



# Reliability of fine needle aspiration biopsy in diagnosis of breast lump

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## ABSTRACT

**Background:** breast cancer is commonest cancer globally and the 1st cancer in Iraq among females, its management and prognosis depend on early diagnosis, the traditional method was excisional biopsy which is expensive and invasive leading to delayed diagnosis, FNAB is cheap nom invasive more acceptable to women, **Aim of the study:** to test the reliability of FNAB in preoperative diagnosis of breast lump.

**Methodology:** This is a retrospective study of 204 cases, 102 breast cancer cases and 102 benign breast lesions, taken between Jan. 2017 – Nov. 2017. The sample taken from the breast cancer early detection center in Al-Alwiya maternity teaching hospital, during the year 2017

**Results:** Invasive ductal carcinoma (IDC) was found among 82(80.4%) of malignant cases, ILC was 14(13.7%) , fibroadenoma was the most common benign lesions 51(50%), The absolute sensitivity was 96% , specificity 100%, with 4% false negative the accuracy was 98%. The complete sensitivity was 96%, and specificity was

83%, with 4% false negative and 17% false positive cases, the accuracy was 90%,

**Conclusion and recommendation:** fine-needle aspiration biopsy (FNAB) is accurate for breast lump diagnosis. With high sensitivity and specificity. FNAB is a good screening method and help in an improvement of treatment planning

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## INTRODUCTIONS

Breast cancer is commonest cancer among women, comprising about 23% of the newly diagnosed cancers among females<sup>1,2</sup>. According to National Cancer Institute statistics in America, one out of eight women suffers from breast cancer and 6 % of all deaths worldwide are caused by this type of cancer<sup>3</sup>. In Iran, In 2005, standardized incidence rate of breast cancer was 23.56 in females<sup>4</sup>. In Iraq the crud incidence rate of breast cancer was 11.53 per 100000, and female incidence rate was 23.01per 100000, accounting about 34% of all reported cancer among females<sup>5</sup>.

Breast cancer survival rates tend to be poorer in developing countries, most likely because of a combination of late diagnosis and limited access to timely and appropriate treatment<sup>6</sup>.

Palpable breast mass is a common problem in female patients. The diagnostic delays of breast cancer occur due to the generally low index of suspicion. The traditional diagnosis mode of breast mass is excisional biopsy, which gives a precise diagnosis but may yield a benign pathological result in most cases. Fine-needle aspiration biopsy (FNAB) of the

breast is a minimally invasive diagnostic method, often obviating an open biopsy<sup>7</sup>.

Using the ultrasound guided method, FNAB has been used more widely for non-palpable breast tumors<sup>8,9</sup>.

Although core biopsy is preferred to FNAB in most developed countries, its procedure is more expensive and time consuming as compared to FNAB<sup>10</sup>

However, the clinical use of FNAB has been questioned because of the variability in results reported<sup>11</sup>

In addition, It is also possible that no cells are harvested making cytological analysis impossible. Many institutes in the United Kingdom, the United States and Canada have now abandoned FNA for diagnosis of breast lesions. Nevertheless, it continues to be used in other institutes in these countries, as well as in Greece, Italy, Australia and Japan, and in developing countries such as India, Pakistan, Nigeria, Mexico and Thailand.

This study was conducted to evaluate the sensitivity and specificity , and accuracy of FNA in the diagnosis of breast tumors.

## METHODS

This is a retrospective study of 204 cases, 102 breast cancer cases and 102 benign breast lesions, taken between Jan-Nov. 2017. The sample taken from the breast cancer early detection center in Al-Alwiya maternity teaching hospital, during the year 2017 the center received about 13573 patient, 145 was cancer cases, and 810 cases of benign breast lump, and the others had complaining other than breast lump. Selected women with breast lump that had, FNA and histological examination of the excised lump was included, and those without histological examination were excluded from the study.

FNA Aspiration cytology done by a 21/22 gauge needle and 10ml syringe, a multiple passes through the lump in all directions with negative pressure in the syringe. Aspirated material is spread on a glass slide, dried and fixed with 95% alcohol, stained with hematoxylin and eosin before being studied by a cytopathologist.

The outcomes of FNA were reported using the standard National health services breast cancer screening program of the UK (NHSBSP) criteria, C1 = unsatisfactory, C2 = benign, C3 = atypical probably benign,

C4= suspicious of malignancy, C5= malignant. Sensitivity of FNAC were calculated in two ways (Britton, 1999)<sup>12</sup>: absolute sensitivity included only C5 results and complete sensitivity included C3, C4 and C5.

Statistical analysis and data management: The Statistical Package for Social Sciences (SPSS, version 18) was used for data entry and analysis. Chi ( $\chi^2$ ) square test, and t-test was used to compare means and proportions of different factors among different groups of study sample. P value of  $\leq 0.05$  was regarded as statistically significant. Bar charts and tables used to present the data

## RESULTS

The total patient in Al-Alwiya cancer early detection center was 13573, with 145 breast cancer cases.

