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EVALUATION OF CLINICAL, RADIOLOGICAL, AND FINE NEEDLE ASPIRATION OF BREAST LUMP IN IRAQI FEMALE PATIENTS SAMPLE

Prof. Dr. Alaa Ghani Hussein, M.B.CH.B., M.Sc., FICMS (Histopathology),
***Sara Habeeb Abdulhussein, M.B.CH.B.**

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***Corresponding Author**
Sara Habeeb Abdulhussein, M.B.CH.B.

ABSTRACT

Background: the female patients present with a variety of complaints in the breast like mastalgia, nipple discharge, cystic lesions, and more commonly a lump. One-fourth of women suffer from breast disease in their life time. **Aim of the study:** to evaluate the role of the triple assessment (a combination of clinical assessment, ultrasonic examination, and FNAC) in the diagnosis of breast lump and in correlation with histopathological diagnosis. **Materials and Methods:** A retrospective and prospective study include analysis of 40 conveniently selected female patients with breast lump collected from breast clinic in Al-Emamain Al- Kadhmain medical hospital (from 20 January to 13 Decemeber/ 2020). With inclusion criteria consisted of age group: (20 to 69 years), married females, with and without children. Exclusion criteria composed of females of pediatric group (age under 18 years) with breast lump and recurrent breast cancer. **Results:** the peak number of patients with breast lump in the 4th decade of life which represents 35% of cases. The mean age distribution was 44.5 year. The most common symptom was pain as was 75%. In the clinical examination 60% of lumps considered to be benign while 40% of patients were considered being malignant. Ultrasound examination revealed that 70% were negative for malignancy while 30% were positive for malignancy, in addition to FNAC revealed that 75% of female patients were negative for malignancy and 25 % were positive for malignancy. **Conclusion:** this study demonstrates that the combination of triple assessment (clinical, ultrasound, and FNAC) yield a high degree of sensitivity, specificity and accuracy.

KEYWORDS: clinical examination, ultrasonic examination, fine needle aspiration cytology and breast cancer.

INTRODUCTION

Breast lumps are very common, mainly among women of reproductive age. Over 25% of women are affected by breast lump in their lifespan. Breast lumps have a wide-ranging of causes, from physiological adenoid to highly aggressive malignancy.[1]

Though the majority of breast lumps present in adult women, children and men can also be affected. Actually, male breast cancer is a well-documented condition and needs a careful suspicion for its diagnosis and intervention.[2]

Although most of breast lumps are benign, a thorough and organized approach is required in all cases because breast cancer is the most common type of malignant tumor in women worldwide, with an incidence of approximately 12 %.[3]

The breast is a modified sweat gland that contains fibrous tissue, glandular tissue, and adipose tissue. Each breast has 15 to 20 lobes, which are drained by lactiferous ducts that converge under the nipple in the subareolar region. The lobes are supported by fibrous stroma and fatty stroma. Lymphatic drainage is mainly through the axillary lymph nodes, but can as well involve the pectoral, subscapular and internal mammary nodes.[4]

Breast tissue is present in children and males but is more developed in females of reproductive age due to hormonal surges that begins at puberty. Breast tissue involute significantly after menopause, the glandular tissue atrophies due to decreased circulating estrogen levels and are mainly replaced by fatty tissue.[4]

The most common cause of a new breast lump is a fibrocystic disease, particularly among premenopausal women between the ages of 35 and 50. Fibrocystic changes, including simple and complex cysts, fibrosis, adenosis, hyperplasia and apocrine metaplasia are very common, affecting more than 50% of women of reproductive age, and are usually asymptomatic.[5, 6]

According to the WHO, breast cancer is the leading cause of cancer-related deaths among women worldwide with an estimated lifetime risk of 12 %.[3]

In general, the approach should follow the triple-assessment pathway of clinical examination, radiological imaging, and fine needle aspiration cytology. Such an approach will be designated in this research, with examples throughout of the common breast pathologies that we found.[7]

MATERIALS AND METHODS

A retrospective and prospective study include analysis of 40 selected female patients with breast lump collected from breast clinic in Al- Emamain Al- Kadhmain medical hospital (from 20 January to 13 Decemeber/ 2020). Inclusion Criteria: age group: (20 to 69 years), married females with and without children and no previous family history of breast cancer. Exclusion Criteria: females of pediatric group (age under 18 years) with breast lump, recurrent breast cancer.

