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ULTRASONOGRAPHIC EVALUATION OF BREAST PATHOLOGIES WITH FNAC CORRELATION

Radiodiagnosis

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ABSTRACT

The present study has endeavored to determine the role of ultrasonography (gray scale & colour Doppler) in defining benign from malignant breast masses and to correlate these features to FNAC. 100 patients were included in this study who underwent sonography (gray scale and colour Doppler) and FNAC and correlate these findings to determine sensitivity and specificity, positive and negative predictive value, diagnostic accuracy of imaging of benign and malignant breast masses. Ultrasonography (gray scale & colour Doppler) is a non-invasive diagnostic option in patients being evaluated for breast pathologies. The value of adding a simple invasive procedure like USG guided FNAC to this enhance the diagnostic accuracy. The results of this study reflect that combination of imaging ultrasonography (gray scale & colour Doppler) and USG guided FNAC offers the best approach to diagnosing a breast lesion.

KEYWORDS

Ultrasonography, Colour Doppler, FNAC, Breast lesions

INTRODUCTION:

Breast Cancer is the commonest malignancy of females all over the world and second leading cause of death due to cancer among females[1]. Most pathologies present as a palpable masses. Others commonly present as a nipple discharge or pain. However, not all palpable abnormalities represent discrete masses; this is especially true in younger women, in whom normal glandular nodularity may be mistaken for dominant masses.

Because many breast masses may not exhibit distinctive physical findings, an imaging evaluation is necessary in almost all cases to characterize the palpable lesion and screen the remainder of each breast for additional lesions[2]. Integrated methodology, where clinical assessment, imaging by ultrasonography and cytopathology by fine needle aspiration cytology and/or histopathology by core biopsy must combine in such a way that the risk of missing a disease pathology is minimized to negligible[3]. The most readily accepted use of ultrasound is to differentiate cystic from solid masses[4].

A landmark study by Stavros et al[5] aimed to determine the use of sonography to distinguish between benign and malignant lesions.

Only three combinations of benign features resulted in a nodule's classification as benign:

1. Intense and uniform hyperechogenicity
2. Ellipsoid shape plus a thin echogenic pseudocapsule
3. Fewer than four gentle lobulations

Shadowing was the result of attenuation of the sound beam by desmoplastic host response to breast cancer rather than being due to the tumor itself. It was most commonly seen in low grade infiltrating ductal carcinomas and tubular carcinomas. High cellular tumors such as papillary or medullary carcinomas were associated with a normal to enhanced through transmission[6,7].

Beuglet et al inferred that the calcification which are seen sonographically within a solid mass are more likely to be malignant

Angiogenesis is defined as formation of new blood vessels through sprouting of capillaries from preexisting microvessel[8]. The formation of these vessels is associated with increased risk of malignancy[9]. The vascularity of breast masses has been analyzed in the hopes of determining the masses as benign or malignant.

Bukhari et al (2011)[10] conducted a study designed to see the role of fine needle aspiration cytology (FNAC) in palpable breast lumps. They concluded that FNAC serves as a rapid, economical, and reliable tool for the diagnosis of palpable breast lesions because the cytopathological examination of these lesions before operation or treatment serves as an important diagnostic modality. FNAC of the breast can reduce the number of open breast biopsies[11-13].

OBJECTIVES:

The present study has endeavoured to determine the useful role of ultrasonography (grey scale & colour Doppler) in defining benign from malignant breast masses and to correlate these features to FNAC. Determine sensitivity and specificity, positive and negative predictive value, diagnostic accuracy of imaging of benign and malignant breast masses

MATERIALS AND METHODS:

The present cross sectional study was conducted in P.D.U. Medical college, Rajkot between January to December, 2017 on 100 cases who underwent sonography (gray scale and colour Doppler) and FNAC.. Patients of all ages for whom the clinician is concerned enough about like High risk patients, Follow up with proven breast cancer and those with CIN (Cervical Intraepithelial Neoplasia), Sign and symptom suggestive of breast disease like 1. Lumpiness 2. Contour change 3. Nipple discharge 4. Non-cyclical pain 5. Adenopathy are included.

