

# Cytomorphological Study of Palpable Breast Lumps: Spectrum of Lesions and Diagnostic Utility of FNAC.

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## ABSTRACT

**Background:** Palpable breast lumps are quite common which can be benign or malignant. Carcinoma breast is the second most common cancer after cervical cancer. Fine needle aspiration cytology (FNAC) is a minimally invasive, rapid, reliable and cost-effective outdoor procedure to provide effective diagnosis and way to further planning of treatment without need for biopsy. The objective of the study is to study the spectrum of various breast lesions on cytomorphology and its histopathological correlation. **Methods:** This was a two years retrospective study from June 2014 to May 2016 including 280 cases aspirated from palpable breast lumps. Physical examination of breast lumps by palpation was done. Cytological diagnosis was made and histopathological correlation was done, wherever available. **Results:** On cytomorphological study of 280 breast lump aspirates 32 (11.43%) were inflammatory lesions, 180 (64.29%) benign, 6 (2.14%) atypical/probably benign, 8 (2.86%) suspicious of malignancy, 46 (16.43%) malignant and 8 (2.86%) were unsatisfactory for evaluation, of these 280 cases, 70 (25%) were available for histopathological examination. The most common benign lesion in the present study was fibroadenoma 115 (41.07%) and the most common malignant lesion was ductal carcinoma 43 (15.36%). **Conclusion:** Fine needle aspiration cytology is a rapid and reliable tool to provide effective diagnosis in palpable breast lumps. It should be used as routine diagnostic procedure to provide the effective health care to the patients with breast lesions.

**Keywords:** Breast lumps, Fine needle aspiration cytology, Histopathology.

## INTRODUCTION

Breast lumps are common complaints of women visiting to health organisation clinics of which 80 to 85% are benign and rest are malignant.<sup>[1-3]</sup> Breast cancer is leading cause of morbidity and mortality in women.<sup>[4]</sup> In Indian women carcinoma breast is the second most common malignancy preceded by cervical cancer, comprising 22.2% of all new cancers diagnosis and 17.2% of all cancer deaths.<sup>[5]</sup>

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It becomes very important to distinguish benign from malignant lesions prior to definitive treatment as well as early detection is the mainstay in management of breast carcinoma. Many times it becomes difficult to determine whether a

suspicious lump is benign or malignant only by clinical examination. The global protocol for diagnosis of breast lump is the “triple assessment” a combined approach by clinical examination, imaging (mammography and or ultrasound) and fine needle aspiration cytology (FNAC).

Fine needle aspiration cytology has become widely accepted as simple, cost effective, diagnostic tool with high sensitivity and specificity.<sup>[6]</sup> The sensitivity and specificity of FNAC as a diagnostic tool for palpable breast lumps are 65-99% and 96-100% respectively.<sup>[7]</sup> Usually when the size of the breast lump exceeds 2.0 cm it becomes clinically palpable. With increase in age of patient the tendency of being malignant of breast lumps increases. Only 10% of breast lumps are malignant under the age of 40 years as compared to 60% lumps over the age of 50 years.<sup>[8]</sup> FNAC provides rapid and accurate diagnosis so patients get psychological relief once diagnosed with benign breast lesions.<sup>[9]</sup> It is also capable to evaluate local chest wall recurrences and providing material for

ancillary techniques such as hormone receptor analysis, flowcytometry and molecular studies. Therefore, the study aimed to access the cytomorphological spectrum of palpable breast lumps as well as the diagnostic utility of FNAC which can be relied upon to decide the crucial surgical procedures for the management of patients without resorting to any other cumbersome diagnostic procedure.

## MATERIALS AND METHODS

It was a retrospective study carried out from the data retrieved from the Department of Pathology of Teerthanker Mahaveer Medical College & Research Centre, Moradabad in a period from June 2014 to May 2016. All cases of female and male breast lumps which underwent FNAC in the mentioned period were retrieved. A proper written consent in patient's local language was obtained from each patient. Physical examination of breast mass by palpation was done along with the examination of axillary lymph nodes, if any. FNAC was done by using 22/23 Gauge needle attached to 10cc/20cc disposable syringe. Air dried as well as 95% alcohol fixed smears were prepared. Air dried smears were stained with May Grunwald Giemsa (MGG) stain and alcohol fixed smears were fixed with H&E (Hematoxylin & Eosin) & Papanicolaou stains.

