

# CYTOHISTOLOGICAL CORRELATION OF PALPABLE BREAST LESIONS IN A TERTIARY CARE CENTRE – A RETROSPECTIVE STUDY.

## ABSTRACT

**Background:** Breast cancer is one of the leading causes of death from cancer among women<sup>(1,2)</sup>. WHO reported that around 1lakh new cases of carcinoma breast are diagnosed every year in India and about 70,218 deaths due to breast cancer was estimated in Indian women every year<sup>(3)</sup>. Early diagnosis and prompt treatment plays an important role in decreasing the mortality due to breast cancer. Presenting complaint in majority of the cases is a palpable lump in the breast. Fine needle aspiration cytology is a simple, fast, inexpensive method and reliable. It is being used as a first line procedure for diagnosing breast lesions

**Comment [WU1]:** Write "Fine needle aspiration cytology (FNAC)"

**Aim:** This study is aimed to examine the cytological features of FNAC done on palpable breast lesions and to correlate the results of these breast FNAC with the corresponding tissue biopsy reports. Thereby we are determining the accuracy of reporting FNAC breast lesions in our hospital.

**Material and methods:** This is a 1-year retrospective study of breast lumps seen in Department of Pathology, Saveetha Medical College, Chennai. All patients who had FNAC of breast lumps with subsequent histological confirmation over this period are included in this study. Cytological diagnosis was categorized as benign, inflammatory, suspicious for malignancy, positive for malignancy and inadequate and compared with histopathological diagnosis for correlation. Statistical analysis was done to test sensitivity specificity, positive predictive value and accuracy

**Results:** This is a 1-year retrospective study of breast lumps seen in Department of Pathology, Saveetha Medical College, Chennai. All patients who had FNAC of breast lumps with subsequent histological confirmation over this period are included in this study. Cytological diagnosis were categorized as benign, inflammatory, suspicious for malignancy, positive for malignancy and inadequate and compared with histopathological diagnosis for correlation. Statistical analysis was done to test sensitivity specificity, positive predictive value and accuracy

**Conclusion:** FNAC is a quicker, easier, inexpensive, safe and readily acceptable procedure. Though definitive specific diagnosis may not be possible by cytology, but it can be categorized and differential diagnosis can be derived. So, to conclude, Aspiration cytology can be done as a first line procedure but cannot be considered as a substitute for histopathology.

**Keywords:** FNAC, Benign, Malignant, Cytohisto corelation

**Comment [WU2]:** Select Key words based on Mesh words

## 1. INTRODUCTION

Breast cancer is one of the leading cause of death from cancer among women<sup>(1,2)</sup>. WHO reported that around 11l cases of carcinoma breast are diagnosed every year in India and about 70,218 deaths due to breast cancer was

**Comment [WU3]:** Use International Unit

estimated in Indian women every year<sup>(3)</sup>. Early diagnosis and prompt treatment plays an important role in decreasing the mortality due to breast cancer. Presenting complaint in majority of the cases is a palpable lump in the breast.

Gold standard for diagnosis of palpable breast lump is open surgical biopsy. But in the recent days minimally invasive techniques like fine needle aspiration cytology (FNAC) and core needle biopsy (CNB) have become significant to come to a diagnosis.<sup>(4)</sup> So now-a-days the gold standard for diagnosis of breast lumps is the "triple test" which consists of clinical examination, mammography and FNAC.<sup>(5)</sup>

Fine needle aspiration cytology is a simple, fast, inexpensive method and is found to be reliable. It is being used as a first line procedure for diagnosing breast lesions. Major advantage is that it is rapid and reduces the frequency of open surgical biopsies.<sup>(5)</sup> Pain and haematoma formation are the few drawbacks of FNAC. Hematoma formation may interfere with the radiological assessment, so it is advisable to complete radiological investigations prior to FNAC.<sup>(4)</sup> Another setback is that there is a possibility for the smears to be acellular which hinders the cytological analysis. The diagnostic accuracy of FNAC can be improved by good aspiration technique.<sup>(6)</sup> Biopsy is advised when there is discrepancy in the triple test.

