

Study of Role of Ultrasonography in Detection of Palpable Breast Lump in a Tertiary Care Teaching Hospital

Ashish K Shukla^{1*}, BKS Chauhan², Vikas Verma³

^{1*}Assistant Professor, ²Professor & Head,
Department of Radiology, Santosh Medical College, Ghaziabad, India.

³Resident, Department of Radiodiagnosis,
BPS Government Medical College for Women, Khanpur Kalan, India.

Article History

Received: 24 Oct 2015

Revised: 1 Nov 2015

Accepted: 5 Nov 2015

*Correspondence to:

Dr. Ashish K Shukla
Assistant Professor,
Department of
Radiology, Santosh
Medical College,
Ghaziabad, India.

ABSTRACT

Introduction: Present study has been carried out to determine role of USG in diagnosis of breast lumps in a sample population by comparing ultrasound findings with ultrasound guided fine needle aspiration cytology (FNAC) findings or histopathology findings and to find out the more useful and specific criteria among the various USG criteria used to differentiate between benign and malignant breast lumps.

Materials & Methods: USG examination of 60 cases of palpable female breast masses was done by an expert Sonologist (Radiologist). The scans included information regarding the shape, margins, width antero-posterior, echogenicity and vascularity of the breast masses. The USG diagnosis was confirmed by fine needle aspiration cytology or histopathology.

Results: Out of 60 palpable breast lumps ultrasound diagnosed the lump in 49 cases thus the overall sensitivity of ultrasound was 81.67%. Fibroadenoma of the breast had the highest diagnostic accuracy of 85.71%, followed by carcinoma of the breast 81.25%. USG features that most reliably characterized breast masses as benign type were round or oval shape (30 of 34 [88.24%] were benign), circumscribed margins (27 of 31 [87.1%] were benign), width: AP ratio >1.4 (27 of 32 [84.38%] were benign). 81.82% of isoechoic and 80% of hyperechoic masses were benign. Features that characterized masses as malignant were irregular shape (11 of 15 [73.33%] were malignant), Non-circumscribed margins (11 of 18 [61.11%] were malignant), width: AP ratio \leq 1.4 (12 of 17 [70.59%] were malignant).

Conclusions: Ultrasound should be used as an adjunct to mammography, increases the cancer detection rate. USG 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. It should be the first investigation to be done in young females or pregnant women where mammography is not advisable.

KEYWORDS: Breast, Fibroadenoma, Lump, Ultrasound.

INTRODUCTION

Ultrasonography (USG) has established its role in the investigation of breast abnormalities as well as 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.¹

USG is useful to differentiate cystic from solid abnormalities of the breast. Breast cancer accounts for

around 20 percent of all malignancies in females. Wild & Neal in 1952 were the first to report the use of diagnostic sonography in the diagnosis of breast disease.² Commonly, a large number of patients with palpable breast lesions are referred to diagnostic breast centres for mammography, biopsy (FNAC, excisional/incisional) and sonography to guide the treatment of breast mass and to screen the rest of the breast. The accurate diagnosis of breast lumps without formal biopsy is highly desirable.

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. USG 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.³⁻⁵

Present study has been carried out to determine role of USG in diagnosis of breast lumps in a sample population by comparing ultrasound findings with ultrasound guided fine needle aspiration cytology (FNAC) findings or histopathology findings and to find out the more useful and specific criteria among the various USG criteria used to differentiate between benign and malignant breast lumps.

MATERIALS & METHODS

USG examination of 60 cases of palpable female breast masses was done by an expert Sonologist (Radiologist) in department of radiology, Santosh Medical College, Ghaziabad, India from January 2014 to June 2015. Age

ranges from 20-60 years. 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 shape, margins, width antero-posterior, echogenicity and vascularity of the breast masses. The USG diagnosis was confirmed by fine needle aspiration cytology or histopathology.

RESULTS

Out of 60 palpable breast lumps ultrasound diagnosed the lump in 49 cases thus the overall sensitivity of ultrasound was 81.67%. The largest number of patients was in the age group of 20-39 years (61.67%).

The accuracy of ultrasound in the detection of carcinoma of the breast was 81.25%. The Fibroadenoma of the breast had the highest diagnostic accuracy of 85.71% followed by carcinoma (81.25%) (Table-1).