Slides were studied under light microscope & cytological diagnosis was made under the standard cytological diagnostic protocol. The patients were followed up for the subsequent mastectomy or biopsy. Cytological diagnosis was compared with the histopathological diagnosis and the statistical analysis was done to assess the utility of FNAC to detect the type of lesion in the breast in comparison to histopathology.

## RESULTS

We included 280 breast aspirates, 268 (95.71%) were female and 12 (4.29%) were males. The age range of these 280 patients was 10 to 80 years. The most common affected age group was 31 to 40 years having 86 (30.71%) patients followed by 21 to 30 years having 70 (25%) patients, so that more than 50% patients were in 3rd to 4th decades [Table 1]. In 128 patients, lump was located in right breast, in 145 patients in left breast and in 7 cases it was bilateral [Table 2]. The most common site for lump was upper outer quadrant having 140 cases followed by upper inner quadrant in 35 cases. In 31 cases, lump was subareolar and in 23 cases it was diffuse involving all the quadrants.

Of the total 280 cases, in 271 cases the aspirated material was adequate to confer the diagnosis, while in 8 cases it was paucicellular with

hemodilution precluding the definite opinion. The spectrum of lesions on cytomorphological interpretation and diagnosis was inflammatory 32(11.43%), benign 180 (64.29%), atypical 6 (2.14%), suspicious of malignancy 8(2.86%) and malignant 46 (16.43%) [Table 4].

In Inflammatory lesions [Table 5], the maximum cases were of acute mastitis 14 (5%) followed by granulomatous mastitis 12 (4.29%). In only 2 (0.71%) cases, stain for AFB was positive and diagnosed as tuberculous mastitis. 3 (1.07%) cases were of Fat necrosis having the history of previous surgeries. In 1 (0.04%) case there was chitinous wall, vegetative nuclei, with scattered lymphocytes, plasma cells, histiocytes, epithelioid cells & foreign body giant cells and diagnosed as Cysticercosis.

In Benign lesions [Table 6], the maximum cases were of Fibroadenoma 115(41.07%). 40 (14.29%) cases were of Fibrocystic disease, 5 (1.79%) having Simple cyst which disappeared after aspiration, galactocele and benign phyllodes tumor shared an equal incidence of 4(1.43%) cases each. All 12 (4.29%) male patients were diagnosed with gynaecomastia.

In 46 (16.43%) malignant lesions [Table 7], maximum cases were of ductal carcinoma NOS 43 (15.36%), 2 (0.71%) were malignant phyllodes and only 1 (0.36 %) was diagnosed as medullary carcinoma.

**Table 1: Breast lumps: Age distribution.**

Age group (years)	Number of cases	Percentage (%)
10-20	50	17.35
21-30	70	25
31-40	86	30.71
41-50	49	17.50
51-60	18	6.43
61-70	3	1.1
>70	4	1.43

**Table 2: Breast lumps: Side distribution (Right, left & bilateral).**

Side	Cases	Percentage (%)
Right	128	45.71
Left	145	51.79
Bilateral	07	2.5
Total	280	100

**Table 3: Breast lumps: Quadrant distribution.**

Quadrant	No. of cases	Percentage (%)
All	23	8.21
Lower inner	21	7.5
Lower outer	30	10.71
Subareolar	31	11.07
Upper inner	35	12.5
Upper outer	140	50
Total	280	100

**Table 4: Breast lumps: Cytomorphologic spectrum.**

Cytological diagnosis	No. of cases	Percentage (%)
Inflammatory	32	11.43
Benign breast lesions	180	64.2
Atypical/probably benign	6	2.14
Suspicious of malignancy	8	2.86
Malignant	46	16.43
Unsatisfactory	8	2.86

