Section: Pathology

Original Research Article

SPECTRUM OF BREAST LESIONS AND CYTOHISTOLOGIC CORRELATION AT A TERTIARY CARE HOSPITAL IN THIRUVARUR DISTRICT, TAMIL NADU

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ABSTRACT

Background: Breast lesions encompass a wide spectrum ranging from benign to malignant conditions. Fine needle aspiration cytology (FNAC) plays a pivotal role in the initial diagnosis of these lesions. Correlating FNAC findings with histopathology helps validate its diagnostic utility. The objective is to study the spectrum of breast lesions encountered at a tertiary care hospital in Thiruvarur and evaluate the cytohistologic correlation.

Materials and Methods: A retrospective study was conducted over two years, including patients who underwent FNAC followed by histopathological examination. FNAC results were categorized using the IAC Yokohama System, and histopathology served as the gold standard. Diagnostic indices of FNAC were calculated.

Results: A total of 120 breast lesions were evaluated. The age of patients ranged from 15 to 75 years. Benign lesions constituted 65%, while 30% were malignant and 5% were atypical or suspicious. The most common benign lesion was fibroadenoma, and invasive ductal carcinoma was the predominant malignant lesion. The overall cytohistologic concordance was 90%. FNAC showed a sensitivity of 95.3%, specificity of 97.6%, and accuracy of 96.1%.

Conclusion: FNAC is a reliable, cost-effective, and minimally invasive diagnostic tool for breast lesions. High cytohistologic concordance underscores its importance in early diagnosis, especially in resource-limited settings.

Keywords: Breast lump, FNAC, malignancy.

INTRODUCTION

Breast cancer is one of the most common malignancies affecting women worldwide. In India, its incidence is steadily increasing, making early detection and accurate diagnosis crucial. Breast lesions, however, are not limited to malignancies; a broad range of benign and non-neoplastic conditions also present clinically with similar features. Fine needle aspiration cytology (FNAC) has emerged as a frontline tool in the preliminary evaluation of palpable breast lumps due to its simplicity, affordability, and minimal invasiveness.[1-3]

Histopathology remains the gold standard for definitive diagnosis. Correlating cytological findings with histopathology helps in determining the diagnostic accuracy of FNAC and in refining cytological reporting. This study aims to analyze the spectrum of breast lesions at a tertiary care center in Thiruvarur and assess the correlation between cytologic and histologic diagnoses.[4-6]

MATERIALS AND METHODS

Study Design: Retrospective descriptive study
Duration: January 2022 – December 2023
Setting: Department of Pathology, Government Medical College and Hospital, Thiruvarur

Inclusion Criteria

- Patients presenting with breast lumps who underwent both FNAC and subsequent biopsy/surgical excision.

Exclusion Criteria

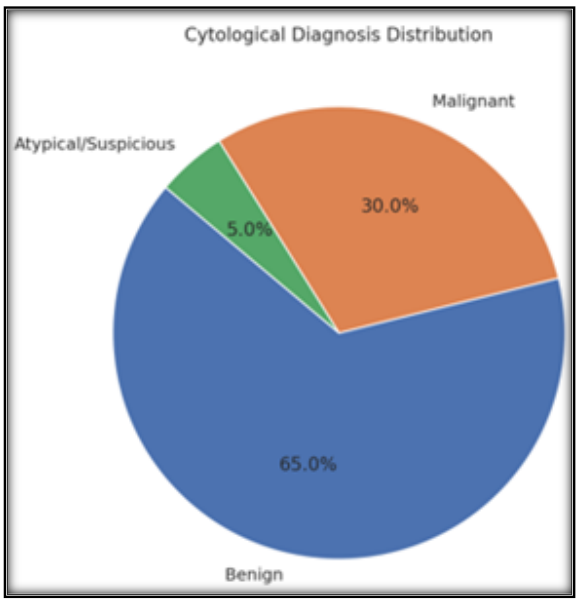
- Inadequate cytology smears.
- Incomplete clinical or histopathological data.

