# A Prospective Study on Cytological Evaluation of Palpable Breast Lumps

**Swati Singh[1], Mayurika S Tyagi[2]**


## ABSTRACT

**Introduction:** Lesion of Breast, Benign as well as malignant, are quite common in the Indian population. Breast is the second most common cancer after cancer of the cervix. Fine-needle aspiration cytology (FNAC) is a safe, easy, reliable, and time-saving outdoor procedure with little discomfort to the patient. FNAC is useful in the diagnosis and further planning of treatment without the need for biopsy. The current study was carried out to study the frequency of various breast lesions on FNAC.

**Material and Methods:** This was two years prospective study carried out from January 2016 to December 2018. Physical examination of mass by palpation was done. Smears prepared after Fnac were stained with May-Grunwald Giemsa stain and Papanicolaou stain.

**Results:** Of the 200 cases, 178 were in the benign category, and 16 belonged to the malignant category, while the cytology study of 04 cases was unsatisfactory. Out of these sixty cases were available for histological correlation.

**Conclusion:** Fine-needle aspiration cytology is a fast and effective method for the primary categorisation of palpable breast lumps. They can be classified into benign, malignant, atypical, suspicious, and unsatisfactory categories. Benign breast lesions are common in comparison to malignant lesions


**Keywords:** Breast Lump, Fibroadenoma, Fine Needle Aspiration Cytology, Infiltrating Duct Carcinoma.

## INTRODUCTION

Most of the Breast diseases present as a breast lump. Breast cancer is one of the most common cancer in women in India.[1] Fine needle aspiration cytology (FNAC) has become a valuable tool in preoperative assessment of breast masses as it shows sensitivity, specificity and high accuracy. FNAC has become popular due to its fast and straightforward approach. It is inexpensive and can be performed with minimal complications.

One of the primary goals of FNAC is to differentiate benign from malignant lesions. In the evaluation of breast masses, the time-honoured triple assessment combines clinical, radiological, and pathological information, and FNAC, together with a core needle biopsy, is the primary pathological investigation of choice. FNAC can obviate standard excisional biopsy if all three components of the triple test are conclusively positive or negative.[2] Nevertheless, there are instances where the differentiation of benign and malignant is not possible on Fnac. This problem arises when there is inadequate specimen sampling, or there is an overlap in the morphological spectrum of benign and malignant lesions (e.g., papillary lesions, atypical hyperplasia, low-grade carcinoma in situ).

To accommodate these problematic areas and grey zone lesion and to incorporate the groups with uncertainties, cytological reporting categories are used. These categories objectively describe morphological features in cytological terms.

The most commonly used categorisation is a five-tier system, with the following categories,[3]

Category 1 (C1) insufficient/inadequate,
Category 2 (C2) benign,
Category 3 (C3) atypical,
Category 4 (C4) suspicious of malignancy,
Category 5 (C5) frankly malignant.

Under this categorisation, Category C1 is inadequate aspirate smear due to hypocellularity, which may be caused due to staining, smearing or aspiration errors. Usually, it is the degree of cellularity of the epithelial cells that is inadequate[3] C2 category is for smears that are usually cellular and show the characteristic morphology of different benign lesions. Atypical or malignant features are not present. Duct configurations, bipolar nuclei and numerous myoepithelial cells are visible. The inflammatory background is commonly encountered.

In contrast, C3 and C4 are grey zones. C3 smears present the characteristics of a benign lesion; however, there are features that are not commonly seen in clearly benign specimens such as cellular crowding, discohesion and pleomorphism. C4 is reserved for aspirates where atypical features are apparent, however confounding factors like hypocellularity, poor preservation, or components of a benign smear are present, thus preventing a confirm malignant diagnosis. This ambiguity emphasises the importance of correlation with other disciplines. It also emphasises not to stretch the result of FNAC outside the experience and capabilities of the interpreter to diminish both positive and negative errors.[3]

[1]Assistant Professor, Department of Pathology, Santosh Medical College, [2]Assistant Professor, Department of Pathology, Santosh Medical College, India