**Table 5:** Breast lumps: Distribution of Inflammatory lesions.

Cytological diagnosis	No. of cases	Percentage (%)
Acute mastitis/abscess	14	5
Granulomatous mastitis	12	4.29
Tuberculous mastitis	2	0.71
Fat necrosis	3	1.07
Cysticercosis	1	0.04
Total	32	11.43

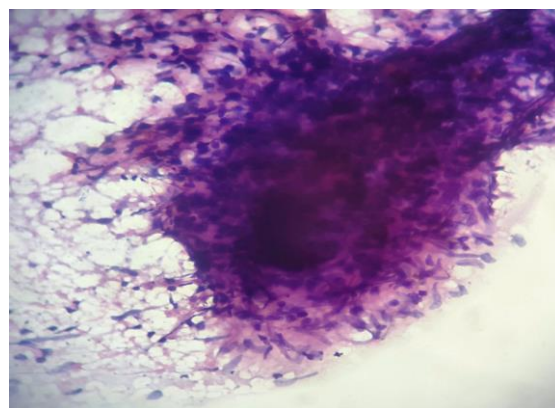
**Table 6:** Breast lumps: Distribution of benign breast lesions.

Benign Breast Lesions	No. of cases	Percentage (%)
Fibrocystic disease	40	14.29
Simple cyst	5	1.79
Galactocele	4	1.43
Gynaecomastia	12	4.29
Fibroadenoma	115	41.07
Benign Phyllodes	4	1.43
Total	180	64.29

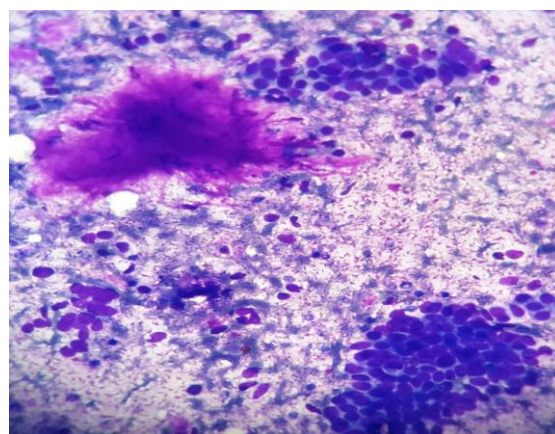
**Table 7:** Breast lumps: Distribution of malignant lesions.

Malignancy	No. of cases	Percentage (%)
Ductal	43	15.36
Medullary	1	0.36
Malignant Phyllodes	2	0.71
Total	46	16.43

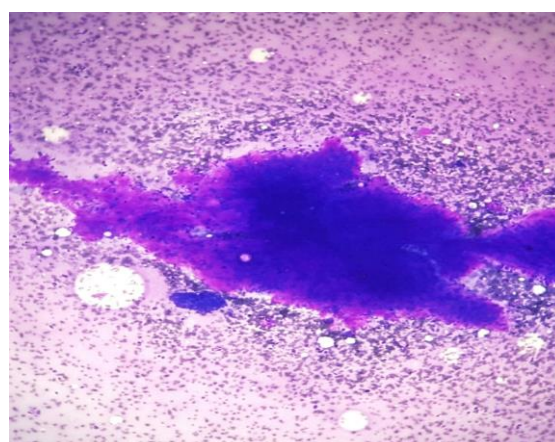
Out of 280 cases of cytomorphological study, only 70 cases underwent a surgical procedure and could be correlated with histopathological examination. In these 70 cases, 1 case of cytologically diagnosed borderline phyllodes was reported Benign phyllodes on histopathological examination (H&E). 2 cases diagnosed as fibroadenoma on cytology were found to be one as ductal carcinoma in situ and other as Invasive ductal carcinoma on histopathology. Another 1 case reported as fibrocystic disease on cytology was diagnosed Invasive ductal carcinoma on histopathological examination, giving false negative result. The sensitivity of present study was 95.7% & in other studies it was 83%-98.5%. All the cases which were diagnosed as malignant lesion on cytology were found to be malignant on histopathology also. Ductal carcinoma was the most common malignant lesion both on cytomorphological & histopathological diagnoses, so the ability of FNAC to detect a malignant case was 100%.