## 2. MATERIAL AND METHODS

A retrospective institutional audit was done in all patients with FNAC of breast lumps for a period of 1 year at Saveetha Medical College and Hospital, Chennai, Tamilnadu. Inclusion criteria was all patients who had FNAC of breast lumps with corresponding histopathological confirmation during the study period. A detailed clinical history like family history of breast cancer in first degree relatives, previous surgery in contralateral breast mass were obtained; physical examination of both breasts and the lump was done before performing the procedure. Details of the procedure to be performed was well explained and patient's consent was taken.

Fine needle aspirations were performed using 10 ml -20 ml syringe with 23 G needle. 2 or 3 smears were fixed in 95% ethyl alcohol and few were air dried and then stained with H & E (Haematoxylin and Eosin), Papanicolaou and MGG (May Grunwald Giemsa) stains.

Cytological smears were examined. The sample is considered to be adequate if it has at least six clusters of ductal epithelial cells with each cluster comprising of atleast 10 cells. The cytological diagnoses of the cases were then categorized into one of five diagnostic categories according to Yokohama system for reporting breast FNAC.

1. Unsatisfactory
2. Benign
3. Atypical
4. Suspicious
5. Malignant

By using this reporting system, the pathologist is able to demonstrate some degree of diagnostic certainty and is able to make a diagnosis and advise the surgeon to plan the treatment.<sup>(7)</sup>

Benign and malignant lesions were distinguished based on the following cyto-morphological characteristics: 1. Dyscohesive cells 2. Variation in size and shape of cells 3. Changes in the nucleus 4. Increased/abnormal mitoses 5. Abnormal cytoplasmic inclusions

## 3. RESULTS AND DISCUSSION

Of the total 81 FNACs done during the study period, only 56 cases had corresponding histopathological follow-up. 53(94.6%) were females and 3(5.4%) were males. The right breast was more affected- 50.1% than left breast 40.8% and bilateral breasts were affected in 8.7% cases. In 56 cases, tissue biopsies were done giving a biopsy rate of 69.1%.

Cytological diagnosis of 56 aspirations were classified into 5 categories: Inadequate 4(7.14%), Benign 43(76.7%), Atypical 3(5.35%), Suspicious for malignancy 1(1.78%) and positive for malignancy 5(8.92%). There were no false positives and 3 false negatives were observed in benign cases. Histopathological diagnosis were again classified into 5 categories: Inadequate 2 (3.57%), Benign 43(76.7%), Atypical 3(3.57%), no cases were diagnosed as Suspicious for malignancy and Positive for malignancy were 9 (16.07%). In the present study sensitivity was 66.67%, specificity was 100%, positive predictive value was 100%.

**Comment [WU4]:** You have already defined it as FNAC

**Comment [WU5]:** The necessity of conducting this study should be well described. Why was this method chosen as the gold standard, and in previous studies, what was the sensitivity and specificity of each individually and in total?

**Comment [WU6]:** The study design is completely unclear. What is this study design? Who entered the study? Describe each assessment (checklist, clinical examination, mamography and FNAC). Has written informed consent been obtained? Analysis method and evaluation indicators should be mentioned with the formula (sensitivity, etc.) Separate result and discussion

The cyto-histological correlation was found to be 100% for malignant cases and 85.7% for the benign conditions.

Table 1. Positive and negative ratio

	POSITIVE	NEGATIVE
POSITIVE	6	0
NEGATIVE	3	47

Total Positives – 6  
 Total Negatives - 47  
 False Positives – 0  
 False Negatives – 3

Table 2. Data statistics

STATISTIC	VALUE
Sensitivity	66.67 %
Specificity	100 %
Positive Predictive Value	100 %
Negative Predictive Value	93.88 %
Positive LR	Infinity
Negative LR	93.88 %
Accuracy	94.55 %

Table 3. Diagnostic results

DIAGNOSIS	CYTOLOGY	HISTOPATHOLOGY
INADEQUATE	4 (7.14%)	2 (3.57%)
BENIGN	43 (76.7%)	43 (76.7%)
ATYPICAL	3 (5.35%)	2 (3.57%)
SUSPICIOUS FOR MALIGNANCY	1 (1.78%)	0
POSITIVE FOR MALIGNANCY	5 (8.92%)	9 (16.07%)

