COMPARISON OF CYTOLOGICAL AND HISTOPATHOLOGICAL FINDINGS IN BREAST LESIONS – A TERTIARY CARE CENTER

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ABSTRACT

Objective: The objective of the study was to compare the findings of cytological and histopathological features of breast lesions.

Methods: This study conducted on 109 patients with breast lump with fine needle aspiration cytology (FNAC) followed by histopathology at Department of Pathology, Pacific Institute of Medical Sciences, Umarda, Udaipur, Rajasthan. The study duration is 18-month study period (April 2021 to September 2022).

Results: The mean age of the study subjects was 44.20 years with majority of the patients belonged to the age group 41–50 years (36.70%). Out of 109 cases, 84 cases (77.07%) were benign and 23 cases (21.10%) were malignant pathology in FNAC. Rest two cases had intermediate pathology. Majority of histopathological diagnosis of breast lumps in the present study were benign pathology (75.23%) and rest all malignant (24.77%).

Conclusion: Our study shows that FNAC can reliably distinguish between benign and malignant conditions and it is a sensitive and specific modality that assist in diagnosis and management of breast lesions. Although FNAC has been found to be a most valuable economic, simple, and safe diagnostic procedure, due to certain pitfall of FNAC like in case of pauci-cellularity blood mixed aspirates and blind technique procedure. Histopathological correlation is always mandatory for early diagnosis and better prognosis.

Keywords: Breast lump, Fine needle aspiration cytology, Histopathology.

INTRODUCTION

Lump in breast is a common presentation in surgical procedures. The lesions of the breast have diverse etiology and presentation may range from a benign tumor, cyst, or amalignancy [1]. All breast lesions are not malignant and all the benign lesions do not progress to cancer. However, the accuracy of diagnosis can be increased by a combination of preoperative tests (like physical examination, mammography, fine-needle aspiration cytology, and core needle biopsy). These modalities are more accurate, reliable, and acceptable when compared with a single adopted diagnostic procedure despite of having their own technical limitations [2].

The diagnostic methods of palpable breast lumps should be rapid, inexpensive, most accurate and least invasive to evaluate and distinguish between benign and malignant lumps in outpatient clinics. Such methods benefits both patients and surgeons by promoting proper preoperative diagnosis and management and by limiting the unnecessary testing and procedures [3,4]. Fine needle aspiration cytology (FNAC) is alternatively simple, reliable, a traumatic, economical, and complication free technique for the evaluation of mass lesions. It can also be easily repeated if an adequate aspirate is not obtained. The use of core biopsy is the current gold standard but its procedure is more cumber some, expensive, and time consuming as compared to FNA procedure [5,6]. Core biopsy or true cut needle biopsy is not widely used because of its complications, interpretation, and time-consuming results; therefore, palpable breast lesions are mostly diagnosed by screening on the basis of triple assessment only (Physical examination, FNAC, and Mammography) [7].

Although fine-needle aspiration (FNAC) cytology of the breast has been shown to be a safe and accurate technique, many surgeons question whether it is reliable enough to replace excisional biopsy. If FNAC is followed by an excisional biopsy for confirmation, it would seem that the cost of diagnostic work up would be increased. However, it has been seen that FNAC is cost-effective even when followed by an excisional or frozen section biopsy for confirmation. It is considered safe and reasonable to expand its use to smaller hospitals where the personnel may be initially less experienced with the technique [8,9].

It is considered a successful and less complicated procedure with excellent results; however, the main factors influencing success should be considered before its procedure to increase its accuracy and these are the aspirator, the small size of many cancers, and the occult nature of the lesions seen only on mammography [10]. Aberration of normal development and involution (ANDI) includes variety of benign disorders occurring at different reproductive periods in females. In early reproductive age group (15–25 years) includes fibroadenoma and giant fibroadenoma (>5 cm). In mature reproductive age group (25–40 years) includes fibrocystadenosis. In involution age group (40–55 years) includes sclerosing adenosis, periductal mastitis, bacterial infection, non-locational breast abscess, and mammary duct fistula, epithelial hyperplasia or atypia.

Malignancy of the breast occurs usually in women above 40 years of age, though rarely it may occur earlier, so age should not be the criterion to exclude the diagnosis of breast carcinoma. Fine-needle aspiration cytology (FNAC) is widely used in India as a reliable, rapid, cost-effective, complication free, and an accurate ediagnostic modality for the evaluation or management of breast lumps. The present study was conducted to compare the cytological and histopathological findings in the breast lesion at tertiary care center.