**Figure 1:** Granulomatous mastitis, smear showing epithelioid cell granuloma (H&E stain, x400).



**Figure 2:** Fibroadenoma, smear showing ductular epithelial cells in clusters with myoepithelial cells along with scattered bare bipolar nuclei and fibromyxoid stroma (May-Grunwald-Giemsa stain, x400).

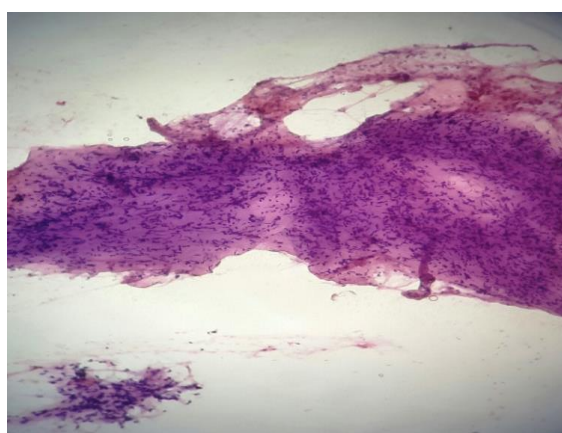


**Figure 3:** Benign phyllodes, smear showing predominance of stromal over epithelial component (May-Grunwald-Giemsa stain, x100).

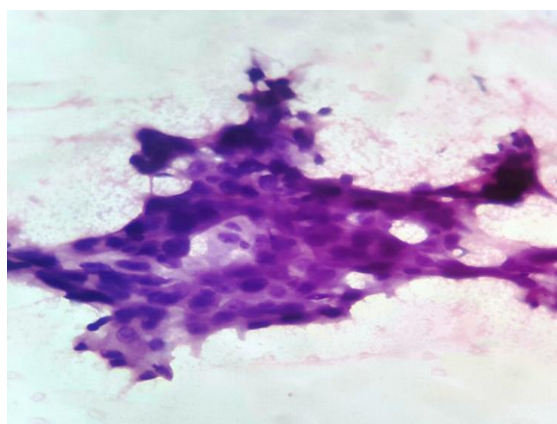
## DISCUSSION

In the present study, we included 280 breast lump cases in which cytomorphological study was done and cytological diagnosis were made following laid down criteria. In these, 70 cases underwent

lumpectomy or mastectomy and became available for histopathological correlation. FNAC results were divided into inflammatory, benign, atypical/probably benign, suspicious of malignancy, malignant & unsatisfactory categories. Only in 8 cases (2.88%) aspirate was unsatisfactory for evaluation where no diagnosis was made, rest aspirates were adequate and diagnosis were made. Unsatisfactory smears were slightly more than Mohammed et al<sup>[10]</sup>, less than Park & Han<sup>[11]</sup>, Rocha et al<sup>[12]</sup> & Domingner et al<sup>[13]</sup>. Unsatisfactory samples can be due to insufficient experience, faulty techniques or due to the nature of lesion itself. Repeat aspiration with proper technique usually yields adequate material to confer cytological diagnosis, if still inadequate, core/incisional biopsy remains the choice.



**Figure 4:** Benign phyllodes, smears showing cell rich stroma (H&E stain, x400).



**Figure 5:** Ductal carcinoma NOS, smear showing pleomorphic epithelial cells in loose clusters having pleomorphic, hyperchromatic nuclei, coarse chromatin and prominent nucleoli (H&E stain, x400).

