

Correlating Fine Needle Aspiration Cytology Results of Mammary Malignancy with Corresponding Ultrasound BIRADS Score

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Objective: Breast mass is a major complaint making women attending any breast clinic. About 10% of the lumps are usually malignant. Triple assessment techniques using clinical examination, ultrasound, and cytology are usually sufficient in reaching the final diagnosis, especially in specialized breast centers. The aim of this study was to assess how accurate ultrasound was in the diagnosis of definite breast cancer according to BIRADS (Breast Imaging Reporting and Data System), and correlate these radiological findings with the results of fineneedle aspiration cytology (FNAC).

Methods: A retrospective study included 42 patients who presented with a self-detected breast lump and attending the Early Detection of Breast Tumors clinic in the Oncology Teaching Hospital, Medical City Complex, Baghdad during the period from May 2019 to August 2020. Their age ranged from 29 to 92 years. Patients underwent ultrasound examination after clinical examination and the reported BIRADS score was correlated with the corresponding cytology data.

Results: the main ultrasound findings are masses that are either irregular in the majority of cases and this represents 55%, poorly demarcated lesions seen in (26%) while 14% of them were well defined. axillary lymphadenopathy with typical malignant features was noted in (50%). FNAC revealed mammary carcinoma in (93%); while severe atypia was seen in 7%, BIRADS V score was assigned in 76%, of breast exam BIRADS IV in 21% while the remaining 3% were in BIRADS III category. By correlating these ultrasound findings of BIRADS with FNAC results, the ultrasound accuracy in the diagnosis of breast cancer was reaching to 90%.

Conclusion: Ultrasonography represents an accurate diagnostic radiological modality for any breast lesion and is thus considered a recommended method for assessment of underlying cause responsible for palpable breast mass or any presenting symptoms related to the breasts. Its value was demonstrated in characterizing the mass lesion, assessing its location, its echo texture, margin, and size, it has a major role in analyzing the axilla for normal or pathological lymph nodes.

Introduction

Breast lumps are focal abnormal lesions that differ from nearby normal breast tissue consistency [1]. Not every breast lump means cancer as it can characterize a sign for altered diagnosis [2]. Breast lumps remain the main presenting complaint that worries women and made them look for help [3]. Breast cancer is increasing nowadays in women all over the world [4-5] and still the most common cancer among Iraqis [6]. Nearly 10% of breast masses will be malignant, this requires taking care of women presenting with such a symptom; besides, to be the commonest cancer in Iraq, it is also the leading cause of death amongst women suffering from cancer [1,4]. The breast cancer incidence varies from one country to another, being high in developed countries (>80 per 100,000 populations) than that in developing parts of the world (<40 per 100,000 populations) [4-7]. Women older than 40 years of age are the most affected with breast cancer in the USA [8]. However, that is not true in developing countries where younger age are at risk for breast cancer resulting in a major health problem [4-9] self-examination, seeking medical advice early and early treatment remains the best method for decreasing death and spread of breast cancer [4-6,10].

After clinical examination radiological imaging techniques play a major role in diagnosis and follow up of proved cases this is based on Breast Imaging Reporting And Data System (BIRADS) that was used by radiologists to give a final impression about the breast lesion, BIRADS motive the surgeon and pathologist as well to work together with the radiologist as a multidisciplinary team to reduce mistake and improve communication with the patients and other medical doctors [11].

A BIRADS category V is where the concern for breast cancer risk is greater than 95% and where the breast cancer treating physician should take action [12-13].

Materials and Methods

Patients and methods

This was a retrospective study that enrolled 42 patients who complained of palpable breast mass referred from the surgical unit of early detection of breast cancer to the Radiology Unit in the Oncology Teaching Hospital, Medical City Complex, Baghdad during the period from May 2019 to August 2020. Their age was between 29 to 92 years.

All patients after clinical examination by a specialist surgeon were referred for breast ultrasound examination which was performed by a specialist radiologist using GE Voluson E6 machine (Korea). The scanning was performed using a 7-12 megahertz linear transducer. The ultrasound examination of the patients was performed by asking the patient to lie flat on the couch with both breasts completely exposed, arms above the head and the axillae were fully visible. The breast was assessed for any mass, its location, margin, echogenicity, and size, were documented, assessment of the axilla for suspicious lymph nodes; recording their shape, hilum, and cortical thickness was also documented.

The next step was FNAC which performed by a specialist cytologist using a 22 G needle either by palpation or under an ultrasound guide. Then aspiration was done, the sampled cells were prepared on the slide, immersed in an absolute alcohol jar, and then stained by Papanicolaou stain and examined cytologically for the presence of any atypical, or malignant cells.

