



CYTOMORPHOLOGICAL PATTERNS OF BREAST LESIONS: A FIVE YEARS RETROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL

Pathology

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ABSTRACT

Background: Breast lesions are one of the most commonly encountered lesions in women which require prompt pathological confirmation by fine needle aspiration cytology (FNAC) and histo-pathological examination.

Methods: We conducted a retrospective cross-sectional hospital based study from August 2011 to July 2016. A total of 4028 cases with palpable breast lumps were subjected to FNAC, of which 546 cases were available for histopathological correlation by means of core needle and excision biopsy.

Results: Out of 4028 cases, 69% were diagnosed cytologically as benign lesion (both neoplastic and inflammatory) and 25% were diagnosed as malignant lesions. The histo-pathological correlation shows greater magnitude of discordance in malignant lesions in comparison with benign lesions. As among 24 discordant cases of breast carcinoma, 10 were falsely reported as Duct Carcinoma in FNAC, which came out to be Lobular Carcinoma in biopsy, 7 came out to be Non Hodgkin Lymphoma and 1 Hodgkin Lymphoma. 3 were reported as Malignant Histiocytic Tumor and rest 3 were reported as Metastatic deposits in breast. The sensitivity of FNAC in comparison to histology is higher for malignant breast lesions (99%) than benign tumors (96%) and inflammatory lesions (88%) but specificity is slightly lower for malignant lesions.

Conclusion: Hereby we concluded that breast lesions are easily accessible to FNAC, which is an easy cost effective and less time-consuming procedure. FNAC is used to diagnose both benign and malignant lesions.

KEYWORDS

Breast lesions, FNAC, Histology

INTRODUCTION:

Diseases of breast are most commonly presented as palpable masses followed by nipple discharge, or incidental abnormalities on imaging studies. [1]. Breast lumps are common in women. About 10% women visiting health organization clinics present with breast lumps as the chief complaint. 80-85% of breast lumps are benign and rest are malignant. [2-4] Breast carcinoma is the leading cause of cancer incidence and death in women [5-8]. An estimated 1.38 million new cancer cases diagnosed in 2008 (23% of all cancers). It is now the most common cancer both in developed and developing regions [9]. Early detection is the mainstay in management of breast carcinoma. In India, benign and malignant breast lesions are common. Breast carcinoma is the second most common malignant neoplasm in females, comprising 22.2% of all new cancer diagnoses and 17.2% of all cancer deaths. Currently, 75,000 new cases of breast cancer are detected in India every year [10-11]. A palpable breast lump is a common diagnostic problem to both general practitioners and surgeons and its evaluation requires judicious use of available invasive and non-invasive diagnostic techniques including radiological investigations, clinical examination and cytological and histo-pathological investigations [12-13]. To the best of our knowledge, Fine needle aspiration cytology (FNAC) is a routine, convenient and economically affordable procedure in clinical evaluation and initial diagnosis in breast lump worldwide. FNAC is safe and produces minimal tissue trauma and discomfort to the patient and is carried out as an outpatient procedure [14-17].

For this purpose, 4028 cases of FNAC, samples in last 5 years were studied to study the spectrum of different breast lesions as evaluated cytologically and finding the correlation between results of cytology and histopathology investigations in applicable cases.

MATERIALS AND METHODS:

The study was conducted under the Department of Pathology, Calcutta national medical college and hospital from February 2015 to January 2020. During this period, 4028 cases of fine needle aspirations (FNA) were performed on female and male patients presenting with lump in breast as an outpatient and indoor referral basis in all working days from 10am to 1pm. Patient Informed consent was taken before aspiration. Specimens were received from 546 patients who underwent surgery, which formed the material of this study. Aspirations were carried out

using a 23 gauge needle and 10 ml disposable syringe fitted in FNA handle/gun. Cytological smears were air dried and stained in Romanowsky stain like Leishman & Giemsa Staining. The collected surgical specimens were fixed in 10% formalin. The gross and cut section findings were noted. Several bits were taken from appropriate sites for processing and paraffin embedding in Leukart L blocks. From each block, sections were cut at 4-5 microns thickness and stained by Haematoxylin and Eosin stain. All the patients who only came to pathology department with visiting surgeon's written advice of doing FNAC from palpable breast lumps are included in our study. Patients who were not willing to participate in the study and failed to follow up are excluded from this study. The following statistical methods were used in the study conducted-

True positive: These were the patients with malignant disease, positive cytological results confirmed on histopathology

True Negative: These were the patients without malignant disease, negative cytological results confirmed on histopathology

False positive: These were the patients diagnosed positive on cytology but on histopathology the results turned out to be negative for malignancy.

