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EVALUATION OF BREAST LUMPS BY ULTRASONOGRAPHY: A STUDY IN RURAL TEACHING INSTITUTION

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ABSTRACT: To find the sensitivity, specificity and positive predictive value of ultrasound in detection of palpable breast lumps and to correlate the findings of ultrasound with the findings of fine needle aspiration cytology (FNAC), or histopathology. Ultrasonagraphic evaluation of 50 palpable breast lumps was done in our institute from January 2011 to February 2012. Diagnosis was made considering four features of the lumps i.e. shape, margins, width: AP ratio and echogenicity. Diagnosis was confirmed by fine needle aspiration cytology or histopathology. The sensitivity of ultrasound in detection of palpable breast lumps was 84%. The incidence of breast lumps was highest in the age group of 20-39 years (60%). Lump alone was the presentation in 88% of the cases. 64% of the lumps were present in outer upper quadrant of the breast. The sensitivity, specificity and positive predictive value of ultrasound in fibroadenoma of the breast was 88.88%, 94.7% and 91.2% respectively. The sensitivity for carcinoma of the breast was 84.61% and for cystic masses it was 100%. The ultrasound features that most reliably characterized breast masses as benign were round or oval shape (93.33% were benign), circumscribed margins (89.28% were benign) and width: AP ratio >1.4 (87.09% were benign). Features that characterized masses as malignant were irregular shape (75% were malignant), non-circumscribed margins (57.14% were malignant) and width: AP ratio ≤1.4 (63.63% were malignant).Ultrasound is a useful tool in differentiation of cystic from solid masses of the breast. It is useful in young females and pregnant women where mammography is not advisable. However its role in diagnosis of carcinoma of the breast needs further evaluation before it can be used for screening of carcinoma breast.
KEYWORDS: Breast, Lump, Ultrasound.

INTRODUCTION: Ultrasound is a useful modality in the evaluation of breast abnormalities. Its main role is in differentiation of cystic from solid abnormalities of the breast. In palpable breast lumps, it is the fear of breast cancer which usually makes women consults a doctor, because of the fact that the breast is the commonest site for development of cancer in the females and accounts for around 20 percent of all malignancies in this sex. Wild & Neal in 1952 were the first to report the use of diagnostic sonography in the diagnosis of breast disease.[1] Large number of biopsies for benign breast abnormalities has long been recognized as a serious problem.[2] 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 availability of ultrasound and sonologist even at the level of sub-district level in our state along with increased incidence and prevalence of breast lumps prompted us to do this study which deals with fifty cases of palpable breast lumps examined by ultrasonography at our institute and confirmed by fine needle aspiration cytology or histopathology.

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MATERIALS & METHODS: Ultrasonographic examination of 50 cases of palpable female breast masses was done in our institute from January 2011 to February 2012. USG of the breast lumps was done by an expert Sonologist in the department of radio diagnosis. 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
- 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 fifty palpable breast lumps ultrasound diagnosed the lump in 42 cases thus the overall sensitivity of ultrasound was 84%. The largest number of patients in our study were in the age group of 20-39 years (60%) followed by 40-49 years (18%). 82% of the patients were married. Lump alone was the presenting symptom in 88% of the patients followed by lump with pain (30%) and lump with discharge from the nipple (8%). The average duration of the symptoms was six months. 64% of the masses were present in the outer upper quadrant of the breast. Both breasts were involved in 12% of the cases.

The accuracy of ultrasound in the detection of carcinoma of the breast was 84.61%. The cystic masses of the breast had the highest diagnostic accuracy of 100% followed by fibroadenoma (88.88%) (Table-1).

Ultrasound features that most reliably characterized breast masses as benign were round or oval shape (28 of 30 [93.33%] were benign), circumscribed margins (25 of 28 [89.28%] were benign), width: AP ratio >1.4 (27 of 31 [87.09%] were benign). 83.33% of isoechoic and 100% of hyperechoic masses were benign. Features that characterized masses as malignant were irregular shape (09 of 12 [75.00%] were malignant), Non-circumscribed margins (8 of 14 [57.14%] were malignant), width: AP ratio ≤1.4 (07 of 11 [63.63%] were malignant), 16.66% of isoechoic and 38.09% of hypoechoic masses were malignant. No hyperechoic mass was malignant (Table-2).

