

A CLINICOPATHOLOGICAL STUDY OF BREAST LUMPS

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ABSTRACT

Breast cancer affects women more than men. From puberty to death, breasts go through constant physical and physiological changes related to menstruation, pregnancy, and menopause. The goal was to classify different types of breast lesions and conduct a clinicopathological study on them. **Methodology:** In the present study carried out at the department of Pathology of ACSR Govt Medical College, Nellore AP during the period from January 2019 to June 2021 (18 months) a total number of 150 FNA^s were performed on patients with breast lumps. **Results:** The youngest patient in this study was 12 years and the oldest 79 years. Majority of the patients were in the age group of 21-40 years. In majority of the patients i.e. From 150 aspirates, 65 were from the right breast and 70 from the left. 15 cases involved both breasts. Upper outer quadrant of right and left breast had 39 and 35 cases of breast lumps, respectively. Lower outer quadrant of the right breast had 11 cases and upper medial had 11 cases. Two breast cases showed diffuse all-quadrant involvement. 2 of the 45 cases were clinically suspected of malignancy and 1 of fibroadenosis, but FNAC showed fibroadenoma. Three clinicocytologically discordant cases lacked excision biopsy. 15 cases of breast cancer were in the right breast and 9 in the left. Upper outer quadrant is most common for breast lumps. Side and quadrant distribution are shown below. All 20 cases were confirmed by excision biopsy. FNAC diagnosed 18 IDC NOS cases and 2 IDC Mucinous cases. **CONCLUSION:** FNAC is the procedure that is most commonly used since it is an initial outpatient procedure that is straightforward, risk-free, quick, and dependable. Additionally, it contributes to an early preoperative diagnosis of any lump in the breast.

Keywords: FNAC, breast lumps, cytological diagnosis, histopathology, malignant phyllodes tumor, gynecomastia.

INTRODUCTION

Breast disease is the most prevalent form of illness affecting women. The symptoms of pain, a palpable mass, "lumpiness" (without a definite mass), or nipple discharge are the ones that are reported by women the most frequently [1]. In many regions of the world, breast cancer is the most common form of malignant tumour found in females. This is because breast cancer is the most aggressive form of cancer. It is an issue that affects the entire planet, and no one group or nation is immune to this illness. The issue with the breasts could be anything as innocuous as a breast abscess or as serious as cancer. The breast lump, in addition to making women anxious, increases the risk of developing cancer and is the source of severe discomfort and deformity. Because benign breast disease is so prevalent, more than half of the world's female population will consult a doctor about a breast problem at some point in their lives [2]. The FNAC test has emerged as an essential component of both the preoperative evaluation and the screening process for breast masses. When paired with a clinical examination and imaging, the method reaches extraordinarily high levels of both sensitivity and specificity. The primary purpose of a breast FNAC is to differentiate between malignant tumours, which require immediate surgical removal, and benign lesions, which do not. [3]. Cytological assessment of palpable breast lesions can be performed using either fine needle aspiration cytology or, if nipple discharge is present, by analysing it. Both of these methods are available. FNAC of the breast can be performed on nonpalpable breast lesions with the assistance of imaging modalities such as ultrasonography and mammography with stereotaxis. FNAC of the breast can be performed on lesions that are palpable. Investigation of any palpable lump in the breast as well as prevention of unnecessary surgery in some benign disorders are the primary goals of FNAC procedures performed on breast lesions. The following are the benefits: It is both diagnostic and therapeutic in cystic conditions, and it allows for a number of ancillary studies such as hormone receptor analysis, flow cytometry, and molecular diagnostic studies. It provides a quick and accurate diagnosis; additionally, it is diagnostic as well as therapeutic in cystic conditions [4].

Over the course of the past quarter century, FNAC has seen considerable use as a diagnostic tool for breast lesions. Recently, FNAC has been surpassed by tissue core biopsy as the method of choice for making a diagnosis of breast cancer. When compared to a FNAC, a tissue core biopsy allows for easier grading of tumours as well as determination of the status of ER and PR receptors in the body. This may be the reason for this finding. The difficulty of a FNAC to differentiate between in situ and

aggressive cancer is one of the test's drawbacks[4].The benefit of performing a tissue core biopsy is that it enables histological assessment rather than cytologic assessment, and hence facilitates discrimination between in situ and invasive cancer. Its downsides are: In comparison to FNAC, which involves the destruction of tissue and the displacement of benign epithelium, the technique to imitate invasive carcinoma is more complicated, time-consuming, and resource-intensive [5].In spite of this, FNAC is still the most widely used method of diagnosis since it is the least intrusive, can produce repeatable results in a short amount of time, and has a high level of overall accuracy when performed by knowledgeable personnel.

