

## Diagnostic Accuracy of (FNAC) Biopsy in Palpable Mammary Lesions

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### Abstract

- Background** Fine Needle Aspiration Cytology (FNAC) has advantage of providing a diagnosis before the time of surgery; this situation enable the patient and surgeon to discuss and decide the type of surgery to be done and may obviate the need for a 2 stage procedure in surgical management of breast cancer.
- Objectives** To study the accuracy, sensitivity and specificity of FNAC of solid breast mass compared to histopathological examination.
- Methods** A retrospective study includes 126 female patients palpable solid breast mass aged 17 to 67 years with masses in the breast. FNAC and histopathological studies was done to all of them.
- Results** Fifty six patients had mass in the Rt. Breast and 70 (57.4%) had mass in the Lt. breast. 58 (47.5%) masses diagnosed as malignant (54 true-positive and 4 false negative) with diagnostic accuracy of 93% (54 of 58). Sixty four patients (52.5%) were diagnosed as benign (62 true-negative and 2 false positive) with diagnostic accuracy of 96.8% (62 of 64).
- Conclusions** FNAC is simple, quick and relatively low cost procedure, with minimal patient discomfort; it is helpful in reducing the number of breast biopsies done for benign breast disease. It can provide a diagnosis before the time that operation is performed and this may help to obviate the need for two stage procedure in surgical management of breast cancer.
- Keywords** Solid breast mass, FNAC, Histopathological examination.

### Introduction

Breast lump is the most common symptom associated with breast cancer; between 9% and 11% of breast lumps result in a diagnosis of breast cancer<sup>(1-3)</sup>.

The prevalence of breast cancer among women who present with a breast lump increases with age from 1% for women 40 years of age and younger to 9% for women between 41 and 55 years of age to 37% for women aged 55 years and older<sup>(2)</sup>. In Iraq breast cancer had remained the commonest malignancy of female accounting for 16% of all cancers in Iraqi patients with cancers and with a general trend toward an increase in younger age group<sup>(4,5)</sup>.

If a circumscribed non-calcified solid mass is palpable, the recommended management is usually to obtain a tissue diagnosis, even when, according to morphologic criteria, the mass is probably benign<sup>(6-9)</sup>. The rationale behind this recommendation is the absence of published data on the safety and efficacy of periodic imaging surveillance for palpable circumscribed non-calcified solid breast masses<sup>(10)</sup>. Although previous studies have shown the safety and efficacy of periodic imaging surveillance for non-palpable or palpable circumscribed non-calcified solid breast masses on sonography, but pathologic diagnoses were not obtained in all cases<sup>(11,12)</sup>. Moreover, follow-up of a palpable mass with benign morphology may be more risky

than follow-up of a non-palpable lesion. On the chance that the lesion is malignant, the risk for metastasis is higher, since palpable masses are usually larger than non-palpable lesions<sup>(13)</sup>.

The three main areas where Fine Needle Aspiration Cytology still plays a major role are the following: (a) diagnosis of benign disease in symptomatic palpable lumps as part of triple assessment; (b) staging of breast carcinoma, in particular preoperative axillary lymph node FNAC and intraoperative sentinel node imprints; and (c) diagnosis of metastatic disease at distant sites following treatment for carcinoma<sup>(14)</sup>.

Fine-needle aspiration biopsy uses a small-gauge needle (21- to 25-gauge) to obtain fluid and cellular material from a breast lump or suspicious area of breast texture. Samples are obtained from the entire lump or suspicious area by multiple passes with one puncture<sup>(15)</sup>.

In fact, Fine Needle Aspiration Cytology has advantage of provide a diagnosis before the time that operation is performed, this situation enable the patient and surgeon to discuss and decide the type of surgery to be done and may obviate the need for a 2 stage procedure in surgical management of breast cancer<sup>(16)</sup>.

Fine-needle aspiration cytology is a very useful test, relatively rapid and inexpensive, less invasive owing to finer needle size and is easier/safer in certain lesions, such as very small lesions, lesions just under the skin or very close to the chest wall<sup>(17,18)</sup>.

