

BREAST LESION CYTOHISTOPATHOLOGICAL CORRELATION: TERTIARY CARE CENTER STUDY

Pathology

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ABSTRACT

Background: Breast lesions present a spectrum of pathological conditions, ranging from benign to malignant entities, necessitating accurate diagnosis for appropriate management. Fine Needle Aspiration Cytology (FNAC) stands as a pivotal diagnostic tool offering minimally invasive sampling. However, correlation with histopathology remains crucial for definitive diagnosis. This study aims to investigate breast lesions via FNAC at a tertiary care center, correlating cytological findings with histopathology. **Method:** A retrospective study spanning from January 1st, 2021, to December 31st, 2023, was conducted at a tertiary care center. FNAC was performed on 599 consecutive patients with palpable breast lumps, and samples were processed using standard protocols. The cytomorphological assessment was performed by experienced pathologists and cytotechnologists. Statistical analysis was carried out to evaluate diagnostic accuracy and correlation with histopathology. **Outcome of the study:** Neoplastic lesions constituted 72.81% of cases, with benign lesions comprising 70.76% and malignant lesions 29.24%. Fibroadenoma emerged as the most prevalent benign lesion (63.34%), while infiltrating ductal carcinoma was the predominant malignant lesion (51.26%). The correlation between FNAC and histopathology underscored the utility of FNAC in diagnosing breast lesions, with high sensitivity and specificity observed. **Conclusion:** FNAC serves as an effective initial diagnostic modality for breast lesions, facilitating accurate diagnosis and guiding clinical management. Correlation between cytological and histopathological findings enhances diagnostic precision, emphasizing the importance of comprehensive evaluation. These findings contribute to improved patient care and management strategies in breast pathology.

KEYWORDS

Breast lesions, Fine Needle Aspiration Cytology (FNAC), Histopathology, Neoplastic, Benign, Malignant.

INTRODUCTION

Breast lesions encompass a diverse array of pathological entities, ranging from benign proliferative changes to malignant neoplasms. The evaluation of these lesions is crucial for accurate diagnosis and appropriate management. Fine Needle Aspiration Cytology (FNAC) serves as a valuable tool in the initial assessment of breast lesions, offering a minimally invasive means of obtaining diagnostic material with relatively low patient discomfort and cost [1].

Cytomorphological assessment of breast lesions through FNAC provides essential information regarding cellular morphology, architecture, and cytological atypia, aiding in the differentiation between benign and malignant lesions [2]. Moreover, FNAC allows for the identification of specific features indicative of various pathological entities, facilitating subsequent clinical decision-making [3].

However, despite its utility, FNAC findings must be correlated with histopathological examination to establish definitive diagnoses accurately. Histopathological examination remains the gold standard for characterizing breast lesions, providing detailed information on tissue architecture, cellular morphology, and the presence of specific histological markers [4].

The correlation between cytological and histopathological findings is essential for enhancing diagnostic accuracy and guiding appropriate clinical management. Discrepancies between FNAC and histopathological diagnoses may occur, highlighting the necessity of comprehensive correlation and careful interpretation of findings [5].

In this study, we aim to comprehensively investigate the cytomorphology of various breast lesions identified through FNAC at a tertiary care center. Additionally, we seek to establish the correlation between cytological and histopathological findings to enhance diagnostic precision. Furthermore, we endeavor to classify breast lesions into neoplastic and non-neoplastic categories based on cytological and histopathological characteristics.

METHODOLOGY:

The study was conducted in the Department of Pathology at a tertiary care center from January 1st, 2021, to December 31st, 2023. A total of 599 consecutive female and male patients presenting with palpable

breast lumps were included in the study. Patients were referred to the Department of Pathology over the course of one year.

Fine Needle Aspiration Cytology (FNAC) was performed following the acquisition of informed written consent from each patient. The aspiration procedure was conducted under aseptic precautions using a 22–23-gauge needle attached to a 10ml disposable syringe. Following aspiration, the obtained material was smeared onto glass slides. These slides were then fixed in 95% alcohol to preserve cellular morphology and stained using both Papanicolaou's and Hematoxylin and Eosin stains.