False Negative: These were the patients diagnosed negative on cytology but on histopathology the results turned out to be positive for malignancy.

Sensitivity: It is calculated as $\text{True positive} \times 100 / (\text{True Positive} + \text{False Negative})$

Specificity: It is calculated as $\text{True negative} \times 100 / (\text{True negative} + \text{False Positive})$

Positive predictive value: It is calculated as $\text{True positive} \times 100 / (\text{True positive} + \text{False Positive})$

Negative predictive value: It is calculated as $\text{True negative} \times 100 / (\text{True negative} + \text{False negative})$

Diagnostic accuracy: It is the proportion of correct results in relation to all the cases studied.

It is calculated as $(\text{True Positive} + \text{True negative}) \times 100 / (\text{True positive} + \text{false negative} + \text{true negative} + \text{false positive})$

RESULT ANALYSIS:

4028 cases of FNAC samples (FIGURE 1, 4) were collected in the department of pathology in a medical college situated in a metro city in

last 5 years and thoroughly studied. The study shows among all cases only five were male rest were female. The youngest patient in our study was a 13 years old girl whereas the eldest is 69 years old aged lady (Figure 1). The most common age group affected by breast lump was between 21 years to 30 years and the most commonly affected age group by breast carcinomas was between 41 years to 50 years (Figure 2). Among 4028 cases, a total number of 1745 cases (43%) were cytologically diagnosed as fibroadenoma followed by 987 cases (24%) of breast carcinoma, (FIGURE 5,6) the other prevalent cases were 564 cases (14%) of fibrocystic breast diseases and 222 cases (5.8%) of atypical ductal hyperplasia respectively. The least prevalent cases were 4 cases (0.10%) of gynecomastia and 3 cases (0.10%) of phylloides (Table 1, Figure 3). Only 23 cases (0.57%) were considered inconclusive due to inadequacy of smear. Among the 4028 cases, surgical specimens were examined for histopathology in 546 cases. (FIGURE 5) When after completion of the histopathological examination, we found among a total number of cytologically diagnosed 278 cases of breast carcinomas (FIGURE 6,7). Whereas 254 cases are concordant histologically. The 250 cases of cytologically diagnosed fibroadenomas were later concordant histologically for 246 cases (Table 2). Immuno-Histochemical Analysis of *SELECTED CASES of Breast Carcinoma by ER, PR, HER2 NEU ANTIGENS* was done further for the prognostic significance of the **DUCT CARCINOMA** (FIGURE 8).

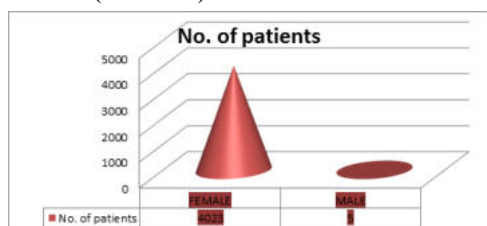


Figure 1: Distribution Of Cases According To Sex:

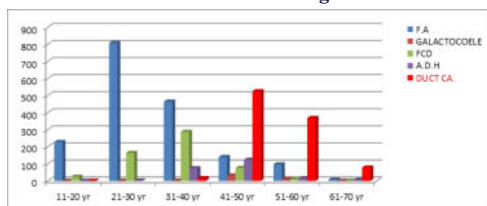


Figure2: Age Wise Schematic Distribution Of Breast Lesions

Table1: Distribution Of Cases According To Cytological Diagnosis

DIAGNOSIS	NO. OF CASES	PERCENTAGE
Fibroadenoma	1745	43%
Fibrocystic breast disease	564	14%
Fibroadenoma with fibrocystic breast disease	196	4.8%
Suppurative	177	4.4%
Granulomatous breast disease	22	0.55%
Galactocoele	46	1.14%
Gynecomastia	4	0.10%
Duct papilloma nipple adenoma	24	0.60%
Atypical duct hyperplasia	222	5.51%
Breast Carcinoma	987	24%
Phylloides	3	0.10%
Miscellaneous	15	0.37%
Inconclusive	23	0.57%
Total	4028	100%

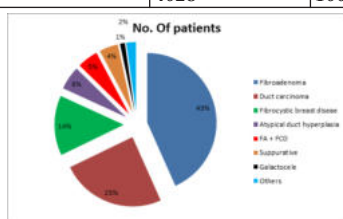


Figure 3: Pie Diagram Showing Distribution Of Cases Acc.to Diagnosis

Table2: Cytological And Histological Correlation (546 Cases)

CYTOLOGICAL DIAGNOSIS	HISTOLOGICAL CONCORDANCE	HISTOLOGICAL DISCORDANCE
Fibroadenoma (250 cases)	246	4
Duct papilloma with nipple adenoma (18 cases)	15	3
Breast carcinoma (278 cases)	254	24

In our current study of the cases, fibroadenomas showed sensitivity and specificity of 96.85% and 98.63 % respectively. Whereas, the positive predictive value of the cases was 98.40, having a significant **Confidence Interval (CI)** ranges from **95.95-99.56**.

On the other hand, cases of Ductal Papilloma showed the sensitivity of 88.24% and Specificity of 99.43% respectively with a significant **CI value** ranges from **98.36-99.88** and the positive predictive value was 83.33%.

While, maximum sensitivity was shown in Duct Carcinoma cases – 99.61% having specificity of 91.75%. The positive Predictive Value of the duct carcinoma was 91.37% and negative predictive Value was 99.63% as well having the significant **CI value** ranges from **97.99-99.99**. (Table3)

Table 3: Detailed Statistical Analysis Of Histo Pathologically Confirmed Cases:

CASES	SENSITIVITY	SPECIFICITY	POSITIVE PREDICTIVE VALUE	NEGATIVE PREDICTIVE VALUE
Fibro Adenoma	96.85%	98.63%	98.40%	97.29%
Duct Papilloma	88.24%	99.23%	83.33%	98.62%
Duct Carcinoma	99.61%	91.75%	91.37%	99.63%

- **Bold Values** are represented having significant **Confidence Interval** ranging in between **95%-99%**.