Instruments and Equipment used in this study were gloves and masks, disinfectant agent (spirit 75%), cotton wool 21 or 23 gauge needle attached to a 10 ml disposable syringe, glass slides, ultrasound unit (Philips HD 11 EX), microscope (Olympus CX 21i).

Ultrasound examination: done by hand hold equipment with 3MHZ probe the breast lump was classified as benign or malignant. The criteria for diagnosis of benign masses were (round, smooth, hyperechogenecity). The criteria for diagnosis malignant masses (irregular margins, posterior shadowing).

FNAC: the skin is cleaned with alcohol usually no local anesthesia is necessary. A21 G gauge needle attached to 10 ml disposable syringe was used. With one hand holding gauge and the other hand fixing the lump, the aspirator places the needle into the lump, applies suction, and moves the needle within the lump in a rotationary way and back and forth with negative pressure is applied. Negative pressure is then released slowly while the needle is in the lump and the needle is withdrawn. Aspirated material is expelled on glass slides and prepared in a manner similar to that for blood smears. Slides are air-dried and immediately wet-fixed in 95% ethyl alcohol for 20-30 min and stained using a modified papanicolaou method.

Statistical Analysis

The data were collected by following 40 patients retrospective and prospective, The data were entered through excel 2010 and then analyzed by using the statistical package for the social sciences version 20 the following analysis plan was used.

1. Frequency tables were used.
2. Mean % scores were used.
3. The parameters sensitivity, specificity, PPV, NPV, accuracy to evaluate the triple assessment (clinical, US, FNA).

1. Sensitivity: the ability to identify individuals who have a specific disease.

Sensitivity=TP/TP+FN *100. T=true, F=false, p=positive, N=negative

2. Specificity: the ability to identify individuals who don't have a specific disease.

Specificity=TN/TN+FP*100

3. PPV: the probability that a mass is CA when the result of the test is positive.

PPV=TP/TP+FP *100

4. NPV: the probability that mass is benign when the result of the test is negative.

NPV=TN/TN+FN

5. Accuracy: closeness of the measurements to a specific value.

Accuracy: TP+TN/TP+TN+FP+FN*100

6. Cronbach's Alpha Test: it is measure of reliability or internal consistency by determination close relation of a set of test items are as a group.

Cronbache's alpha	**Internal consistancy**
$\alpha \geq 0.9$	**Excellent**
$0.9 > \alpha \geq 0.8$	**Good**
$0.8 > \alpha \geq 0.7$	**Acceptable**
$0.7 > \alpha \geq 0.6$	**Questionable**
$0.6 > \alpha \geq 0.5$	**Poor**
$0.5 > \alpha$	**Unacceptable**

RESULTS: forty females patients with breast lump were evaluated in our study regarding physical examination, ultrasound examination and FNAC compared with histopathological examination.

Number of Patients and their Age Distribution: The patient's age ranged from 20 to 69 years old. The peak number of patients was the 4th decade of life which represents 35% of cases. While in the second decade was zero %. The mean age distribution was 44.5 year as shown in (Table 1) and (Figure 1).

Table (1): Number of Patients and Their Age Distribution.

Age Group	No. of Patients	Percentage
20-29	Zero	Zero
30-39	12	30%
40-49	14	35%
50-59	10	25%
60-69	4	10%
Total	40	100%

