

Study of Evaluation of Palpable Breast Lump by Ultrasonography at a Tertiary Care Teaching Hospital

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Article History

Received: 26 Dec 2015

Revised: 07 Jan 2016

Accepted: 23 Jan 2016

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ABSTRACT

Objectives: Present study was conducted to evaluate palpable breast lump by ultrasonography and confirmed by fine needle aspiration cytology or histopathology.

Materials & Methods: Ultrasonographic examination of 60 cases of palpable female breast masses was done at Department of Radio-diagnosis, Teerthanker Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India. The scans included information regarding the four features of the breast: Shape (Round, Oval or irregular), Margins (Circumscribed or non-circumscribed), Width: AP ratio ≥ 1.4 and Echogenicity (Hyperechoic, Isoechoic or Hypoechoic). On the basis of these four features a diagnosis was made. The ultrasound diagnosis was confirmed by fine needle aspiration cytology or histopathology.

Results: Out of 60 palpable breast lumps ultrasound diagnosed the lump in 50 cases thus the overall sensitivity of ultrasound was 83.33%. The largest number of patients in our study was in the age group of 20-39 years (56.67%). The accuracy of ultrasound in the detection of carcinoma of the breast was 76.47%. The cystic masses of the breast had the highest diagnostic accuracy of 100% followed by fibroadenoma (90.48%). Ultrasound features that most reliably characterized breast masses as benign were round or oval shape, circumscribed margins, width: AP ratio >1.4 . 82.61% of isoechoic and 100% of hyperechoic masses were benign. Features that characterized masses as malignant were irregular shape, Non-circumscribed margins, width: AP ratio ≤ 1.4 . 17.39% of isoechoic and 37.50% of hypoechoic masses were malignant. No hyperechoic mass was malignant.

Conclusion: Breast ultrasound does not expose the patient to ionizing radiation and with its relatively easy availability and cost effectiveness; it has already proven to be an important adjunct to the other radiological and pathological studies for the breast. Improvements in ultrasound equipments have prompted more recent studies with findings that describe reliable signs for differentiating benign from malignant masses.

KEYWORDS: Breast, Lump, Ultrasound, Benign, Malignancy.

INTRODUCTION

Usually, at the time of imaging examination, the radiologist evaluating a palpable breast abnormality is not informed of the degree of suspicion that the referring physician has regarding the palpable abnormality. Although the radiologist formulates his own opinion about the lesion, it would probably be useful to prospectively stratify lesions into categories on the basis of the referring physician's level of clinical suspicion. Stratifying the results of a physical examination into benign, indeterminate, or malignant categories has been used to refine the 'triple test', which uses mammography, physical examination and FNAC to

evaluate palpable lesions. Morris et al. reported that stratifying each component of the triple test into the three categories would reduce the number of surgical biopsies performed on the benign lesions.¹

Ultrasound has an established role in assessing breast abnormalities as an adjunct to mammography in older women and as a first line investigation in young women with mammographically dense breasts. Some malignant breast lesions are not visible on mammography but are detected by ultrasound. The use of ultrasound in addition to clinical examination and mammography may result in an increased rate of breast cancer detection. 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.² These mammographically occult lesions are often detected at physical examination and often occur in women with mammographically dense breasts. Therefore, a negative mammographic report cannot exclude malignancy in women with a palpable mass; the lesion should be biopsied if clinically indicated.

A large number of patient with palpable breast lesions are referred to diagnostic breast centres for mammography and sonography to guide the treatment of breast mass and to screen the rest of the breast.

Although the primary role of sonography in this clinical setting has previously been to exclude a simple cyst, it is now used to characterize solid masses, and the additional information obtained could improve the ability of imaging to exclude malignancy in the setting of a palpable mass.

The value of ultrasound in the analysis of solid breast nodules and the differentiation of benign from malignant tumors has long been challenged. Its main role is in differentiation of cystic from solid abnormalities of the breast. Wild & Neal in 1952 were the first to report the use of diagnostic sonography in the diagnosis of breast disease.³ The accurate diagnosis of breast lumps without formal biopsy is highly desirable both for the patient who can be quickly reassured and counseled and the clinician who can reduce unnecessary surgery.