**Corresponding author:** Dr Mayurika S Tyagi, Assistant Professor, Pathology, Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh, India. 201009

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C5 category consists of cellular smears with evidently malignant cytologic features. This categorisation helps the cytopathologists to define the uncertain areas, and the clinicians to offer further investigation like an excisional biopsy. Used judiciously, FNAC is not only useful in the diagnosis and further planning of treatment without the need for biopsy, but also helpful in prognostication of the tumour factors such as nuclear grading, mitotic index, hormone receptor status and DNA contents. The present study aimed at identifying the frequency of various cytological breast lesions on FNAC and its histopathological correlation whenever possible.

## MATERIAL AND METHODS

The current study was carried out in the Pathology Department of a tertiary care centre over two years from January 2016 to December 2018 after taking permission from the ethical committee of the institution. The patients with palpable breast lump referred from general surgery department in the institution for FNAC were involved in the study.

The case history of the patient was recorded. The examination of breast lump was done with the recording of size and site of lump, consistency, fixation to the skin and underlying tissue, and retraction of nipple along with regional lymph node involvement.

Consent was taken after due explanation of the procedure and its benefit to the patients. The procedure was done using 24 gauge needle fitted on 10 ml disposable syringe in syringe holder. The wet smear fixed with ether/alcohol mixture stained with Papanicolaou stain. The air-dried smears were stained with May Grunwald Giemsa stain. Smears were examined and categorized from C1 to C5, according to the five tier system.

**Inclusion Criteria**

1. All the female patients presented with breast lump and willing to undergo investigations and treatment
2. All the female patients presented with clinically palpable breast lump with features of benign disease
3. All the female patients presented with lump whose cytology report showed negative for malignancy or inconclusive report

**Exclusion Criteria**

1. All male patients with breast lumps.

## RESULTS

A total of 800 cases were obtained in the cytopathology section over two years from January 2016 to December 2018, out of which 200 (25%) cases were breast lump FNACs. All the 200 patients underwent a diagnostic FNAC in our Pathology Department.

The age of patients varied from 14 years to 78 years [Table 1]. The youngest patient was 14 years old and diagnosed with fibroadenoma. The most aged patient was 78 years old and diagnosed with infiltrating duct carcinoma. Maximum cases were noted in the third decade,i.e. 90 cases (45%).

In the present study cytology reporting categories were used. The national coordinating committee launched this categorisation for breast screening and the UK national breast screening program. Since then, it serves as a common dialect among all breast health care professionals involved in breast management.

The cytological spectrum of various palpable breast lesions in the present study shows that out of the total 200 cases, 178 were in the benign category, 02 were in the atypical category, and 16 belonged to the malignant category. In comparison, the cytology study of 04 cases was unsatisfactory [Table 2].

Table 3 shows various types of diagnosis given on Fnac. The spectrum of various benign breast lesions encountered in the present study shows that out of the total, 178 cases that could be satisfactorily labelled as benign in the present study, fibroadenoma accounted for 130 (65%) cases (Fig. 1), fibrocystic disease for 20 (10%) cases, inflammatory breast disease for 14 (7%).

Out of 220 cases of cytopathological study in the present study, 60 cases were available for histopathological correlation. Out of 49 benign cytological cases, 47 (95.9%) were confirmed as benign on histopathology, but 02 turned out to be malignant. Out of 06 malignant cytological cases, all were confirmed as Malignant. [Table 4]

| Age (years) | Number of patients | Percentage (%) |
|---|---|---|
| 10-20 | 06 | 03 |
| 21-30 | 25 | 12.5 |
| 31-40 | 90 | 45 |
| 41-50 | 60 | 30 |
| 51-60 | 10 | 05 |
| 61-70 | 08 | 04 |
| 71-80 | 01 | 0.5 |
| Total | 200 | 100 |

