

# Reliability of Fine Needle Aspiration Cytology in Patients with Palpable Breast Lumps

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## ABSTRACT

**Aim:** To evaluate the diagnostic accuracy of fine needle aspiration cytology [FNAC] in patients with palpable breast lump by taking histopathology as a gold standard.

**Study design:** - Cross sectional study.

**Setting:**-Department of General Surgery, Nishtar Hospital, Multan.

**Duration:** Six months from 18<sup>th</sup> April 2008 to 17<sup>th</sup> October 2008.

**Material and methods:** All female patients between 30-55 years of age who presented with breast lump of recent onset who fulfill the inclusion exclusion criteria were admitted. A total of 74 female patients were included in the study.

**Results:** - Most of the 40 ( ) patients were seen in the age group of 41-50 years. According to FNAC analysis, conclusive diagnosis of malignancy was made in 24 patients, while 40 lesions were labeled as benign. Pathologists were unable to commit a diagnosis in 10 lesions. Histopathology reports showed that 50 lesions out of 74 were benign as 24 were malignant. Out of benign lesions 22 were Fibroadenoma, 18 were fibrocystic disease, 8 were chronic pyogenic mastitis and two cases of tuberculosis was diagnosed. In 24 malignant cases, there were 13 cases of invasive ductal carcinoma and 11 cases of intraductal carcinoma.

**Conclusion:** FNAC is a patient friendly, easy, reliable, repeatable and simple diagnostic test. When performed by an expert pathologist, the diagnostic accuracy of FNAC is very high.

**Keywords:**-Fine-needle aspiration cytology, fibroadenoma, pyogenic mastitis.

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## INTRODUCTION

Breast lump is a common surgical problem in females. In Pakistan, the commonest pathology encountered in cases of lump breast was Fibroadenoma (25%), followed by fibrocystic disease (22%), carcinoma (18.7%), inflammatory lesions (18%) gynaecomastia (11.2%) and miscellaneous conditions (5.1%)<sup>1</sup>. Breast cancer is the most common malignancy in women, comprising 30% of all cancers in women<sup>2</sup>. The incidence of breast cancer is increasing in most populations<sup>3</sup>. In developing countries breast cancer accounts for 1-3% of deaths<sup>4</sup>. In Pakistan breast cancer is ranking number one cancer in females<sup>5</sup>.

Surgical biopsy of palpable breast lump was considered the gold standard for the diagnosis of breast lump(s). Emphasis has been placed on improving method for establishing a definitive diagnosis of breast mass prior to surgery<sup>6</sup>. Different Fine needle aspiration cytology (FNAC) is now the most popular, single modality for diagnosing different

breast lumps<sup>7</sup>. The absence of false positive conclusively confirms its place not only as a complimentary adjunct but also a substitute of excision biopsy in majority of instances<sup>8</sup>. It is relatively inexpensive and can be performed either freehand or with image guidance (ultrasound or stereotactic)<sup>9</sup>. It can be carried out safely as a preoperative diagnostic method in patients with breast lumps mostly in outpatient department.

As breast lump is a common and serious problem, we conducted a study to measure the reliability of FNAC in palpable breast lumps by comparing its result with gold standard open biopsy/histopathology in our setting and obtain local data to assess its effectiveness.

## MATERIAL AND METHODS

This Cross sectional, non-probability, purposive study was conducted in the Department of General Surgery, Nishtar Hospital, Multan on 74 patients for a period of six months from 18<sup>th</sup> April 2008 to 17<sup>th</sup> October 2008. All female patients, between 30 to 55 years of age, presented with breast lump of recent onset (i.e., within the past one month), were included in the study. All the male patients with breast lump, with breast abscess and lactating mothers were excluded from the study.

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**Data collection procedure:** A specialized Performa was designed to record the findings. Permission from the Institute Ethical Committee was obtained. Informed consent from the patients was taken ensuring confidentiality, describing procedures and facts that no risk for patients in this study was involved. All female patients having breast lump, fulfilling the inclusion criteria presenting in outpatient department were admitted in the ward. All the patients were sent for FNAC to cytopathologist in Nistar Hospital. FNAC was labeled as positive if it confirms the presence of malignant cells. Histopathology findings were independently assessed irrespective of FNAC findings. Later on FNAC sensitivity, specificity, positive predictive value and negative predictive value were calculated in comparison to histopathology findings.

The data were analyzed using computer program SPSS-10. Descriptive statistics was applied to calculate mean and standard deviation for age and duration of presenting complain. Sensitivity and specificity was calculated using following formula:-

$$\text{Sensitivity} = \frac{TP}{TP+FN} \times 100$$

$$\text{Specificity} = \frac{TN}{TN+FP} \times 100$$

Positive predictive value and negative predictive value were calculated using following formula:-

$$\text{Positive predictive value} = \frac{TP}{TP + FP}$$

$$\text{Negative predictive value} = \frac{TN}{TN + FN}$$

[TP= true positive, TN= true negative, FP=false positive, FN= false negative]

## RESULTS

Results of FNAC were recorded accordingly with C2 confirm benign and C5 confirm malignant. Most of the 40 (54%) patients were seen in the age group of 41-50 years. Descriptive analysis for age and duration of presenting complaint was done. Minimum duration was 8 days while maximum was 30 days. Mean of duration of presenting complain was 20.88 with std. deviation of 6.14.