USG features that most reliably characterized breast masses as benign type were round or oval shape (30 of 34 [88.24%] were benign), circumscribed margins (27 of 31 [87.1%] were benign), width: AP ratio >1.4 (27 of 32 [84.38%] were benign). 81.82% of isoechoic and 80% of hyperechoic masses were benign.

Features that characterized masses as malignant were irregular shape (11 of 15 [73.33%] were malignant), Non – circumscribed margins (11 of 18 [61.11 %] were malignant), width : AP ratio \leq 1.4 (12 of 17 [70.59%] were malignant). (Table-2)

Table 1: USG of Solid and Cystic Breast Masses.

Lesion	No. diagnosed by USG	No. of final diagnosis	% of correct diagnosis by USG
Carcinoma	13	16	81.25
Fibroadenoma	18	21	85.71
Fibro-adenosis	11	14	78.57
Cysts	4	5	80.00
Breast abscess	3	4	75.00

Table 2: USG Features in Benign and Malignant Lesions

Ultrasound features	Tissue Diagnosis		
	Benign	Malignant	
Shape	Round/oval	30 (88.24%)	04 (11.76%)
	Irregular	04 (26.67%)	11 (73.33%)
Margins	Circumscribed	27 (87.1%)	04 (12.9%)
	Non- Circumscribed	07 (38.89%)	11 (61.11%)
Width: AP ratio	> 1.4	27 (84.38%)	05 (15.63%)
	\leq 1.4	05 (29.41%)	12 (70.59%)
Echogenicity	Hyperechoic	04 (80%)	01 (20%)
	Isoechoic	18 (81.82%)	04 (18.18%)
	Hypoechoic	14 (63.64%)	08 (36.36%)
Vascularity	Normal	20 (76.92%)	6 (23.08%)
	Increased	2 (8.7%)	21(91.3%)

DISCUSSION

Breast sonography is the most important adjunct to mammography for patients with palpable breast masses and normal or equivocal mammographic findings. Most carcinomas smaller than 1cm in diameter can be identified and analysed with respect to sonographic features using modern high resolution, linear array, real-time transducers.³ Agreement on breast sonographic diagnosis is reported to be lower than for mammographic diagnosis, but the highest agreement was found on combined mammographic-sonographic interpretation.⁶ Any palpable mass in a woman's breast represents potentially a serious lesion and requires prompt evaluation.

The largest number of patients was in the age group of 20-39 years (61.67%). Almost similar finding were reported by Sareen M et al.⁷ Khanna et al.⁸ reported 39.8% in the age group of 21-30 years.

Out of 60 palpable breast lumps, ultrasound diagnosed the lump in 49 cases thus the overall sensitivity of ultrasound was 81.67%. Similar findings were reported by previous studies.^{7,9-11}

The sensitivity of ultrasound in the detection of carcinoma of the breast was 81.25%. This diagnostic accuracy was better as compared to Kopans et al⁴ (52.6%), Mansoor et al¹¹ (57.14%). Sensitivity of the ultrasound in diagnosis of fibroadenoma of the breast was 85.71%. This is consistent with the findings of previous studies.^{7,10,11}

The accuracy of ultrasound in diagnosing cystic breast lesions was 80%. Higher figures were reported by Fleishcher¹⁰ et al 6 (96%) and Mansoor¹¹ et al 7 (90.9%). Probably it is due to small sample size of study population than these studies.

The Ultrasound features according to present study that predicts a lesion to be benign type were oval or round shape (88.24% were benign), circumscribed margins (87.1% were benign), normal vascularity (76.92% were benign) and width: AP ratio >1.4 (84.38% were benign). The features most predictive of a malignant diagnosis were irregular shape (73.33% were malignant), Non-circumscribed margins (61.11% were malignant), increased vascularity (91.3% were malignant) and width AP ratio ≤1.4 (70.59% were malignant). These finding closely correlates with results of Rahbar et al.⁶ and Sareen M⁷ et al.

A primary advantage of breast ultrasound 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.

A further indication for breast sonography is the diagnostic workup of impalpable masses manifesting as indeterminate densities on mammography. Attention must be paid to combinations of sonographic features rather than any single characteristic.