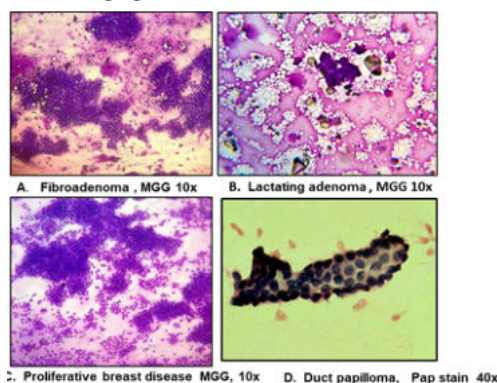


Figure4: Cytological Illustrations Of Commonly Encountered Breast Lesions

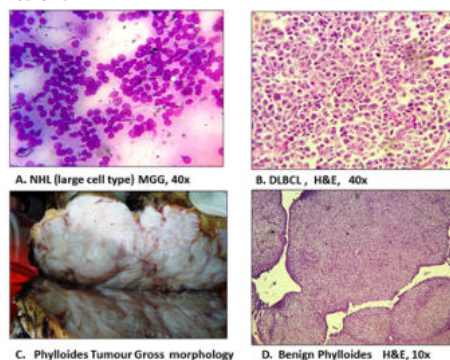


Figure5: Surgical Specimens With Its Corresponding Histology Photomicrograph

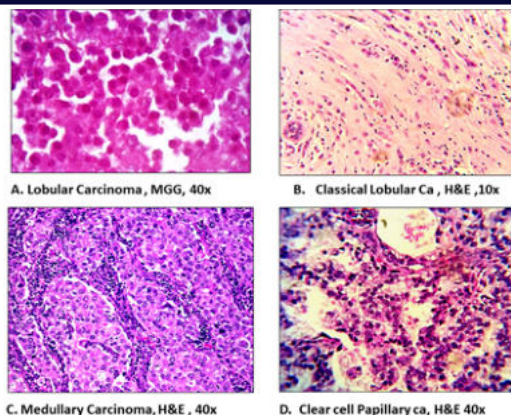


Figure6: Photomicrographs Of Cytology And Histology Of Breast Carcinomas (2)

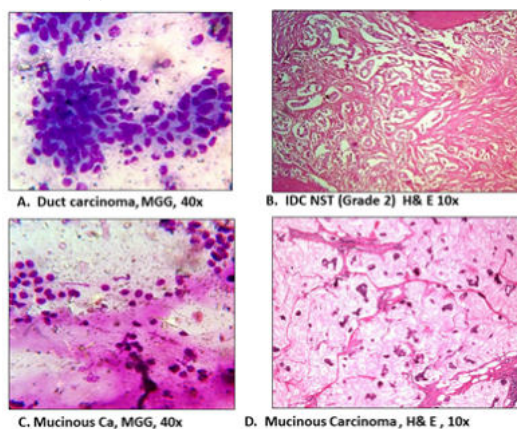


Figure7: Photomicrographs Of Cytology And Histology Of Breast Carcinomas (1)

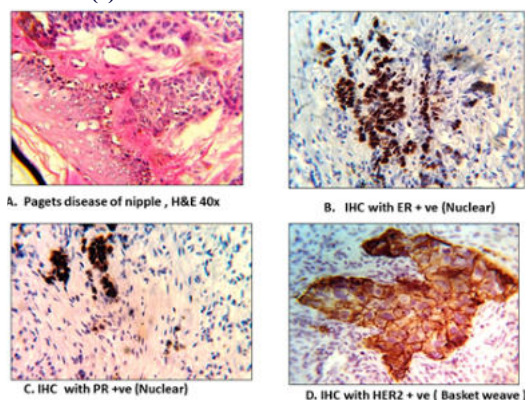


Figure8: Immunohistochemical(ihc) Analysis In Selected Cases By Er, Pr, Her2 Neu Antigens.

DISCUSSION

In our study, major fraction of the breast lesion were fibroadenoma, which is about 43% followed by breast carcinoma 25% and fibrocystic breast disease 14% which is similar to the findings of Ghosh et al²

The peak age group of Fibroadenoma was in third decade with mean age of 23 years.

The peak age group of Breast Carcinoma was in fifth decade with mean age of 49 years.

The high frequency of Breast Carcinoma in our study is due to lack of awareness among patients with breast lump and late presentation.

FNAC appears to be an effective tool of screening of breast lesions with high concordance to the tune of 95%. The sensitivity of FNAC in comparison to histology is higher for malignant breast lesions (99%)

than benign tumors(96%) and inflammatory lesions(88%), which is similar to other studies^{3,4,5}.

Of four discordant cases of fibroadenoma, reported in FNAC, one was reported as benign phylloides, rest two were tubular adenoma and a single case of papillary DCIS in histology. Among the Twenty four discordant cases of Breast Carcinoma, Ten were falsely reported as Duct Carcinoma in FNAC, which came out to be Lobular Carcinoma in biopsy, seven came out to be Non Hodgkin Lymphoma and one Hodgkin Lymphoma. Three were reported as Malignant Histiocytic Tumor of breast. Rest Three were reported as Metastatic deposits in breast.

CONCLUSION

Considering histological diagnosis as the gold standard, we concluded that breast lesions are easily accessible to FNAC, which is an easy, cost effective and less time-consuming procedure. FNAC is used to diagnose both benign and malignant lesions with high sensitivity and specificity.

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Conflict of Interest: Authors have no conflict of Interest.

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