METHODS

The present study was cross-sectional study, conducted in the Department of Pathology of Pacific Institute of Medical Science, Udaipur Rajasthan, from April 2021 to September 2022. The sample size of 100 was calculated using the formula 4pq/l² [10]. The study was conducted after obtaining the ethical clearance from the Institutional Ethical Committee of PIMS, Udaipur dated October 23, 2021, with reference no. STU/IEC/2021/24. The patient who was undergoing FNAC and subsequent biopsy of breast lump for diagnostic or therapeutic purpose was included in the study. Those patients in which FNAC were performed, but biopsy not done were excluded from the study. The present study was conducted on patients presenting with breast lesions in surgery department. Detailed history, clinical examination and radiological finding were done in every case. The patient was explained in detail about the procedure of FNAC. If the aspirate sample is large enough, several slides prepared both air dried and wet fixed so that special staining can be carried out if required. Smears were stained by Rapidpap's stain, fields stain, and Giemsa stainor by standard hematoxylin and eosin methods. The basic constituent of both stains is Harris hematoxylin.

The biopsy samples from the breast lump received in the histopathology section of the Pathology department will be evaluated. After the surgery, histopathology department will receive the specimen in formalin filled container. The specimen was fixed in 10% formalin for 24 h. After that tissue will be taken for grossing and it will be done according to standard procedure being followed in the department. Paraffin blocks will be made and with the help of the microtome, sections will be cut off 4–5 mm thickness and stained by haematoxylin and eosin and was studied by light microscopic examination 3–4 µm thickness paraffin blocks sections made with the help of micro tome and sections kept on hot plate at 65°C temperature. Sections were stained by hematoxylin and eosin. The Nottingham histological score was used in the study which is as follow:

Nottingham histological grading score assigns a score of 1–3 for each parameter; degree of tubular formation, nuclear pleomorphism, and mitosis. The final histological grade is based on a sum of the individual scores of the three parameters: 3, 4, or 5 = Grade 1 (well differentiated), 6 or 7 = Grade 2 (moderately differentiated) and 8 or 9 = Grade 3 (poorly differentiated). The data were collected and analyzed using excel sheet.

RESULTS

The present study showed that 95 (87.15%) female patients were associated with high incidence of breast disease as compared to 14 (12.85%) male patients. Majority of the patients belonged to the age group 41–50 years (36.70%) with mean age was 44.20 years. The youngest patient was a 16-year-old while oldest was 87 years of age (Table 1). In our study, majority of patients were married 103 (94.50 %) and only 06 (5.50%) of patients was unmarried. In our study, 55 (55.45%) patients were complaining of right breast lump and 54 (49.55%) patients were complaining of left breast disease.

The present study showed that upper outer quadrant 43 (39.45%) patient mostly involved by breast lump followed by lower 31 (28.44%), central 25 (22.94%), lower inner 07 (6.42%), and upper inner 03 (2.75%). In the present study, majority of patients had normal

nipple condition 83 (76.15%). Only 21 (19.27%) patients had retracted nipple and 4.58% had inverted nipple which associated with breast disease. Majority of patients had soft to firm consistency of breast lump 40 (36.70%) followed by firm 33 (30.27%), hard 19 (17.43%), and soft 17 (15.60%). Out of 109 cases, 84 cases (77.07%) were benign and 23 cases (21.10%) were malignant pathology in FNAC. Rest two cases had intermediate pathology based on cytology.

Out of all benign pathology of FNAC, most of the patients were diagnosed with fibroadenoma (35) on FNAC (Table 3). Out of 23 malignant cases in FNAC, majority of cases 22 (95.65%) were diagnosed with

Table 2: Distribution based on benign and intermediate pathology observed on fine-needle aspiration cytology

Benign pathology	Cases
Fibroadenoma	35
Gynecomastia	13
Fibrocystic disease	12
Abscess	6
Chronic mastitis	5
Phyllodes	4
Acute mastitis	3
Proliferative lesion without atypia	4
Proliferative lesion with atypia	2
Lipoma	1
Sclerosis adenosis	1
Total	86

Table 3: Distribution based on benign pathology observed on histopathology

Benign pathology	Cases
Fibroadenoma	35
Gynecomastia	13
Fibrocystic disease	10
Abscess	6
Chronic mastitis	5
Phyllodes	4
Acute mastitis	3
Ductal papilloma	1
Usual ductal hyperplasia	2
Lipoma	1
Sclerosis adenosis	1
Complex fibroadenoma	1
Total	82

