

## Comparison of Fine Needle Aspiration Cytology (FNAC) With Excisional Biopsy of Breast Lump

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### ABSTRACT

**Background:** Ideal method for diagnosis of breast cancer is arguable. FNAC is a type of biopsy in which cells sample or shatter tissue are obtained for cytological examination from a breast lump using a fine needle method. The needle size may differ from 20G to 24G which is mounted on a syringe.

**Aim:** To evaluate the diagnostic accuracy of FNAC on the basis of comparison with excisional biopsy.

**Methods:** This comparative study was conducted on 90 selected patients with some superficial breast lump, who attend the surgery OPD at Allama Iqbal Memorial Hospital Sialkot from May 2009 to April 2010. Firstly, all the cases were experienced FNAC and then excisional biopsy of the breast lump. The sample was evaluated through cytological and histopathological examination in pathology Laboratory.

**Results:** On basis of FNAC, breast lump in 72 patients (80%) diagnosed as benign, 6 patients (6.67%) as malignant and remaining 12 patients (13.33%) were inconclusive. On the basis of histopathology, lumps in 79 patients (87.78%) diagnosed as benign and remaining, 11 patients (12.22%) as malignant. The patients were excluded which were inconclusive in FNAC and the comparison was done in 78 patients. Out of 78 cases, 6 cases (7.69%) were found True Positive, 69 cases (88.46%) found True Negative, 01 case (1.28%) False Positive and remaining 2 cases (2.57%) had False Negative results.

**Conclusion:** FNAC is a simple, non-invasive and cost effective technique for early diagnosis. FNAC is an easier procedure than the Excisional Biopsy. This never produce scar in the patients. FNAC can help in surgical management of carcinoma of breast by diagnosis at an early stage.

**Keywords:** FNAC, Excisional Biopsy, True Positive, True Negative, False Positive, False Negative,

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### INTRODUCTION

Fine needle aspiration cytology (FNAC) is a biopsy type in which cell sample or fragmented tissue is acquired for cytological examination from breast lump using a needle. It is a sensitive, technically easy to perform and safe procedure for high risk patients. Different size of needles (20G to 24G), mounted on syringe were used for FNAC. It is a perfect test to be existed at any site where fine needle aspirations are being execute and instantly evaluated.<sup>1</sup> The limitations, advantages, complications and risk factors of fine needle aspiration cytology (FNAC) of breast lumps are well comprehended today<sup>2</sup>. Researchers reported it a productive diagnostic gadget with accuracy rate for breast lumps ranging from as low<sup>3</sup> as 75.7% to as high<sup>4</sup> as 98.2%. Paul Ehrlich is credited for needle biopsy. In Germany, he performed first percutaneous biopsy using needle in 1883<sup>5</sup>. In 1950, Paul Lopez Cardozo firstly introduced in Europe Fine needles used for aspiration (22-27 gauge vs. 18 gauge) in the Netherland & Soderstrom in Sweden<sup>6</sup>. It was not until the 1980 that fine needle aspiration cytology (FNAC) became widely used<sup>7</sup>. It is

a cost effective and valuable diagnostic method and deserve greater gratitude<sup>8,9</sup>. It is readily available and very easy to perform and it has very few complications. Occasionally there may be false negative, inconclusive, doubtful and false positive results which may be lessened/reduced by acquiring experienced hands and accurate technical procedures. In excisional biopsy of breast lump, makes an incision in the skin and remove all or part of the abnormal tissue for examination. Unlike FNAC, the excisional biopsy leaves a visible scar on the breast and sometimes causes a noticeable change in breast size and shape after healing.<sup>10-12</sup> This perspective study was conducted to assess the diagnostic accuracy of FNAC of breast lumps on the basis of comparison with Excisional Biopsy.

### MATERIALS AND METHODS

This comparative study was conducted on 90 patients of different groups of age with superficial breast lump. The said patients attended surgery OPD at Allama Iqbal Memorial Hospital Sialkot from May 2009 to April 2010. That patients were excluded from the study who's results of Fine Needle Aspiration Cytology or Histopathology were doubtful and inconclusive. During study, these cases were clinically examined and investigated. The findings of the study were recorded. Fine Needle Aspiration

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Cytology was done by using a sterilized 21G disposable fine needle. This needle attached to a 20cc disposable syringe to create a moderate negative pressure for aspiration. Prepared slides with this aspirated material and fixed in 95% ethyl alcohol. These slides were sent to cytology laboratory along with complete clinical details to evaluate where a diagnosis was made on the basis of Fine Needle Aspiration Cytology. These patients underwent Excisional Biopsy under general anesthesia at the operation theatre of Allama Iqbal Hospital Sialkot after FNAC. Excised tissue was preserved in formalin. Preserved tissues were sent to histopathology laboratory where a diagnosis was made on the basis of histopathological examination. The diagnostic accuracy of Fine Needle Aspiration Cytology was evaluated after comparison of FNAC and Histopathology reports of each patient.

**RESULTS**

Out of 90 cases, most of the cases belonged to the age group of 2<sup>nd</sup> and 3<sup>rd</sup> decade 66.67%. The age wise distribution of patients is tabulated in Table 1.

In this study the minimum breast lump size was 1cm and maximum size was 8cm. The breast lump in 72 cases were diagnosed as benign, in 6 cases as malignant and in remaining 12 cases were inconclusive is shown Table 2.

Breast lump in 79 cases were diagnosed as benign and in 11 cases were diagnosed as malignant through Histopathology as shown in Table 3.