This current study is to perform FNAC and histopathological examinations on breast lumps wherever they are deemed essential in order to determine the incidence of various breast lesions and the subtypes of each of those lesions.

OBJECTIVES

1. To find the incidence of non-neoplastic and neoplastic lesions and further their subtypes.
2. To find out the incidence of the various breast lesions with respect to age, sex, menstrual cycle, parity, pregnancy, history of taking of OCPs etc.
3. To make a FNAC diagnosis in each case.
4. To facilitate proper preoperative planning for surgical management.
5. To subject for histopathological [biopsy] examination of those cases in which there is no correlation between the clinical diagnosis and FNAC diagnosis and also in cases where the FNAC report proves to be malignant.
6. To assess the prognosis in case of malignant tumors by considering the microscopic grading.
7. To carry out a lymph node biopsy in all such cases where the primary lesion in the breast is associated with axillary enlargement for evidence of metastasis.

MATERIALS AND METHODS

Sources of data.

All FNAC's of breast done on patients referred to us and also biopsies received at the Department of Pathology, ACSR Govt Medical College, Nellore, AP from January 2019 to June 2021 ie, 18 months were included for the present study.

Method of collection of data

After a detailed clinical history and examination all the clinical findings along with the results of the investigations done were recorded in detailed proforma.

Sample size – A total of 150 patients with breast lumps were subjected for FNAC examination and also, a histopathological study in case of those patients with acinical diagnosis of malignancy and in patients where the FNAC findings were suspicious of malignancy.

Procedure of FNAC:

The procedure was explained to the patient and oral consent taken.

The patient was laid supine and the lump was localized by palpation and cleaned with sterile swab. The swelling was fixed with the thumb and index finger of the left hand.

A 10cc disposable syringe with 22 to 23 gauge needle fitted on a syringe holder was inserted into the mass and aspiration done under negative pressure. A single point of entry with multidirectional technique was used.

Once the material entered the hub of the needle, negative pressure was released and the needle withdrawn. Immediate pressure was applied with sterile gauze over the mass.

In order to make smears, air was taken into the syringe and the material expelled on to the slides to make a series of smears.

With the help of another slide, smears were made with a single gentle sweep. The smears were then fixed in 95% ethyl alcohol for 1 minute. Subsequently the smears were stained by Haematoxylin & Eosin, Papanicolaou stains. The air dried smears were stained with Giemsa stain.

Procedure for histopathological study: The tissue biopsies obtained were fixed in 10% formalin, subjected for tissue processing and the paraffin sections obtained. Paraffin sections obtained were all stained with H & E stain and wherever necessary with special stains like Periodic Acid Schiff, Mucicarmin etc. A detailed gross and microscopic examination of the specimen along with lymph nodes if any was carried out to arrive at a correct diagnosis. He various data compiled were analysed for incidence with respect to age, sex, menstrual cycle, parity, pregnancy, history of taking of OCPs etc.

Inclusion criteria

All cases with breast lumps were included for FNAC study, and only those cases for histopathological examination which were suggestive of malignancy on FNAC study.

Exclusion criteria

Cases of those breast lumps were excluded from histopathological study wherethe FNAC study pointed towards only benign lesion and where there was absolutely no ambiguity regarding FNAC and clinical diagnosis.

RESULTS

In the present study which was conducted over a span of 18 months from January 2019 to June 2021, 150 breast aspirations were studied. The observations of the study were as follows:

Final diagnosis of breast lesions:

Out of 150 aspirations done, benign breast lesions predominated with 108 cases, followed by malignant lesions which were 27 in number.

Table 1: Showing final diagnosis of breast lesions.