Table 4: Comparison between results of fine-needle aspiration cytology and histopathology

	Cytology	Histopathology
Benign	84	82
Intermediate	02	--
Malignant	23	27
Total	109	109

Table 1: Age-wise distribution of patients

Age (years)	Number of cases (%)
<20	5 (4.58)
21–30	8 (7.40)
31–40	31 (28.44)
41–50	40 (36.70)
51–60	20 (18.35)
≥61	5 (4.58)
Total	109 (100)

Table 5: Fine-needle aspiration cytology for benign and malignant lesions

FNAC	Benign (%)	Malignant (%)
Sensitivity	100	92
Specificity	92	100
PPV	97.67	100
NPV	100	97.67
Accuracy	98.16	98.16

FNAC: Fine-needle aspiration cytology, NPV: Negative predictive value, PPV: Positive predictive value
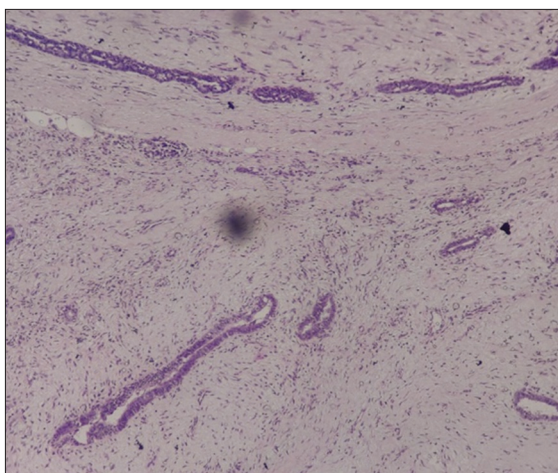
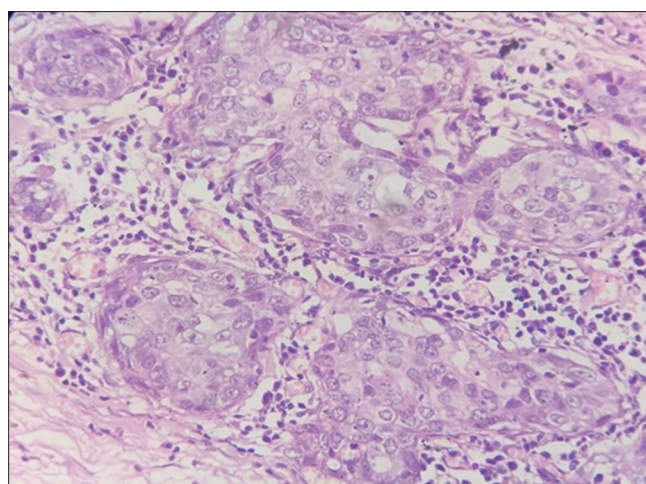**Fig. 1: Fibroadenoma (H and E- ×20)**

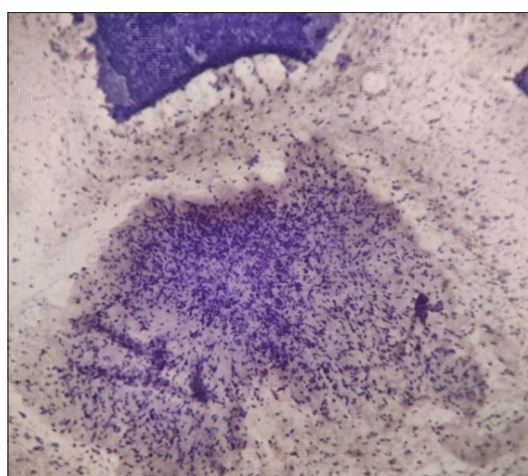**Fig. 4: Ductal carcinoma *in situ* (H and E - ×40)**