The aim of this study was to study the accuracy, sensitivity and specificity of Fine Needle Aspiration Cytology of solid breast mass compared to histopathological examination, and to study the distribution of breast masses according to the patient's age and site of involvement.

## Methods

This retrospective study was done between April 2007 and March 2010, the study included 126 patients with palpable solid breast mass.

All the patients were examined by a pathologist and a surgeon; they had palpable evidence of breast lump on clinical examination.

The patients were examined by U/S using a high-resolution sonography system (Sonoline Versa pro, Siemens Medical System) using a 7-10 MHz linear array transducer, US characteristics that were evaluated included: size of lump, margin (well defined or ill defined), shape (regular or irregular), consistency (whether solid or cystic), presence of calcification. Only those patients with solid breast masses were referred for Fine Needle Aspiration Cytology, patients with cystic masses were excluded from the study.

The Fine Needle Aspiration Cytology was done using fine needle (G 20 or 21). The aspirated material was spread on 2 slides and fixed in 90% alcohol, stained by Hematoxylin and Eosin (H and E) and examined under light microscope. Those aspirates that had yielded insufficient or inadequate materials for diagnosis were excluded from the study of surgical specimens mastectomy.

The final diagnosis of breast masses was confirmed by subsequent histopathological examination of the excised specimen. The type of surgery ranged between excisional biopsy for probable benign lesions and simple mastectomy with axillary sampling for probable malignant lesions.

All the aspirated and biopsy materials were examined in the laboratories of Al-Kadhimiya teaching hospital and some Private laboratories, Baghdad, Iraq.

Statistical analyses were done by using the program SPSS (version 14 for Microsoft Windows). Statistical significance was indicated by a value of less than 0.05.

## Results

The study population included 126 females with palpable solid breast mass. The mean age was 56 years (range, 17-67 years). 56 patients had mass in the Rt. Breast and 70 (57.4%) had mass in the Lt. breast.

Of 126 breast masses 58 (47.5%) diagnosed as malignant (54 true-positive and 4 false negative) with diagnostic accuracy of 93% (54 of 58). Sixty four patients (52.5%) were diagnosed as benign

(61 true-negative and 2 false positive) with diagnostic accuracy of 96.8% (62 of 64). The overall diagnostic accuracy of the procedure was 95% (116 of 126), sensitivity 93%, and

specificity 97.5%. Table (1) shows the final pathological diagnoses and results of FNAC.

**Table 1. Final pathological diagnoses and results of Fine Needle Aspiration Cytology**

	Final pathological Diagnosis	No.	Accurate diagnosis by FNAC	
			No.	Diagnostic accuracy
<b>Malignant lesions</b>	Invasive ductal carcinoma	50	48	93%
	Invasive lobular carcinoma	6	4	
	Ductal carcinoma in situ	2	2	
<b>Benign lesions</b>	Fibroadenoma	34	34	96.8%
	Fibrocystic disease	20	18	
	Duct ectasia	6	6	
	Fat necrosis	4	4	
<b>Total</b>		126	116	91%

The breast masses (both benign and malignant) were more common in the upper outer quadrant of the breast, followed by upper inner quadrant,

lower outer quadrant, central peri-areolar region lastly lower inner quadrant as shown in table 2.

**Table 2. The distribution of lump in relation to quadrant of the breast**

Site	Benign		Malignant		Total	
	No.	%	No.	%	No.	%
Upper outer	34	53.4%	32	55.2%	66	54%
Upper inner	16	25%	10	17.3%	26	21.3%
Lower outer	8	2.5%	8	13.8%	16	13.1%
Central	2	3.2%	6	10.3%	8	6.6%
Lower inner	4	6.2%	2	3.4%	6	5%

The mean age of patients with malignant masses was 45.5±0.8 years (mean ± SD) compared with 36.4±0.2 years in those with benign masses (P<0.01)

The peak incidence of malignant conditions was in the 6<sup>th</sup> decade of life, while the peak incidence of benign conditions was in the 3<sup>rd</sup> decade as shown in table 3.

