


Original Research Article

# Cytological study of palpable breast lumps with their histological correlation in a tertiary care hospital

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## Abstract

**Background:** Breast lump have varied pathology and different techniques are available to diagnose it. But fine needle aspiration cytology (FNAC) is highly accurate, rapid, and reliable tool for diagnosing breast lump. It helps the clinician to plan correct management.

**Aim:** Aim of this study was to evaluate role of FNAC in diagnosis of palpable breast lesions in term of sensitivity, specificity, accuracy, positive predictive value, negative predictive value and to compare cytopathological findings of breast lesions with histopathology wherever possible.

**Materials and methods:** This study was carried out on 234 patients, all presented with breast lump in pathology Department, GMERS medical college, Valsad over a period of January 2015 to May 2017. Out of 234 patients 2 were male. Cytological diagnoses were correlated with histopathological findings.

**Results:** Cytopathologically lesions were categorized as non-neoplastic 16(6.83%), benign 122(52.13%), malignant 30(31.19%) suspicious 12(5.12%) and unsatisfactory aspirates 11(4.70%). Of these 234 cases 69(29.48%) cases were available for histopathological examination, of which 39 benign cases and 24 malignant cases were similarly diagnosed on histopathology. 5 suspicious cases and 1 unsatisfactory aspirate on FNAC were turned out to be malignant on histopathology. So sensitivity was 80%, specificity 100%, positive predictive value 100%, negative predictive value 86.6% and diagnostic accuracy 91.30%.

**Conclusion:** FNAC is a simple and reliable method for diagnosis of breast lump with quite accuracy and avoiding unnecessary surgery. The results of FNAC show high degree of correlation with

histopathology reports and that proves that the procedure has high sensitivity, specificity and diagnostic accuracy.

## Key words

Breast lumps, FNAC, Histopathology.

## Introduction

Diseases of breast mainly present as palpable masses, nipple discharge, or abnormalities on imaging studies. In India, breast carcinoma is the second most common malignant neoplasm in females, comprising 22.2% of all new cancer diagnoses and 17.2% of all cancer deaths [1]. Different techniques are available to diagnosis breast lump but FNAC accurate, easy to perform, reproducible and acceptable to the patient. It is not only helpful in diagnosis and further planning of treatment but also helps in prognostication of the tumor [2]. Many countries have breast cancer screening programs aimed at detecting early disease in asymptomatic women, the diagnostic process involves the "Triple test" consisting of clinical examination, mammography and FNAC [3].

This study has been conducted to evaluate the role of FNAC in the diagnosis of palpable breast lesions in terms of sensitivity, specificity, positive predictive value, negative predictive value, accuracy of the procedure and compare cytopathological findings with histopathology.

## Materials and methods

The study was conducted in the Department of Pathology, from January 2015 to May 2017. During this period, 234 fine needle aspirations (FNA) were performed on female and male patients presenting with lump in breast (Both benign and malignant tumors were followed-up). Specimens were received from 69 patients who underwent surgery, which formed the material of this study. Informed consent was taken before aspiration. Aspirations were carried out using a 23 gauge needle and 10 ml disposable syringe. Cytological smears were fixed in 95% alcohol and stained with hematoxylin and eosin (H & E) stain. Criteria such as cost-effectiveness, use of

anesthesia, turn-around time, patient's hospital stay and most importantly, reliability in deciding subsequent treatment, are all factors to be taken into account in this regard. The surgical specimens were fixed in 10% formalin. The gross and cut section findings were noted. Several bits were taken from appropriate sites for processing and paraffin embedding. From each block, sections were cut at 4-5 microns thickness and stained by H and E stain.

The following statistical methods were used in the study conducted [4].

**True positive:** These were the patients with malignant disease, positive cytological results confirmed on histopathology

**True Negative:** These were the patients without malignant disease, negative cytological results confirmed on histopathology

**False positive:** These were the patients diagnosed positive on cytology but on histopathology the results turned out to be negative for malignancy.

**False Negative:** These were the patients diagnosed negative on cytology but on histopathology the results turned out to be positive for malignancy.

