



CYTOMORPHOLOGICAL STUDY OF DIFFERENT BREAST LESIONS IN NEW RURAL MEDICAL COLLEGE

Dr. Satish Tandale	Assistant Professor, Department Of Pathology, Government Medical College, Dharashiv, Maharashtra.
Dr. Shraddha Kolewad*	Senior Resident, Department Of Pathology, Government Medical College, Dharashiv, Maharashtra. *Corresponding Author
Dr. Ashwini Kadam	Senior Resident, Department Of Pathology, Government Medical College, Dharashiv, Maharashtra.
Dr. Vivek Kolage	Assistant Professor, Department Of Pathology, Government Medical College, Dharashiv, Maharashtra.
Dr. Rutuja Wayal	Assistant Professor, Department Of Pathology, Government Medical College, Dharashiv, Maharashtra.

ABSTRACT

Background: Fine Needle Aspiration Cytology (FNAC) is a vital, minimally invasive, and cost-effective technique for evaluating breast lumps, particularly in rural healthcare settings. Breast lesions range from benign to malignant, and FNAC plays a crucial role in early diagnosis and guiding appropriate clinical management. **Objectives:** This study aimed to assess the cytomorphological patterns of breast lesions diagnosed via FNAC at a rural medical college in Maharashtra and to determine the frequency of benign versus malignant findings. **Materials And Methods:** A retrospective analysis was performed on 119 patients presenting with palpable breast lumps. FNAC findings were categorized into benign, atypical, suspicious, and malignant based on standard cytological criteria. **Results:** Among the 119 cases, fibroadenoma was the most common lesion (34.5%), followed by benign non-specific lesions (16.8%), acute suppurative lesions (9.2%), and suspicious ductal malignancy (9.2%). Confirmed malignancy accounted for 11.8% of cases. Other findings included fibrocystic disease (6.7%), atypia of undetermined significance (3.4%), gynaeomastia (4.2%), mastitis (2.5%), and phyllodes tumors (0.8%). **Conclusion:** The study confirms a predominance of benign breast lesions, with fibroadenoma being the most frequent. FNAC remains an invaluable diagnostic tool, especially in rural areas with limited access to advanced diagnostic resources.

KEYWORDS :**INTRODUCTION**

Breast lesions encompass a broad spectrum of conditions, ranging from benign changes to malignant tumors.^[1] One of the most common clinical presentations among women is a palpable breast lump, often associated with anxiety due to the potential risk of cancer. Though not all lumps are malignant, early differentiation between benign and malignant lesions is essential for timely management and alleviating patient concerns.

The "triple assessment" approach—clinical examination, radiological imaging (ultrasound or mammography), and cytological evaluation—remains the gold standard in diagnosing breast lesions.^[13] Fine Needle Aspiration Cytology (FNAC) is a key component of this assessment due to its cost-effectiveness, simplicity, and suitability for outpatient use. It plays a particularly significant role in rural or resource-constrained settings, where advanced diagnostic infrastructure is limited. In areas like rural Maharashtra, where challenges such as specialist scarcity, diagnostic delays, and financial barriers are common, FNAC serves as a frontline diagnostic tool.

This study was conducted at a rural medical college to evaluate the cytomorphological spectrum of breast lesions through FNAC. The goal was to enhance early detection strategies, support clinical decision-making, and contribute to regional cancer surveillance.

Table 1: Cytological diagnosis of cases with age distribution

Diagnosis	11-20 Ye ars	21-30 Ye ars	31-40 Ye ars	41-50 Ye ars	51-60 Ye ars	61-70 Ye ars	71-80 Ye ars	> 80 Ye ars	Tot al	Percent age of total cases (%)

Fibroadenoma	14	14	11	2					41	34.5%
Benign breast lesions (unspecified)	2	5	9	3			1		20	16.8%
Gynaeomastia	1	1		1	1	1			5	4.2%
Mastitis		3							3	2.5%
Fibrocystic disease									8	6.7%
Proliferative breast lesion		1							1	0.8%
Benign phyllodes			1						1	0.8%
Acute suppurative breast lesions	1	3	2	2			3		11	9.2%
Atypia of undetermined		1	2	1					4	3.4%
Suspicious for malignancy			2	3	3	1	1	1	11	9.2%
Positive for malignancy			2	1	4	5	1	1	14	11.8%
total	17	25	27	11	8	7	3	2	108	100%

