

COMBINED MAMMOGRAPHIC AND SONOGRAPHIC EVALUATION OF PALPABLE BREAST MASSES

Reena Mathur¹, Sumitra Choudhary², Jaya Pamnani³, Divya Bagoria⁴, Unmila T. N⁵, Kalpna Manra⁶, Shashi Meena⁷, Parma Dubey⁸

¹HOD, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

²3rd Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

³3rd Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

⁴3rd Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

⁵2nd Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

⁶1st Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

⁷1st Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

⁸1st Year Resident, Department of Radiodiagnosis, Jawaharlal Nehru Medical College, Ajmer.

ABSTRACT

BACKGROUND

Breast diseases are common in females. In developing countries like India, females are unaware of breast pathologies hence they are detected usually in advanced stages. We have studied 100 patients of palpable breast masses presenting to our department and evaluate the role of combined mammographic and sonographic imaging in patients with palpable abnormalities of the breast, which help in decision making by clinician as to lesion go for biopsy or follow up.

MATERIALS AND METHODS

The study was conducted at Department of Radiodiagnosis J. L.N. Medical College & Associated Groups of Hospitals, Ajmer. We included women equal to or more than 30 years referred to this centre with palpable abnormalities of breast during a period from March 2015 to August 2016. All these women underwent a combined mammographic and sonographic evaluation of breast.

RESULTS

50 (50%) of the 100 palpable abnormalities had benign assessment, 30 (60%) of the benign lesions were visible both on mammography and sonography; 18 (36%) of the 50 benign lesions were mammographically occult and identified at sonographic evaluation.² lesion was sonographically occult (4%) and visualized on mammography. In 14 (14%) of the 100 cases, imaging evaluation resulted in a suspicious assessment and all these lesions underwent biopsy and 4 were diagnosed as having malignancy. 36(36%) of the 100 palpable abnormalities had negative imaging assessment finding: of these 14 patients underwent biopsy and all had benign findings. The sensitivity and negative predictive value for combined mammographic and sonographic assessment were 100%; the specificity was 78.26%.

CONCLUSION

Combined use of mammography and sonography plays an important role in the management of palpable breast lesions. It 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 to the patient and prevent unnecessary biopsy.

KEYWORDS

Biopsy; Breast; Mammography; Palpable Lump; Sonography.

HOW TO CITE THIS ARTICLE: Mathur R, Choudhary S, Pamnani J, et al. Combined mammographic and sonographic evaluation of palpable breast masses. J. Evid. Based Med. Healthc. 2016; 3(86), 4697-4701. DOI: 10.18410/jebmh/2016/989

BACKGROUND

Breast cancer is the leading cause of non-preventable cancer deaths among women. Early detection and improved

Financial or Other, Competing Interest: None.

Submission 22-09-2016, Peer Review 29-09-2016,

Acceptance 12-10-2016, Published 25-10-2016.

Corresponding Author:

Dr. Sumitra Choudhary,

*Hasmukhvila, Luna Agency Vali Gali,
Kalabagh, Ajmer-305001.*

E-mail: drsumitrachoudhary@gmail.com

DOI: 10.18410/jebmh/2016/989

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. Breasts are a secondary sexual characteristic in female. They are also present in a rudimentary form in males. They are also the source of nutrition for the neonate and thus of mankind. This tender, sensitive and delicate complex structure is constantly under the influence of hormones.^{1,2}

The breast develops from mammary ridges. After menarche, the young breast contains more dense connective tissue with progression in age the dense breast



becomes mixed glandular pattern tissue, and with further progression in age, breast begins to involute into fatty tissue. Any aberration in this process leads to the susceptibility to a spectrum of localised pathologies like, hyperplastic and neoplastic changes in breast. Of the various pathologies that afflict the breast, cancers are most often encountered and are the most dreaded.^{1,2}

