**Original Research Paper**

**Pathology**

# BENIGN BREAST LESIONS CYTOLOGY AT A TERTIARY CARE CENTRE

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**ABSTRACT** **Objectives:** To study the various cytomorphologic features of benign breast lesions. **Methods:** This study is a retrospective cross-sectional study conducted in the Department of Pathology from 2020 to 2022. Clinical details and cytologic features were obtained from departmental records. **Results:** A total of 200 cases were recorded during the study period. The age groups ranged from 12-60 years. All cases were female. The cytological diagnoses were as follows: Fibroadenoma - 110 (55%), fibrocystic disease - 28 (14%),benign phyllodes - 27 (13.5%), fibroadenosis - 10 (5%), acute suppurative mastitis - 9 (4.5%), chronic granulomatous mastitis - 8 (4%), lactating adenoma - 5 (2.5%),fat necrosis - 3(1.5%) **Conclusion:** FNAC helps in the rapid diagnosis and early treatment of lesions. It also helps to avoid unnecessary invasive surgery for non-neoplastic and benign breast disease, making it a useful diagnostic tool.

**KEYWORDS :** FNAC, benign breast lesions

## INTRODUCTION

Benign breast lesions are the most common spectrum among breast lesions. They occur more frequently in the left than in the right breast, and the most common location is the upper outer quadrant. Fibroadenomas occur most frequently in the second and third decades of life, usually in nulliparous young women, whereas fibrocystic disease occurs most frequently in the fifth decade, usually in parous women.

FNAC of the breast has a high ranking as the first method of examination. This is likely due to its simplicity, minimal invasiveness, cost-effectiveness, quick turnaround time, and good diagnostic accuracy. The rapid turnaround time helps ensure that breast lesions can be diagnosed the same day and treated early. Rapid identification of benign breast disease reduces patient concern[1] This study was conducted to identify different types of benign breast lesions presented at our hospital Government General Hospital in Anantapuramu.

Benign breast disease has a high prevalence and a noticeable impact on women's quality of life and increases the risk of breast cancer in certain histological forms[2]

It is estimated that one in two women will develop some form of fibrocystic breast disease during their lifetime and that one in five women may develop fibroadenoma.

## MATERIALS AND METHODS

The following study was conducted on 200 cases in the Department of Pathology, Government Medical College and Hospital, Anantapuramu, from 2020 to 2022 as a cross-sectional study. All cases that met the inclusion criteria, i.e., those diagnosed with non-neoplastic and benign breast disease, were included and all non-benign breast cases were excluded. Clinical and demographic data were obtained from departmental records. FNAC was performed using 5-cc syringes with a 22-23-G needle, observing all aseptic precautions, and stained with hematoxylin and eosin stain. Categorical data were expressed as percentages, pie charts, and tables and used for data presentation. Ethical clearance was obtained from the GMC Institutional Ethics Committee, Anantapuramu.

## RESULTS

A total of 200 cases were included in the present study. All cases were female. The most common complaint was a lump in the breast, followed by breast pain in the majority of cases. The average age at presentation of benign breast disease was 25 years. The youngest patient was 14 years old and the oldest was 56 years old.

The mean age of the most common benign neoplasm, fibroadenoma, was 25 years. The cytologic diagnoses were as follows: Fibroadenoma - 110 (55%), fibrocystic disease - 28 (14%), phyllodes - 27 (13.5%), fibroadenosis - 10 (5%), acute suppurative mastitis - 9 (4.5%), chronic granulomatous mastitis - 8 (4%), lactating adenoma - 5 (2.5%), fat necrosis - 3 (1.5%) (see Table 1).