Table 2: Cytological Comparison of the Study with Literature Reports

Studies	Inadeq uate/In sufficie nt (%)	Benign /Infla mmato ry (%)	Suspici ous for malign ant (%)	Malig nant lesio n (%)	Total cases (No)
Panjvani et al. [2]	0	68.18	1.35	31.08	222
Khan et al. [13]	0	32.4	12.2	55.4	74

Chauhan et al. [3]	4.9	73.07	3.85	18.16	468
Yusuf and Atand A [4]	0	54.5	23.5	22	200
Singh et al. [5]	0	51	5	39	100
Rehan et al. [6]	11.1	64.5	14	10.5	287
Montezuma et al. [7]	5.77	73.38	15.31	5.54	3625
Gorasiya and Jhaveri [8]	0	9.38	60	30.62	160
Rioki and Rogená [9]	15.2	78.1	5.9	0.8	768
Khattak et al. [10]	0	72.7	7.94	19.31	88
Present study	0	54	26	19.5	46

RESULTS -

Sample Overview

A total of 119 palpable breast lump cases were examined cytologically using FNAC. The study encompassed both female and male patients, ranging in age from 11 to over 80 years.

Cytological Distribution -

Among the 119 cases, benign lesions were predominant:

- **Fibroadenoma** was the most frequent, found in **41 cases (34.5%)**.
- **Unspecified benign lesions** were noted in **20 cases (16.8%)**.
- Other benign diagnoses included **fibrocystic disease (8 cases, 6.7%)**, **gynaecomastia (5 cases, 4.2%)**, **mastitis (3 cases, 2.5%)**, **benign phyllodes tumor (1 case, 0.8%)**, and **proliferative breast lesion (1 case, 0.8%)**.
- **Acute suppurative inflammation** was observed in **11 cases (9.2%)**.

Atypical cases (Atypia of Undetermined Significance - AUS) were identified in **4 cases (3.3%)**, where the cytological features did not definitively indicate either benignity or malignancy.

Suspicious for malignancy lesions accounted for **11 cases (9.2%)**, while **malignant lesions** confirmed by cytology total **14 cases (11.7%)**, all suggestive of **ductal epithelial carcinoma**.

Age-Wise Distribution

- The highest number of cases was seen in the **31–40 years** age group (**27 cases, 22.7%**), followed by **21–30 years (25 cases, 21.0%)** and **11–20 years (17 cases, 14.3%)**.
- **Benign lesions** were most common in individuals under 40.
- **Malignant and suspicious lesions** were predominantly seen in patients **above 40 years**, particularly between **51–70 years**, where **9 out of 14 malignant cases (64.3%)** were reported, indicating a significant correlation between **increased age and malignancy risk**.

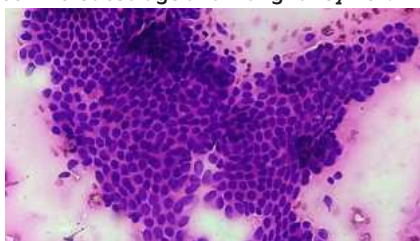


Image 1 Fibroadenoma on cytopathology smear (H&E stain, 400x)

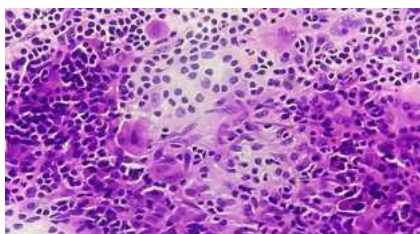


Image 2 Granulomatous mastitis (H&E stain, 400x)

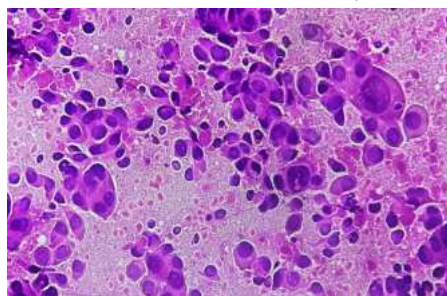


Image 3 Positive for malignancy (H&E stain, 400x)

DISCUSSION

FNAC continues to prove its utility as an essential diagnostic tool in the assessment of palpable breast lumps. Its value lies in being minimally invasive, cost-effective, and capable of yielding rapid results. Introduced by Martin and Ellis in 1930, FNAC has become indispensable in early breast lesion diagnosis, particularly in settings with limited resources.