**Table 3. The distribution of benign and malignant lesions of the breast in relation to age groups**

Age (years)	Benign		Malignant	
	No.	%	No.	%
10-19	4	6.3	-	-
20-29	34	53.1	-	-
30-39	14	21.8	6	10.3
40-49	8	12.5	16	27.6
50-59	4	6.3	34	58.6
60-69	-	-	2	3.4

## Discussion

Breast Cancer is the most frequent cancer in women worldwide with 1.05 million new cases every year and represents over 20% of all malignancies among females<sup>(19)</sup>. It is important to understand the relationship of histological type to etiology, and to allow separation of entities with distinct etiologies. Histology as a prognostic factor has been well documented. Patients with histology of Infiltrating duct carcinoma (IDC) have a poor survival compared to other types<sup>(3)</sup>.

There is controversy in the literature about the role of combining fine needle aspiration cytology (FNAC) and needle core biopsy (NCB) in the assessment of breast lesions. Some studies favor FNAC over NCB as a less expensive, faster, and more sensitive test<sup>(6,20)</sup>. Others criticize the use of FNAC as the only pathological diagnostic test, particularly the assessment of non homogenous micro calcification containing breast lesions<sup>(21)</sup>, as well as the inability of FNAC to distinguish invasive from in situ malignancy<sup>(17,22,23)</sup>. Some authors recommend combining the two techniques in selected cases<sup>(24)</sup>.

FNAC is an effective method of diagnosing carcinoma of the breast and can prevent unnecessary surgery for benign disease in women of any age without increasing the risk of missing cancer<sup>(25)</sup>. FNAC had many advantages over surgical biopsy, because it is simple, rapid, relatively painless (that is why it is accepted and tolerated by patient), it does not need local or general anesthesia, inexpensive and reliable method for diagnosis of breast mass<sup>(24)</sup>.

In order to achieve a zero false positive rate (100% specificity) in FNAC, however the pathologist must be conservative and refuse to diagnosis malignancy if there is the least bit of uncertainty<sup>(25)</sup>. Avoiding false positive must lead necessarily to an increase in uncertain diagnosis in women with breast cancer and this explains the decrease sensitivity.

In order to reduce false negative and suspicious diagnosis as much as possible and in order to get high accuracy of FNAC is limited by the skill of the surgeon in obtaining the specimen (ensure

that appropriate area is biopsied) and by the experience of cytopathologist in its interpretation<sup>(23)</sup>.

In compare result of FNAC to histopathological examination only four (3.2%) cases of 126 was found to be false negative on subsequent histopathological examination, its similar to result of other studies whereas the false negative rate between 0-4%<sup>(20,18)</sup>. Condition associated with false negative results, include small tumor size, fibrotic tumors, well differentiated tumors (because individual cell some time lack obvious malignant changes)<sup>(19-21)</sup>.

The false positive result was 2 patients (1.6%) which is comparable to a previously reported study (of surgical specimens mastectomy)<sup>(18)</sup>.

The distribution of the masses between left and right breast were unequal with increased incidence in the left side and this result match a previous study in which increase incidence of left sided cancer has been noted<sup>(17)</sup>.

Regarding the site of predilection of breast lump to the quadrant of the breast its similar to both benign and malignant lesions, most common quadrant affected was upper outer quadrant accounted 54%, which is similar to other studies<sup>(15)</sup>.

The mean age for benign lesions was 36.4 years while that of malignant was 45.5 years, which is lower than mean age of malignant tumors of the breast as reported<sup>(16)</sup>.

Our study showed an overall diagnostic accuracy of 95%, sensitivity 94%, and specificity 96% breast, which is similar to other studies<sup>(10,18)</sup>.

We conclude that FNAC is simple, quick, inexpensive and reliable method of establishing tissue diagnosis and the positive clinical and FNAC for malignancy may obviate the need for a two stage procedure in surgical management of breast cancer.

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