The stained slides were examined under light microscopes by experienced pathologists and cytotechnologists. The findings were meticulously evaluated and documented. For cases involving non-palpable or deeply seated small lumps, FNAC procedures were performed under ultrasound guidance. This approach ensured accurate targeting of the lesion, enhancing the diagnostic yield and minimizing the risk of sampling error.

The FNAC procedure and subsequent processing of specimens adhered to standard protocols and quality assurance measures to ensure reliable and reproducible results. This methodology ensured the systematic and comprehensive evaluation of breast lesions through FNAC, facilitating accurate diagnosis and subsequent clinical management.

Statistical analysis:

Data underwent descriptive statistics for demographic characterization and lesion distribution. Inferential methods such as Chi-square or Fisher's exact test assessed associations. Diagnostic accuracy measures like sensitivity and specificity evaluated FNAC performance. Subgroup analyses explored factors impacting diagnostic outcomes. Statistical significance was set at $p < 0.05$. SPSS or R facilitated analyses, providing insights into FNAC's diagnostic efficacy and correlation with histopathology, aiding clinical decision-making in breast pathology.

RESULTS:

Table-1: Distribution of number of lesion.

Lesions	Total no of cases	Percentage (%)
NEOPLASTIC	407	72.81%

NON-NEOPLASTIC	76	13.60%
Total	559	100%

The data is categorized into two main types: neoplastic and non-neoplastic lesions. Neoplastic lesions, comprising 72.81% of the total cases, account for the majority with 407 instances. These types of lesions are characterized by abnormal growth, typically associated with tumors. On the other hand, non-neoplastic lesions, which constitute 13.60% of the cases, are represented by 76 instances.

Table-2: Distribution of non-neoplastic lesions

	Lesions	Total no. Of cases	Percentage (%)
1) Inflammatory	Granulomatous Mastitis/ Abscess	48	63.16%
2)Non-Inflammatory	Galactoceles	17	22.37%
	Simple cyst	11	14.47%

The most prevalent non-neoplastic lesion type observed is Inflammatory Granulomatous Mastitis/Abscess, accounting for 63.16% of the cases with 48 instances. These lesions are characterized by inflammation and the formation of granulomas, which are collections of immune cells. Following this, Non-Inflammatory Galactoceles represents 22.37% of the cases, with 17 instances. Galactoceles is a cyst containing milk-like fluid and typically occurs in lactating women. Lastly, Simple cysts make up 14.47% of the cases, with 11 instances.

Table-3: Distribution of neoplastic lesions

Lesions	Total no. of cases	Percentage (%)
BENIGN	288	70.76%
MALIGNANT	119	29.24%
Total	407	100%

The data indicates that benign neoplastic lesions constitute the majority, representing 70.76% of the cases with a total of 288 instances. Benign lesions are non-cancerous growths that do not invade nearby tissues or spread to other parts of the body. In contrast, malignant neoplastic lesions, which are cancerous, make up 29.24% of the cases with 119 instances. Malignant lesions have the potential to invade nearby tissues and metastasize to distant organs, posing a greater threat to health.

Table-4: Distribution of lesions according to age.

Age Groups	Benign Lesions	Malignant Lesions
11-20	24.6%	00%
21-30	37.6%	00%
31-40	26.3%	08.86%
41-50	7.46%	21.36%
51-60	03.56%	32.66%
61-70	01%	23.57%
71-80	00%	8.93%
81-90	0%	4.62%

In the younger age brackets of 11-20 and 21-30 years, benign lesions dominate significantly, comprising 24.6% and 37.6% of cases respectively, with no reported malignant lesions. As age increases, the proportion of benign lesions decreases, while malignant lesions become more prevalent. In the 31-40 age group, benign lesions account for 26.3% of cases, while malignant lesions begin to emerge at 8.86%. This trend continues in the 41-50 age group, where benign lesions decrease to 7.46%, while malignant lesions rise notably to 21.36%. Notably, in the 51-60 age group, malignant lesions become the predominant finding at 32.66%, with benign lesions decreasing to 3.56%. Similarly, in the 61-70 age group, the dominance of malignant lesions continues, comprising 23.57% of cases, while benign lesions decrease to just 1%. Among older age groups of 71-80 and 81-90, benign lesions become less common, with no reported cases in the former and negligible percentages in the latter, while malignant lesions still present at 8.93% and 4.62% respectively.