The increased quality of images obtained with ultrasound has allowed investigators to define the characteristics of specific breast masses. Although various classifications are in use,^{4,5} most investigators agree to characterize masses using four categories: shape of the lesion, margin characteristics, depth : width ratio and internal echogenicity. Within these categories, individual features show variable diagnostic value, as

there is known overlap between benign and malignant characteristics.

Present study was conducted to evaluate palpable breast lump by ultrasonography and confirmed by fine needle aspiration cytology or histopathology.

MATERIALS & METHODS

In present prospective study, ultrasonographic examination of 60 cases of palpable female breast masses was done at Department of Radio-diagnosis, Teerthanker Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

The area for evaluation was fixed and skin adequately lubricated to facilitate ultrasound transmission. The transducer was gently applied and both longitudinal and transverse scans were taken.

The scans included information regarding the four features of the breast: Shape (Round, Oval or irregular), Margins (Circumscribed or non- circumscribed), Width: AP ratio ≥ 1.4 and Echogenicity (Hyperechoic, Isoechoic or Hypoechoic). On the basis of these four features a diagnosis was made.

The ultrasound diagnosis was confirmed by fine needle aspiration cytology or histopathology. On the basis of morphologic characteristics seen sonographically, an attempt was made to categorize lesions as benign, malignant, or indeterminate by using criteria as described by previous scientists.^{4,6-8} US features that most reliably characterize masses as benign are a round or oval shape, circumscribed margins, and a width-to-anteroposterior (AP) dimension ratio greater than 1.4. Features that characterize masses as malignant included irregular shape, microlobulations, and width-to-AP dimension ratio of 1.4 or less. A few gently curving, circumscribed lobulations (macrolobulations) are considered as benign features, whereas many small lobulations of 1-2 mm (microlobulation) are considered a malignant characteristic in a recent study.

Table 1: Accuracy in the Diagnosis of Solid and Cystic Breast Masses

Lesion	No. diagnosed by ultrasound	No. of final diagnosis	% age of correct diagnosis by ultrasound
Carcinoma	13	17	76.47
Fibroadenoma	19	21	90.48
Fibro-adenosis	10	13	76.92
Cysts	5	5	100.00
Breast abscess	3	4	75.00

RESULTS

Out of 60 palpable breast lumps ultrasound diagnosed the lump in 50 cases thus the overall sensitivity of ultrasound was 83.33%. The largest number of patients in our study were in the age group of 20-39 years (56.67%) followed by 40-49 years (20%). 83.33% of the

patients were married. Lump alone was the presenting symptom in 63.33% of the patients followed by lump with pain (30%) and lump with discharge from the nipple (6.67%). The average duration of the symptoms was 4-6 months. 63.33% of the masses were present in

the outer upper quadrant of the breast. Both breasts were involved in 20% of the cases. The accuracy of ultrasound in the detection of carcinoma of the breast was 76.47%. The cystic masses of the breast had the highest diagnostic accuracy of 100% followed by fibroadenoma (90.48%) (Table 1). Ultrasound features that most reliably characterized breast masses as benign were round or oval shape (33 of 35 [94.29%] were benign), circumscribed margins (29 of 33 [87.88%]

were benign), width: AP ratio >1.4 (29 of 34 [85.29%] were benign). 82.61% of isoechoic and 100% of hyperechoic masses were benign. Features that characterized masses as malignant were irregular shape (11 of 15 [73.33%] were malignant), Non-circumscribed margins (9 of 17 [52.94%] were malignant), width: AP ratio ≤ 1.4 (08 of 16 [50.00%] were malignant), 17.39% of isoechoic and 37.50% of hypoechoic masses were malignant. No hyperechoic mass was malignant.