**Sensitivity:** It is calculated as

$$\frac{\text{True positive}}{\text{True Positive} + \text{False Negative}} \times 100$$

**Specificity:** It is calculated as

$$\frac{\text{True negative}}{\text{True negative} + \text{False Positive}} \times 100$$

**Positive predictive value:** It is calculated as

$$\frac{\text{True positive}}{\text{True positive} + \text{False Positive}} \times 100$$

**Negative predictive value:** It is calculated as

$$\frac{\text{True negative}}{\text{True negative} + \text{False negative}} \times 100$$

**Diagnostic accuracy:** It is the proportion of correct results in relation to all the cases studied.

It is calculated as

$$\frac{\text{True Positive} + \text{True negative}}{\text{True positive} + \text{false negative} + \text{true negative} + \text{false positive}} \times 100$$

## Results

Aspirations were performed on 234 patients over a period from January 2015 to May 2017. Out of 234 patients 2 were male. Of the 234 cases examined cytopathologically, 16 (6.83%) cases were categorized as having non neoplastic lesions, 122(52.13 %) cases were benign lesions, 73 cases (31.19 %) were malignant lesions, 12 cases (5.12%) were suspicious and 11 cases (4.70%) were inadequate for evolution (**Table - 1**).

**Table – 1:** Cytopathological diagnosis in 234 cases.

Cytological Diagnosis	No. Cases	%
Non neoplastic lesions	16	6.83
Benign	122	52.13
Malignant	73	31.19
Suspicious/Atypical	12	5.12
Unsatisfactory	11	4.70
Total	234	100

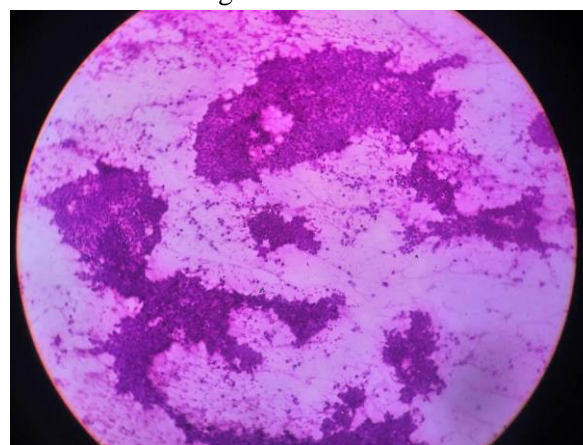
**Table – 2:** Lesions confirmed on histopathology (N=69).

HPE Diagnosis	No. of cases	%
Fibroadenoma	30	43.47
Fibrocystic disease	3	4.79
Benign phylloid lesion	4	5.79
Gynecomastia	2	2.89
Infiltrating ductal carcinoma (IDC)	28	40.57
Infiltrating lobular carcinoma (ILC)	2	2.89
Total	69	100

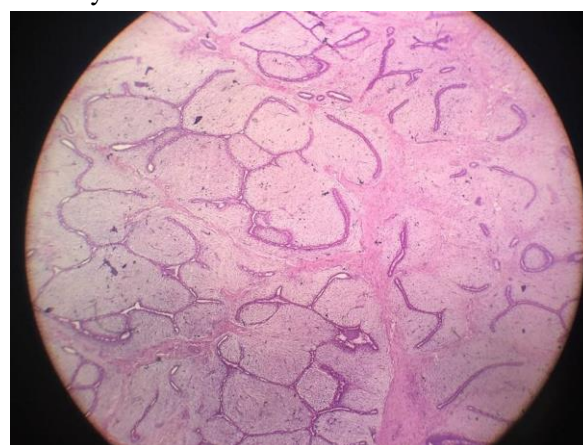
Among 234 cases 69 (29.48%) cases were available for histopathological examination. In benign breast lesions, fibroadenoma with 30(43.47%) cases out of total 69 cases constituted the largest disease group, followed by 4(5.79%) cases of benign phyllodes tumor. Apart

from these, three cases of fibrocystic disease and two cases of gynecomastia were reported. In the malignant breast lesions, maximum cases (40.57%) were reported as infiltrating duct carcinoma, followed by two cases of infiltrating lobular carcinoma (**Table - 2**).

**Figure - 1:** Cytology of fibroadenoma, cell rich smear of elongated, branching fragments of ductal epithelium ad numerous single bipolar nuclei in the background.