About 204 patient was included in the study 102 malignant cases and 102 benign cases. The mean age was  $50.66 \pm 12.2$  year for malignant cases versus  $33.7 \pm 12.4$  for benign cases, this relation was statistically significant,  $P < 0.05$ , as shown in figure 1.

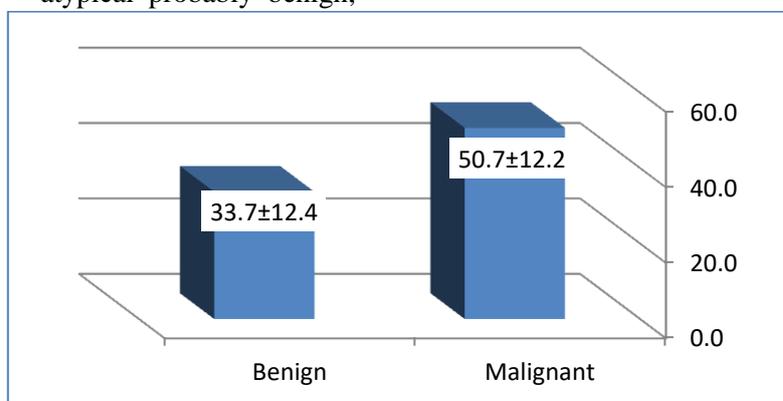


Figure 1 The mean age of study groups

The age distribution of cases show that all of patients aged  $>70$  years 10(100%) was malignant, followed by 60-69 years 11(78.6%). The malignant tumor also presented at earlier age group 20-29 years 2(5%) and 30-39 years 16(38.1%), this relation was statistically significant as shown in table 1

Table 1 the age distribution of study groups

Age	study groups		Total
	Malignant	benign	
10-19years	0 0.0%	8 100.0%	8 100.0%
20-29 years	2 5.0%	38 95.0%	40 100.0%
30-39 years	16 38.1%	26 61.9%	42 100.0%
40-49 years	32 68.1%	15 31.9%	47 100.0%
50-59 years	31 72.1%	12 27.9%	43 100.0%
60-69 years	11 78.6%	3 21.4%	14 100.0%
> 70 years	10 100.0%	0 0.0%	10 100.0%
Total	102 50.0%	102 50.0%	204 100.0%

$\chi^2 = 71.96$ ,  $P < 0.05$

Table 2 show the clinical stage s of malignant cases, about 35(34.3%) diagnosed at stage 2A and 19(18.6%) was diagnosed at stages 2B, only 1 case (1%) was ductal carcinoma insitu ( DCIS) , as shown in table 2.

Table 2 The clinical stage of breast cancer cases at diagnosis

Clinical stage	Frequency	Percent
.00	2	2.0
1a	10	9.8
1b	7	6.9
1c	1	1.0
2a	35	34.3
2b	19	18.6
3a	12	11.8
3b	14	13.7
3c	1	1.0
4a	1	1.0
Total	102	100.0

Invasive ductal carcinoma (IDC) was found among 82(80.4%) of malignant cases, ILC was 14(13.7%) , fibroadenoma was the most common benign lesions 51(50%) followed by fibrocystic 24(23.5%), as shown in table 3 and 4.

Table 3 The histological types of diagnosed benign breast diseases

Histological type	Frequency	Percent
Fibroadenoma	51	50
Fibrocystic disease	24	23.5
Mastitis	12	11.8
Fat necrosis	7	6.9
Lipoma	1	1
Ductectasia	3	2.9
Intraductal papiloma	4	3.9
Total	102	100

Table 4 The histological types of diagnosed malignant breast diseases

Histological type	Frequency	Percent
Invasive ductal carcinoma (IDC)	82	80.4
Invasive lobular carcinoma (ILC)	14	13.7
Ductal carcinoma in situ (DCIS)	2	2
Metaplastic ca	2	2
Sarcoma	1	1
Phylloids tumor	1	1
Total	102	100

Most of the malignant cases was found in the right site 54(52.9%) versus the benign found in the left 54(52.9%), this relation was statistically not significant, as shown in table 5.

Table 5 The distribution of the breast lesion according to the site

site of lesion	histology result		Total
	Malignant	Benign	
Right	54	48	102
	52.9%	47.1%	50.0%
Left	47	54	101
	46.1%	52.9%	49.5%
Bilateral	1	0	1
	1.0%	.0%	.5%
Total	102	102	204
	100.0%	100.0%	100.0%

$\chi^2 = 1.838$ ,  $P > 0.05$  not significant

About 89(87.3%) of malignant cases diagnosed by the FNA as malignant , and 85(83.3%) of benign diagnosed as benign, with 4 (3.9%) of false negative diagnosis, this relation was statistically significant as shown in table 6.