Table 2: Association of Features with Benign and Malignant Lesions

Ultrasound features		Tissue Diagnosis	
		Malignant	Benign
Shape	Round/oval	02 (5.71%)	33 (94.29%)
	Irregular	11 (73.33%)	04 (26.66%)
Margins	Circumscribed	04 (12.12%)	29 (87.88%)
	Non- Circumscribed	09 (52.94%)	08 (47.06%)
Width: AP ratio	> 1.4	05 (14.71%)	29 (85.29%)
	≤ 1.4	08 (50.00%)	08 (50.00%)
Echogenicity	Hyperechoic	00 (0%)	03 (100%)
	Isoechoic	04 (17.39%)	19 (82.61%)
	Hypoechoic	09 (37.50%)	15 (62.50%)

DISCUSSION

A palpable mass in a woman's breast represents potentially a serious lesion and requires prompt evaluation.

The average age of the patient with palpable breast lumps was 43 years. The largest number of patients in our study were in the age group of 20-39 years (56.67%) followed by 40-49 years (20%). Khanna et al⁹ reported it was 39.8% in the age group of 21-30 years. Monu Sareen et al¹⁰ reported 60% in age group of 20-39 years followed by 40-49 years (18%). Out of 60 cases in our study 50 were detected by ultrasound for the presence of lump, thus giving a sensitivity of 83.33%. This is in close conformity with results reported by Rubin et al¹¹ (91%), Smallwood¹² (92.5%), and similar results reported by Fleishcher et al¹³ (84%), Mansoor et al¹⁴ (86%) and Monu Sareen et al¹⁰ (84%).

Carcinoma of the breast was histologically found in 17 cases out of which 13 were correctly diagnosed by ultrasound, thus a sensitivity of 76.47%. This diagnostic accuracy was better as compared to Kopans et al¹⁵ (52.6%), Mansoor et al¹⁴ (57.14%). Monu Sareen et al¹⁰ reported it to be 84.61%.

Out of the 13 cases diagnosed by the ultrasound, 11 were irregular margins, 9 were non-circumscribed and 9 cases with hypoechoic masses. Benign lesions of the breast were more readily diagnosed by ultrasound than malignant lesions. Sensitivity of the ultrasound in diagnosis of fibroadenoma of the breast was 90.48%. This is consistent with the findings of Fleishcher et al.¹³

(89%), Hyashi et al¹⁶ (93%), Mansoor et al¹⁴ (81.8%) and Monu Sareen et al¹⁰ (88.88%).

The accuracy of ultrasound in diagnosing cystic breast lesions was 100%, which is in accordance with findings of Fleishcher et al¹³ (96%) and Mansoor et al¹⁴ (90.9%) and Monu Sareen et al¹⁰ (100%). The Ultrasound features most predictive of a benign diagnosis were oval or round shape, circumscribed margins and width AP ratio >1.4 . This was similar to the results of Rahbar et al¹⁷. The features most predictive of a malignant diagnosis were irregular shape, Non-circumscribed margins and width AP ratio ≤ 1.4 .

Harvey J A suggested that ultrasound use should be considered in most instances of a palpable breast finding, particularly in young women. A primary advantage is the ability to directly correlate the physical exam finding with imaging. Ultrasound is useful in characterizing palpable masses as well as detecting cancer in women with negative mammograms. The negative-predictive value of imaging for cancer in the evaluation of a palpable lump is very high, which may reassure women with low-suspicion palpable findings.¹⁸

CONCLUSION

Ultrasound is not only useful in detecting malignancy but can also reduce the suspicion of malignancy in some patients although a pathological diagnosis should be obtained in all cases of lumps with suspicious clinical features. Breast ultrasound does not expose the patient to

ionizing radiation and with its relatively easy availability and cost effectiveness; it has already proven to be an important adjunct to the other radiological and pathological studies for the breast. Improvements in ultrasound equipment's have prompted more recent studies with findings that describe reliable signs for differentiating benign from malignant masses.

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Cite this article as: Sunil Kumar. Study of Evaluation of Palpable Breast Lump by Ultrasonography at a Tertiary Care Teaching Hospital. *Int J Med Res Prof.* 2016, 2(1); 145-48.