**Table 1: Cytomorphological Diagnosis of Benign Breast Lesions on FNAC**

| Benign Breast lesions | No of cases | Percentage % |
|---|---|---|
| Fibroadenoma | 110 | 55 |
| Phyllodes tumor | 27 | 13.5 |
| Fibrocystic disease | 28 | 14 |
| Fibroadenosis | 10 | 5 |
| Acute suppurative mastitis | 9 | 4.5 |
| Chronic Granulomatous mastitis | 8 | 4 |
| Lactational Adenoma | 5 | 2.5 |
| Fat necrosis | 3 | 1.5 |

**Table 2: Age-wise distribution of Benign Breast Lesions**

| Benign breast lesion | 10-20 yrs | 21-30yrs | 31-40yrs | 41-50yrs | 51-60yrs |
|---|---|---|---|---|---|
| Fibroadenoma | 10 | 60 | 20 | 10 | 10 |
| Phyllodes tumor | nil | 10 | 10 | 7 | nil |
| Fibrocystic disease | nil | 15 | 10 | 3 | nil |
| Fibroadenomas | nil | 5 | 5 | nil | nil |
| Acute suppurative mastitis | nil | 5 | 4 | nil | nil |
| Chronic Granulomatous mastitis | nil | 4 | 4 | nil | nil |
| Lactational Adenoma | nil | 5 | nil | nil | nil |
| Fat necrosis | nil | 1 | 2 | nil | nil |
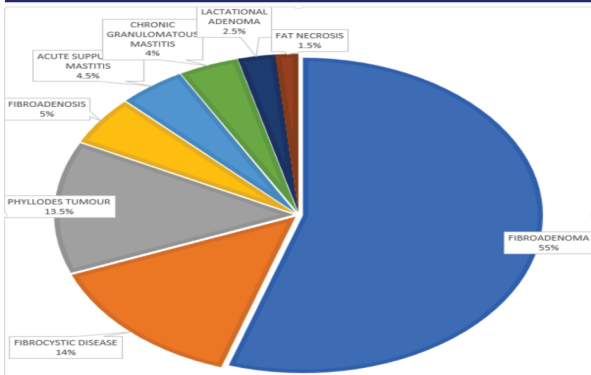
Pie Chart Depicting Benign Breast Lesions

## DISCUSSION

Breast lesions are a heterogeneous group of diseases ranging from inflammatory lesions to invasive carcinomas. Breast lesions are the most common complaint with which patients present to the hospital. Most of these lesions are either benign or non-neoplastic[1]

Fine needle aspiration cytology (FNAC) is one of the most common investigations for palpable lesions. It is one of the first examinations performed on palpable breast masses.

The **TRIPLE ASSESSMENT** approach to breast lesions combines clinical, radiologic, and pathologic information to ensure accurate diagnosis and patient management. FNAC is an important component of this "triple approach". It is a safe, simple, and cost-effective outpatient procedure with high accuracy[2]. FNAC is an effective method for diagnosing breast lesions and aids in early detection and treatment[9].

### Fibroadenoma:

Fibroadenoma is the most common benign breast lesion. On cytopathology, the smears are hypercellular with a relatively monomorphic population of ductal cells (Figure 1), some of which form single-layered sheets and others form angular clusters, staghorn patterns, along with numerous bipolar cells (myoepithelial cells) in the background[4].

### Grey Zone Lesion Features

Fibroadenoma is one of the most commonly misdiagnosed lesions that present as grey zone lesions. Some degree of atypia, nuclear enlargement, and cellular discohesion is often associated with aspirates of fibroadenomas, raising suspicion of low-grade adenocarcinoma associated with hypercellularity of the lesions[5].

However, maintenance of polarity, relative paleness of nuclear chromatin, and the presence of background bipolar cells often aid in correct diagnosis. Fibroadenomas, unlike tubular carcinomas, do not show sudden changes in tube diameter or pointed tips. Of particular concern are cases referred to as "fibroadenoma with atypia" because they can be diagnosed as low-grade malignancies[5].
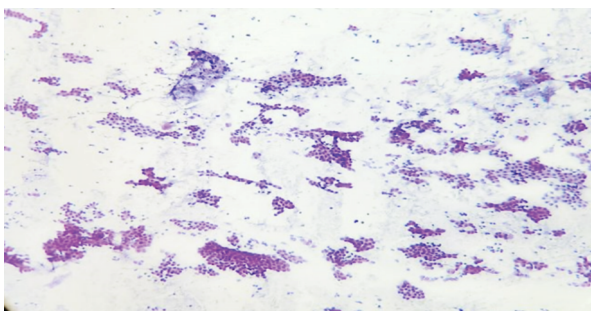