Breast cancer remains one of the leading causes of death in women around the world. In developing countries like India, females are unaware of breast pathologies hence they are detected usually in advanced stages. Detection of breast cancer in its earliest possible stage is the ultimate goal in imaging the breast, and the role of the radiologist is therefore vital. Breast cancer remains one of the leading causes of death in women around the world. Detection and evaluation of breast lesions can be one of the most challenging and rewarding areas of medicine. The goal is to differentiate between benign and malignant lesions at an earliest possible stage and yet keep unnecessary biopsies to a bare minimum. The incidence of breast cancer deaths can be reduced by 30 % by the routine screening of healthy women with MG.^{3,4}

This is because breast changes like asymmetry, neodensity, distortion of fibroglandular architecture and microcalcifications are picked up earlier than lesions that become clinically palpable, or are sometimes detected by self-examination.^{3,4} USG plays a key role in differentiating cystic and solid masses. It is useful in the evaluation of palpable masses not visible in radiographically dense breasts, abscesses, masses that are not completely evaluable with MG and in young patients susceptible to radiation damage.^{4,5} Both MG and USG methods have been used in attempts to reduce the negative to positive biopsy ratio.

The false-negative rate of mammography in the detection of breast cancer has been consistently reported to be approximately 10%, as determined by studies such as the Breast Cancer Detection Demonstration Project.⁶ These mammographically occult lesions are usually discovered by physical examination and often occur in women with mammographically dense breasts. Therefore, a negative mammographic result cannot exclude malignancy in women with a palpable mass; the lesion should be biopsied if clinically indicated. The sonographic evaluation of a palpable breast mass is based on three categories. First, if the lesion is a simple cyst, no further workup is required. Second, if the palpable lesion is a solid mass or complex cyst, further intervention is often required, such as fine-needle aspiration or core cut biopsy. Third, if findings from the sonography are negative (no discrete cystic or solid lesions are seen to correlate with the palpable mass) and the findings from the mammography are negative, then the treatment of the palpable abnormality is based on the results of the physical examination.

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 an useful adjunctive modality and helps characterizing a

mammographically detected palpable abnormality, especially in patients with dense breast.⁷ Sensitivity and specificity of sonography or mammography is higher if sonography and mammography are combined.

AIMS AND OBJECTIVES

1. To study the role of ultrasound and mammography in diagnosis and management of various breast lesions.
2. To provide a systematic and practical approach to image evaluation of palpable breast masses, establish the presence of mass and then evaluate its image characteristics which help in decision making by the clinician as to go for biopsy of lesion or follow up. To study the role of ultrasound and mammography in diagnosis and management of various breast lesions.

MATERIALS AND METHODS

Data for the study will be collected from patients with palpable breast mass attending department of Radio-diagnosis J. L. N. Medical College and Associated Group of Hospitals, Ajmer.

Method of Collection of Data

Study Design

A prospective study will be conducted on patients during a period from March 2015 to August 2016 who underwent a combined mammographic and sonographic evaluation of breast. We included women more than or equal to 30 years referred to this centre with palpable abnormalities of breast.

Palpable abnormalities of the breast included in the study had a variety of clinical descriptions, such as palpable lump, thickening, nodularity etc.

In all patients studied, the palpable abnormalities were of sufficient clinical concern to be referred for imaging evaluation. The following information was documented at the time of initial visit, age of the patient, site of the palpable abnormality and description of the palpable abnormality.

All patients underwent diagnostic mammography, which included standard craniocaudal, and medial-lateral-oblique views. Later all the patients were subjected to sonography of breast.

Mammography was performed with SIEMENS MAMMOMAT C3 equipment and sonographic examination was performed with a 7-10 MHz transducer of ALOKA Prosound i4.