**Table-1:** Age-wise distribution of cases

| Category | | No of cases | Percentage (%) |
|---|---|---|---|
| C1 | Inadequate | 04 | 02 |
| C2 | Benign | 178 | 89 |
| C3 | Atypia probably benign | 02 | 01 |
| C4 | Suspicious of Malignancy | 00 | 00 |
| C5 | Malignancy | 16 | 08 |

**Table-2:** Patients Categorised according to Cytology Reporting criteria.

| FNAC diagnosis | Number of cases | (%) |
|---|---|---|
| Benign breast lesions | 178 | 89 |
| Fibroadenoma | 130 | 65 |
| Lactating adenoma | 06 | 03 |
| Fibrocystic change | 20 | 10 |
| Galactocele | 06 | 03 |
| Benign phyllodes | 02 | 01 |
| Inflammatory breast disease | 14 | 07 |
| Atypical ductal hyperplasia | 02 | 01 |
| Malignant breast lesions | 16 | 08 |
| Invasive duct carcinoma | 14 | 07 |
| Invasive lobular carcinoma | 02 | 01 |

**Table-3:** Cytological spectrum of breast lesions

## DISCUSSION

There has been an increasing use of cytology techniques as diagnostic tools in the preoperative assessment of patients with breast lesions.

The application of FNAC for the diagnosis of palpable breast masses was first introduced by Martin and Ellis in 1930. Since then, it has been established as an essential tool in the evaluation of breast lesions.[4]

In the present study, the number of benign cases was more and malignant cases was less than studies by Mohammed et al.[5], Yeoh et al.[6] and Park and Ham[7] [Table 5]. This higher number of the benign and lower number of malignant cases in our study may be due to good follow up or more awareness amongst the patients' population

In the present study, fibroadenoma (65%) followed by fibrocystic disease (10%) and mastitis/breast abscess (7%) were the most common breast lesions on cytology, which is in agreement with a similar study by Domínguez et al.[8]

In the present study, 16 malignant lesions were seen, IDC (Fig. 2) was the most common histological subtype in the present study with 14 (87.5%) cases in the present study and 141 (95.91%) in the study by Domínguez et al.[8] Lobular carcinoma was seen in only 2 cases in this study, while it was the second common tumour in the study by Domínguez et al. with 4 (2.72%) cases.[8]

FNAC is a vital component in the preoperative management of breast lesions. Its accuracy, affordability, ease of use are factors that cause its popularity. The advent of imaging technology, together with the clinical expertise of the clinician, contributed to its increased sensitivity. The adequacy of smears is influenced by the nature of the lesion, experience of the aspirator, and access to the available imaging modality.

An adequate smear can be defined by either quantitative or qualitative means. Nevertheless, the operators' experience and confidence in correlating with the clinical and radiologic findings, the cellularity of smears, and the aspiration technique are always helpful. Exceptions occur in cystic and fibrotic lesions that are inevitably hypocellular.

Benign breast lesions are usually easy to diagnose when their characteristic cytologic patterns are apparent. Hypocellularity, necrosis, degenerated apocrine cells, and epithelial hyperplasia are some of the factors that may be encountered in evaluating a difficult smear, mimicking atypical or malignant lesions. The false-negative cases in breast FNAC, although few, are commonly due to poor sampling technique, poor tumour localisation, and the

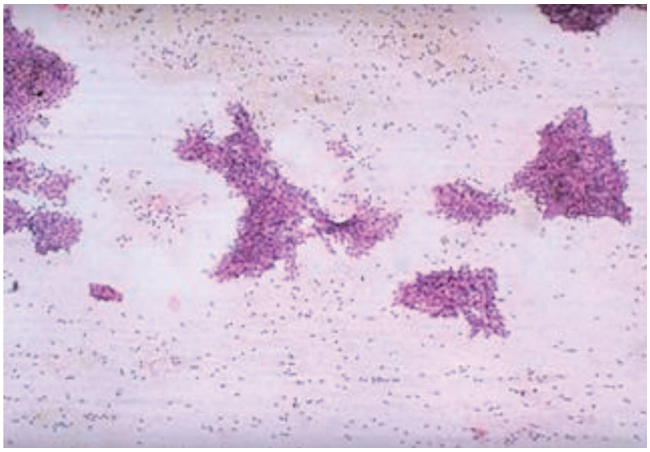

**Figure-1:** Fibroadenoma Cell rich smears of elongated, branching fragments of ductal epithelial cells and numerous single, bare bipolar nuclei in the background. (MGG, Low power)