Breast lesions	Number of cases
Benign breast lesions	108
Inflammatory lesions	31

Non-neoplastic lesions	33
Benign tumors	53
Malignant breast lesions	27
Total	150

Among benign breast lesions, fibroadenoma was the most common with 40 cases followed by fibrocystic change with 27 cases. Among the malignant lesions Infiltrating Ductal carcinoma had highest incidence rate with 18 number of cases. Below table shows incidence of various breast lesions and their subtypes.

Table 2: Showing incidence of breast lesion.

I. Benign breast lesions		108
a. Inflammatory and related lesions	Acute mastitis	12
	Acute on chronic mastitis	3
	Breast abscess	9
	Galactocele	2
b. Non neoplastic: Non proliferative:	Fibrocystic change	30
	Gynecomastia	2
	Epithelial hyperplasia	1
Proliferative:		
c. Benign tumors	Fibroadenoma	44
	Lipoma	4
	Adenomyoepithelioma	2
	Haemangioma	2
	Spindle cell lesion	1

II. Malignant breast tumors		27
	Infiltrating Ductal Carcinoma, NOS	18
	IDC, Mucinous type	1
	IDC, Medullary type	2
	IDC, Papillary type	2
	Invasive Lobular Carcinoma	3
	Malignant Phyllodes	1
Total		150

Age and sex distribution:

The age of the patients ranged from 12 to 79 years. There were 122 female patients and 2 male patients. The age distribution in relation to sex is shown in table 3.

Table3: Age and sex distribution.

Age in years	< 20	21 - 40	41 - 60	61 - 80	Total
Females	21	79	35	7	144
Male	3	2	1	-	6
Total	17	75	30	2	150

Distribution of the breast lumps in relation to the side and quadrant:

Out of 150 aspirates, in 65 cases the lump was located in the right breast and 70 cases had in left breast. In 15 cases, both the breasts were involved.

The most common location of breast lump was upper outer quadrant in both right and left breast with a incidence of 39 and 35 cases respectively. The least common location in right breast was upper medial with 11 cases and the least common location in left breast was lower outer quadrant with 12 cases. Two cases, one in each side of the breast showed diffuse involvement of all quadrants.

Presenting symptoms:

The commonest presenting symptom was a lump in the breast. This was observed in all the cases. Twenty five cases in addition had associated pain, two cases presented with nipple discharge (one bloody and one purulent) in addition to the lump. Two cases showed ulceration of the skin, overlying the lump – Table 4.

Table 4: Showing presenting symptoms.

Symptoms	No of cases
Lump in the breast	150
Pain	35
Nipple discharge	4
Ulceration of the skin	3

Size of the lump:

Among the inflammatory and related lesions largest size of the lump documented was in a case of acute on chronic mastitis which was measuring 5x5cms and the smallest lump was measuring 2x1cms which was a case of abscess. Among non-neoplastic lesions largest and smallest size of the lump was noted in FCC which measured 5x4cms and 1x1cms respectively. Among benign tumor the largest size of the lump was documented in a case of giant fibroadenoma which measured 7x6cms and the smallest benign tumor was a fibroadenoma measuring 1.5cm across.

Among malignant tumors the largest size of the lump was documented in a malignant PT which measured 20x15cms and the smallest malignant tumor was documented in a case of IDC, NOS which measured 4x3cms.

Table 5: Size of the lumps.

		Largest	Smallest
Benign breast lesions	Inflammatory and related	Acute on chronic mastitis [5x5 cms]	Breast abscess [2x1cms]
	Non-neoplastic lesions	FCC [5x4cms]	FCC [1x1cms]
	Benign tumors	Giant fibroadenoma [7x6cms]	Fibroadenoma [1.5x1.5cms]
Malignant breast tumors		Malignant PT [20x15cms]	IDC, NOS [4x3.5cms]

Duration of breast lump:

Duration of the breast lumps among the cases studied ranged from 2 days to 2years. Most of the cases presented with history of 1 - 6 months duration.

Benign epithelial lesions:

A final diagnosis of benign breast lesion was made in 102 cases among 150 patients who presented with palpable breast lumps.

I. Inflammatory and related lesions:**a) Mastitis**

FNAC was helpful in diagnosing a total of 24 cases of mastitis, among which 12 was acute, 3 were acute or chronic mastitis and 9 were cases of breast abscess.

