

# Concordance of Ultrasound and Fine Needle Aspiration Cytology Findings in BIRADS IV Breast Lesions

Mohson, Khaleel I<sup>1</sup>, Alwan, Nada A. S.<sup>2</sup>, Jinan Abdul Kareem<sup>3</sup>

<sup>1</sup>MB.ChB, DMRD, CABMS (Rad), Lecturer of Radiology, National Cancer Research Center, Baghdad University, Iraq, Baghdad

<sup>2</sup>MB.ChB, PhD (Pathology), Professor of Pathology, Director, National Cancer Research Center, Baghdad University, Iraq, Baghdad

<sup>3</sup>MBChB, DMRD (Radiology), Specialist Radiologist, Oncology Teaching Hospital, Medical City Complex

**Abstract:** ***Background:** Breast mass is a common presenting complaint in women attending any breast clinic. Approximately 10% of the lumps are often diagnosed as malignant. Accurate diagnosis in specialized breast centers depends on the Triple Assessment Technique which combines the findings of clinical examination, radiological analysis and fine needle aspiration cytology. **Aims:** The objective of the study was to evaluate the role of the ultrasound in the diagnosis of suspicious breast lesions classified according to BIRADS (Breast Imaging Reporting and Data System) as BIRADS IV; and correlate the findings with the results of fine needle aspiration cytology (FNAC). **Methods:** A retrospective study included 50 patients who complained of apparent breast lumps and attending the Training Center for Early Detection of Breast Tumors in the Oncology Teaching Hospital, Medical City Complex, Baghdad during the period from January 2017 to March 2018. Their age ranged from 24 to 77 years. Patients were subjected to ultrasound test after clinical examination and the findings of those cases diagnosed as BIRADS IV were correlated with the corresponding cytopathology results. **Results:** By reviewing breast ultrasound findings, masses were seen in 74%; of these 30% were poorly demarcated while 44% were well defined. Complex cysts were observed in five cases (10%) while axillary lymphadenopathy with lost or asymmetrical cortical thickening was noted in four cases (8%). FNAC revealed highly suspicious changes in 33 cases (66%); of these changes in favor of carcinoma was seen in 26%, while severe and moderate atypical cellular changes were observed in 40% and mild atypia in 18%. By correlating the ultrasound findings of BIRAS IV with FNAC results, breast carcinoma (11 cases, 22%) and moderate to severe atypia (20 cases, 40%) totally represented 62% of all detected lesions seen by ultrasound in this study. **Conclusion:** Ultrasonography remains a reliable diagnostic modality for breast lesions and a recommended tool for evaluation the underlying cause standing behind the suspicious breast mass. Its value was illustrated in localizing the mass lesion, assessing its size, consistency, the margin of the lesion and in defining suspicious axillary or supraclavicular lymph nodes.*

**Keywords:** breast ultrasound, BIRADS IV, fine needle aspiration cytology, Baghdad

## 1. Introduction

Breast lumps are focal abnormal bulge lesions that differ clinically and radiologically from nearby breast tissue [1]. It does not necessarily mean cancer as its can represent a symptom or sign for a different conditions.[2]. In all breast clinics; the breast lump remains the most presenting complaint that worries women and drive them to seek help.[3]. Breast cancer is progressively increasing in women worldwide [4,5] and remains the most commonly diagnosed malignancy among the general population in Iraq [6]. Nearly 10% of breast masses turn to be malignant urging vital management for women presenting with a breast lump; breast cancer being still the main causes of death amongst women suffering from cancer [1,4]. The incidence differs from region to region, being more in developed countries (>80 per 100,000 populations) than that in developing regions of the world (<40 per 100,000 populations)[4,7]. In the US it has been emphasized that women older than 40 years of age are the most victims of breast cancer [8]. Nevertheless, that is not the condition in developing countries where younger breast cancer patients form a major health burden [4,9] Early detection and treatment remains the best method for preventing death and dissemination of breast cancer from spreading..[4-6,10].