Maximum cases diagnosed through histopathological examination after excisional biopsies were benign and there was no case diagnosis with false positive or false negative. Diagnosis with FNAC, 12 cases were inconclusive even they were diagnosed histopathologically. These 12 cases were excluded from the study because their status whether benign or malignant was not clear. Further there was no diagnosis to compare these cases. The entire calculations were done out of 78 cases. Out of 78 cases, 6 cases (7.69%) were found to be True Positive (TP) in which diagnosis was malignant cytologically and histologically. Out of 78 cases, total 69 cases (88.46%) were found True Negative (TN) in which diagnosis was Benign cytologically and histologically. Out of 78 cases, 01 case (1.28%) was found False Positive (FP) in which the diagnosis (Malignant Diagnosis) was positive cytologically and negative on histological examination. Out of 78 cases, 02 cases (2.57%) were found to be False Negative (FN) in which diagnosis was malignant cytologically was negative and histologically as positive. There were highest numbers of cases which were true negative in which

both by FNAC and Histopathology the diagnosis was benign. In terms of malignancy various status of FNAC shows in table 4. The accuracy rate of FNAC diagnostic was found 96.15%.

Table 1: Frequency and percentage of age

Age (years)	n	%age
0-10	2	2.22
11-20	36	40.0
21-30	24	26.67
31-40	13	14.45
41-50	8	8.89
51-60	4	4.44
61-70	2	2.22
71-80	1	1.11

Table 2: Findings of fine needle aspiration cytology

Finding	n	%age
Benign	72	80.0
Malignant	6	6.67
Inconclusive	12	13.33

Table 3: Findings of histopathology

Diagnosis	n	%age
Benign	79	87.78
Malignant	11	12.22

Table 4: Comparison of FNAC findings versus histopathology (n=90)

Histopathology	FNAC		Total
	Present	Absent	
Positive	6 (TP)	1 (FP)	7
Negative	2 (FN)	69 (TN)	71

$$\text{Sensitivity} = \frac{6}{8} \times 100 = 75\%$$

$$\text{Specificity} = \frac{69}{70} \times 100 = 98.57\%$$

$$\text{Positive predictive value} = \frac{6}{7} \times 100 = 85.71\%$$

$$\text{Negative predictive value} = \frac{69}{70} \times 100 = 97.18\%$$

$$\text{Accuracy} = \frac{65}{78} \times 100 = 83.33\%$$

**DISCUSSION**

On the basis of diagnostic results of FNAC and histopathology of 78 cases, the number of TP, TN, FP and FN were calculated as 6 cases (7.69%), 69 cases (88.46%), 01 case (1.28%) and 02 cases

(2.57%) respectively. FNR, sensitivity, specificity, PPV, NPV and the diagnostic accuracy was calculated as 25%, 75%, 98.57%, 85.71%, 97.18% and 96.15% respectively. Leonard and Melcher<sup>13</sup> have reported false negative results less than 5%. The false negative cases found in this study are 25% which is much higher as reported by Leonard and Melcher.<sup>13</sup> The high false negative results may be due faulty sampling technique or lack of expertise. The accuracy rate calculated in the current study 96.15% were found to be almost same 95.45% as reported by Nagpal et al<sup>14</sup>. It was near to many other previous studies like that of Mihashi et al<sup>4</sup>, Qin et al<sup>12</sup> and Soomro.<sup>15</sup> The sensitivity of FNAC in current study 75. Average sensitivity of previous studies was calculated as 82.99% which is more than that of current study. This difference may be because multiple lesions were included in the present study and the result may vary from lesion to lesion and site to site. Specificity of FNAC in the current study was calculated as 98.57%. The current specificity is in between the range (78.6% to 100%) as reported by many researchers. The mean specificity of previous studies is 93.51% which is also near to the specificity of FNAC calculated in this study. Positive predictive value and negative predictive value in previous studies varies from researcher to researcher. Positive predictive value (PPV) ranges from 68.8% to 100% and negative predictive value (NPV) from 79.5 to 98.79%. Average PPV and NPV in these studies is 85.71% and 97.18% respectively.

Fine Needle Aspiration Cytology can be practiced in hospitals even in remote areas. Further, in developed nations, through breast screening programmes carcinoma is detected for asymptomatic women at an early stage, whereas, women often present with symptomatic breast lumps. This delay is mainly ascribed to inadequacy of healthcare infrastructure and sociocultural barriers and illiteracy<sup>16</sup>.

In small breast lumps which are 2cm or less as FNAC, excisional biopsy is also more successful. Excisional biopsy is the diagnostic gold standard to which other biopsies methods must be compared with almost 100% sensitivity.<sup>17</sup> However, compared with FNAC, excisional biopsy is expensive and associated with a greater degree of patient morbidity. Excisional biopsy also leaves a noticeable scar which is undesirable cosmetically

## CONCLUSION

Technically FNAC is an easy procedure as compared to excisional biopsy. Fine Needle Aspiration Cytology leaves no scar in patient. In surgical outpatient

departments, it can be a routine test for all types of lumps. FNAC provides both diagnostics as well as therapeutic advantage very sensitively and accurately. Fine Needle Aspiration Cytology can also be helpful for surgical management of carcinoma of breast by making early diagnosis. In lymph node cases, FNAC were very high as compared to other lesions. This shows effectiveness of FNAC differ from lesion to lesion. It is concluded that fine needle aspiration cytology is a simple, non-invasive and cost effective skill for early diagnosis and rapid surgical management.

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