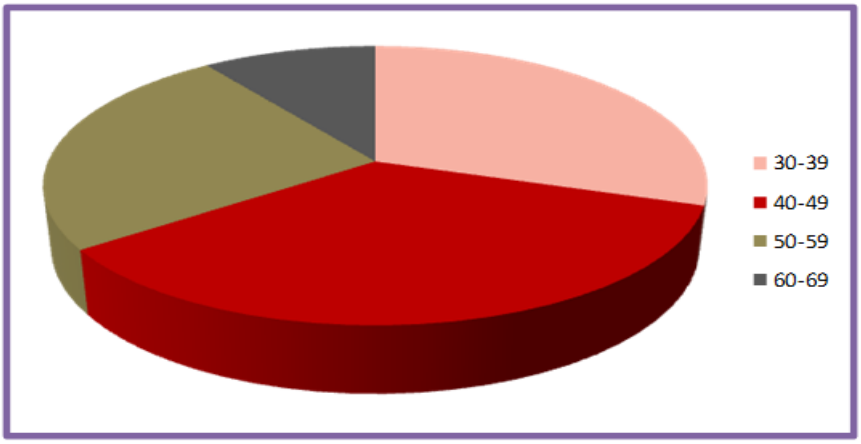

Figure 1: Number of Patients and Their Age Distribution.

Presenting symptoms and signs other than breast lump according to (symptoms and signs): the most common presenting complaint in all patients was a breast lump discovered by the patient herself either through self-examination or following trauma. The next most common symptom was pain as shown in this table 1 which was 75%. The least complaint was nipple discharge which was 15%. Patient's age are ranged from 20-69 years.

Table.2: Presenting symptoms and signs other than breast lump according to (symptoms and signs).

Presenting symptom/sign	No. of patients	mastitis	fibro adenoma	Fibrocystic disease	CA	Fat necrosis	Percent %
Pain	30	10	4	10	4	2	75%
		25%	10%	25%	10%	5%	
Nipple discharge	6	2	0	1	3	0	15%
		5%	0%	2.5%	7.5%	0%	
Skin changes	10	3	0	0	6	1	25%
		7.5%	0%	0%	15%	2.5%	
Palpable ALP	15	6	0	1	8	0	37.5%
		15%	0%	2.5%	20%	0%	
Nipple retraction	10	2	0	0	8	0	25%
		5%	0%	0%	20%	0%	

75% of patients are presented with pain, among those with pain 25% of them having mastitis, 10% having fibroadenoma, 25% having fibrocystic disease, 10% having cancer and 5% having fat necrosis. 15% of patients having nipple discharge, among those with nipple discharge 5% having mastitis, and 2.5% have fibrocystic disease and 7.5% having cancer. 25% of patients having skin changes, among those with skin changes 7.5% having mastitis, 15% having cancer, and 2.5% have fat necrosis. 37.5% having palpable ALP(axillary lymphadenopathy), 15% having mastitis, 2.5% having fibrocystic disease and 20% having cancer. 25% of patients have nipple retraction, 5% having mastitis, and 20% having cancer.

Clinical examination versus histopathological diagnosis: Clinical Evaluation whether the mass was benign or malignant was recorded for all patients. 60% of masses considered to be benign while 40% of patients were considered as having malignant masses in comparison to histopathology 80% of masses were recorded as benign while 20% of masses were recorded as malignant ones. As shown in (Table 3).

Table 3: Clinical evaluation vs. histopathological diagnosis.

Tool of assessment	No. of patients having benign condition	Percentage of benign conditions	No. of patients having cancer	Percentage of CA%
Clinical examination	24	60%	16	40%
Histopathology	32	80%	8	20%

Ultrasound Examination Versus Histopathological Examination: Ultrasound examination was done for all 40 female patients, 70% were negative for malignancy while 30% were positive for malignancy in comparison to histopathology 80% of masses were recorded as benign while 20% of masses were recorded as malignant ones. As shown in (Table 4).

Table 4: Ultrasound Examination vs. Histopathological Examination.

Tool of assessment	No. of patients having benign condition	Percentage of benign conditions	No. of patients having cancer	Percentage of CA%
US	28	70%	12	30%
Histopathology	32	80%	8	20%

FNAC Versus Histopathological Examination: FNA was done for all forty female patients. And the diagnosis reveals that the higher percentages 75%of female patients were negative for malignancy and 2 % were positive for malignancy in comparison to histopathology 80%

of masses were recorded as benign while 20% of masses were recorded as malignant ones. As shown in (Table 5).

Table 5: FNAC vs. histopathological examination.