All the patients under this category were females. Age of the patients ranged from 20 years to 56 years. Majority of the patients were above 40 years. The lump was located in the right breast in 12 cases and left breast in 12 cases.

Among 12 cases which were diagnosed as acute mastitis, 5 cases presented with a short duration of less than 5 days and 7 cases with a duration between 1-3 months. One case presented with ulceration of the overlying skin. The aspirate was blood mixed. The smears showed neutrophils along with few clusters of ductal epithelial cells.

Among 3 cases which were diagnosed as acute on chronic mastitis, all the patients presented with a lump of duration between 7 to 10 days. The aspirate was blood mixed. The smears showed neutrophils, lymphocytes, plasma cells and macrophages. Occasional ductal epithelial cells were observed.

Among 9 cases which were diagnosed as breast abscess, one case was clinically suspected as carcinoma of the breast. But FNAC revealed it to be a case of abscess. The patients presented with an average duration of 20 days. The aspirate was frank pus. The smears showed sheets of neutrophils, degenerated neutrophils in a dirty background. The ZN stain was negative in all the cases.

b) Galactocele: (Plate 4)

2 cases were diagnosed as Galactocele. Both were located in the right breast. Average age of the patients was 25 years. Both were lactating mothers who presented with lump since 2 days associated with pain.

Aspirate was yellowish milky material. The smears showed plenty of cyst macrophages, occasional acinar cells with fragile cytoplasm in a background of fat globules and milky secretion.

II. Non-neoplastic lesions:

a) Non proliferative (Fibrocystic change):

Among 26 cases diagnosed as fibrocystic change, majority of the patients were in the age group of 21-40 years.

14 cases had an ill-defined lump in the left breast and 7 cases in right breast and in 5 cases the lesion was present in both the breasts. The average duration of the lump was 4 months. 15 cases had associated pain, among which, 8 cases had cyclical pain during menstruation.

The aspirate was fluid like material. The smears showed ductal epithelial cells in cohesive clusters and many cyst macrophages. Few cases showed in addition apocrine change and adenosis component.

One case of Gynecomastia was diagnosed in a 30 year old male who presented with a lump in the left breast since 1 year. The aspirate was blood mixed. The smears showed scanty cellularity comprising of benign ductal epithelial cells in sheets. Biopsy was received and was confirmed histopathologically.

b) Proliferative lesions:

One case of usual type of epithelial hyperplasia was encountered during FNAC. A female patient aged 40 years presented with a lump in the upper outer quadrant of right breast since 6 months.

The aspirate was blood mixed. The smears were hypercellular with benign ductal epithelial cells in tight clusters and in three dimensional sheets.

III) Benign breast tumors:

Among 150 cases, 48 were diagnosed as benign tumors. Fibroadenoma predominated the picture with a total of 42 cases.

a) Fibroadenoma.

Of the benign tumors, fibroadenoma was the most common lesion which was seen in 42 cases. Among 48 patients, 33 were in the age group of 21-40 years, signifying high incidence during reproductive age group. There were no cases with age more than 40 years. Left breast was more commonly involved and the most common location was upper outer quadrant. One case involved all the quadrants which was cytologically diagnosed as giant fibroadenoma.

Table 6: Showing age, side and quadrant wise distribution

Parameters		No of cases
Age group	< 20 years	12
	21-40 years	33

Side of the breast	Right	19
	Left	25
	Both	5
Quadrant	Upper outer	27
	Upper medial	8
	Lower outer	7
	Lower medial	5
	All the quadrants	2

Among the 45 cases, 2 were clinically suspected of malignancy and 1 was suspected to be fibroadenosis, but FNAC gave the result of fibroadenoma. Excision biopsy was not received for these 3 clinicocytological discordant cases.

2 cases were clinically suspected of fibroadenoma but FNAC diagnosis was fibrocystic change, but histopathology diagnosis was fibroadenoma in both the cases.

The aspirate was thick whitish material in majority of the patients. The smears showed moderate cellularity comprising of benign ductal epithelial cells in tightcohesive clusters and sheets with overriding myoepithelial cells in a background showing bare nuclei and fibromyxoid stromal fragments.

4 cases of fibroadenoma in addition had fibrocystic change, 4 cases had epithelial hyperplasia and one case showed apocrine change.