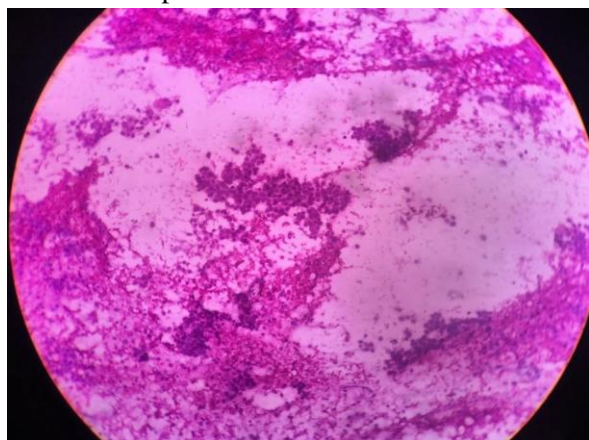
**Figure - 2:** Histopathology of fibroadenoma, The epithelial component form of elongated and branching ducts with a lining of columnar epithelium. The stromal component form of fibromyxoid connective tissue.



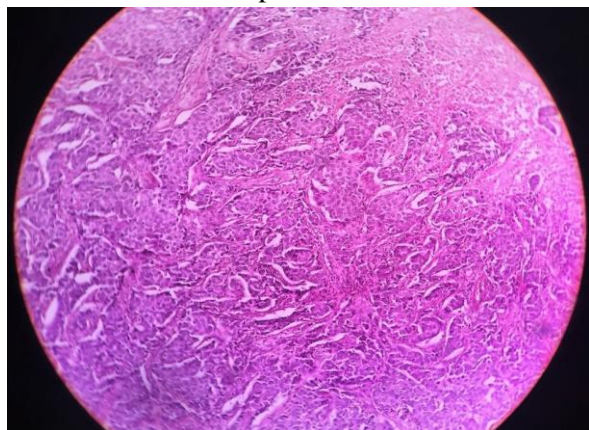
Out of 12 cytopathologically reported as suspicious cases 5 cases were available for histopathology examination. One of them turned out to be infiltrating lobular carcinoma on histology. The smears showed scanty cellularity but the cells were definitely malignant but the exact nature of the tumor cells was not identified.

Another four suspicious cases turned out to be infiltrating ductal carcinoma. The cells were showing atypical nuclei but the loss of polarity was not as much as in infiltrating ductal carcinoma. Out of 11 unsatisfactory cases, one case of histology proven lobular carcinoma was missed on aspirates because of paucicellular aspirates causing a procedural error.

**Figure - 3:** cytology of ductal carcinoma of breast, clustered and single malignant epithelial cells, mild nuclear enlargement and atypia; absence of bipolar nuclei.



**Figure - 4:** Histopathology of ductal carcinoma of breast, nests and sheets of neoplastic cells having pleomorphic, hyperchromatic and vesicular nuclei with prominent nucleoli.



Out of 39 cases diagnosed as benign on FNA and included in cytohistological correlation, fibroadenoma comprised the maximum cases (29) followed by fibrocystic change (3) and Benign phylloid tumor (3). Cytohistological correlation was 96.55% for fibroadenoma

(**Figure – 1, 2**), 75% for fibrocystic disease, 100% for Benign phylloid tumor and 100% for duct cell carcinoma (**Figure – 3, 4**) (**Table - 3**).

Following cytohistological correlation, sensitivity, specificity, positive predictive values were calculated in accordance with park6. Among 69 patients with cytohistological correlation, 24 (34.78%) had a final tissue diagnosis of malignancy (true positive ) and 39 (56.52%) had benign condition (true negative). 5 cases were reported as atypical ductal hyperplasia and one case is inadequate for giving diagnosis on cytology. these all six cases were found as malignant on histopathological examination that give false negative result. Not a single case was found to be false positive in present study. So in present study the sensitivity of FNAC in palpable breast lump was 80%, specificity was 100%, positive predictive value was 100%, negative predictive value was 86.6% and diagnostic accuracy was 91.30% (**Table - 4**).