**FIG 1a:** Fibroadenoma with benign ductal epithelial cells,

arranged in clusters and lined by myoepithelial cells. bare bipolar nuclei are seen in the background.H&E stained 10x magnification.
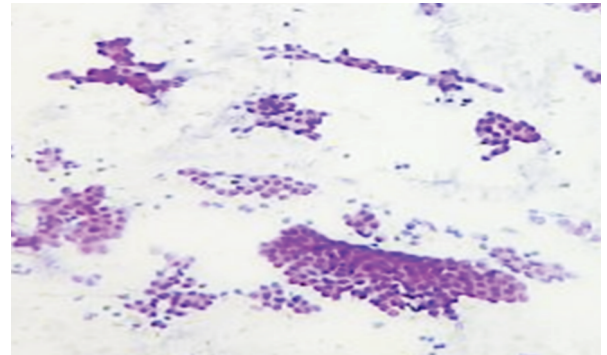


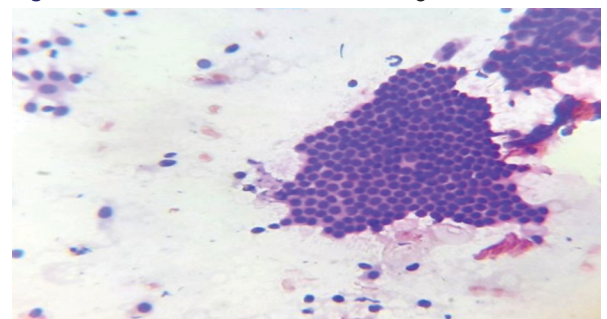**Fig. 1b :** Fibroadenoma ,H&E stain, 40x magnification.



**Fig .1c :**Fibroadenoma, H&E stain, 40x magnification.

### Phyllodes Tumour

Phyllodes tumor is a fibroepithelial tumor in which more stromal proliferation is seen. A lesion larger than 4 cm with abundant and hypercellular fibromyxoid stroma is usually diagnosed as a Phyllodes tumor. In addition, the epithelial component of phyllodes is broad and rounded compared with the angular or spiny clusters of fibroadenomas 5.

### Grey Zone Lesion

Phyllodes tumor also represents an important grey zone lesion. Nuclear pleomorphism and mitotic count progressively increase from borderline to malignant phyllodes tumor 5
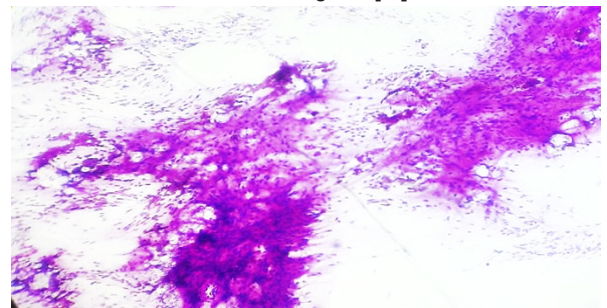


**Figure 2a :** Benign phyllodes tumour with distinct stromal component, H & E stained,10x magnification.
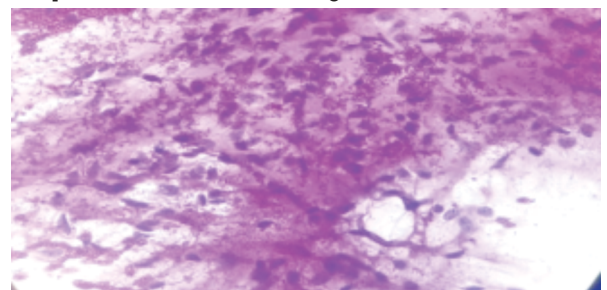