Excision biopsy was received for 21 cases, in 18 cases there was cytohistopathological correlation. 3 cases which were diagnosed as fibrocystic change in FNAC turned out to be fibroadenoma on biopsy. Grossly the tumor was well circumscribed with a capsule and the cut surface was solid, grey white with cleft like spaces. Histopathology showed ductal epithelial cells in both intracanalicular and pericanalicular pattern in a background of

fibromyxoid tissue.

Lipoma.

Lipoma was diagnosed in 3 cases. It was more common in elderly patients. One was located in the axillary tail.

Among the three, one was clinically diagnosed as fibroadenoma, and one more as carcinoma breast but multiple aspirations in FNAC revealed only fat and was diagnosed as Lipoma in both the cases. All the cases had firm mobile lump.

In all the cases aspirate was oily and smear showed mature adipocytes admixed with fibrous tissue fragments.

Excision biopsy was received in one case and was confirmed histopathologically.

b) Adenomyoepithelioma.

A young female patient aged 14 years presented with a recurrent lump in the left breast, upper medial quadrant. On inspection, the left breast showed a scar of previous surgery which was seen located in the upper medial quadrant. Remaining part of the skin including nipple and areola was unremarkable. On palpation, a firm to hard lump was felt in the upper medial quadrant which was mobile in all the directions. It was tender on palpation.

Previous report was Adenomyoepithelioma- left breast excised 2 years back. Now patient had presented with lump of 2 months duration.

Aspirate was blood mixed. Smears showed marked cellularity comprising of tumor cells in loose clusters and sheets with overcrowding and overriding. Plenty of naked nuclei were seen in the background with occasional scanty stromal fragments. Histopathological examination was not possible as patient went to higher centre for the treatment.

c) Hemangioma.

A young male patient aged 12 years presented with a lump in the right breast, upper outer quadrant since 6 months. Clinically he was diagnosed as Gynecomastia.

On inspection, the lump had bosselated appearance and was bluish. Aspiration was frank blood. Smears showed blood components, histiocytes in singles and clusters and hemosiderin laden macrophages. A FNAC diagnosis of hemangioma was given.

d) Spindle cell lesion. (Plate 16)

An elderly patient presented with a lump in the right breast upper outer quadrant of 2 months of duration. Clinically a diagnosis of benign lump was made.

On inspection, the lump was mobile and hard in consistency. Aspiration was blood mixed. Smears showed spindle shaped cells in clusters. A FNAC diagnosis of spindle shaped lesion was given. However, typing of this lesion could not be made as the material was not available for histopathological study.

IV) Malignant breast tumors

Among 150 cases, a final diagnosis of malignancy was made in 27 cases. Infiltrating Ductal Carcinoma predominated among malignant tumors with 18 cases followed by Infiltrating Lobular carcinoma with 3 cases. Least was malignant Phyllodes tumor with 1 case.

a) Infiltrating Ductal Carcinoma.

A total of 18 cases were diagnosed as ductal carcinoma. All were female patients and it was more common in elderly patients. Age distribution is shown in the below table.

Table 7: Showing age distribution.

Age	<20	21-40	41-60	>60
No of cases	-	7	15	2

In 15 cases the carcinoma was located in the right breast and remaining 9 cases presented in left breast. Most common anatomical quadrant location of lumps in both the breast was upper outer quadrant. Below table shows side and quadrant distribution.

Table 8: Showing side and quadrant distribution.

Side of the breast	Quadrant	No of cases
Right	Upper outer	9
	Lower outer	-
	Upper medial	2
	Lower medial	1
Left	Upper outer	5
	Lower outer	-
	Upper medial	4
	Lower medial	1
Total		22

In FNAC, a diagnosis of Ductal carcinoma, not otherwise specified (NOS) was made in 16 cases and a subtype of Mucinous carcinoma was made in 1 case. Below table shows the same.

Table 9: Showing FNAC results in IDC:

Ductal carcinoma	No of cases
Not otherwise specified	19
Mucinous type	2
Total	21

Among these 19 cases one case was clinically diagnosed as fibroadenoma. She was a 44 year old with a hard lump in upper outer quadrant of left breast since 4 months. FNAC was reported as Ductal carcinoma. Biopsy obtained for histological examination revealed Infiltrating Ductal Carcinoma (NOS). In all the remaining 19 cases clinicocytological diagnosis correlated. Below table shows the same.