Tool of assessment	No. of patients having benign condition	Percentage of benign conditions	No. of patients having cancer	Percentage of CA%
FNA	30	75%	10	25%
Histopathology	32	80%	8	20%

Histopathological examination: 10 patients have mastitis which represents 25%.10 patients have fibroadenoma which represents 25% and 10 patients have fibrocystic changes which represents also 25%. 2 patients have fat necrosis which represents 5%. 8 patients have cancer which represents 20%. As shown in (Table 6).

Table 6: Histopathological Examination.

Histopathological examination	No. of patients	Percentage
Mastitis	**10**	**25%**
Fibroadenoma	**10**	**25%**
Fibrocystic disease	**10**	**25%**
Fat necrosis	**2**	**5%**
Cancer	**8**	**20%**
Total	**40**	**100%**

Types of breast CA: 8 patients have CA; 6 of them have invasive ductal CA that represents 75%, whereas 1 patient has invasive lobular CA which represent 12.5% and same result for ductal CA in situas shown in(Table.7).

Table 7: Types of breast CA.

Types of CA	No. of patients	Percentage
Invasive ductal CA	**6**	**75%**
Invasive lobular CA	**1**	**12.5%**
Ductal CA in situ	**1**	**12.5%**
Total	**8**	**100%**

Evaluation of Clinical, Ultrasound, FNA Findings: The triple assessment s was applied to all 40 patients. On clinical evaluation 60% of the masses were considered as benign while 40% were considered to have malignant masses. On US examination 70% of patients were negative for malignancy, 30% positive for CA. On FNA 75% were negative for CA and 25 were positive for CA. On histopathology 80% of patients having benign conditions while 20% of patients having CA. All patients who had breast cancer were positive for malignancy

in one or more of the diagnostic test. As we see in table no.7 the sensitivity and specificity of US and FNAC are higher than that of clinical examination and all are lower than that of histopathology. The PPV and NPV of clinical examination is lower than that of US and FNAC and all are lower than that of histopathology. The accuracy of US and FNAC are higher than that of clinical examination and all are lower than that of histopathology. Cronbach's Alpha Test demonstrate good internal consistency among clinical, US and FNAC about 0.867 as shown in (Table 8).

Table 8: The values of some statistical parameters which were used to express the validity of clinical, ultrasound and FNA in diagnosing breast lump.

Statistical parameter	Clinical examination	US	FNAC
True +	5	6	7
False+	11	6	3
True -	21	26	29
False -	3	2	1
Sensitivity	62.5%	75%	87.5%
Specificity	65.6%	81.25%	90.6%
PPV	31.25%	50%	70%
NPV	87.5%	92.85%	96.6%
Accuracy	65%	80%	90%
Cronbach's Alpha Test (internal consistency)	0.867 (good internal consistency)		