Inter-observer variations during imaging examinations may be a serious problem and it has been reported that radiologists differ substantially in their interpretation of mammograms.¹² Agreement on breast sonographic diagnosis is reported to be lower than for mammographic diagnosis, but the highest agreement was found on combined mammographic-sonographic interpretation.⁶ Sonography as an adjunct to mammography should always be performed to conclusively obtain a diagnosis.¹³

Diagnostic features taken into account while performing breast USG for characterization of masses also determines success of imaging as different radiologists ignores some features that other workers describes as useful.¹⁴ Standardization of sonographic features analysis for imaging USG is necessary to reduce the inter-observer variability and to improve the potential of breast sonographic features analysis. Further research on this subject should be encouraged to confirm the role of sonography for differentiation between benign and malignant breast tumours.

CONCLUSION

Ultrasound should be used as an adjunct to mammography, increases the cancer detection rate. USG 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. It should be the first investigation to be done in young females or pregnant women where mammography is not advisable.

Ultrasound is therefore recommended in all cases where there is a clinical suspicion of malignancy even if the mammogram is normal. 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.

ACKNOWLEDGEMENT

We thankfully acknowledge department of Surgery and obstetrics & gynaecology, Santosh Medical College, Ghaziabad for their co-operation.

REFERENCES

1. Seidman H, Gelb S K, Silverberg E, La Verda N, Lubera JA . Survival Experience In The Breast Cancer Detection Demonstration Project. CA Cancer J Clin 1987 :37: 258-290
2. Wild JJ, Neal D. Further pilot echo-graphic studies of the histologic structures of tumors of living intact human breast. American J Pathol 1952; 28: 839-61.
3. Stavros AT, Thickman D, Rapp CL, et al. Solid breast nodules: use of sonography to distinguish between benign and malignant lesions. Radiology 1995; 196:123-134.

4. Kopans DB, Moore RH, Slanetz PJ, Yeh ED, Hall DA, McCarthy KA. The specificity of combined mammographic and ultrasonographic evaluation of palpable lumps and palpable thickening. *Radiology* 1999;213:371.
5. Dennis MA, Parker SH, Klaus AJ, Stavros AT, Kaske TI, Clark SB. Breast biopsy Avoidance; the value of normal mammograms and normal sonograms in the setting of a palpable lump. *Radiology* 2001;219: 186-191.
6. Rahbar G, Sie AC, Hansen G C, Prince JS, Melany ML, Reynolds HE, Jackson VP, Sayre JW, Bassett LW. *Radiology*. 1999; 213:889-894.
7. Monu Sareen, Pawan Tiwari, Madhu Tiwari. "Evaluation of Breast Lumps by Ultrasonography: A Study in Rural Teaching Institution". *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 27, July 07; Page: 7406-7410, DOI: 10.14260/jemds/2014/2910
8. Khanna S, Arya NC and Khanna NN. Spectrum of benign breast diseases. *Ind J Surgery* 1988; 3: 169-75.
9. Rubin E, Miller VE, Berland LL et al. Hand-held real-time breast sonography. *American J Radiology* 1986; 144: 623-27.
10. Fleishcher AC, Muhletaler CA, Reynolds VH, et al. Palpable breast masses: evaluation by high frequency hand held real-time sonography and xeromammography. *Radiology* 1983; 148: 813-17.
11. Mansoor T, Ahmed A, HH Syed et al. Role of Ultrasonographic in the differential diagnosis of palpable breast lumps. *Ind J Surgery* 2002; 64 (6): 499-501.
12. Fornage BD, Lorigan JG, Andry E. Fibroadenoma of the breast: sonographic appearance. *Radiology*. 1989; 172:671-675.
13. Vlasisavljevic V. Differentiation of solid breast tumours on the basis of their primary echographic characteristics as revealed by real time scanning of the uncompressed breast. *Ultrasound Med Biol* 1988;14[suppl];75-80
14. Bamber JC, Gonzales LD, Cosgrove DO, Simons P. Quantitative evaluation of real time ultrasound features of the breast. *Ultrasound Med Biol* 1988;14 [suppl];81-87.

Copyright: © the author(s) and publisher IJM RP. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite the article: Ashish K Shukla, BKS Chauhan, Vikas Verma. Study of Role of Ultrasonography in Detection of Palpable Breast Lump in a Tertiary Care Teaching Hospital. *Int J Med Res Prof.* 2015, 1(3); 88-91.