Table 10: Showing clinical and FNAC diagnosis in malignant breast tumors.

	Benign	Malignant	Total cases
Clinical diagnosis	2	18	20
FNAC diagnosis	-	20	20

Out of 20 cases, excision biopsy was obtained in all the cases for final confirmatory diagnosis. 18 cases of IDC Not Otherwise Specified (NOS) type and 2 case of IDC Mucinous type was diagnosed on FNAC. Among the 18 cases which were diagnosed as NOS type, on histopathology revealed to be of one Mucinous, one Medullary and one Papillary type each. Below table shows the cytological and histological diagnosis subjected for modified radical mastectomy

Table 11: Showing cytological and histological diagnosis in IDC.

FNAC diagnosis of DC		20
	NOS type	18
	Mucinous carcinoma	2
Histological diagnosis of IDC		20
	NOS type	16

	Mucinous type	1
	Medullary type	2
	Papillary type	1

Aspirate was blood mixed in all the cases. Smears showed abundant cellularity comprising of malignant ductal epithelial cells in loose clusters and in singles. Individual cells showed mild to moderate pleomorphism with moderate eosinophilic cytoplasm, high N:C ratio and hyperchromatic nuclei. One case showed background of abundant mucin and intracellular mucin. Grossly, the tumor was solid, grey white with areas of haemorrhage and necrosis. Histopathology showed malignant ductal epithelial cells in sheets, clusters and tubule formations and 1 case in addition showed abundant extracellular mucin with cells floating in the sea of mucin which was diagnosed as IDC, Mucinous type and 1 more showed malignant cells in syncytial clusters with pushing margins which was diagnosed as IDC, Medullary type. One more case, in addition showed complex anastomosing papillae with fibrovascular core which was diagnosed as IDC, Papillary type. 8 out of 20 cases showed metastatic deposits in ipsilateral axillary lymph nodes.

On all the 18 cases of FNAC, Nuclear grading was done using Robinson's cytological grading system⁴⁴. Of the 20 excised specimens, histopathological grading was done using Scarf Bloom Richardson's [Modified Elston and Ellis].⁴⁹ Grade 2 tumors predominated. Results are tabulated below.

Table 12: Showing final grading of the tumor.

Category	Grading			Total no of cases
	Grade 1	Grade 2	Grade 3	
Cytology	5	12	3	20
Histology	4	12	4	20

a) Infiltrating Lobular Carcinoma.

Among 22 cases of malignant breast tumors 3 were finally diagnosed as ILC. All the patients were in the 5th decade.

Among the 4 cases, one case showed bilateral presentation in both the breasts. Other 2 cases one in right and left each. For all the cases a clinical diagnosis of carcinoma was made.

In 3 cases, there was cytohistopathological discordance. One case was diagnosed as

Sclerosing adenosis on FNAC which was clinically suspected of carcinoma. The MRM specimen was received and a final diagnosis of ILC was made. In one more case which was clinically suspected as carcinoma a cytological diagnosis of Infiltrating Ductal carcinoma was given but final histological diagnosis was ILC.

Aspirate was hemorrhagic in 3 cases and in the case which cytological diagnosed as Sclerosing adenosis aspiration was gritty and yielded scanty hemorrhagic material. Smears showed moderate cellularity composed of tumor cells in singles, sheets and small clusters. Individual cells were pleomorphic with hyperchromatic nuclei. Grossly, the tumor was solid grey white with infiltrating margins. Histopathology showed malignant cells in singles, Indian file arrangements and in vague concentric pattern. Individual cells were predominantly small with scanty cytoplasm, nucleus with coarse chromatin and prominent nucleoli.

C) Malignant Phyllodes tumor.

Among 25 cases of malignant breast tumors, 1 case was finally diagnosed as malignant Phyllodes tumor.

A 35 year female patient presented with a huge lump since 1 year in the right breast involving all the quadrants. Clinically a diagnosis of Phyllodes tumor was made. On FNAC, smears showed moderate cellularity comprising of epithelial cells in the cohesive sheets, in 3D cluster along with stromal fragments with increased cellularity in the stroma. A FNAC diagnosis of Phyllodes tumor with epithelial hyperplasia was made.