**Figure 2b:** Benign phyllodes tumor with a distinct stromal component, H & E stained, 40x magnification.

## Fibrocystic Disease

Fibrocystic breast disease is one of the most common benign breast diseases. The etiology of benign breast disease has shown a strong clinical association with women receiving estrogen and anti-estrogen treatment6. Hyperestrogenism and anovulation are associated with benign breast disease because the growth of glandular breast tissue is affected by estrogen and progesterone levels in pathologic processes7.
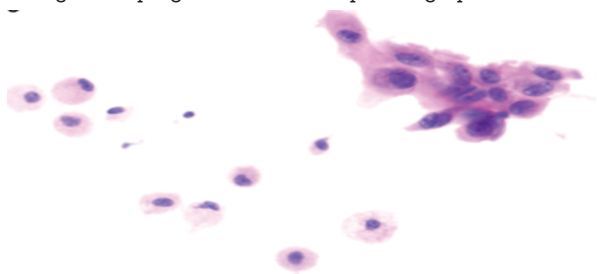


**Fig. 3 :** Benign ductal epithelial cells and cyst macrophages are seen (H & E stain, 40x magnification).

## Acute Suppurative Mastitis

Mastitis is an inflammation of the breast tissue that can be divided into lactational and non-lactational mastitis. Lactation mastitis is the most common form of mastitis. It is also known as postpartum mastitis, is usually due to persistent obstruction of the milk ducts and contains infectious components that result from bacterial invasion through skin lesions. Patients may develop a focus on erythema, pain, and swelling and may present with systemic symptoms, including fever. It most commonly occurs during the first six weeks of breastfeeding but can occur at any time during lactation, with most cases resolving after three months11. Periductal Mastitis is a benign inflammatory disease of the subareolar milk ducts and most commonly occurs in women of childbearing age. Lactation mastitis is most commonly caused by bacteria that colonize the skin with Staphylococcus aureus being the most common. Methicillin-resistant S. aureus (MRSA) has become an increasingly common cause of mastitis, and risk factors for MRSA should be considered12.

Risk factors for mastitis during lactation include a history of mastitis, cracks, and crevices in the nipple, inadequate milk letdown, maternal stress, sleep deprivation, tight-fitting bras, and the use of antifungal nipple creams12.
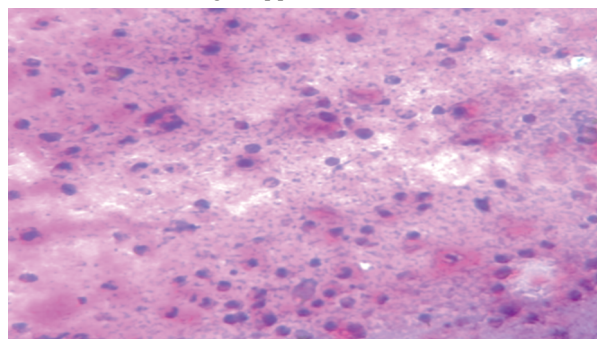


**FIG: 4** Acute inflammatory cells and few benign ductal epithelial cells in purulent mastitis H & E stained 40x magnification.

## Chronic Granulomatous Mastitis

Cytologic smears in granulomatous inflammation show multiple epithelioid cell granulomas, multinucleated giant cells, inflammatory cells composed of lymphocytes and plasma cells, and often a necrotic background.

Granulomatous inflammation of the breast can be caused by infectious diseases such as tuberculosis (Fig. 4 ) or fungi; however, it can also have noninfectious causes such as sarcoidosis or idiopathic granulomatous mastitis or sometimes occur as part of a foreign body reaction to silicone implants5.