Real time gray scale and colour Doppler breast sonography was performed in all cases using a 7.5-12 MHz linear array transducer on Samsung accuvix xg.

The patients were informed about the procedure and its possible complications. Any previous history of anti-coagulatory medication was determined before undertaking the FNAC procedure.

RESULTS:

Maximum number of patients belonged to fifth decade (25%). There were a total of 20 post-menopausal patients in this study. 50% of the patients with an early menopause (40-45yrs) had a benign pathology.100% of the patients who attained menopause between 51-55 years had malignant lesions.

The most common presenting symptom was presence of palpable abnormality (80% cases) followed by pain(39%), dimpling contour deformity (19%) and nipple discharge (5%) respectively.

52% cases demonstrated circumscribed margins (of these all were benign) followed by 12% Spiculated. Amongst the 64% cases appearing hypoechoic, 76.56% were benign and remainder 23.43% were Malignant. Posterior acoustic enhancement was noted in 47% cases (of these 93.62% were benign and 6.38% malignant), attenuation in 35% cases (of these 71.42 were benign and 28.58 were malignant) whilst no change was observed in 18% cases. 51.76% of benign lesions showed posterior enhancement while 75% of malignant lesions

showed posterior acoustic attenuation. Calcification was noted in 16% of the cases of which 9% showed macro-calcification and 7% showed micro-calcification.

TABLE 1: Incidence Of Breast Pathologies

PATHOLOGY	NO. OF CASES	% OF CASES
GALACTOCELE	7	7
FIBROADENOMA	41	41
GRANULOMASTITIS	1	1
ABSCESS	5	5
FIBROCYSTIC DISEASE	12	12
PHYLLOIDES	5	5
CARCINOMA	15	15
DUCT ECTASIA	10	10
CYST	4	4
TOTAL	100	100

18% of the total cases demonstrated presence of vascularity on Doppler (of these 27.78% benign and 72.22% malignant). There were 10% of total vascular lesions which showed peripheral vascularity (of these 80% were benign and 20% were malignant) and 3% showed central + peripheral pattern (of these all were benign and none were malignant).

80% of vascular benign lesions had RI of <0.6 while 73.3% of vascular malignant lesions had an RI >0.8.

TABLE 2: Diagnostic Performance Of Ultrasonography (usg)

ULTRASONOGRAPHY DIAGNOSIS	FNAC DIAGNOSIS		
	BENIGN	MALIGNANT	TOTAL
BENIGN	82	02	84
MALIGNANT	03	13	16
TOTAL	85	15	100

Showing Diagnostic Performance Of Ultrasonography (Gray scale +Color doppler).

TABLE 3: Comparison Between Benign And Malignant Lesions On Usg

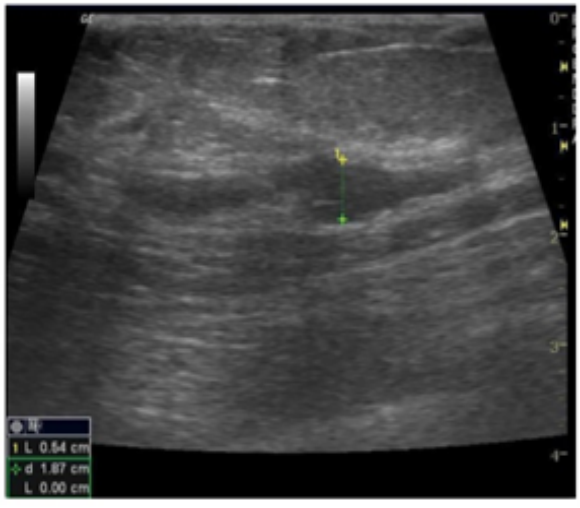
GRAY SCALE USG FEATURES		Benign	Malignant	Total
SHAPE	Oval	34	**00**	34
	Round	24	**05**	29
	Lobular	10	**08**	18
	Irregular	00	**02**	02
	Tubular	12	**00**	12
	NA	05	**00**	05
	Total	85	**15**	100
MARGINS	Circumscribed	52	00	52
	Micro lobular	07	04	11
	Spiculated	02	10	12
	Indistinct	16	01	17
	NA	08	00	08
	Total	85	15	100
Echogenecity	Hypo echoic	49	15	64
	Isoechoic	05	00	05
	Anechoic	17	00	17
	Hyper echoic	14	15	14
	Total	85		100
Posterior Acoustic Feature	Enhancement	44	03	47
	Unaltered	16	02	18
	Attenuation	25	10	35
Wider than Taller	Yes	50	04	54
	No	35	11	46
Calcification	Macro	09	00	09
	Micro	01	06	07
	Abscent	75	09	84
	Total	85	15	100
Axillary Lymphnodes	Absent	70	05	75
	Present	15	10	25
Fatty Hilum	Preserved	16	00	16
	Lost	00	10	10