Lesion	No. diagnosed by ultrasound	No. of final diagnosis	%age of correct diagnosis by ultrasound
Carcinoma	11	13	84.61
Fibroadenoma	16	18	88.88
Fibro-adenosis	9	12	75.00
Cysts	4	4	100.00
Breast abscess	2	3	66.66
Table 1: Accuracy of Ultrasound in the Diagnosis of Solid and Cystic Breast Masses			

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Ultrasound features		Tissue Diagnosis	
		Malignant	Benign
Shape	Round/oval	02 (6.66%)	28 (93.33%)
	Irregular	09 (75.00%)	03 (25.00%)
Margins	Circumscribed	03 (10.71%)	25 (89.28%)
	Non- Circumscribed	08 (57.14%)	06 (42.85%)
Width: AP ratio	> 1.4	04 (12.90%)	27 (87.09%)
	≤ 1.4	07 (63.63%)	04 (36.36%)
Echogenicity	Hyperechoic	00 (0%)	03 (100%)
	Isoechoic	03 (16.66%)	15 (83.33%)
	Hypoechoic	08 (38.09%)	13 (61.90%)
Table 2: Association of Ultrasonic Features with Benign and Malignant Lesions			

DISCUSSION: Breast diseases range from mild changes in the tissue to full-fledged malignant change. These cause considerable physical and psychological morbidity. 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 41 years. The highest incidence of breast lumps was in the age group of 20-39 years (60%) followed by 40-49 years (18%). Khanna et al[3] reported it was 39.8% in the age group of 21-30 years. Out of 50 cases in our study 42 were detected by ultrasound for the presence of lump, thus giving a sensitivity of 84%. This is in close conformity with results reported by Rubin et al[4] (91%), Smallwood[5] (92.5%), and similar results reported by Fleishcher et al[6] (84%) and Mansoor et al[7] (86%).

In our study 100% of the cases of malignancy were married and all of them were more than 32 years of age. Carcinoma of the breast was histologically found in 13 cases out of which 11 were correctly diagnosed by ultrasound, thus a sensitivity of 84.61%. This diagnostic accuracy was better as compared to Kopans et al[8] (52.6%), Mansoor et al[7] (57.14%). Out of the 11 cases diagnosed by the ultrasound, 9 were irregular, non-circumscribed hypoechoic masses. In the study by Durfee et al[9] 97% of cancers were hypoechoic. 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 88.88%. This is consistent with the findings of Fleishcher et al[6] (89%), Hyashi et al [10] (93%) and Mansoor et al[7] (81.8%).

The accuracy of ultrasound in diagnosing cystic breast lesions was 100%, which is in accordance with findings of Fleishcher et al [6] (96%) and Mansoor et al[7] (90.9%). The Ultrasound features most predictive of a benign diagnosis were oval or round shape (93.33% were benign), circumscribed margins (89.28% were benign) and width AP ratio >1.4 (87.09% were benign). This was similar to the results of Rahbar et al[11] where in these features were present in 94%, 91% and 89% respectively. The features most predictive of a malignant diagnosis were irregular shape (75% were malignant), Non-circumscribed margins (57.14% were malignant) and width AP ratio ≤1.4 (63.63% were malignant). These results were again in conformity to the results obtained by Guita Rahbar et al[11] where in these features were present in 61%, 50% & 40% respectively.

In another study a sensitivity value of 95%, specificity of 94.10%, positive and negative predictive values of 95.50% and 93.75% were noted.[12] Similarly another study suggested that

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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 [13]. Most recent study also suggests that the negative predictive value of sonography for palpable breast masses with probably benign morphology was very high (99.4%).[14]

CONCLUSION: Ultrasound is a simple, time saving tool for evaluation of breast masses. It should be the first investigation to be done in young females or pregnant women where mammography is not advisable. Its sensitivity for detection of cystic masses is very high so it has a definite role in differentiation of cystic from solid masses of the breast. The sonographic evaluation of a simple cyst should eliminate the need for further invasive procedures including aspiration and biopsy. The role of ultrasound in diagnosis of carcinoma of the breast needs further evaluation before it can be used for screening of carcinoma breast.

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