## Discussion

FNAC was first described by Martin and Ellis in 1930 for sampling cervical lymph nodes [5]. “Fine-needle aspiration (FNA) biopsy is an established and highly accurate method for diagnosing breast lesions.” The use of core biopsy (CB) is being increasingly advertised but its procedure is more cumbersome, expensive and time consuming as compared to FNA procedure [6, 7, 8]. “Although fine-needle aspiration (FNA) biopsy of the breast has been shown to be a safe and accurate technique, many surgeons question whether it is reliable enough to replace excisional biopsy. If FNA biopsy is followed by an excisional biopsy for confirmation, it would seem that the cost of diagnostic workup would be increased, but it has been seen that FNA biopsy is cost effective even when followed by an excisional or frozen section biopsy for confirmation. It is considered safe and reasonable to expand its use to smaller hospitals where the personnel may be initially less experienced with the technique” [9, 10].

The present study was conducted at Department of Pathology, GMERS Medical College, Valsad to find out the cytological patterns of various palpable breast lesions and to correlate the cytopathological diagnosis with histopathology

wherever possible so as to find out the false positive rate, false negative rate, positive predictive values and diagnostic accuracy of the procedure.

**Table – 3:** Cytological and histopathological correlation of the lesions (N = 69).

Cytopathological diagnosis	Histopathological diagnosis					Total	
	Fibro-adenoma	Fibrocystic Disease	Benign Phylloides Tumor	Gynecomastia	Ductal Carcinoma		Lobular carcinoma
Fibroadenoma	28(96.55%)		1(3.44%)			29	
Fibrocystic diseases	1(25%)	3(75%)				4	
Gynecomastia				2(100%)		2	
Ductal hyperplasia	1(100%)					1	
Benign phylloid tumor			3(100%)			3	
Atypical ductal hyperplasia					4(75%)	1(25%)	5
Ductal carcinoma					24(100%)		24
Inadequate						1(100%)	1
Total	30	3	4	2	30		69

**Table – 4:** Correlations of FNAC reports with Histopathological diagnosis.

FNAC Results	Histopathological diagnosis		Total
	Malignant	Benign	
Malignant	24 (True positive)	0 ( False positive)	24
Benign	6 (False negative)	39 (True negative)	45
Total	30	39	69

**Table - 5:** Comparative analysis of various statistical values.

Author	Total No of cases	Sensitivity	Specificity	Positive Predictive value	Negative Predictive value	Diagnostic Accuracy
Hammond, et al. [11]	678	94.0%	98.0%	98.0%	94.0%	96.0%
Watson, et al. [12]	350	77.9%	99.5%	97.8%	93.8%	95.0%
Nicosia, et al. [13]	1875	93.2%	99.5%	99.6%	99.6%	95.6%
Bhagat R, et al. [14]	200	93.0%	98.0%	96.7%	96.0%	96.0%
Present study	234	80%	100%	100%	86.6%	91.30%

In the present study, 234 aspirations were performed over a period of January 2015 to May 2017. Out of 234 aspirations, 165 cases were lost to follow up and 69 cases were followed-up by histopathologic confirmation. These 69 cases were considered as the study group for the (present study) cytological and histopathological correlation of tumors of the breast. Lumps in the breast may be benign or malignant. Preoperative diagnosis helps in planning the correct surgical and therapeutic treatment.

In the present study, sensitivity was 80%, specificity 100%, positive predictive value 100%, negative predictive value 86.6% and diagnostic accuracy 91.3%. Various authors like Hammond, et al. [11], Watson, et al. [12], Nicosia, et al. [13] and Bhagat R, et al. [14] have given different values viz. sensitivity ranging from 77.9% to 94%, specificity ranging from 98% to 99.5%, PPV ranging from 96.7% to 99.62%, NPV ranging from 94% to 99.62% and diagnostic accuracy ranging from 95 to 96%.13-

16 So the results of present study is comparable to the studies conducted by other authors (**Table - 5**).

## Conclusion

Fine needle aspiration cytology is a quick, inexpensive, safe and readily acceptable procedure for diagnosis of breast lump with quite accuracy and avoiding unnecessary surgery. The results of FNAC show high degree of correlation with histopathology reports and that proves that the procedure has high sensitivity, specificity and diagnostic accuracy.

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