Focusing on the role of imaging techniques in the early detection of breast lesions, the benefit of BIRADS to radiologists lies in the fact that it forces them to think about which category their findings will fit into. BIRADS urges the surgeon and pathologist as well to collaborate with the radiologist as a multidisciplinary team to reduce confusion and improve communication with the patients and other physicians[11]

A BIRADS category IV is where the concern for breast cancer risk begins to increase and where the breast cancer physician recommends a biopsy; specifically when a lump is present, but does not initially appear to have the morphological characteristics of breast cancer[12]. In general, the American College of Radiology reported three sub-categories of BI-RADS IV: BIRADS IV A when there is a low suspicion of malignancy, BIRADS IV B when there is a moderate suspicion of malignancy and BIRADS IV C indicating a high suspicion of malignancy[13].

## 2. Patients & methods

This was a retrospective study that enrolled 50 patients who complained of apparent breast lumps referred to the Radiology Unit of the Training Center for Early Detection of Breast Tumors in the Oncology Teaching Hospital, Medical City Complex, Baghdad during the period from January

2017 to March 2018. They were in age group between 24 to 77 years.

All patients were subjected to clinical examination by a specialist surgeon and then referred for breast ultrasonography which was performed by specialist radiologists using General Electric machine. The scanning was performed using 6-12 megahertz linear transducer. The ultrasound examination of the Patients was performed by asking the patient to lie flat on the couch with both breasts in concern completely naked and the axilla was fully visible. The breast was assessed for any mass where its size, shape, margin and echogenicity was documented, that was followed by the assessment of the axilla searching for positive lymph nodes; recording their shape, hilum and cortical thickness was recorded.

After localizing the suspicious lesion by Ultrasound, the patient was referred for FNAC which was performed by specialized cytopathologists using either palpation or under ultrasound guide for the suspicious area. After aspiration, the sampled cells were stained by Papanicolaou and examined cytologically for any atypical, suspicious or malignant cells.

### 3. Results

Fifty patients presenting with breast mass were included in this study. Their ages ranged between 24 to 77 years (mean age 51 years). The age of the patients is shown in figures 1.

The ultrasound findings of those 50 patients were divided according to lesion outline. Well defined lesions were dominant in the collected sample and represented 22/50 (44%), while poorly demarcated lesions were noted in 15/50 (30%). Most of these lesions had irregular shape, few of them were well defined rounded or had lobulated margin. Cystic lesions were seen in five cases (10%). Only axillary lymph nodes with lost hilum or thick cortex were seen in 6% and 2% of the cases respectively.

Miscellaneous findings including peripheral ductal dilation were observed in three cases and architecture distortion was seen in one case.

Details regarding the ultrasound findings are illustrated in Table 1.

**Table 1:** Ultrasound findings of the study sample

		Percent
Mass	Well defined	22 (44%)
	Poorly demarcated	15 (30%)
Dilated ducts		3 (6%)
Cystic lesions		5 (10%)
Lymph nodes	Lost hilum	3 (6%)
	Thick cortex	1 (2%)
Architecture distortion		1 (2%)
Total		50

Findings of FNAC cytology are displayed in Table 2:

Inflammatory cell infiltration was observed in the 6 cases (12%). Nine cases (18%) of FNAC revealed mild atypia while 12 cases (24%) were diagnosed as moderate atypia. Severe

atypia and frank mammary carcinoma were recorded in 16% and 26% of cases respectively.

Fibrocystic findings were observed in 4%. FNAC findings are illustrated in Table 2 below.

**Table 2:** Cytological results of the aspirated BIRAS IV lesions

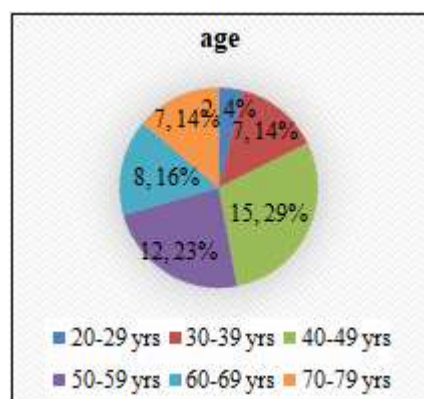
Fine needle aspiration finding of breast mass	No.	%
Inflammatory	6	12%
Malignant cells	13	26%
Dysplastic -atypia	Mild	9 (18%)
	Moderate	12 (24%)
	Severe	8 (16%)
Fibrocystic changes	2	4%

By correlating the ultrasound findings of BIRAS IV with FNAC results, breast carcinoma (11 cases, 22%) and moderate to severe atypia (20 cases, 40%) totally represented 62% of all BIRADS IV detected lesions seen by ultrasound in this study (Table 3).