Benign Lesions

In this study, benign breast lesions comprised the majority of cases (approximately 70%), with fibroadenoma (34.5%) being the most common diagnosis. This finding is consistent with prior studies by Panjvani et al.², Sankaye and Dongre¹, and Almobarak et al.¹², which all identified fibroadenoma as the most frequent benign breast lesion in young women. Other benign conditions such as fibrocystic changes (6.7%) and unspecified benign lesions (16.8%) further reflect global and regional epidemiological trends.

Atypical And Suspicious Lesions

Atypia of Undetermined Significance (AUS), noted in 3.3% of cases, highlights a diagnostic gray zone in FNAC, where cytomorphological features fall short of providing a definitive classification. These cases generally require further evaluation, preferably by core needle biopsy (CNB) or excisional biopsy. However, in rural or low-income settings, access to such procedures may be limited, reinforcing the need to optimize FNAC interpretation and improve diagnostic acumen.

The **suspicious category (C4)** made up 9.2% of the cases. These also demand further confirmation through histopathology, though FNAC can guide immediate clinical decisions in high-risk or symptomatic patients.

Malignant Lesions

Malignant cytology was reported in 11.7% of cases, all of which were suggestive of **ductal epithelial malignancy**. This malignancy rate is lower than reported in some other studies: Bukhari et al.¹¹⁵ (31%) and Almobarak et al.¹¹² (32.6%). These variations can be attributed to differences in population demographics, health-seeking behavior, availability of screening programs, and regional healthcare infrastructure. The relatively lower rate in this study could reflect early health-seeking behavior, better awareness in the study population, or potentially underdiagnosed malignancies due to limited access to confirmatory tools like histopathology.

Age-Related Trends

A clear correlation was observed between **increasing age and malignancy risk**. Individuals above 40 years accounted for a disproportionate number of malignant and suspicious cases. Specifically, the **51–70 years age group contributed 64.3% of the malignant cases**. This is consistent with global data highlighting **post-menopausal age as a significant risk factor for breast cancer**.

In contrast, **benign lesions like fibroadenoma and**

fibrocystic changes were predominantly reported in women below 40 years, aligning with typical patterns of benign breast disease in young adults and adolescents.

Cytomorphological Indicators

Previous Research Has Highlighted Several Diagnostic Indicators For Malignancy, Including:

- High cellularity
- Nuclear pleomorphism
- Increased nuclear-to-cytoplasmic (N:C) ratio
- Presence of prominent nucleoli
- Necrosis

In future studies, systematic recording and analysis of these features would enhance the diagnostic utility of FNAC and help differentiate borderline or suspicious lesions more confidently.

FNAC In Rural Healthcare

In rural areas such as the region studied, FNAC's role becomes even more critical due to limited access to advanced imaging or surgical biopsy services. It enables rapid, cost-effective diagnosis and guides appropriate referral or management decisions at the primary care level. Moreover, it contributes valuable epidemiological data for regional cancer tracking, enabling public health authorities to plan interventions more effectively.

CONCLUSION

This study reinforces FNAC as an effective first-line diagnostic tool for evaluating breast lumps, particularly in rural and resource-constrained settings. The predominance of benign lesions, especially fibroadenoma in younger women, suggests that FNAC helps avoid unnecessary invasive procedures. However, the significant number of suspicious and malignant lesions in older women underlines the need for increased vigilance, timely diagnosis, and targeted awareness in the aging population.

FNAC's strengths—low cost, minimal invasiveness, rapid diagnosis—make it especially valuable in places where diagnostic infrastructure is limited. While limitations like diagnostic ambiguity in atypical cases persist, FNAC remains a cornerstone of breast lesion evaluation and an essential component of early breast cancer detection strategies in rural healthcare systems.

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