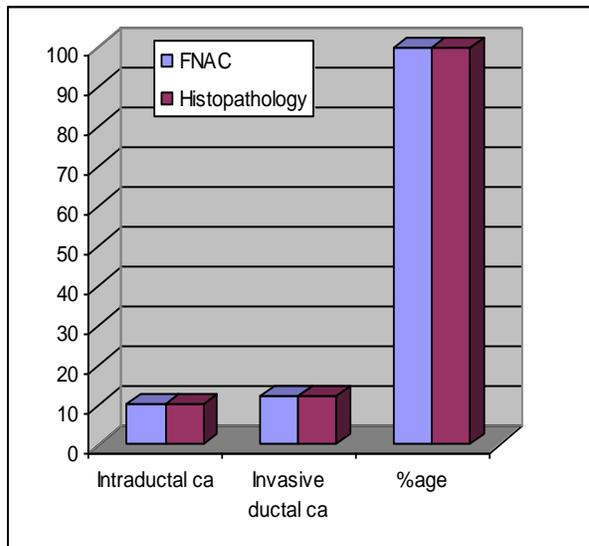
According to FNAC analysis, conclusive diagnosis of malignancy was made in 24 patients, While 40 lesions were labeled as benign. Diagnosis in 10 lesions was not confirmed and advised trucut biopsy or excisional biopsy. These smears were categorized as unsatisfactory.

Histopathology reports showed that 50 lesions out of 74 were benign as 24 were malignant. Out of benign lesions 22 were Fibroadenoma, 18 were fibrocystic disease, 8 were chronic pyogenic mastitis and two cases of tuberculosis was diagnosed. In 24 malignant cases, there were 11 cases of invasive ductal carcinoma and 13 cases of intraductal carcinoma.

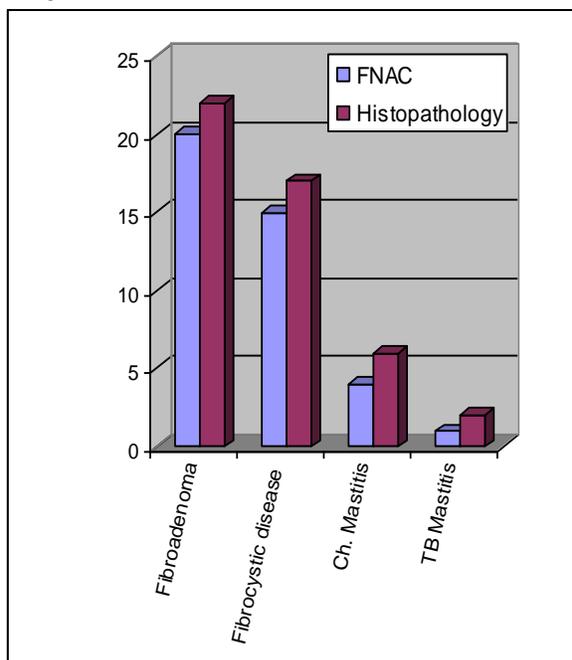
Histopathological diagnosis (n=74)

Diagnosis	=n	%age
Benign	50	67.6
Fibroadenoma	22	44
Fibrocystic disease	18	36
Ch-pyogenic mastitis	08	16
Tuberculosis	02	04
Malignant	24	32.4
Intraductal carcinoma	11	45.83
Invasive ductal carcinoma	13	54.16