### 3.1 DISCUSSION

Franzen and Zajicek around 1960s first introduced FNAC for breast aspirations at the Karolinska Hospital in Stockholm.<sup>(7)</sup> They did May-Grunwald Giemsa stains on air-dried smears for rapid interpretation and diagnosis. Despite their success, due to lack of confidence in the new procedure, surgeons' unwillingness and for the fear of tumor implantation in the needle track FNAC was not popularly used until 1980s.<sup>(8)</sup>

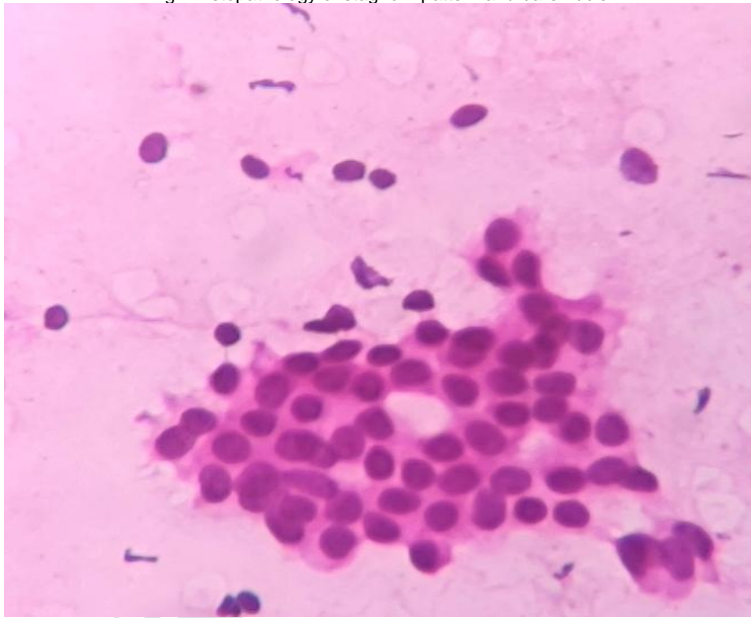
FNAC of the breast is a part of the triple test, which includes clinical and radiological examination in addition to FNAC. The diagnostic accuracy of FNAC increases when combined with the other two modalities.<sup>(9)</sup> However the gold standard investigation remains to be open surgical excision biopsy which accounts to almost 100% sensitivity.<sup>(10)</sup> But excision biopsy is expensive and is associated with a higher degree of morbidity as compared to FNAC and CNB. Open biopsy is cosmetically undesirable as it leaves a visible scar which may complicate mammographic follow up. And also there is longer "turn-around time" for open biopsies as compared to FNAC.<sup>(11)</sup> If the sample in FNAC is inadequate, then CNB should be done as second line method. Last option considered should be Excision biopsy.<sup>(12)</sup>

The sensitivity and specificity of the results obtained by FNAC have helped for an easier management of breast lumps. Previously done studies show that the sensitivity ranges from 80% to 97% and the specificity can be up to

100%<sup>(13,14)</sup>. False-positive and false-negative results may be encountered<sup>(15)</sup>. Major cause for this discrepancy is the overlapping features of different lesions on FNAC<sup>(16)</sup>.

FNAC done on 56 cases were reported under 5 categories according to Yokohama system for reporting breast FNAC- inadequate 4, benign 43, atypical 3, suspicious for malignancy 1, positive for malignancy 5. Among the 3 males cases, all were reported as gynecomastia. In this study among the 43(76.7%) benign lesions reported on FNAC, fibroadenoma was the diagnosis made in 27 cases(62.7%). On FNAC fibroadenoma shows large branching sheets of uniform ductal epithelial cells. The characteristic diagnostic feature is the staghorn pattern and bare nuclei. (Fig.1) Common age group seen in benign lesions was 15 to 35 years.

Fig 1 histopathology of staghorn pattern and bare nuclei



Corresponding histopathology showed the same number of benign cases i.e. 43 cases (76.7%) of which majority was again fibroadenoma accounting for 24 cases (55.8%). On HPE, fibroadenoma appears to have compressed and dilated ducts with surrounding stroma. Fibroadenoma was the most common benign breast lesion reported accounting for 55.8% of total benign lesions. The findings of this study in respect to fibroadenoma correlates with study done by Stone et al<sup>(17)</sup>. Cytohistological concordance in case of benign lesions accounted for about 85.7% which correlates with study done by pinto et al<sup>(18)</sup>.