Procedure

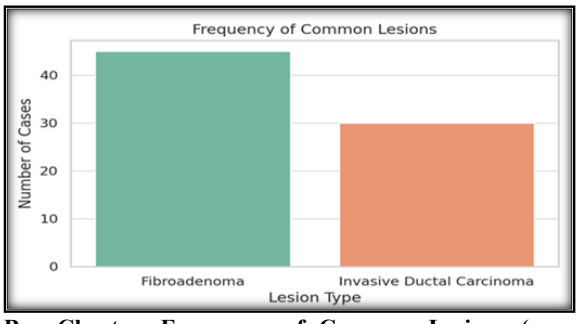
FNAC was performed using a 23-gauge needle under aseptic conditions. Smears were stained with hematoxylin-eosin and May-Grünwald-Giemsa. Cytological diagnoses were classified as per the IAC Yokohama Reporting System. Histopathological examination was conducted on paraffin-embedded tissue sections stained with hematoxylin and eosin. Cytohistological correlation was done and diagnostic indices calculated.

Statistical Analysis: Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were calculated using standard formulas.

RESULTS



Pie Chart: Distribution of Breast Lesions by Cytological Diagnosis (Benign, Malignant, Atypical/Suspicious)



Bar Chart – Frequency of Common Lesions (e.g., Fibroadenoma, Invasive Ductal Carcinoma)

This study analyzed a total of 120 breast lesion cases over a two-year period. The patient population ranged in age from 15 to 75 years, with a significant concentration (60%) in the 21–40 year age group. The gender distribution was overwhelmingly female, with only 3 male participants, resulting in a female-to-male ratio of 117:3.

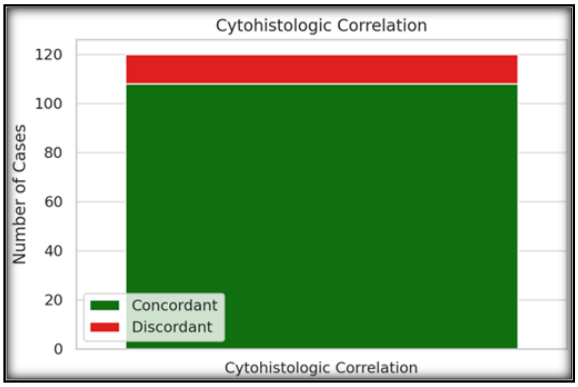
Cytological analysis classified the lesions into three main categories: benign (65%), malignant (30%), and atypical/suspicious (5%). Among the benign lesions, fibroadenoma emerged as the most frequent, observed in 45 out of 78 cases. Malignant lesions were predominantly invasive ductal carcinoma (IDC), accounting for 30 of the 36 malignant cases.

On comparing cytological findings with histopathological diagnoses, 108 of the 120 cases (90%) were found to be concordant, indicating strong agreement between the two methods. The remaining 12 cases (10%) were discordant, highlighting certain diagnostic challenges.

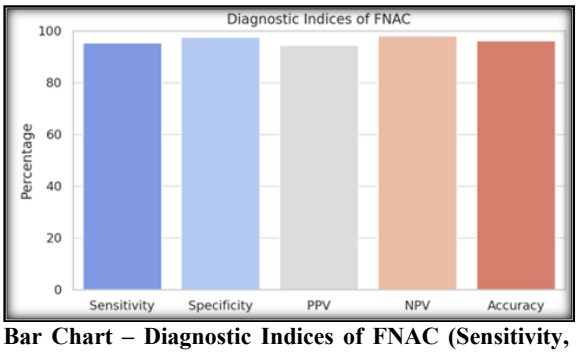
The diagnostic performance of FNAC was calculated as follows:

Sensitivity: 95.3%
Specificity: 97.6%
Positive Predictive Value (PPV): 94.4%
Negative Predictive Value (NPV): 98.1%
Overall Accuracy: 96.1%

These metrics reflect the high reliability of FNAC as a diagnostic modality for breast lesions.



Stacked Bar Chart – Concordant vs Discordant Cytohistologic Findings



Bar Chart – Diagnostic Indices of FNAC (Sensitivity, Specificity, PPV, NPV, Accuracy)

Table 1: Age and Gender Distribution of Patients

Sr. No.	Age Group	Number of Patients	Gender (F. M.)