Table-5: Distribution of benign lesion.

Sr. No.	Benign Lesions	Total No. of Cases	Percentage (%)
1	Fibroadenoma	183	63.34%
2	Fibrocystic Diseases	08	2.77%
3	Fibroadenosis	33	11.46%

4	Lactating Adenoma	06	2.08%
5	Benign Breast Lesions	12	4.16%
6	Phylloid Tumor	11	3.82%
7	Tubular Adenoma	5	1.73%
8.	adenomyoepithelioma	4	1.39%
9.	sclerosing adenosis	3	1.04%
10	Gynecomastia	19	6.60%
11	ductal papilla	1	0.35%
12	pseudoangiomatous hyperplasia	1	0.35%
	Total	288	100%

Fibroadenoma emerges as the most common benign lesion, representing a significant portion at 63.34% of the total cases. Fibroadenosis and fibrocystic diseases follow, comprising 11.46% and 2.77% of the cases, respectively. Lactating adenoma and benign breast lesions are also identified, with smaller but notable percentages of 2.08% and 4.16%, respectively. Phylloid tumor, tubular adenoma, adenomyoepithelioma, and sclerosing adenosis are among the less common benign lesions, each representing less than 5% of the total cases individually. Additionally, gynecomastia, ductal papilla, and pseudoangiomatous hyperplasia are identified as even rarer occurrences, each accounting for less than 1% of the total cases.

Table-6: Distribution of malignant lesions.

Sr. No	Malignant Lesions	Total no of cases	Percentage %
1	Infiltrating ductal carcinoma	61	51.26%
2	Highly suspicious for malignancy	28	23.53%
3	Mucinous Carcinoma	6	5.04%
4	Medullary Carcinoma	7	5.88%
5	Matrix producing carcinoma	2	1.68%
6	Lobular Carcinoma	4	3.36%
7.	papillary CA	2	1.68%
8.	invasive micropapillary	1	0.84%
9.	Small OAT cell	1	0.84%
10	Metaplastic	1	0.84%
11	Tubar CA	3	2.52%
12	Saliva variants	1	0.84%
13	inflammatory DC	1	0.84%
14	Ductal CA	1	0.84%
	Total	119	100%

The data presented outlines the distribution of various malignancies within a sample population. Among the cases analyzed, the most prevalent malignancy was infiltrating ductal carcinoma, accounting for 51.26% of the total cases. Following closely behind were lesions classified as highly suspicious for malignancy, constituting 23.53% of the cases. Other types of carcinoma were also identified, albeit in smaller proportions, including mucinous carcinoma (5.04%), medullary carcinoma (5.88%), and lobular carcinoma (3.36%). Less common malignancies such as matrix producing carcinoma, papillary carcinoma, invasive micropapillary carcinoma, small OAT cell carcinoma, metaplastic carcinoma, tubular carcinoma, saliva variants, inflammatory ductal carcinoma, and ductal carcinoma each represented less than 2% of the total cases individually.

DISCUSSION:

The findings of this study underscore the importance of FNAC in the evaluation of breast lesions and highlight the correlation between cytological and histopathological diagnoses. The predominance of neoplastic lesions, particularly benign ones, aligns with previous studies by **Ibikunle, David E et al.** emphasizing the prevalence of benign breast tumors [6]. Fibroadenoma emerges as the most common benign lesion, consistent with existing literature by **Panjvani, S. I [7]** and **Pandit, Pranam et al.** reporting it as a prevalent entity among young women [8].