Inclusion Criteria

1. Women more than or equal to 30 years with palpable abnormalities of breast.

Exclusion criteria

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

RESULTS AND OBSERVATIONS

Patients' Age Group	No. of Palpable Abnormalities (N=100)
30 – 39	50
40 – 49	30
50 – 59	12
> 60	8

Table 1. Age Distribution of Patients in the Study Group

Descriptor	No Palpable Abnormalities (n=100)
Palpable lump	66
Palpable thickening	12
Nodularity	12
Not specified	10

Table 2. Descriptors of Palpable Abnormalities

Breast Parenchymal Density	No. of Palpable Abnormalities
Scattered fibro glandular density	50
Predominately Fatty	30
Heterogeneously Dense	6
Dense	4

Table 3. Mammographic Tissue Density in The Patients Studied

Imaging Findings	No. of Palpable Abnormalities
Negative	50
Benign	36
Suspicious	14

Table 4. Final Assessment after Combined Mammographic and Sonographic Evaluation of Palpable Abnormalities in 100 Patients

Benign Lesions	No. of Abnormalities (n=50)
Cysts	30
Fibroadenoma	11
Duct Ectasia	5
Fat Necrosis	2
Fibrocystic Disease	2

Table 5

Characteristics	Value (%)
Sensitivity	100%
Specificity	78.26%
Positive predictive value	28.5%
Negative predictive value	100%

Table 6. Test Characteristics for Combined Mammographic and Sonographic Evaluation in 100 Patients with Palpable Abnormalities of Breast

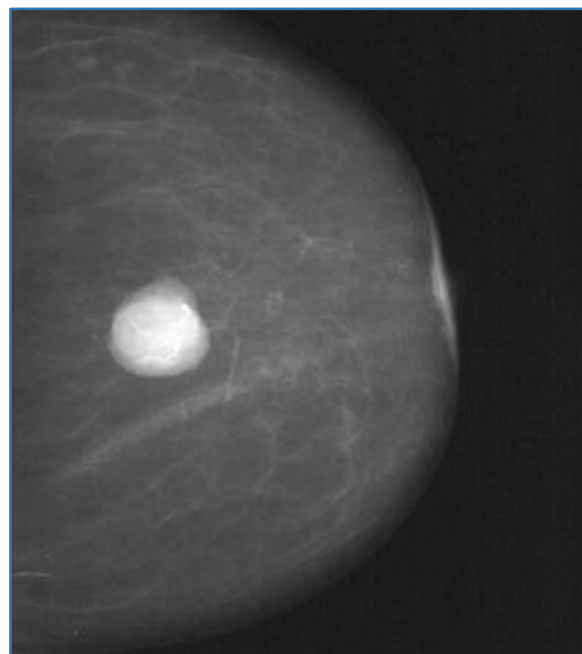


Figure 1. Simple Cyst: Well Defined Rounded Opacity



Figure 2. Simple Cyst on USG Well Defined Anechoic Lesion with Posterior Enhancement



Figure 3. Fibroadenoma Multiple Well Defined Opacity

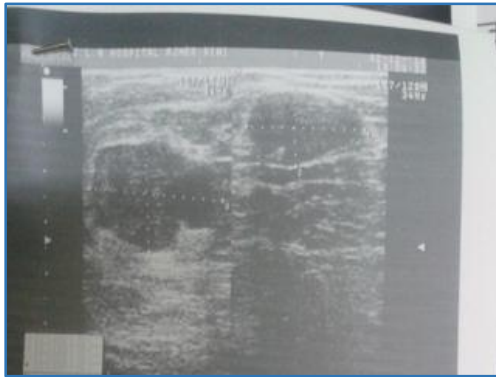


Figure 4. Fibroadenoma:- USG Image Showing Well Defined, Lobulated Hypoechoic Lesion