(Table 6) the histological and FNA results of breast lump

FNA	histology result		Total
	Malignant	Benign	
Malignant	89 87.3%	0 .0%	88 43.1%
Suspicious of malignancy	5 4.9%	6 5.9%	11 5.4%
Atypical probably benign	4 3.9%	11 10.8%	16 7.8%
benign	4 3.9%	85 83.3%	89 43.6%
Total	102 100.0%	102 100.0%	204 100.0%

$\chi^2=166.06$ ,  $P<0.05$

The absolute sensitivity was calculated by considering only those diagnosed as benign and malignant by the FNA, the sensitivity was 96% , specificity 100%, with 4% false negative the accuracy was 98%, as shown in table 7.

(Table 7) The absolute and complete sensitivity and specify of FNA

Test	Disease		Sensitivity	Specify	False +ve	False -ve	accuracy	PP V	NP V
	+ve	-ve							
+ve	89	0	96	100	0	4	98	100	95.5
-ve	4	85							
Total	93	85							

## DISCUSSION

For a good therapeutic management , we in need for rapid, in expensive , and non invasive test, FNA is the test of choice for this purpose because of the 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 compared with CB. In addition, FNAC maintains tactile sensitivity, allows multidirectional passes allowing a broader sampling of the lesion and immediate reporting where necessary. However, it is less reliable at differentiating invasive cancer from DCIS, may be limited in some cases in the assessment of tumor grade and prognostic.

The mean age of breast cancer cases was  $50.7 \pm 12.2$  year, this was near of what found in Iraq 2015 by Molah SA<sup>13</sup>, among Kurdish Iraqi women et al  $49.4 \pm 11.66$  years.no cases was reported below 24 years this also come in concordance with Molah SA<sup>13</sup>

The age distribution of malignant cases show that most of cases 39(38.2%) was aged 45-54 years, followed by 55-64 years 24(23.5%) ,this result was also found by Alwan N<sup>14</sup> in Iraq 2010,the peak age at 40-49 years followed by 50-59years, the pattern of progressive increase in cancer incidence after age of 30 years also documented in Egypt and china<sup>15</sup>, 2014, with peak at the age group of 55-59 years , 60-64 years in china and Egypt, respectively., our result was in clear contradistinction with western

countries<sup>16,17,18</sup>, where a continuous rise in BC incidence is observed with increasing age, to reach a peak of at the age 80 years. This pattern certainly challenge the rule of “increasing breast cancer risk with increasing age”, which might not be a default hypothesis, when it comes to North African and East Asian women<sup>15</sup>.

About 89(87.3%) of malignant cases diagnosed by the FNA as malignant, with 4 (3.9%) of false negative diagnosis, all of them was done outside the center, this is lower than what found by Anwar M R et al<sup>19</sup>, 100% of the malignant cases diagnosed as malignant by FNA.

85(83.3%) of benign diagnosed as benign, 17(16.7%) were suspicious, this was higher than what found by Anwar M R et al<sup>19</sup>, 40(80%) of benign diagnosed as benign and 10(20%) as unsatisfactory or suspicious

The absolute sensitivity was 96%, was higher than what found by Hussain ET al<sup>20</sup> and Dennison<sup>21</sup>, and Lieske B<sup>22</sup> 90.9%, 90.4%, 65% respectively, and lower than Anwar M R et al<sup>19</sup> 100%

The absolute specificity 100%, concordance with Anwar M R et al<sup>19</sup> 100, with 4% false negative the accuracy was 98%, the PPV was 100%, NPV 96%.

The positive and negative predictive value of a test is the ones which measure the performance of a and reflects its diagnostic power. They depend upon the sensitivity, specificity and disease prevalence. In this study the PPV was 100%, and NPV was 96%. This is near of what found by Anwar M R et al<sup>19</sup> 100%, Florentine et al<sup>23</sup>, reported positive predictive value of 100% and a negative predictive value of 92%, Choi et al<sup>24</sup> 98.4%, 88% respectively. and Shastri R K<sup>25</sup>, which found that the PPV 100%, and NPV 80%.

The FNA is a good test for pre-operative decision, but tru-cut always provides a better histological diagnosis and is more accurate and more trusted.

FNA results influenced by of needle maneuvers performed with less than ten needle maneuvers being associated with a 54% unsatisfactory aspiration rate, as compared to 25% when more than ten maneuvers were performed, training and

experience in aspiration cytology of the breast with a maximum influence on sensitivity values which dropped sharply from 98.2% to 75% with an untrained person performing the aspiration<sup>26,27</sup>.

## CONCLUSION

Fine-needle aspiration biopsy (FNAB) is an accurate biopsy for evaluating breast malignancy if rigorous criteria are used. With high sensitivity and specificity, most benign and malignant breast lesions can be reliably diagnosed by FNAB. FNAB is a favorable screening method and help in an improvement of treatment planning. But, all cases with results of atypical hyperplasia, and suspicious malignancy should have tru-cut biopsy.

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