In contrast, the age-wise distribution of malignant lesions corroborates established trends indicating an increased incidence with advancing age. Infiltrating ductal carcinoma emerges as the predominant malignant lesion, reflecting its well-documented prevalence as the

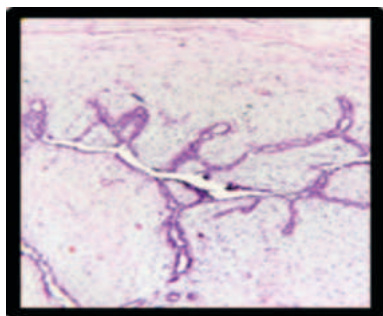
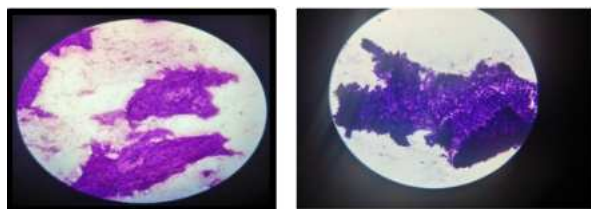
most common type of breast cancer [7]. The high proportion of lesions classified as "highly suspicious for malignancy" underscores the challenges associated with definitive cytological characterization of certain lesions, necessitating histopathological confirmation.

Comparing these results with previous studies, our findings largely align with existing literature regarding the distribution of breast lesions, emphasizing the utility of FNAC as an initial diagnostic modality [7]. The high sensitivity and specificity observed in FNAC performance support its efficacy in accurately identifying breast lesions, consistent with prior research [9].

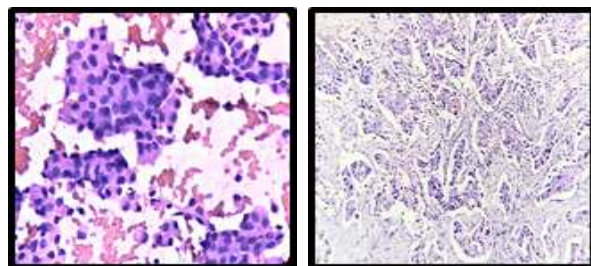
CONCLUSION:

This study comprehensively evaluates breast lesions through FNAC and establishes a correlation with histopathological findings, enhancing diagnostic precision. Neoplastic lesions, predominantly benign, constitute the majority of cases, with fibroadenoma emerging as the most prevalent benign lesion. Malignant lesions exhibit an age-dependent increase in incidence, with infiltrating ductal carcinoma being the most common malignancy. The findings underscore the importance of FNAC in the initial assessment of breast lesions, facilitating timely clinical decision-making and management.

Photographs:



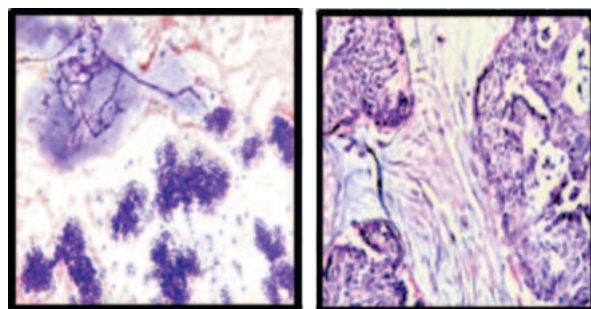
(40X) FIBROADENOMA



(10X)

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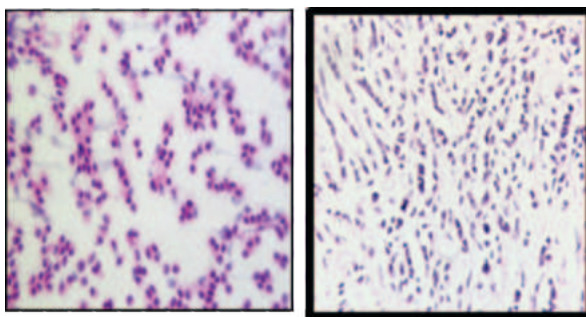
INFILTRATING DUCT CARCINOMA



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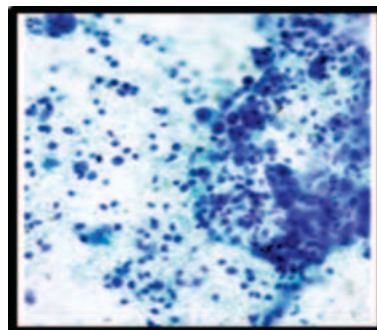
MUCINOUS CARCINOMA



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LOBULAR CARCINOMA



(40X) MEDULLARY CARCINOMA

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