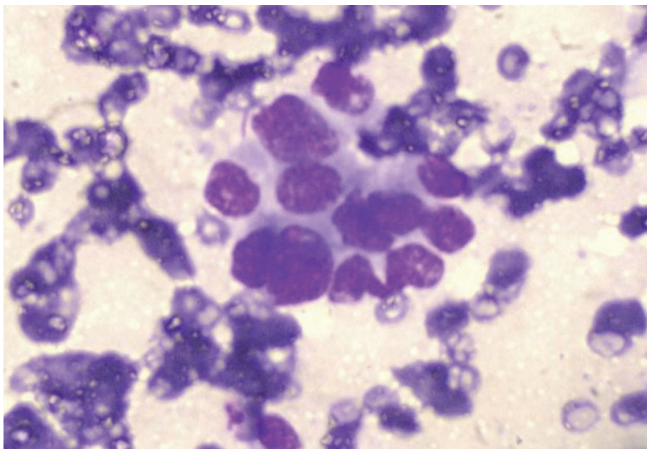

**Figure-2:** Invasive duct carcinoma NOS Loosely cohesive cluster of malignant cells with obvious nuclear enlargement, pleomorphism and irregular chromatin. (MGG, High Power)

| Cytological type | Histologically benign | Histologically malignant | Total |
|---|---|---|---|
| Unsatisfactory | 03 (100%) | - | 03 |
| Benign | 47 (95.9%) | 02 (4.08%) | 49 |
| Atypical | 01(50%) | 01 (50%) | 02 |
| Malignant | - | 06 (100%) | 06 |

**Table-4:** Histopathological correlation with the cytopathological spectrum of lesions

| Cytological type | Present study (%) | Mohammed et al. 5 | Yeoh and Chan[6] | Park and Ham[7] |
|---|---|---|---|---|
| Inadequate | 04 (2%) | 3(1.9%) | 274 (17.83%) | 169 (25.3%) |
| Benign | 178 (89%) | 117 (71.3%) | 1121(73.12%) | 384 (57.4%) |
| Atypical | 02 (1%) | 2 (1.3%) | 51 (3.32%) | 24 (3.6%) |
| Suspicious | - | 2(1.3%) | 19 (1.23%) | 7 (1.0%) |
| Malignant | 16 (8%) | 38 (24.2%) | 68 (4.43%) | 85 (12.7%) |

**Table-5:** Comparison of the present study with other studies.

presence of a well-differentiated histology of the tumour. Small tumour size and nonpalpable breast lesions are also frequently associated with false-negative results and inadequate aspirate. Therefore all these factors should be considered in the interpretation of breast FNAC before a benign diagnosis is being rendered.

In this study, we have realised that one cannot overlook the importance of clinical and radiological assessment for diagnosing breast lumps. This is especially so in cases that are labelled on cytology as atypical or suspicious.

Accurate diagnosis of breast lesions relies on a triple assessment approach comprising of clinical, radiology and pathologic examinations. Fine needle aspiration cytology (FNAC) is extensively adopted for the pathologic assessment of palpable breast lesions due to its accuracy and ease of use.

## CONCLUSION

Fine-needle aspiration cytology is a rapid and effective method for the primary categorisation of palpable breast lumps into benign, malignant, atypical, suspicious, and unsatisfactory categories.

Benign breast lesions are common than malignant lesions, fibroadenoma, and fibrocystic disease are more common in benign disease, whereas IDC accounts for the highest number of malignant cases.

**Ethical Clearance**

The study was conducted after being cleared from the institutional ethics committee.

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