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ULTRASOUND ROLE IN EVALUATING PALPABLE BREAST LUMP IN FEMALE PATIENTS ATTENDING AL-ELWEIYA MATERNITY TEACHING HOSPITAL IN IRAQ

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ABSTRACT

Introduction: Breast lump is a common presenting symptom in women; lumps pose a potential threat to women especially in the era of increased cases of breast cancer worldwide. In Iraq there is increase in incidence rate of breast cancer with trend to affect young women. Different tools used for early detection of breast masses; ultrasound (US) playing an increasingly vital role. A major advantage of US is ability to direct correlate the clinical and imaging finding and for assessment of possible masses after mammography. Ultrasound is feasible, low-cost and, easily accepted. **Objectives:** The study was conducted to find the role of ultrasound in diagnosing palpable breast lumps among women attending Al-Elweiya Maternity Teaching Hospital. **Methods:** A cross-sectional study conducted o 150 cases of palpable breast masses are evaluated by US in Al Elweiya Maternity Teaching Hospital between March to October 2021. By using US criteria, a mass then classified according to BI-RADS (Breast Imaging-Reporting and Data System) which is a risk assessment and quality assurance tool developed by ACR (American College of Radiology). **Results:** Out of 150 women most of patients 27%were in (40-49) years age group. Benign breast lumps account for 99 (66%) and 51 (34%) breast lumps were malignant. There was significant association between malignant breast lump and age group 50-59 years (33%, P=0.001). Ultrasound showed 96.07% accuracy in detecting malignant lump with good sensitivity, specificity, positive predictive value (PPV) and, negative predictive value (NPV) (90.2%, 97.0%,93.87%,95%) respectively. Malignant lumps significantly associated with US features; irregular, uncircumscribed, shadowing and not parallel orientation (92.2%, 94.1%, 66.7% and 100.0% with P value = 0.001) respectively. **Conclusion:** Ultrasound has high diagnostic accuracy, so it is highly reliable in detecting breast abnormalities when strict diagnostic criteria are met especially mass shape, margin, orientation, and posterior features. Breast cancer affect one third of women with trend to affect young. Based on this evidence using US as first line screening program especially in young women or as adjunct to mammogram is recommended; Although further studies to evaluate the cost effectiveness of ultrasound to be used as first screening modality are needed.

KEYWORDS: Breast Lump, Ultrasound, Accuracy.

INTRODUCTION

Breast carcinoma ranks first among the malignant tumors affecting females in many parts of the world.[1] In Iraq there is increase in incidence rate of breast cancer with trend for the disease to affect younger age group.[2] Different tools are used for early detection of breast masses; one that playing an increasingly vital role is ultrasound.[3] Ultrasound (US) is an important imaging modality in the assessment of palpable breast masses that are mammographically occult.[3,1] Ultrasound is feasible and low-cost compared to mammography or even biopsies, makes it easily accepted by women when requested by the clinicians (1). A major advantage of US is ability to direct correlate the clinical and imaging finding and determine whether the mass cystic or solid and demonstrates those features of solid masses that

would denote the mass as suspicious and warranting biopsy. Many US is often used for further assessment of possible masses after mammography and is the initial imaging modality in the evaluation of clinically detected palpable masses in women younger than 30 years of age and during pregnancy to avoid ionizing radiation.[4] In addition, breast US is superior to mammogram in evaluation of breast abscess.[3] Ultrasound has become popular even in lower-level health centers of developing countries.[5] Mammography, which has long been considered the gold standard for screening and early detection of breast cancer, is not always feasible, especially in limited-resource settings while US offers a potentially viable alternative for early breast cancer detection.[6]

AIM OF THE STUDY

1-Role of ultrasound in evaluating palpable breast lumps.
2- Determine the diagnostic accuracy of ultrasound according to breast lump type.

MATERIAL & METHODS

A cross-sectional study was done on 150 case of palpable female breast masses and evaluated by ultrasound in Al Elweiya Maternity Teaching Hospital/ Tumor Women Center department between March to October 2021. By using ultrasound criteria (shape, margins, echogenicity, orientation, and posterior feature) a mass then classified according to BI-RADS (Breast Imaging-Reporting and Data System) which is a risk assessment and quality assurance tool developed by ACR (American College of Radiology).[7]

Based on these categories an impression about diagnosis was made. The confirmation of the ultrasound diagnosis was made by fine needle aspiration cytology (FNAC) or histology which was done by an expert pathologist in the department of pathology.

Data management and statistical analysis

A total of 150 patients presented with breast lump were the subjects of this study. IBM SPSS version 26 was used for this study statistical analysis. Participant characteristics were presented as mean, SD, percentages, and tables. Fisher exact test and chi square test was used to test the association between different study parameters ($p < 0.05$).