Comparison of FNAC with histopathology for diagnosis of breast malignancies



Comparison of FNAC and histopathology for diagnosis of benign breast diseases

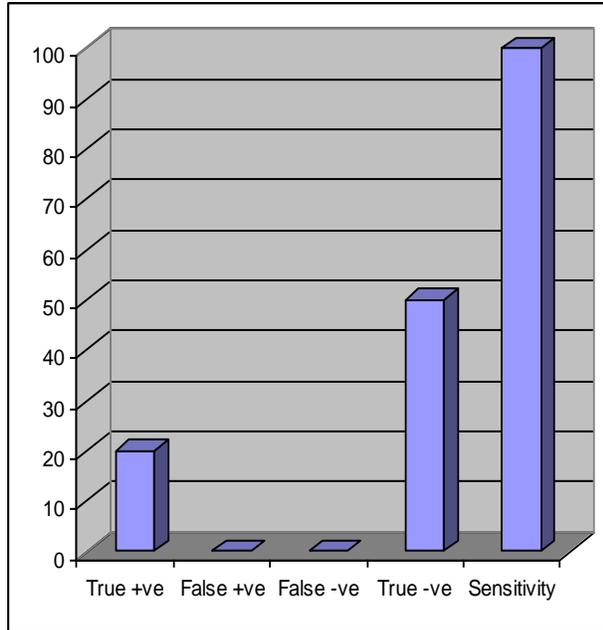


Positive predictive value and negative predictive value of benign lumps

Positive predictive value (PPV) =100

Negative predictive value (NPV)=71%

Sensitivity of FNAC for malignant lumps



Positive predictive value and negative predictive value of malignant lumps

Positive predictive value (PPV) =100

Negative predictive value (NPV) = 100

## DICUSSION

In present study, 74 patients were included. FNA detected 24 out of 24 malignant tumors (100%). Out of these 24 malignant tumors, 13 were invasive ductal carcinoma and 11 were intraductal carcinoma and there was no false positive result and FNAC accuracy was 100%.

In this study the analysis of cytological reports have shown that for most of the lesions, the pathologist could make a correct diagnosis except for the lesions with acellular smear. Lowest rate of diagnosis was observed in chronic pyogenic mastitis. Pathologists were reluctant to commit a diagnosis of chronic mastitis in two cases and requested for open biopsy.

For 50 lesions labeled as benign by histopathology, FNA diagnose 40 (80%) lesions while 10 (20%) were labeled unsatisfactory for diagnosis.

Among these 40 cases FNAC could diagnose 20 Fibro adenoma, fibrocystic disease in 15, chronic pyogenic mastitis in 4 and tuberculous mastitis in 1.

The analysis of various analytical data regarding the efficacy and reliability of FNAC has shown a

sensitivity of 100%, specificity of 100% diagnostic accuracy of 83.3%, false positive rate of 0% and false negative rate of 0%. These results are more or less similar with other such studies comparing FNAC with histopathology. While the value of sensitivity of FNAC for malignant lumps in our study was 100%, an absolute value of 90.9% was obtained by the series by Hussain ET al<sup>10</sup>. In a series of 100 patients, Dennison reported the sensitivity of FNAC as 90.4%<sup>11</sup> whereas Wu et al. compared postoperative pathology results and showed a sensitivity of 75% for FNAC<sup>12</sup>, while true cut biopsy showed a sensitivity value of 92% and frozen section 100%. Westend et al depicted a value of 92% for FNAC which was slightly lower than our findings<sup>13</sup>.

As already discussed above, the positive and negative predictive value of a test is the ones which measure the performance of a test by measuring its "predictive value" which reflects the diagnostic power of the test. They depend upon the sensitivity, specificity and disease prevalence. In this regard, Franco et al, in his study of 300 patients on the utility of FNAC, reported a positive predictive value of 100% and a negative predictive value of 92%<sup>14</sup>. A very large study of 1,297 patients done by Choi et al, on correlation of FNAC and histopathology reports, found the positive predictive value to be 98.4% and a negative predictive value of 88%<sup>15</sup>.

It can be seen clearly that our results match well with those of previous studies reported in the literature. While attempting to find the reason for variation in the values in some of the studies, we felt that the commonest cause was probably related to expertise of the person doing the aspiration. Maximum variations in terms of lower values were in the sensitivity. With the procedure of performing FNAC fairly standardized by now in all institutions, the only important variable remains the person doing the actual aspiration. In such a scenario the procedure itself should not be maligned and a plethora of studies done on this aspect bear testimony to the fact that this factor is being considered, when such studies are interpreted and reported. In our study, the consistently high values of all the parameters was most likely due to the fact that, as mentioned before, only pathologists with at least five years of experience were performing the aspiration. In this way, a major obstacle in getting better results is removed and better cytohistologic correlation is obtained.

In a similar study done by Hussain on 50 patients, the age distribution was between fifteen and sixty-five years and the maximum patients were seen in the thirty one to forty year group (30%)<sup>8</sup>. Similar studies done by Homesh<sup>6</sup> et al and Tiwari<sup>10</sup> showed similar age patterns.

Patel et al showed that FNAC results were influenced by the number 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<sup>16</sup>. They concluded that experience and technique are the most important factors in obtaining a satisfactory aspirate from breast lumps. Ljung et al<sup>17</sup> also reported on the influence of 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.

## CONCLUSIONS

Fine-needle aspiration cytology is a patient friendly, easy, reliable, repeatable and simple diagnostic test. When performed by an expert cytopathologist, the diagnostic accuracy of FNAC is very high. A high sensitivity and a high positive predictive value proved that a positive FNAC in the breast means a definite diagnosis of the concerned pathology if compared with the final histology report. The high specificity and a high negative predictive value for malignancy illustrated the high accuracy of FNAC in the diagnosis of malignancy in the breast. Very importantly, a report negative for malignancy was highly accurate (>92%) in predicting an absence of malignancy. Thus, we have no hesitation in concluding that FNAC is a very important preliminary diagnostic test in palpable breast lumps, and done by expert hands, the results show a high degree of correlation with the final histopathology report.

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