0	15-20	12	11:1
1	21-40	72	70:2
2	41-60	28	27:1
3	61-75	8	9:0

Table 2: Cytological vs Histopathological Diagnosis Comparison

Sr. No.	Parameter	Value(%)
0	Sensitivity	95.3
1	Specificity	97.6
2	PPV	94.4
3	NPV	98.1
4	Accuracy	96.1

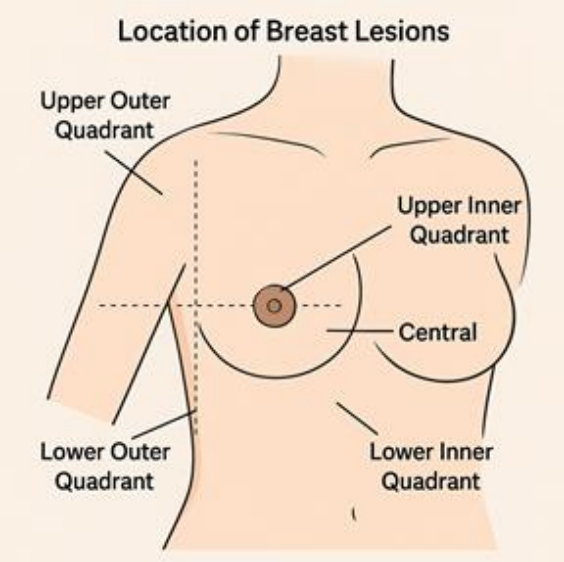


Figure 3: Diagnostic Performance of FNAC

Histopathological Correlation:

- Fibroadenoma was the most frequent benign lesion (45 cases).
- Invasive ductal carcinoma (IDC) accounted for 30 of 36 malignant cases.

Cytohistologic Correlation

- Concordant: 108 cases (90%)
- Discordant: 12 cases (10%)

Diagnostic Indices of FNAC

- Sensitivity: 95.3%
- Specificity: 97.6%
- Positive Predictive Value: 94.4%
- Negative Predictive Value: 98.1%
- Diagnostic Accuracy: 96.

DISCUSSION

The findings of this study reinforce the critical role of Fine Needle Aspiration Cytology (FNAC) in the preliminary evaluation of breast lesions. The technique's simplicity, rapid turnaround time, minimal invasiveness, and cost-effectiveness make it especially valuable in settings with limited resources[2,3].

A majority of the cases evaluated were benign, aligning with global and national trends where benign breast conditions, particularly fibroadenomas, are more prevalent in younger women[1,4]. The high incidence of fibroadenoma in this study also underscores the importance of distinguishing benign tumors from malignant ones using reliable diagnostic tools like FNAC[2].

Invasive ductal carcinoma (IDC) was the most common malignant lesion identified, consistent with its known epidemiological dominance among breast cancers[1]. The strong concordance between FNAC and histopathology, observed in 90% of cases, affirms the diagnostic strength of FNAC when interpreted by experienced cytopathologists[4,5].

The sensitivity (95.3%) and specificity (97.6%) values reported in this study are comparable to or exceed those documented in previous literature,[5,6] indicating that FNAC performs exceptionally well in identifying both true positives and true negatives. The high NPV (98.1%) is particularly noteworthy as it suggests that FNAC is highly effective in ruling out malignancy when the cytological findings are benign[6].

However, the discordant cases draw attention to some limitations. Most discrepancies occurred in lesions that are inherently difficult to classify cytologically, such as atypical ductal hyperplasia or low-grade ductal carcinoma in situ. These "gray zone" lesions can mimic both benign and malignant features, leading to diagnostic ambiguity[3].

Overall, the study confirms that FNAC is a robust screening and diagnostic tool, particularly suited for rural and semi-urban populations where access to more advanced diagnostic modalities might be limited[1,2]. The integration of standardized reporting systems, such as the IAC Yokohama System used in this study, can further improve diagnostic consistency and communication between clinicians and pathologists[6].

CONCLUSION

FNAC, when used appropriately and interpreted skillfully, can serve as a highly effective screening and diagnostic tool for breast lesions. Cytohistologic correlation reinforces its diagnostic validity. In settings with limited resources, FNAC provides rapid, cost-effective, and accurate preliminary diagnosis, aiding in prompt clinical decision-making.

LIMITATIONS

- - Retrospective nature of the study
- - Small sample size
- - Lack of long-term follow-up data

Recommendations

- - Adoption of standard reporting systems such as the IAC Yokohama System
- - Regular audits of cytohistological discrepancies to improve diagnostic precision

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