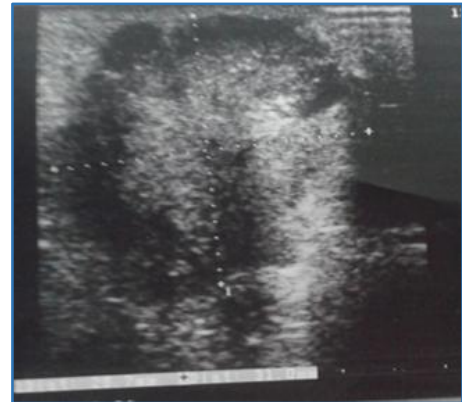


Figure 8. Breast Cancer:- on USG seen as Poorly Defined Hypoechoic Lesion

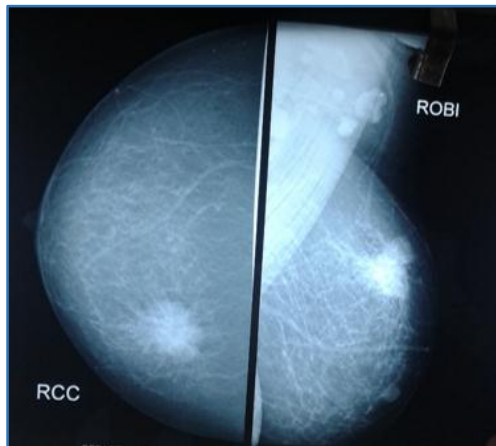


Figure 5. Breast cancer: Spiculated Lesion with Axillary Lymphnodes, Highly Suspicious Lesion, Undergone USG and Biopsy, Proved as Malignant

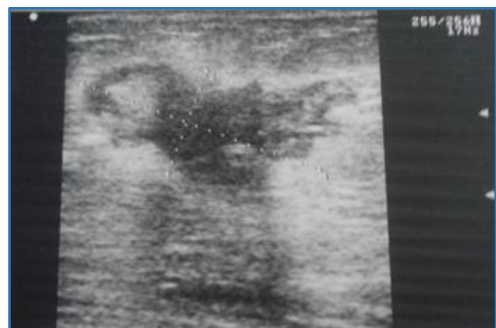


Figure 6. Breast Cancer:- ill-defined Hypoechoic Lesion on USG

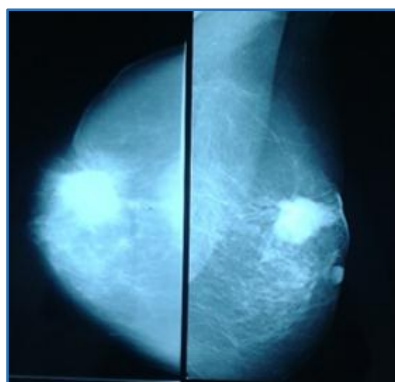


Figure 7. Highly Suspicious Speculated Lesion, evaluate further with USG and Biopsy and Proved Malignant

DISCUSSION

The present clinical study was conducted in hospitals attached to Department of Radio-diagnosis, viz, Jawahar Lal Nehru Medical College and Associated Group of Hospitals Ajmer (Raj.) We included women more than or equal to 30 years referred to this centre with palpable abnormalities of breast during a period of 18 months from March 2015 to August 2016 who underwent a combined mammographic and sonographic evaluation of breast. 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.⁸ we have included in our study only women who are 30 and over 30 years of age with palpable abnormalities of breast.

The role of mammography in patients with palpable breast lumps is to show a benign cause of palpable lesion, avoid further intervention, screen the remainder of the ipsilateral and contralateral breast for additional lesions because 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, causing morbidity.

Mammography characterizes malignant lesion and support early intervention for mass with malignant characters.

Sonography may rule out the need for intervention by showing benign causes of palpable abnormalities such as cysts, benign intra mammary lymph nodes, and superficial thrombophlebitis of Mondor disease of the breast.

In our study the palpable abnormalities were reported in 56 patients in the right breast and 40 patients in the left breast and 4 patients on both sides. In this study, 50 (50%) of the 100 lesions were categorized as benign 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 categorise palpable lesions obscured by dense tissue on mammograms.