Our study accounted for 5 cases diagnosed as malignant. Cytological features showed high cellularity with irregular clusters of atypical cells showing pleomorphic nuclei, irregular nuclear membrane and hyperchromasia. On histopathology 9 malignant cases were reported of which most common was Infiltrating Ductal Carcinoma, NOS. Our study had 100% cytohistocorrelation in case of malignancy which is a similar finding in many other studies<sup>(18,19,20,21,22)</sup>.

We reported a case of medullary carcinoma on FNAC (Fig 2) which turned out to be the same on histopathology (Fig 3).

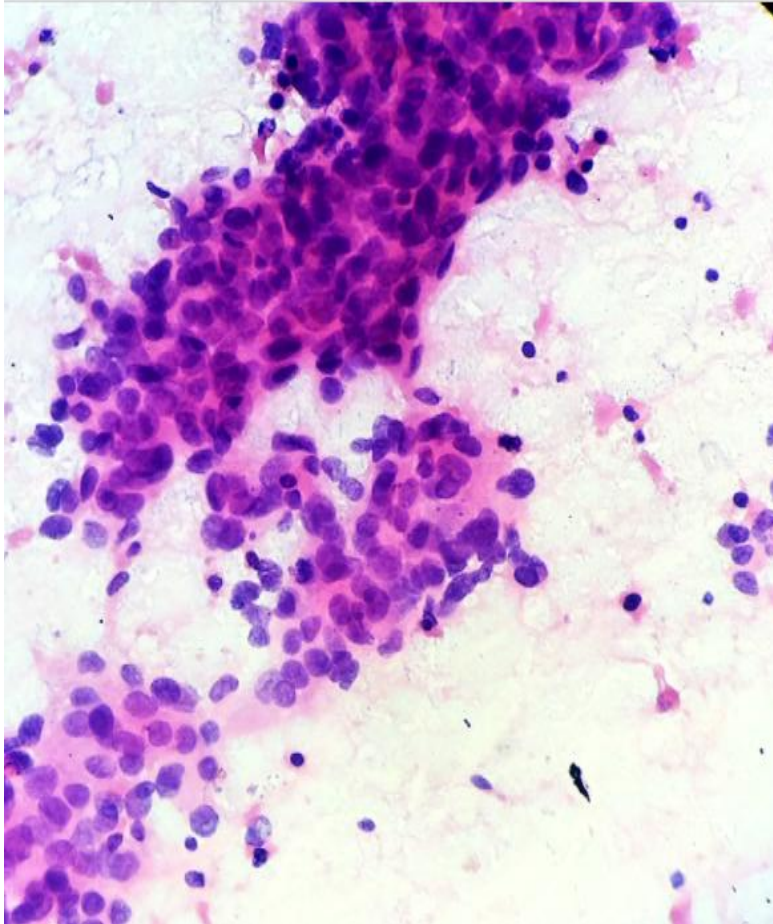
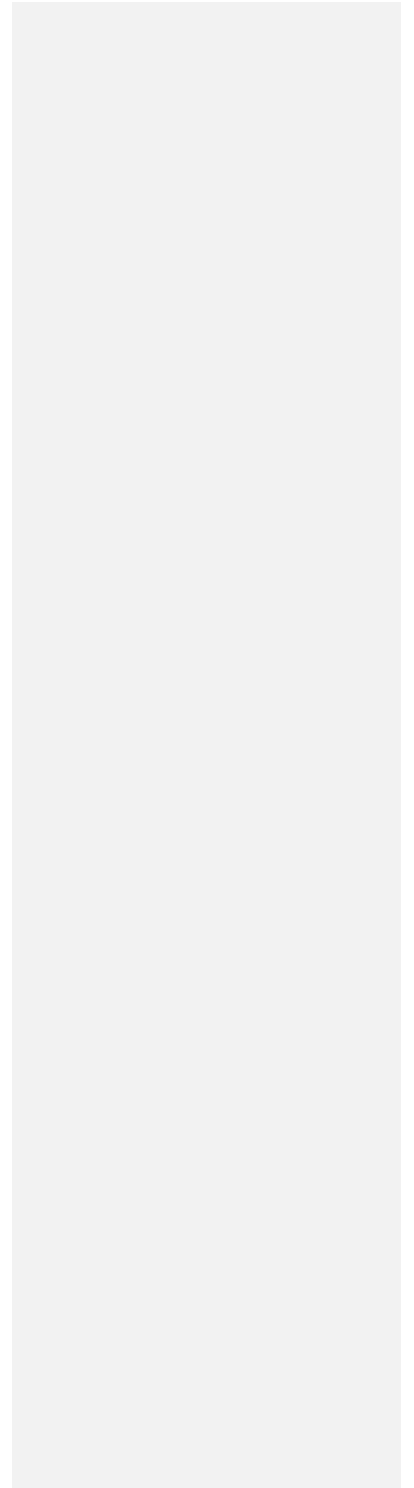