Results

Forty-two patients presenting with breast lump were included in this study. Their ages ranged between 29 to 92 years (mean age 60 years).

The ultrasound findings of those 42 patients were as follow irregular lesion seen in the majority of cases (55%), an ill-defined lesion was documented in (26%), no mass seen in 2 cases which only revealed pathological lymph nodes, multifocal lesions within one breast seen in three cases. Pathological Lymph nodes are seen in 50% of the cases (details regarding the ultrasound findings are illustrated in Table 1).

	No. (Percent)
Mass	
Well defined	6 (14)
Poorly demarcated	11 (26)
Irregular	23 (55)
No mass	2 (4)
Multifocal lesions	3 (7)
Lymph nodes	21 (50)

Table 1. Ultrasound Findings of the Study Sample.

The Findings of FNAC cytology are shown in Table 2, Mammary carcinoma was the major finding in the cytopathological reports seen in 93%,the remaining 7% were documented as severe atypia.

Fine needle aspiration finding of breast mass	No.	%
Malignant cells	39	93
Severe atypia	3	7
Total	42	100

Table 2. Cytological Results of the Aspirated BIRAS IV.

BIRADS V was documented in 32 cases and BIRADS IV in 9 cases, one case score as BIRADS III, this is shown in Table 3.

BIRADS	No.	%
V	32	76
IV	9	21.50
III	1	2.50

Table 3. BIRADS Score in the Examined Sample.

When correlating the BIRADS score (summing BIRADS IV and V) with FNAC result, it shows the high sensitivity of ultrasound in the detection of malignant lesion reaching 97% with a high positive predictive value of 92.5% and overall accuracy of 90.5%, detailed information was given in Table 4 below.

	FNAC		Total
	Positive	Negative	
Ultrasound			
Positive	38	3	41
Negative	1	0	1
Total	39	3	42
Sensitivity		97%	
Specificity		0%	
Positive predictive value		92.60%	
Negative predictive value		0	
Accuracy		90.50%	

Table 4. Validity Test of Ultrasound in the Diagnosis of Mammary Cancer in Correlation with FNAC Results.

Discussion

When compared to the core needle biopsy, FNAC presents a quick, simple, easy, safe, and relatively cheap maneuver through which breast tumors could be easily diagnosed [14-15]. Fibrosis versus chest wall recurrence still a dilemma that can be solved using FNAC, as well as in the evaluation of the axilla for suspicious lymph nodes [16]. In Iraq, FNAC remains the leading choice for solving the suspicious lesion detected by breast ultrasound or mammography according to National guidelines for early detection of breast cancer [17]. however, the restriction of FNAC include difficulty in giving the precise histopathology of breast cancer as being ductal carcinoma in situ or invasive carcinoma, sometimes impossible differentiation between ductal and lobular carcinoma in poorly differentiated cases as well as the failure of providing hormonal receptors and HER2 status if the

aspirated samples are inadequate [18].

The accurate diagnosis demands the availability of efficient cytopathologists; professionals in aspiration and clarification of the findings and well-qualified technicians to ensure the preparation of quality smears [17]. In our study, there was a high concordance between the ultrasound diagnosis of the BIRADS category and the results of FNA. A confirmed cytological diagnosis of mammary carcinoma was observed in 75% of BIRADS V lesions and 21.5% of BIRADS IV labeled ultrasound reports, These figures are in line with those reported by Abdullateef Aliasghar Mustafa [19].

In our study, malignant cells were observed more in poorly demarcated and irregular lesions (26% and 55%) respectively and in 6% of well-circumscribed lesions and this is in agreement with a study done by Sudheer Gokhale [20].

In our study, the overall accuracy of ultrasound in the diagnosis of breast cancer was 90.5%, this was not in agreement with Mubuke Aloysius Gonzaga [21] which shows the accuracy of 57%, but in concordance with a study done by Augustina Badu-Peprah and Yaw Adu-Sarkodie [22] who show a sensitivity of 100%.

In conclusions, ultrasound is an efficient, relatively cost-effective tool and with excellent resolution for detecting suspicious breast lesions; utilizing no ionizing radiation, that it's considered as a first-line investigation in any patient coming with breast mass, especially when performed by professional personals and well-trained radiologists it yields a highly productive and a precise diagnosis.

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Author contribution

The author design the study, collect the sample, and write the article.

