranio-caudal, and medial, lateral, oblique views. Later all the patients were subjected to sonography of breast. Mammography was performed with Allengers Diagnostic unit. Sonographic examination was performed with a 7- 12 MHz transducer of Philips VUE- 350.

### **Results**

The result showed that 50 patients with breast diseases who underwent combined mammographic and sonographic evaluation. 30 (60%) of the 50 palpable abnormalities had benign assessment, 18(60%) of the benign lesions were visible both on mammography and sonography, 11 (36%) of the 20 benign lesions were mammographically occult and identified at sonographic evaluation. 1 lesion was sonographic ally occult (4%) and visualized on mammography. In 10(20%) of the 50 cases, imaging evaluation resulted in a suspicious assessment 10(20%) of the 50 palpable abnormalities had negative assessment. The sensitivity and negative predictive value for combined mammographic and sonographic assessment were 100%; the specificity was 90.91%.

Table 1  
Agedistribution of patients in the study

Age Group	Total patients50
30- 39	25
40-49	15
50-59	6
>60	4



Graph 1. Shows the Age distribution of patients

Table 2  
Mammographic tissue density in the patients studied

Breast Parenchymal Density	No. of patients
Scattered fibro glandular Density	25
Predominantly Fatty	15
Heterogeneously Dense	3
Dense	2



Graph 2. Shows The Mammographic

**Tissue Density in Patients**

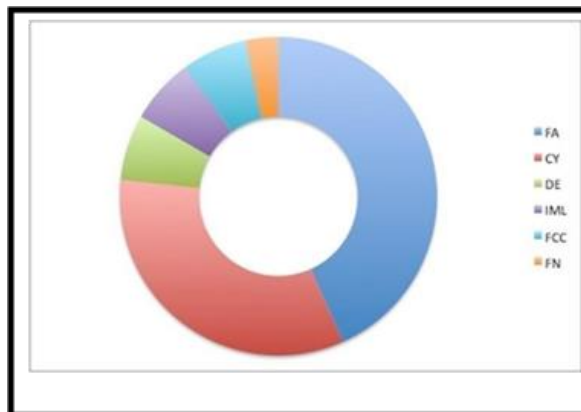
Table 3  
Final Assessment After Combined Mammographic And Sonographic Evaluation In 50 patients

Imaging Findings	No. of patients
Negative	10
Benign	30

Suspicious	10
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Table 4  
Shows The Number Of Benign Lesions

BENIGN LESIONS	NO. OF ABNORMALITIES
FIBROADENOMA	13
CYSTS	10
DUCT ECTASIA	2
INTRAMAMMARY LYMPH NODE	2
FIBROCYSTIC DISEASE	2
FAT NECROSIS	1



Graph 4. Shows the distribution of type of benign lesions

Table 5  
Test Characteristics for Combined Mammographic and Sonographic evaluation in 50 Patients with breast Abnormalities

CHARACTERISTICS	VALUE %
Sensitivity	100%
Specificity	90.91%
Positive predictive value	70%
Negative predictive value	100%

### Conclusion

Breast cancer is one of the leading killers in both developed and developing countries. So, the consciousness about this is increasing in the society. Screening for breast cancer is one of the most common prescribed procedures. The main aim of this investigation is to identify the mass and to differentiate whether the lesion is a benign or a malignant disease. The emphasis on early detection of cancer and not to miss a malignant lesion in early stage of disease and the current medico-legal environment encourage an aggressive biopsy approach to breast problems. The large number of biopsies performed for benign breast

abnormalities has long been recognized as a serious problem. Excessive biopsies for benign lesions have adverse effects on society and on the women who undergo them by increasing the costs of screening projects, causing morbidity, and adding to the barriers that keep women from using a potentially life saving procedure. Combined use of mammography and sonography plays an important role in the management of breast lesions. Its applications are as follows:

- Characterizes the palpable mass lesion.
- Guides the further course of action based on the findings including prompt biopsy.
- 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 to the patient.

### **Summary**

- This study was undertaken to evaluate the role of mammography and sonography in characterizing the breast diseases.
- The study includes 50 patients with palpable breast abnormalities.
- Out of 50 patients, 10 showed no evidence of mass lesion on mammography and sonography.
- 30 patients had benign characters on both mammography and sonography.
- Out of 30, 11 lesions were mammographically occult and visualized on ultrasound of breast and 1 lesion was sonographically occult and seen on mammography.
- 10 patients had suspicious findings on combined evaluation and biopsy was advised and of these 7 patients showed malignancy.
- 14% of patients of 50 showed malignancy in this particular study.

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### **Conflict of Interest**

No Conflict of Interest

### **Disclosure**

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