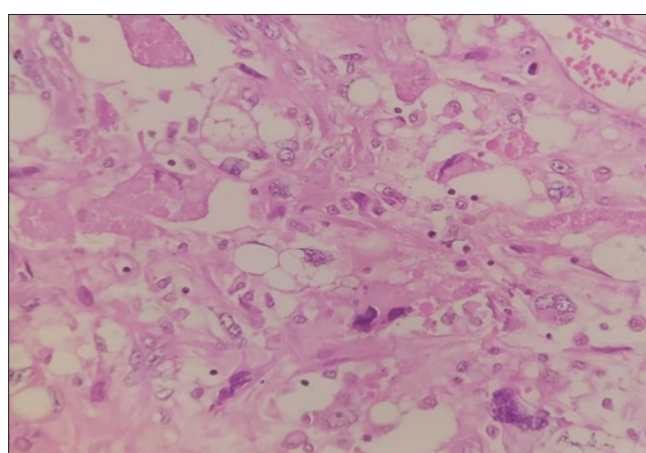**Fig. 2: Benign phyllodes (MGG- ×20)**

Fig. 5: Malignant phylloides with liposarcomatous differentiation (H and E - ×40)

Fig. 3: Specimen of infiltrating duct carcinoma

ductal carcinoma. Only one case was malignant phyllodes. Majority of histopathological diagnosis of breast lumps in the present study were benign pathology 82 (75.23%) and rest all malignant 27 (24.77%).

Out of all benign pathology of histopathology, most of the patients were diagnosed with fibroadenoma (35) on histopathology. Out of 27

malignant cases in histopathological examination (HPE), 19 (70.37%) cases were diagnosed with infiltrating ductal carcinoma followed by 5 (18.53%) cases of ductal carcinoma in situ, 2 (7.40%) cases were malignant phyllodes, and 1 (3.70%) case of papillary lesion were diagnosed.

In malignant pathology (HPE), only four cases were misdiagnosed in FNAC. Two cases of DCIS in HPE were misdiagnosed as proliferative lesion without atypia in FNAC. One case of malignant papillary lesion (HPE) was misdiagnosed as ductal carcinoma in FNAC. Furthermore, a case of malignant phyllodes was misdiagnosed as a benign phyllodes in FNAC.

Furthermore, in benign pathology (HPE), six cases were misdiagnosed in FNAC. One case of each complex fibroadenoma and phyllodes tumor were misdiagnosed as fibrocystic disease in FNAC. Two cases of fibroadenoma in HPE were diagnosed as fibrocystic disease in FNAC. Furthermore, two cases of fibrocystic disease (HPE) were diagnosed as fibroadenoma in FNAC. Remaining all pathologies were concurring on FNAC and histopathology.

Out of 19 cases of IDC in histopathology, 10 cases had Grade II, six cases had Grade III, and only two cases reported with Grade I Nottingham histological score.

We found 100% sensitivity and 92% specificity in a benign lesion whereas in case of malignant breast tumor, 92% is sensitivity and 100% is specificity.

DISCUSSION

Breast cancer incidence rates increase sharply with age, becoming substantial before age 50 years. During the premenopausal years, the rate of increase in incidence is common around the world, approximately 8–9%/year. Many studies evaluating the influence of age on outcome in breast cancer have been small and conflicting results. Age at diagnosis may be used to identify a group of patients who have a higher risk of recurrence. It should be used as an adjunct to other prognostic factors that are better validated such as tumor size. The present study showed that majority of the patients belonged to the age group 41–50 years (36.70%) with mean age of 44.20 years. Female patients (87.15%) were associated with high incidence of breast disease as compared to male patients (12.85%). The study done by Kumar and Mahesh [11], Homesh *et al.* [12], Pruthi [13], Haas *et al.* [14] showed that mean age of women were 34.98 years, 33.34 year,46.12 years and 48.9 years

In our study, majority of patients were married (94.50 %) and only 5.50% of patients are unmarried. Dawood *et al.* [15] evaluated the impact of marital status among patients with breast cancer. Married patients accounted for 56.8% of the cohort. The impact of marital status appears to be greater among older patients compared to younger patients, which may be explained partly by a more aggressive biology generally seen among older patients and the increasing need for a support system among older patients.

The present study revealed that upper outer quadrant (39.45%) was mostly involved by breast lump followed by LOQ (28.44%). The study by Hirachand *et al.* [16] found that 64% cases with breast lump had soft consistency and 16% had hard consistency with retraction of nipple/ pus discharge. VijayaBharathi *et al.* [17] observed that lumps were commoner on the right side in 58.1% than on the left side in (38.6%) with upper outer quadrant being most commonly involved. Similar results were also observed by Patrikar *et al.* [18], Sainsbury [19] and Amrikachi *et al.* [20] with the right-sided breast being slightly more involved than left.