Idiopathic granulomatous mastitis is difficult to diagnose on cytologic smears because it is a logocentric lesion that is difficult to detect on cytologic smears. Based on the history and cytomorphology, only the possibility of mastitis can be suspected 9.
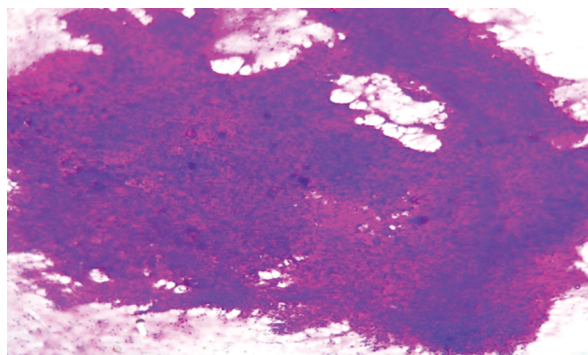


**Figure 5:** Epithelioid cells in granulomatous mastitis H & E stained 10x magnification.
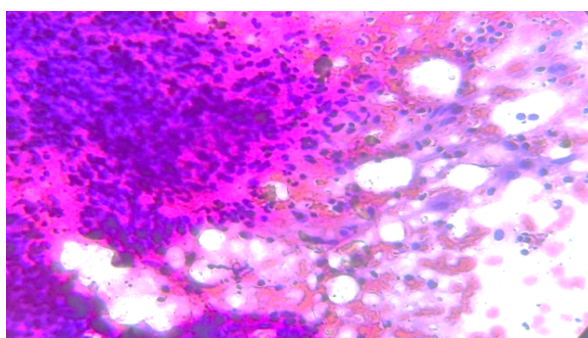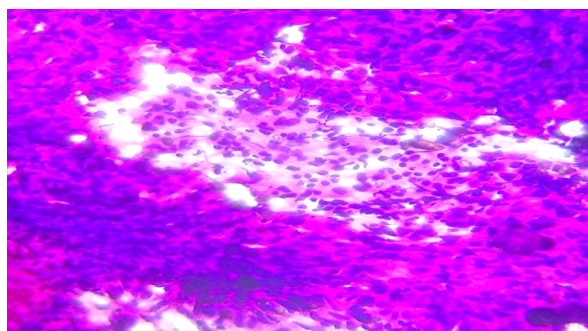




**Figure 5a & 5b :** Epithelioid cells in granulomatous mastitis H & E stained 40x magnification.

## Fat Necrosis

Fat necrosis usually manifests as a breast lump or radiographic compression in the breast. A history of trauma is not always obtained. FNA smears show a dirty necrotic background, many foamy histiocytes, and inflammatory cells, including neutrophils, lymphocytes, and plasma cells. Which cell type predominates depends on the timing of the FNA. In the acute stage, a neutrophilic infiltrate predominates, whereas a lymphoplasmacytic infiltrate is seen in a later stage. Fig. 6

In addition, epithelioid histiocytes, occasional poorly formed granulomas, and multinucleated giant cells are seen. Sometimes capillary proliferation may occur when the lesion reaches an organizing phase.

The main difficulties with this lesion are the clinical-radiologic

suspicion of a mass, the absence of trauma history in some cases, reactive atypia in the ductal cells (Figure 6) that may look malignant, and a necrotic background8.
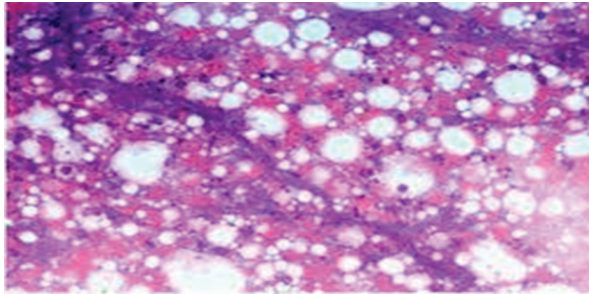


**Figure 6:** Neutrophilic infiltrate and necrotic background.

However, the predominance of inflammatory cells and foamy histiocytes compared to ductal cells, which are often found sparsely on a typically dirty necrotic background, points an experienced cytopathologist to the correct diagnosis.