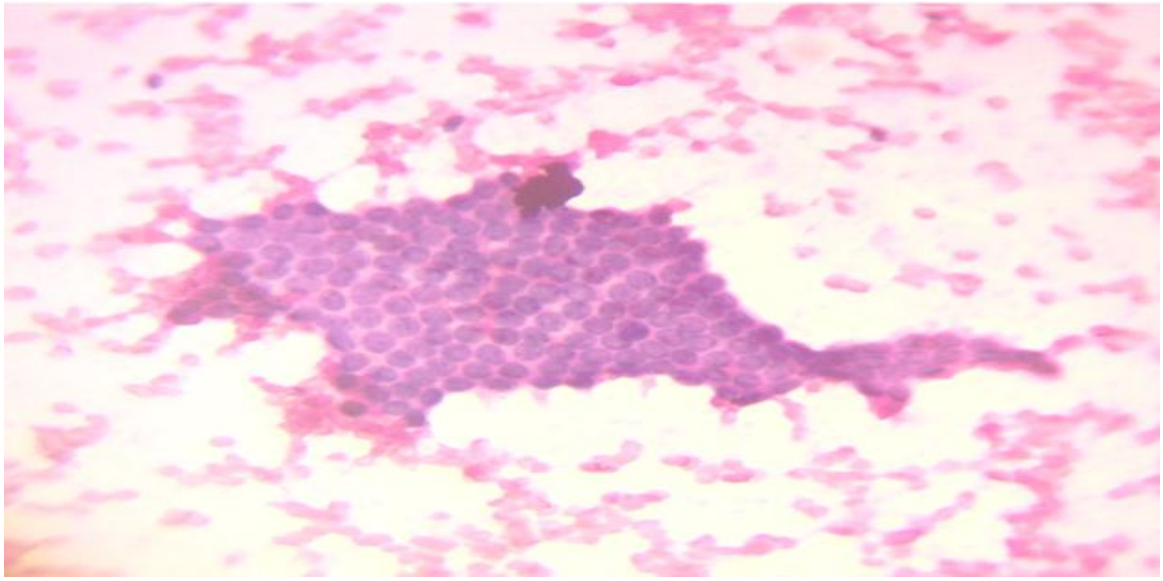

Figure 2: Fibroadenoma, tightly cohesive cluster of bland looking epithelial cells is an important clue for avoiding an over-diagnosis of malignancy (Pap, 10 x).

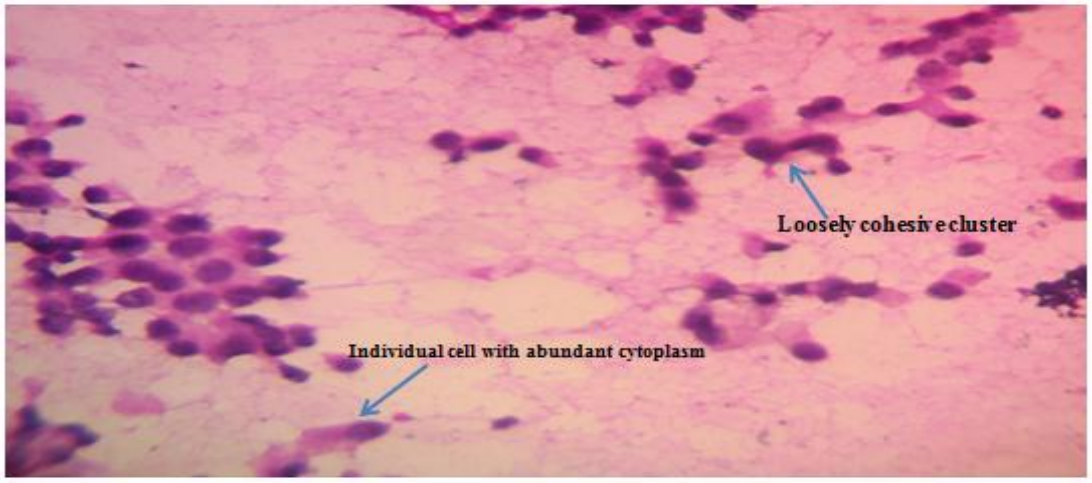

Figure 3: Breast CA, the cells are dispersed both as isolated cells and as loosely cohesive clusters (Pap,10x).