References

References

1. Mohson Khaleel. Ultrasound findings in prediction of breast cancer histological grade and HER2 status. *Journal of the Faculty of Medicine-Baghdad*. 2016; 58(1)[DOI](#)
2. Shrestha MK, Ghartimagar D, Ghosh A, Shrestha E, Bolar P. Significance of Quadruple assessment of breast lump-A hospital based study. *Journal of Pathology of Nepal*. 2014; 4(8)[DOI](#)
3. Lalchan S, Thapa M, Sharma P, Shrestha S, Subash K, Pathak M, et al. Role of Mammography Combined with Ultrasonography in Evaluation of Breast Lump. *American Journal of Public Health Research*. 2015; 3(5A):95-98.
4. International Agency for Research on Cancer (2013) Globocan 2012. *World Health Organization, IARC Press, Lyon, France*.
5. Mohson KI, Alwan NAS. Assessment of Nipple Discharge in Symptomatic Patients attending a Main Breast Cancer Center in Baghdad using Ultrasound and Cytology. *International Journal of Scientific and Research Publications*. 2016; 6:716-719.
6. Alwan Nada A.S.. Breast Cancer Among Iraqi Women: Preliminary Findings From a Regional Comparative Breast Cancer Research Project. *Journal of Global Oncology*. 2016; 2(5)[DOI](#)
7. Chairat Rungnapa, Puttisri Adisorn, Pamarapa Asani, Samintharapanya Sahatham,

Tawichasri Chamaiporn, Patumanond Jayanton. Are Both Ultrasonography and Mammography Necessary for Cancer Investigation of Breast Lumps in Resource-Limited Countries?. *ISRN Oncology*. 2013; 2013 [DOI](#)

8. American Cancer Society. *Breast Cancer Facts & Figures, 2015-2016, 2015*.
9. Bleyer Archie, Barr Ronald, Hayes-Lattin Brandon, Thomas David, Ellis Chad, Anderson Barry. The distinctive biology of cancer in adolescents and young adults. *Nature Reviews Cancer*. 2008; 8(4) [DOI](#)
10. Wolff AC, Domchek SM, Davidson NE, Sacchini V, McCormick B. Chapter 91: Cancer of the Breast. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology. 5th ed. Philadelphia, Pa: Elsevier; 2014*.
11. Obenauer S., Hermann K. P., Grabbe E.. Applications and literature review of the BI-RADS classification. *European Radiology*. 2005; 15(5) [DOI](#)
12. American College of Radiology. *Breast imaging reporting and data system (BI-RADS) 2nd ed. Reston, Va: American College of Radiology, 1995*.
13. Monticciolo Debra L., Caplan Lee S.. The American College of Radiology's BI-RADS 3 Classification in a Nationwide Screening Program: Current Assessment and Comparison with Earlier Use. *The Breast Journal*. 2004; 10(2) [DOI](#)
14. Masood S. Core needle biopsy versus fine-needle aspiration biopsy: Are there similar sampling and diagnostic issues?. *Breast J*. 2003; 9:145-146.
15. Vargas Hernan I., Masood Shahla. Implementation of a Minimally Invasive Breast Biopsy Program in Countries with Limited Resources. *The Breast Journal*. 2003; 9(s2) [DOI](#)
16. Nassar Aziza. Core needle biopsy versus fine needle aspiration biopsy in breast-A historical perspective and opportunities in the modern era. *Diagnostic Cytopathology*. 2010; 39(5) [DOI](#)
17. Al Alwan N. Establishing Guidelines for Early Detection of Breast Cancer in Iraq. *Int. J. of Advanced Research*. 2015; 3(12):555.
18. Tse Gary M., Tan Puay-Hoon. Diagnosing breast lesions by fine needle aspiration cytology or core biopsy: which is better?. *Breast Cancer Research and Treatment*. 2010; 123(1) [DOI](#)
19. Abdullateef Aliasghar Mustafa, BI-RADS 4 and 5 breast lesions: correlation between sonographic findings and histopathological results following ultrasound-guided FNAC, J Fac Med Baghdad. 2014; 56(2):1-9.
20. Gokhale Sudheer. Ultrasound characterization of breast masses. *Indian Journal of Radiology and Imaging*. 2009; 19(3) [DOI](#)
21. Mubuuke Aloysius Gonzaga, How accurate is ultrasound in evaluating palpable breast masses?. *Pan Afr Med J*. 2010; 7:1.
22. Augustina Badu-Peprah and Yaw Adu-Sarkodie, Accuracy of clinical diagnosis, mammography and ultrasonography in preoperative assessment of breast cancer, Ghana Med J. 2018; 52(3):133-139.