In our study, out of 84 benign pathologies of FNAC, most of the patients were diagnosed with fibroadenoma (35) followed by gynecomastia (13) and fibrocystic disease (12) on FNAC. Out of 23 malignant cases, majority of cases (95.65%) were diagnosed with ductal carcinoma. Only one case was malignant phyllodes.

In a study by Kanchana *et al.* [21], out of 178 cases of cytologically diagnosed, 148 cases (83.15%) were non-malignant, and 30 cases (16.85%) were malignant. Out of all non-malignant lesions fibroadenoma constitutes the dominating lesion 64 cases (43.24%). Hirachand *et al.* [16], have found that 64.2% cases with breast lump had fibroadenoma of the breast, 7.5% reported benign proliferative diseases of the breast and 16% reported to be having malignant breast lesions. Similar study by Vijaybharti *et al.* [17], out of 691 (72.58%) benign cases, fibroadenoma (49.92%) was most frequent followed by fibrodenosis (22.43%), and fibrocystic disease (18.52%). Similar observations were also made by Mansoor [22] where fibroadenoma and IDC were the most common benign and malignant breast lesions, respectively.

In our study, out of total 109 cases, majority of histopathological diagnosis of breast lumps in the present study were benign pathology (75.23%) and rest all malignant (24.77%). Out of 82 benign pathologies of histopathology, most of the patients were diagnosed with fibroadenoma (35) on histopathology. Out of 27 malignant cases in HPE, 19 were diagnosed with IDC, followed by DCIS (five cases) and two cases were malignant phyllodes. One case of papillary lesion was also diagnosed.

In a study by Kumar and Mahesh [11], majority of the breast lesions were benign with fibroadenoma being most common (74%) while 23% of lesions were malignant, of which 19.3% turned out as invasive duct carcinoma. Hirachand *et al.* [16] have found that 64.2% of cases

with breast lump had fibroadenoma of the breast, 7.5% reported benign proliferative diseases of the breast and 16% reported to be having malignant breast lesions. In another similar study by Vijaybharti *et al.* [17], out of 691 (72.58%) benign cases, fibroadenoma (49.92%) was most frequent followed by adenosis (22.43%) and fibrocystic disease (18.52%). Similar observations were also made by Mansoor [22] where fibroadenoma and IDC were the most common benign and malignant breast lesions, respectively.

The present study showed that the overall sensitivity and specificity of FNAC for differentiating benign and malignant nature of breast lesions were 100% and 92% each. The overall accuracy for differentiating malignant lesions was 92.25% while for benign lesions, it was 95.49%. In a study by Kanchan *et al.* [21], FNAC has the sensitivity of 87.5%, specificity of 100%, and an overall diagnostic accuracy of 97.62%. Our results are also comparable with the study by Aziz *et al.* [23] and Nggada *et al.* [24]. In regard to specificity, the present study showed concurrence to that reported by Kumar and Mahesh [11] and Aziz *et al.* [23]. The present study, out of 19 cases of IDC in histopathology, 10 cases had Grade II, six cases had Grade III, and only three cases reported with Grade I Nottingham histological score. In a study by Rakha *et al.* [25], histological grading when adequately carried out provides a simple, inexpensive, and highly accurate method for assessing tumor pathological characters and patient prognosis. In similar study by Sikka *et al.* [26], Nottingham histological score provides important independent prognostic information with breast cancer. The prognostic value of Nottingham histological score used either alone or along with tumor size and nodal status as a component of Nottingham prognostic index has been confirmed in many studies of patients with breast cancer.

CONCLUSION

This study was mainly under taken to study the value of FNAC in diagnosis of breast lumps against HPE. Breast lumps may range from simple benign tumor to invasive malignancy. Both the techniques have their own advantages and draw backs. FNAC is the simplest techniques and does not require any special instrument and the result can be obtained in a few hours time as outpatient procedure. FNAC is associated with false positive and false negative results. In case of low cellularity hemorrhagic aspirate and blind technique and certain limitation such as grading of tumor, HPE is mandatory for early diagnosis and better prognostic outcome of patients.

AUTHORS' CONTRIBUTIONS

Patel Hani Bharatkumar– Concept and design of the study, interpreted the results, prepared first draft of manuscript, and critical revision of the manuscript; Matariswa Samanta and Pawan Nikhra– Statistically analyzed and interpreted, reviewed the literature, and manuscript preparation; and VB and PUA, Vishakha Behl and Patel Ujaskumar Ashvinbhai– coordination of the overall study and critical review of the manuscript.

CONFLICTS OF INTEREST

None.

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None.

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