RESULTS

Out of 150 women with palpable breasts lump 119 (82.7%) were married. Lump with pain was the presenting symptom in 86% of the patients followed by lump alone (8.6%) and lump with discharge (5.3%) respectively. The average duration of the symptom was 6.7 months. Most of the lumps (48%) were present in right side of the breast (44.6%) were in left side and breasts were involved bilaterally in (7.3%) of the cases. The mean age of patients of the study was 39.04 +13SD, classified into 7age group showing that most of patients 27%were in (40-49) years age group.

This study showed that 99 (66%) of 150 patient's lumps were benign; these benign lumps are classified according to FNAC the largest group comprised fibroadenoma 30.7% and fat necrosis compromised only 1.3%. Fifty-one (34%) breast lumps were malignant and according to histological results intraductal carcinoma represents 80.3% of malignant lumps (table1).

Table 1: The frequency of pathologic characteristics of masses based on benignancy and malignancy.

Type of mass		No.	%
Benign	Fibroadenoma	46	30.7
	Fibrocystic changes	4	2.7
	Cyst	9	6.0
	fat necrosis	2	1.3
	phyllodes tumor	8	5.3
	Granulomatous mastitis	14	9.3
	Abscess	9	6.0
	Else	7	4.7
Malignant	Intraductal carcinoma	41	80.3
	Inflammatory carcinoma	3	5.8
	Lobular carcinoma	1	1.96
	Mixed carcinoma	1	1.96
	Paget disease of the nipple	2	3.92
	Unknown (missed in follow up)	3	5.88
	Total	150	100

Table 2: Distribution of the study sample (n=150) according to Age and Breast lump type.

Age group	Benign		Malignant	
	No.	%	No.	%
< 20 yrs.	18	18.2	0	0.0
20-29 yrs.	18	18.2	2	3.9
30-39 yrs.	28	28.3	8	15.7
40-49 yrs.	24	24.2	17	33.3
50-59 yrs.	9	9.1	17	33.3
60-69 yrs.	1	1.0	3	5.9
≥70 yrs.	1	1.0	4	7.8
P= 0.001				

There was significant association between malignant breast lump and age group 50-59 years (33%, P=0.001) as shown in (table2)

Ultrasound showed 96.07% accuracy in detecting cancer and 100% accuracy in detecting fibroadenoma, fibrocystic changes, cysts, and fat necrosis, while it was 0.0% accuracy in detecting phyllodes tumor and Granulomatous mastitis (table 3). Ultrasound screening test for breast cancer showed good sensitivity, specificity, positive predictive value (PPV) and, negative predictive value (NPV) (90.2%, 97.0%,93.87%,95%) respectively. Total ultrasound accuracy for detecting breast lump 94.6% (table 4).

Table 3: Ultrasound accuracy percent in detecting breast lumps.

Type of breast lump	No. US	No. (Cytology)	Accuracy%
Fibroadenoma	52	46	>100.00
Fibrocystic changes	5	4	>100.00
Cyst	9	9	100.00
Fat necrosis	3	2	>100.00
Phyllodes tumor	0	8	0.00
Granulomatous mastitis	0	14	0.00
Cancer	49	51	96.07
Abscess	26	9	>100.00
Else	6	7	85.71

Table 4: Ultrasound accuracy in detecting breast lump

		Breast Lump Type (FNA)		Total
		Malignant	Benign	
Breast Lump Type (US)	Malignant	46 (90.2%)	3	49
	Benign	5	96 (97.0%)	101
	Total	51	99	150
Sensitivity = 90.2%, Specificity = 97.0%, PPV= 93.87, NPV=95. Accuracy= 94.6%				

Breast Cancer showed significant association with Ultrasound features; irregular, uncircumscribed, shadowing and not parallel orientation (92.2%, 94.1%, 66.7% and 100.0% with P value = 0.001) respectively (table 5).

Table 5: Distribution of the study sample (n=150) according to Ultrasound features and Breast lump type.

Ultrasound features		Breast Lump Type (FNA)				P- value
		Benign		malignant		
		No.	%	No.	%	
Mass Shape	Oval	57	57.6	3	5.9	0.001
	Round	19	19.2	1	2.0	
	Irregular	23	23.2	47	92.2	
Mass Margin	Circumscribed	66	66.7	3	5.9	0.001
	Uncircumscribed	33	33.3	48	94.1	
Echo Pattern	Hypoechoic	66	66.7	29	56.9	0.227
	Hyperechoic	3	3.0	0	0.0	
	Complex	25	25.3	20	39.2	
	Isoechoic	5	5.1	2	3.9	

Posterior Feature	no feature	77	77.8	14	27.5	0.001
	Enhancement	10	10.1	0	0.0	
	Shadowing	3	3.0	34	66.7	
	Combination	9	9.1	3	5.9	
Orientation	Parallel	72	72.7	0	0.0	0.001
	not parallel	27	27.3	51	100.0	

DISCUSSION

Despite breathtaking advances in science and technology, breast cancer remains mankind's one of the most dreaded diseases. Timely diagnosis and well planned and executed treatment strategy are the cornerstones of successful management of this entity.[8]