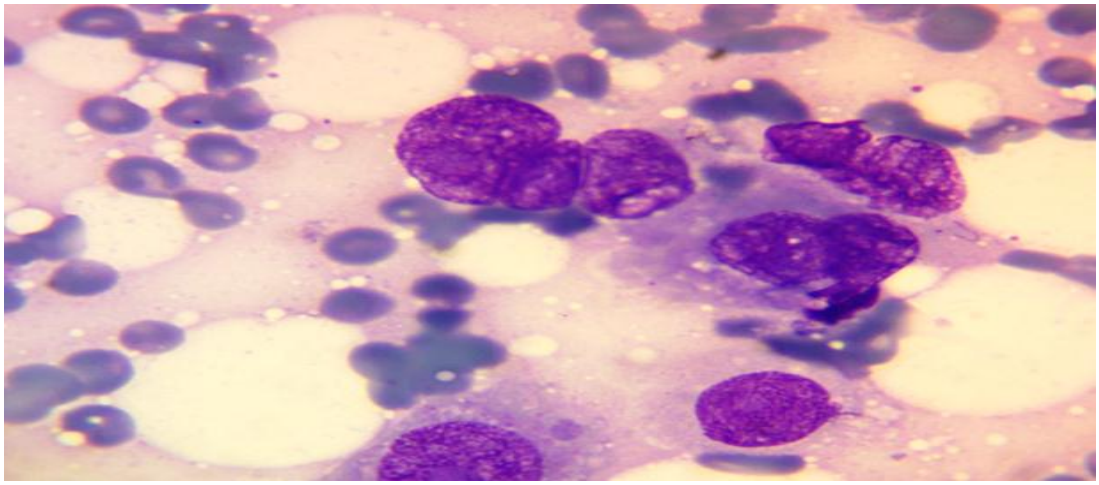

Figure 4. Breast CA, isolated cells with enlarged hyperchromatic nuclei (Pap, 100x).

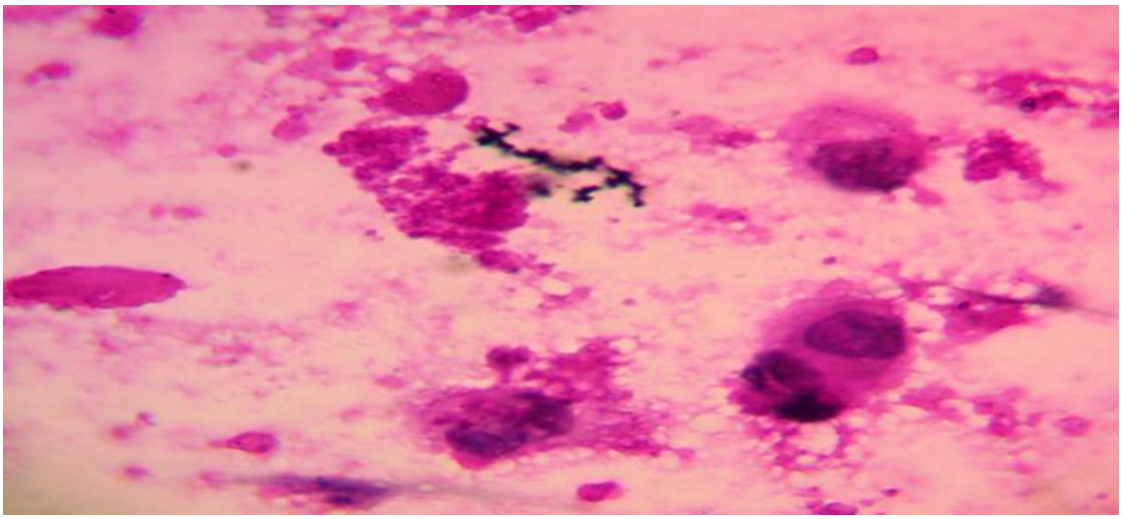

Figure 5: Breast CA, isolated cells with eccentric hyperchromatic nuclei (Pap, 100x).

DISCUSSION

Any technique to diagnose any breast lump should be simple, safe and accurate. FNA was recommended for diagnosis of breast lump because of its simplicity.[8] The current study evaluated that breast lump diagnosis with clinical assessment, US, and FNA examination and result were compared to the histopathological examination as a reference standard.

Number of Patients and their Age Distribution: The current study showed that the mammary lesions predominantly occurred in the 4th decade of life which was 35%, but **Saispandana et al. (2020)**[14] showed that the highest range was in the second decade of life (32%) this may be due to larger sample size. Mean age for malignant lesion is 48 years in our study which came in agreement with results of **Hussain (1997)**[10] and higher than another study of **Khoda etal.(2013)**[11] were the mean age for malignant lesion was 42.4 years, this may be due to large sample size in the study that took different ages. The mean age for benign lesion is 45.5 years which is higher than study done in Basra.[10]

Presenting symptoms and signs other than breast lump according (symptoms and signs): a number of patients with breast CA may have pain, although breast cancers are often painless[9], FNA is effective in distinguishing painful inflammatory masses from malignant ones. Pain in current study represent the higher percentage of sign and symptoms and is 75% and it is higher than study done in Basra[10] and study done UK by **Yue etal (2015)** [12] and this may be because of the female patients become more afraid of breast diseases; another cause may be in our study there were 32 patients have benign conditions and perhaps this is the cause for pain symptom to become higher than other symptoms. Least symptom was nipple discharge which was 15%.