**Table 3:** Correlation between Ultrasound Findings versus Cytopathology Results

	Ultrasound findings	Cytopathology Results				
		Malignant	Inflammatory	Atypia		
				Mild	Moderate	Severe
Mass	Well defined	6	1	5	10	5
	Poorly defined	5	3	0	2	3
Lymph nodes	Thick cortex	1	2	0	0	0
	Lost hilum	1	0	0	0	0

If we consider that moderate and severe atypical lesions by cytology are highly suspicious for malignancy while mild atypia is less likely to present malignant transformation, thus, mild atypia and inflammatory process could be regarded as false positive result for BIRADS IV ultrasound findings. Accordingly, the positive predictive value of ultrasound to detect suspicious BIRADS IV lesions was 75%.



**Figure 1:** Age Distribution of the Study Population.

Figure 1 shows that 4%, 7.1%, 15.3% were in the age groups (20-29 years), (30-39 years) and (40-49 years) respectively.

## 4. Discussion

When compared to the core needle biopsy, FNAC present a simple, quick, safe, easy and relatively cheap method through which breast tumors could be readily detected [14,15]. It has a major role in assessment of chest wall recurrence versus fibrosis and in the evaluation of the axilla for suspicious lymph nodes [16]. National guidelines for early detection of breast cancer has been established in Iraq illustrating that FNAC remains the first choice in evaluating any suspicious breast lesion detected by ultrasound or mammography [17]. Nevertheless, drawback for FNAC include difficulty in giving the precise histopathology of breast cancer as being ductal carcinoma in situ or invasive carcinoma, difficulty in differentiation ductal from lobular carcinoma in poorly differentiated cases and the problems faced with providing the hormonal receptors and HER2 status if the aspirated samples are inadequate [18]

The accurate diagnosis demands the availability of competent cytopathologists; skilled in aspiration and interpretation of the findings and well trained cyto-technicians to ensure the preparation of quality smears [17]. In our study there was high concordance between the ultrasound diagnosis of BIRADS category and the results of FNA. A confirmed cytological diagnosis of mammary carcinoma and severe -moderate atypical cellular changes were observed in 62% of all BIRADS IV detected lesions seen by ultrasound (22% and 40% respectively) while in Lymph nodes two suspicious cases were reported as carcinoma. These figures are in line with those reported by Orel SG et al [19]. Attention should be directed to the fact that most inflammatory masses are the cause of poorly demarcated lesions and thus reported as suspicious by ultrasound [20].

In our study malignant cells were observed in nearly equal proportions among well and poorly demarcated lesions, hence necessitating further assessment of other features if present including the presence of lost hilum lymph nodes or asymmetrical cortical thickening which enforce the decision to report the lesions as highly suspicious for cancer.

The positive predictive value of ultrasound in detection of BIRADS IV lesions was 75%. That was based on considering inflammatory, fibrocystic changes and mild atypia as false positive results assuming that FNAC could play as a gold standard for diagnosing specific breast lesions. Our positive predictive value can be increased to 84.6% by exclusion of the five cases reported as BIRADS IVa by ultrasound where their corresponding FNAC revealed inflammation in two cases, fibrocystic changes in another two and architecture distortion in the last. That was in concordance with results reported M. Torres-Tabanera et al [21].

## Conclusions

Ultrasound is a cost effective, efficient tool for detecting suspicious breast lesions; being free of ionizing radiation it is indicated as a first line investigation in any patient complaining of breast mass. It is considered the mainstay tool in diagnosing the cause behind breast lesions, especially

when performed by professional, well trained radiologists. Attention is requested to focus on the utilized ultrasound machine which should be of high resolution and well sophisticated. The collaborative roles of thorough history, proper clinical examination and competent cytology remain of utmost importance in yielding a high productive and precise diagnosis.

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