### Lactating Adenoma

A lactating adenoma is a benign tumor of the breast that often occurs in late pregnancy and lactation. It is commonly seen in young primiparous women in their second or third decade of life. Cytology reveals numerous, densely packed lobular units, either in clusters or as isolated globular structures, with myoepithelial cells at the periphery. Some of the clusters break open on smear preparation to form flat cell plates with cytoplasm dotted with large vacuoles representing colostrum and spherical nuclei of equal size, each containing one or more conspicuous, large, sometimes irregular nucleoli.

**GREY ZONE FEATURE** that may mislead an uninformed observer into believing that cancer is present. This similarity is deceptive because cellular and nuclear abnormalities are much higher in medullary carcinoma than in cells from a lactating breast.
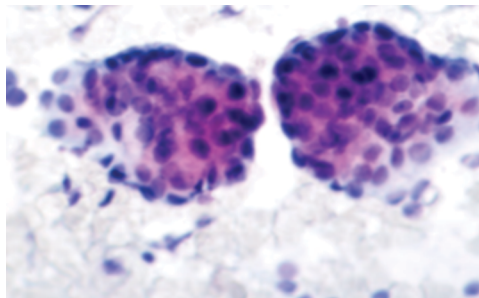


**FIG7a** Two lobular units, benign ductal epithelial cells with comma-shaped myoepithelial cells, H&E stain, 40x magnification
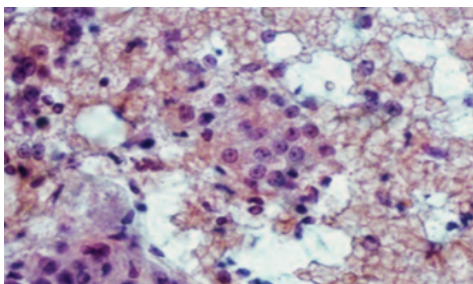


**FIG 7b** Distinct nucleoli in a benign ductal epithelial cell cluster under.

### Conditions associated with a false positive diagnosis onFNAC.

False positive diagnoses on FNAC are often due to difficulties in interpretation. Conditions associated with a false positive

diagnosis include:
1. Fibroadenoma with atypical features.
2. Mass or thickening associated with lactation.
3. Radial scar with hyperplasia.
4. A papilloma: reliable differentiation between papilloma, atypical papilloma, intracystic papillary carcinoma, and invasive papillary carcinoma is usually not possible based on cytological material alone.
5. Fat necrosis: the triple test can be misleading here, as fat necrosis can mimic carcinoma both clinically and on imaging.
6. Atypical apocrine cells: Differentiation between apocrine metaplasia and apocrine carcinoma can occasionally be difficult.
7. Gynecomastia and phyllodes tumor3.

### False-negative diagnoses in FNAC.

False-negative diagnoses are most often the result of sampling errors and sometimes interpretation errors. Some of the situations and conditions associated with false-negative diagnoses on FNAC are:
1. Difficulty in sampling some lesions, for example, small malignant lesions that are well-differentiated and sclerotic, hard-to-palp masses, and lesions close to the chest wall.
2. Well-differentiated grade I cancer, as cell yield may be low or have only mild cell atypia.
3. Infarcted papilloma.
4. Invasive lobular carcinoma may have few cells.
5. Low-grade ductal carcinomas in situ, some tubular carcinomas, and cribriform carcinomas may yield deceptively "benign" aspirates.
6. Inflammatory carcinomas in which no definite mass is palpable.
7. Necrosis at the center of a high-grade carcinoma.
8. Sclerosis, which is a possible cause of low cell yield.
9. Papillary carcinomas, require excision and examination of the entire lesion and capsule.3

### CONCLUSION

FNAC is a simple, minimally invasive test that can contribute to rapid diagnosis and staging of patients with non-neoplastic benign lesions for appropriate treatment.

The purpose of a thorough understanding of benign breast disease is 1) to identify patients at increased risk for breast cancer and 2) to differentiate between benign and malignant breast diseases so that increased monitoring or preventive therapy can be initiated.

FNAC can achieve this goal in conjunction with mammography and biopsy.It is advisable to diagnose benign breast disease early to reduce the mortality and morbidity associated with these lesions so that treatment can be initiated as early as possible

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