Clinical Examination whether the breast mass is benign or malignant: In CBE (clinical breast examination) 60% of patients have benign conditions which is lower than the results of **Hussain (1997)**[10] which was 73% this may be due to larger sample size. 40% of patients in our study were diagnosed as having CA while in Basra were 21%. The results of **Karim etal. (2013)**[13] showed that CBE evaluate 40% patients with breast lesions were benign and 58% have CA.

Results of ultrasound examination: US in our study diagnoses that 70% of masses were benign and 30% were malignant while in another study [12] 76% were benign and 22% were

malignant. Similar results in study done in Basra [(10)] where benign conditions detected by US were 74% while malignant ones were 22%.

Results of FNAC: FNAC diagnoses breast lumps and it was 75% negative for malignancy and 25% positive for malignancy. The results are similar to study done in Basra[10] where FNA results were 72% negative for malignancy and 24% positive for malignancy. In another study FNAC results were 78% negative for malignancy and 22% positive for malignancy.[11]

Histopathological Examination: In our study according to histopathology we have 10 patients have mastitis, 10 have fibroadenoma, 10 have fibrocystic disease, 2 fat necrosis and 8 have CA. Fat necrosis represents 5% of cases which is higher than a study done in Basra (1.3%) of cases in which the smear shows adipocytes mixed with inflammatory cells.[10] Patients who have CA represent 20% of cases which is lower than a study done in Basra where the results were 24% this is because of early detection programs and breast clinic exam that increase the awareness of patients. While in study done in Basra[10] according to histopathology 9 patients have mastitis, 39 patients have fibrocystic disease, 4 have fibroadenoma, one patient have fat necrosis and 26 have CA.

Types of breast CA: invasive ductal CA has higher percentage among all breast CA which represents 75% from total no. of patient with CA.

Evaluation of clinical, ultrasound, FNA findings: FNA has the higher sensitivity, specificity, PPV, NPV and accuracy than clinical and US examination. For FNAC sensitivity was 87.5%, the specificity 90.6%, ppv70%, Npv 96.6% and accuracy 90 which is higher than US and CBE .The US sensitivity 75%, specificity81.25%, ppv50%, Npv92.85% and accuracy80 which is higher than CBE where the sensitivity 62.5%, specificity65.6%, ppv31. 25%, Npv87.5% and finally accuracy 65%. In study done in Basra the results where for FNAC sensitivity was 92%, the specificity 100%, ppv100%, Npv 97% and accuracy 98% which is higher than US and CBE. The US sensitivity 86%, specificity95%, ppv86%, Npv95% and accuracy93% and it is higher than CBE where the sensitivity 58%, specificity88%, ppv66%, Npv84% and finally accuracy 80%.[10] In another study[53], the FNAC sensitivity was 91.6 %, the specificity 100 %, ppv 100%, Npv 97.4% and accuracy 98 % which is higher than US and CBE.The US sensitivity 91.6%, specificity100%, ppv100%, Npv97.3% and accuracy97.9% and it is higher than CBE where the sensitivity 66.6%, specificity100%, ppv100%, Npv90% and finally accuracy 91.6%. Internal consistency test

explained good consistency among clinical, US and FNAC that means the application of triple assessment approaches in diagnosis of breast lesion is very effective, this came in disagreement with Hassan et al.(2014)[15] due to the later compared true- cut needle biopsy with FNAC in diagnosis of breast masses.

CONCLUSIONS

1. FNAC can augment clinical and US diagnosis and can clarify the nature of suspicious lesions found on clinical examination or US.
2. Features on FNAC that separates benign from malignant lesions, where benign lesions characterized by: tightly cohesive cells clusters, presence of bare or naked nuclie, and absence of individual cells with abundant cytoplasm; whereas malignant lesions summarized by: loosely cohesive cluster or individual cells with abundant cytoplasm, high nuclear to cytoplasmic ratio, and absence of bare nuclie..

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