The age of the patients ranged from 10 to 80 years with high majority of cases in 3rd to 4th decades of life, similar age groups were observed by Chandanwale et al<sup>[14]</sup> & Likhar et al<sup>[15]</sup> in 2013. In inflammatory lesions 32 (11.43%), we found most commonly acute mastitis 14 (5%) cases

mostly presented with a short history of tense lump in breast with tenderness and redness of overlying skin. Well-formed epithelioid cell granulomas were found in 12 (4.29%) cases which reported as granulomatous mastitis, 2 (0.71%) cases have granulomas as well as AFB positivity and were thus reported as tuberculous mastitis. Tuberculous mastitis is not infrequent in India and most of the time clinically and radiologically it mimics with carcinoma of breast. So quick and appropriate diagnosis by FNAC relieves the anxiety of patients and opens the door for cure. 3 (1.07%) cases were reported as fat necrosis all have the history of surgery or trauma. In 1 (0.04%) case we found chitinous wall, vegetative nuclei with scattered histiocytes, epithelioid cells and foreign body giant cells, though hooklets not found reported as cysticercosis and responded to medical treatment, cysticercosis of the breast is rare and it should be considered as a differential diagnosis for a lump in breast.

In the present study, fibroadenoma was the most common benign lesion and maximum cases of fibroadenoma were in the age group of 21-30 years which is similar to results shown by Kochhar et al<sup>[16]</sup>, Khanzada et al<sup>[17]</sup>, Iyer et al<sup>[18]</sup>, Akhtor et al<sup>[19]</sup> & Irabor et al<sup>[20]</sup>. Thus, the present study is in concordance with the studies available in the literature. In our study, fibrocystic disease was the next common lesion, 40 (14.29%) cases which is in agreement with Abdullah et al, 1999<sup>[21]</sup> and Khemka et al, 2009<sup>[22]</sup>.

In the present study, there were 12 (4.29%) male breast aspirates and all were diagnosed as gynaecomastia, the age ranged from 27 to 80 years. It is easy to diagnose gynaecomastia on cytology when male comes with a subareolar mass. The main problem in diagnosis is getting a satisfactory material and its painful aspiration. Usually the indication for FNAC is to rule out malignancy.<sup>[23]</sup>

In the present study, we observed 4 (1.43%) cases of phyllodes which is similar to reported by Likhar et al<sup>[15]</sup> in 2013. The number of malignant lesions in the present study was 46 (16.43%) cases which is in concordance with Park and Han<sup>[11]</sup>, Rochar et al<sup>[12]</sup> and Dominguer et al<sup>[13]</sup>. Maximum number of malignant cases were in 41 to 50 years of age group which is similar to the results by Khan et al<sup>[24]</sup>. Most affected age group being 41-50 years. The common side of affected breast was left side and the commonest site for lump breast was upper outer quadrant. This was in accordance with previous studies in literature<sup>[12,25]</sup>. Singh et al<sup>[26]</sup> reported that invasive ductal carcinoma is the most common breast malignancy and found in the age group of 41-60 years. The present study shows similar results. 2 (0.71%) cases reported as malignant phyllodes tumor. Cytological distribution was based on dominance of stromal component on epithelial component with

dispersion, marked nuclear pleomorphism and mitotic activity. We observed the sensitivity of 95.71% & specificity of 98.56% in our study, this is in accordance to sensitivity of 81-98% and specificity of 79.60-100% reported in various studies. High sensitivity & specificity rates of outcome point out the usefulness of FNAC as an effective diagnostic tool in the management of palpable breast lump.

## CONCLUSION

Fine needle aspiration cytology is a minimally invasive, rapid and effective method for preoperative diagnosis to relieve the anxiety of patient if it is benign and also for post operative follow up of breast lumps to ensure the reoccurrences. Despite being an invaluable tool, FNAC has some pitfalls, both false-positive and false-negative results can occur, which can be minimized by experience and expertise of cytopathologist. Benign breast lesions are commoner than malignant lesions, fibroadenoma is the commonest condition in the benign category followed by fibrocystic disease, whereas ductal carcinoma accounts for the highest number of malignant lesions. So, we conclude that FNA should be used as a routine diagnostic procedure for breast lumps due to its cost effectiveness, quick results and high accuracy. Breast cancer is the most common cancer in the women after cancer cervix, so we recommends FNAC as a first line diagnostic procedure in patients presenting with breast lumps especially in developing countries with limited resources.

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