The average age of women with palpable breast lump was 39±13 years ranges (16-75) the highest incidence of breast lump was in the age group 40-49yrs (27%) this agree with studies in Iraq and Saudi Arabia.[9,10,11] followed by 30-39yrs (24%) while disagree with other studies that show breast lumps are more common in third and fourth decade of life.[12] Lump with pain was the most presenting symptom and right sided lesions were more common compared to left sided in the present study, a finding which was also noted in Pakistan while other studies in India showed left sided lesions to be common.[13,14] the mean duration of symptom was 6.7 months, and this agree with study from Kenya.[15]

Although one third of palpable breast lump 51(34%) was malignant, benign lumps still predominate 99(66%) this agrees with other study in India.[14] especially in young women; showing prevalence of fibroadenoma this agrees with studies conducted in Egypt, Saudi Arabia, and south Nigeria.[16,17,18] Malignant breast lumps were further classified according to histological study showing that intraductal carcinoma represents 80% of all malignant lumps which agrees with USA study.[19]

The incidence of breast cancer increases with age, doubling about every 10 years, cancer risk was found to be increased in women with age (≥ 50).[20] in this study although incidence of malignant breast lumps was more in comparison to benign in age group >50 years old which agree with study conducted in Turkey.[21] there is trend of breast cancer to affects younger women. In this study we found that out of 51 malignant breast lump 27 case (52.9%) were in age group <50 years old and two of them were in (20-29) year age group, this finding strongly agrees with study in Iraq.[22] and goes with WHO estimates that reveal approximately half of the cancers in the Eastern Mediterranean Region (EMR) occur before the age of 55; In a WHO collaborative project it has been proposed that the younger age distribution in the Arab population could be a reflection of the younger demographic profile.[23] In Iraq the proportion of women < 50 years old is 82% also genetic factors, contraception use and westernization of lifestyle may play role in this shift of breast cancer toward young age group.[24] this picture differs from that displayed in reports from western and developed countries; where the peak incidence rates project decades later.[22]

In this study inflammatory breast conditions (granulomatous mastitis, abscess, and fat necrosis) compromise the second prevalent cause of palpable breast lumps accounted 8.1% of cases this agree with studies in Iraq and Kenya.[10,15] while in New Guinea, inflammatory condition rank the first.[25] Low-grade (benign) phyllodes, accounted for 5.3% which agree with Indian study.[14] In our study cysts/ fibrocystic condition accounted for (8.7%) of all lumps and this agree with China study.[26]

Fifty-one of breast lumps was diagnosed as mammary carcinoma by FNA cytology out of 49 lumps were correctly diagnosed by ultrasound gives 96% accuracy. In our study sensitivity, specificity, PPV and, NPV was (90.2%,, 97% , 93.87%, 95%) respectively, which closely agree with other studies.[27,6,28] This make diagnostic accuracy of US in detecting breast lumps reach 94.6% which agree with study in India and Iran.[26,27] and it is much better than study conducted in Uganda and India.[5,29] (57%,65%) respectively, this variations may be attributed to inappropriate quality of ultrasound machine and its setting or insufficient knowledge and experience of examiner.

Ultrasound show 100% accuracy in diagnosing cysts that agree with Indian study.[29] fibroadenoma, fat necrosis and abscesses while showing 0.0% accuracy in diagnosing phyllodes and granulomatous mastitis; this could be attributed to the substantial overlap in the sonographic characteristics between phyllodes tumors and fibroadenoma of the breast[30] and the challenging diagnosis of Granulomatous Mastitis because it is indistinguishable from breast abscess or inflammatory cancer, and biopsy is required to exclude these etiologies.[4]

The ultrasound features most predictive of benign diagnosis were oval or round in shape, circumscribed margins and of benign lumps were parallel to the skin (76%,66%and72%) respectively this concordant with Indian study.[29] this gives reasonable role for US to identify solid lumps that has such a low risk of being malignant that the option of short-interval follow-up can be offered as a viable alternative to biopsy.[31]

The three most important feature categories taken together for assessment of likelihood of malignancy are shape, orientation, and margin.[4] In this study malignant breast lumps showed significant association with US

features; irregular, uncircumscribed, posterior shadowing and not parallel (92.2%, 94.1%, 66.7% and 100.0% with P value = 0.001) respectively this strongly agree with India and UK study.[31,32]

In this study there was no significant association regarding echogenicity and type of breast lump because a majority of both malignant and benign solid breast masses are hypoechoic, other features, such as margin characteristics, establish the level of suspicion, this consistent with Iran study.[32]

CONCLUSION AND RECOMMENDATIONS

Ultrasound has high diagnostic accuracy, so it is highly reliable in detecting breast abnormalities in symptomatic women when strict diagnostic criteria are met especially mass shape, margin, orientation, and posterior features. Breast cancer affect one third of women with trend to affect young. Based on this evidence using US as first line screening program especially in young women or as adjunct to mammogram is recommended; Although further studies to evaluate the cost effectiveness of ultrasound to be used as first screening modality are needed.

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