In this study 2 lesion (fat necrosis) was sonographically occult and was visualized only on mammography. 14 (14%) of the 100 lesions were mammographically occult and were seen only on ultrasound. Of these 12 were benign cysts and

2 was duct ectasia. Therefore sonography is complimentary to mammography in patients with palpable abnormalities; its superior to mammography to show lesions obscured by dense breast tissue and characterize palpable lesions that are mammographically visible or occult. Mammography is highly favourable to sonography because of its ability to screen the remainder of ipsilateral and contralateral breast for clinically occult lesions.

It has been reported that the accuracy of sonography is improve as a screening modality for breast cancer if it is combined with mammography. However the role of sonographic for screening additional lesions in the symptomatic patients has not been reported. Combined imaging evaluation leads to fewer unnecessary biopsies. In this study only 14 of the 100 palpable abnormalities underwent biopsy on the basis of imaging findings and only 4 (4%) showed malignancy.

In this study of 100 patients who presented with palpable abnormalities 50 patients showed negative findings on both combined mammographic and sonographic examination. 18 of these patients underwent biopsy on the grounds of clinical suspicion and all were benign.

In this study 4 % of the palpable lesions that underwent combined mammographic and sonographic imaging were cancer. Overall this study confirm sensitivity of 100 % and specificity of 82.14% in patients with palpable breast lesion undergone combined mammographic and sonographic evaluation.

SUMMARY

The study includes 100 patients with palpable breast abnormalities. Out of 100 patients, 50 patients showed no evidence of mass lesion on mammography and sonography. 36 patients had benign characters on both mammography and sonography. Out of 36 patients, 11 lesions were mammographically occult and visualized on ultrasound of breast and 2 lesion was sonographically occult and seen on mammography. 14 patients had suspicious findings on combined evaluation and biopsy was advised and of these only 4 patients showed malignancy. 4% of patients of 100 showed malignancy in this particular study.

Test Characteristics for Combined Mammographic and Sonographic evaluation in our study of 100 patients with palpable abnormalities of breast shows 100 % sensitivity, 82.14 % specificity and 100% negative predictive value.

The positive predictive value for cancer lesions undergoing biopsy that showed questionable findings on combined mammographic and sonographic evaluation was 28.5%.

CONCLUSION

From this study we conclude that combined use of mammography and sonography plays an important role in the management of palpable breast lesions. It characterizes the palpable mass lesion and avoids unnecessary biopsy in patient with benign imaging finding. Negative findings on combined mammographic and sonographic imaging have very high specificity and prevent unnecessary biopsy.

REFERENCES

1. Clarke D, Sudhakaran N, Gateley CA. Replace fine needle aspiration cytology with automated core biopsy in the triple assessment of breast cancer. *Ann R Coll Surg Engl* 2001;83(2):110–112.
2. Schoonjans JM, Brem RF. Fourteen-gauge ultrasonographically guided large-core needle biopsy of breast masses. *J Ultrasound Med* 2001;20(9):967–972.
3. Morris KT, Vetto JT, Petty JK, et al. A new score for the evaluation of palpable breast masses in women under age 40. *Am J Surg* 2002;184(4):346–347.
4. Berg WA, Gutierrez L, NessAiver MS, et al. Diagnostic accuracy of mammography, clinical examination, US, and MR imaging in preoperative assessment of breast cancer. *Radiology* 2004;233(3):830-849.
5. Kerlikowske K, Smith-Bindman R, Ljung BM, et al. Evaluation of abnormal mammography results and palpable breast abnormalities. *Ann Intern Med* 2003;139(4):274–284.
6. Kopans DB. *Breast imaging*. Philadelphia: Lippincott 1998:29–54.
7. Shetty MK, Shah YP, Sharman RS. Prospective evaluation of value of combined mammographic and sonographic assessment in patients with palpable abnormalities of breast. *J Ultrasound Med* 2003;22(3):263-268.
8. Bennett IC, Freitas R, Fentiman IS. Diagnosis of breast cancer in young women. *Aust N Z J Surg* 1991;61(4):284-289.