TABLE 4: Comparison Between Benign And Malignant Lesions On Colour Doppler

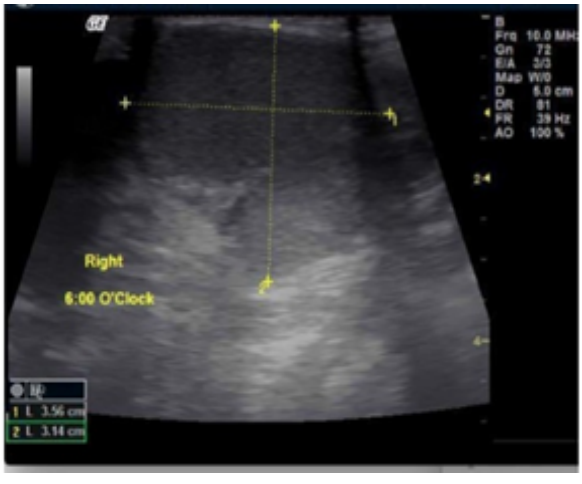
DOPPLER FEATURES		BENIGN	MALIGNANT	TOTAL
VASCULARITY	Peripheral	08	02	10
	Central	02	13	15
	Central + peripheral	03	00	03
	NA	72	00	72
PEAK SYSTOLIC VELOCITY (CM/SEC)	<5	00	04	04
	5-9.9	04	09	13
	10-14.9	00	00	00
	15-19.9	01	00	01
	>20	00	00	00
RESISTIVE INDEX(RI)	0.5-0.59	04	06	10
	0.6-0.69	01	05	06
	0.7-0.79	00	00	00
	0.8-0.89	00	02	02
	0.9-0.99	00	00	00
	>1	00	00	00

Shows Features OF Benign &Malignant Lesions On Doppler & Their Correlation. HS = Highly significant, S=Significant, NS = Not significant

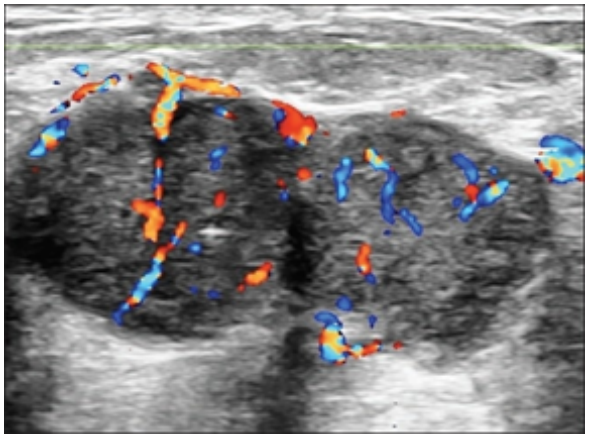
Duct ectasia



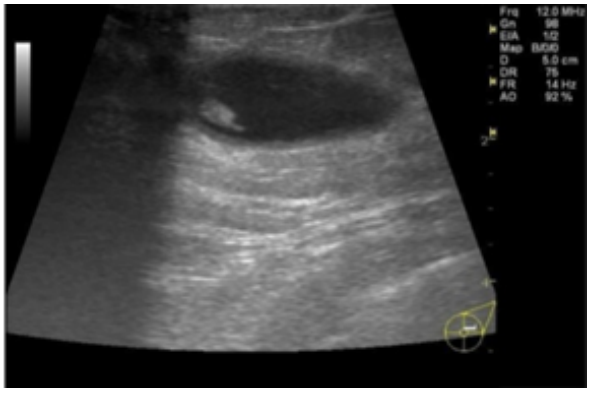
Galactocele



Carcinoma



Abscess



Fibroadenoma

Cyst

DISCUSSION:

The mean age of the entire study group was 37.05 +/- 13.5 years (ranging from 16 years to 68 years).The mean age of patients with benign lesions was 33.68 +/- 11.3 years (range 16-58 years) whereas the mean age of patients with malignant lesions was 56.13 +/- 8.5 years (range 44-68 years). There was a highly significant difference between the mean age of patients with benign and malignant lesions. These results are similar to Badwe et al[14] & Haque et al[15] who reported the mean age as 45.8 years.

Among benign lesions (34 out of total 85 cases) the most common shape encountered was oval (40% of benign lesions) followed by round (28.2%).Among malignant lesions (8 out of15 cases) the most common shape was lobular type (53.3% of malignant lesions) followed by round and irregular type. 52% cases demonstrated circumscribed margins (of these all were benign) followed by 17% indistinct (94.11% benign and 5.89% malignant), 12% speculated (16.66% benign and 83.33% malignant) and 11% with microlobular (63.6% benign and 36.4% malignant). Most of the benign lesions observed (52 out of 85 cases) had circumscribed margins. Among malignant lesions the most common margin seen was the speculated (66.6% of malignant lesions) followed by microlobular (26.66%).

Ill defined/ indistinct margins are also considered a hallmark of malignant lesions.Well defined margins strongly favor a benign lesion[5]. .17% of the lesions were anechoic (all of these were benign) followed by 14% lesions that were hyperechoic (all benign) and 5% were isoechoic (all benign).Most of the benign lesions were noted to be hypoechoic (57.64% of benign lesions) followed by anechoic (20%) and hyperechoic (16.47%). Most the malignant lesions noted were hypoechoic (all of malignant lesions).There was a highly significant association between anechoic echogenicity with benign lesions and hypoechoic echogenicity with malignant lesions. Marked hypoechogenicity has been considered a worrisome feature of malignancy in some studies[5].

Calcification was noted in 16% of the cases of which 10 were benign (11.7% of total benign) and 6 were malignant (40% of total malignant) lesions. Cole-Beuglet[16] noted that calcifications which were seen sonographically within a solid mass were more likely to be malignant.Vascularity was seen in 15.2% of all benign lesions and in all of malignant lesions. There was a highly significant association of presence of vascularity with malignant breast lesions. Reports of detected vascularization fluctuates from 78%-98% for malignancies and 0-68% for benign lesions[3,17,18].

Ultrasonography (gray scale and colour Doppler) had a sensitivity of 86.66%, specificity of 96.04% with positive and negative predictive values being 81.25% and 97.61% respectively for detecting malignant lesions. 13 out of 15 were diagnosed correctly on ultrasonography. 82 out of 85 benign lesions were correctly diagnosed on ultrasonography. FNAC was, as a rule, performed under USG guidance in the study. FNAC in the study had a sensitivity of 100%, specificity of 100% with positive and negative predictive values being 100% and 100% respectively for detecting malignant as well as benign lesions An increasing trend in diagnostic accuracy was observed from ultrasonography (0.81) to combined USG+FNAC[1].

CONCLUSION:

The results of this study reveal that use of ultrasonography (gray scale & colour Doppler) enhance the diagnostic accuracy and hence should be offered as a non-invasive diagnostic option in patients being evaluated for breast pathologies.

Thus developing an integrated approach employing imaging and cytological procedure is the best way to move forward in addressing the diagnostic needs of patients seeking answers. The results of this study also reflect that combination ultrasonography (gray scale & colour Doppler) and USG guided FNAC offers the best approach to diagnosing a breast lesion.

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