Fig 2 medullary carcinoma on FNAC



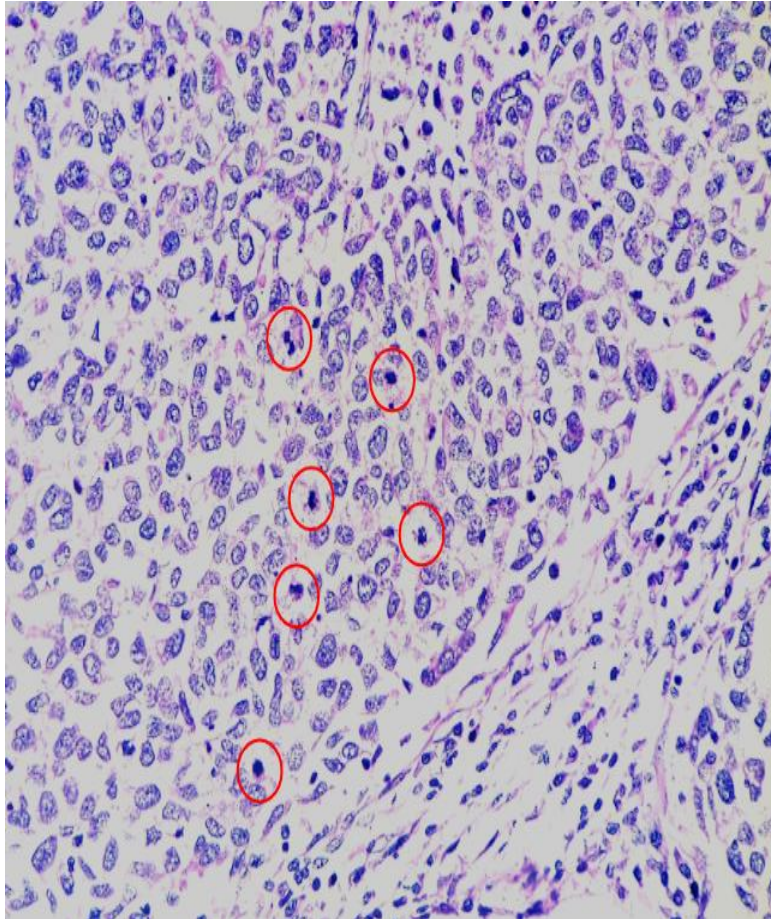


Fig 3 Histopathology of carcinoma

The number of false negatives accounted for 3 of which 2 cases were IDC and 1 case was reported as malignant phyllodes .

Small tumor size, inadequate sampling during aspiration and hypocellularity might be the reasons for false negative cases. Most of the false negatives in our study turned out to be infiltrating ductal carcinoma which was similar to a study done by Velu ARK et.al<sup>(23,24)</sup>.

Our study had a Sensitivity of 66.67%, specificity of 100%, positive predictive value of 100% which were the similar findings in many other authors<sup>(25,26,27,28)</sup>.

#### 4. CONCLUSION

FNAC is a quicker, easier, inexpensive, safe and readily acceptable procedure. Though definitive specific diagnosis may not be possible by cytology, but it can be categorized and differential diagnosis can be derived. So, to conclude Aspiration cytology can be done as a first line procedure but cannot be considered as a substitute for histopathology.

**Comment [WU7]:** The discussion is very weak and irrelevant. This study is not a case series, but this study was conducted with the aim of calculating the sensitivity, specificity and positive and negative predictive value of a diagnostic method. So you need to have a general edit of the text. Discuss the importance of the study findings.

## ETHICAL APPROVAL

Ethical clearance- Institutional ethics committee approval was obtained.

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