MRM specimen was received which was huge showing a grey white lobulated tumor with cleft like areas. Histological examination showed predominantly stromal component in leaf like pattern, along with epithelial component. Stroma showed hypercellularity of spindle shaped cells with elongated nucleus. Atypical mitosis $>10/10$ HPF was noted. A final diagnosis of malignant Phyllodes tumor was made.

Statistical analysis:

Cytological diagnosis was correlated with histopathology wherever possible and efficacy of FNAC was calculated.

48 cases out of 150 had a corresponding histological diagnosis. With this confirmation an overall sensitivity, predictive value of a positive result and percentage of false negative indices were calculated.

Out of 48 biopsies done, the discrepancies were noted in 7 cases at cytology were as follows:

Benign breast tumors:

Two cases reported as benign proliferative disease with cystic change on FNAC was reported as fibroadenoma on histopathological examination. (False positive diagnosis in disease).

Malignant breast tumors:

One case was reported as sclerosing adenosis on FNAC was diagnosed as Infiltrating Lobular Carcinoma at histology (False negative in disease). Another case reported as IDC at cytology was reported as ILC at histology.

One case which was reported as phyllodes tumor with epithelial hyperplasia in cytology was reported as malignant phyllodes tumor at histology. (False negative in disease).

Therefore in 7 out of 48 cases, the diagnosis at cytology was not in keeping with histology.

TP = 44

FP = 2

FN = 2

Table 13: Overall statistical analysis

Value	Formula	Percentage
Sensitivity	$TP(41)/TP(41)+FN(2) \times 100$	93.21%
Positive predictive value	$TP(41)/TP(41)+FP(2) \times 100$	94.21%

False negative percentage	$FN(2)/TP(41)+FN(2) \times 100$	4.23 %
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Plate 1
Acute mastitis

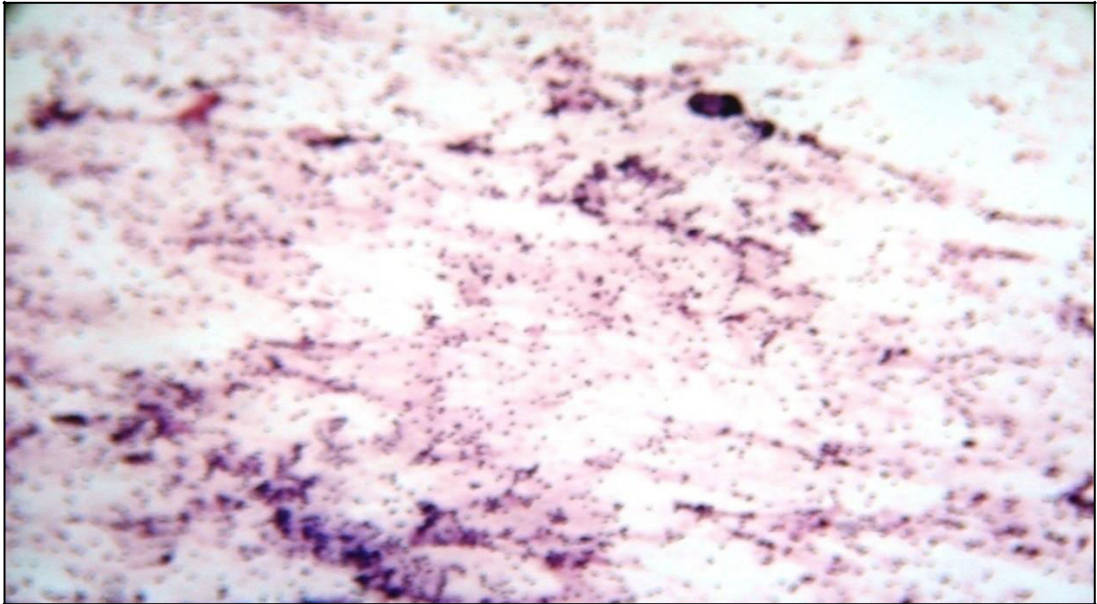


Figure 1: Cytology: Smear showing sheets of neutrophils in a dirty background.10x, H&E

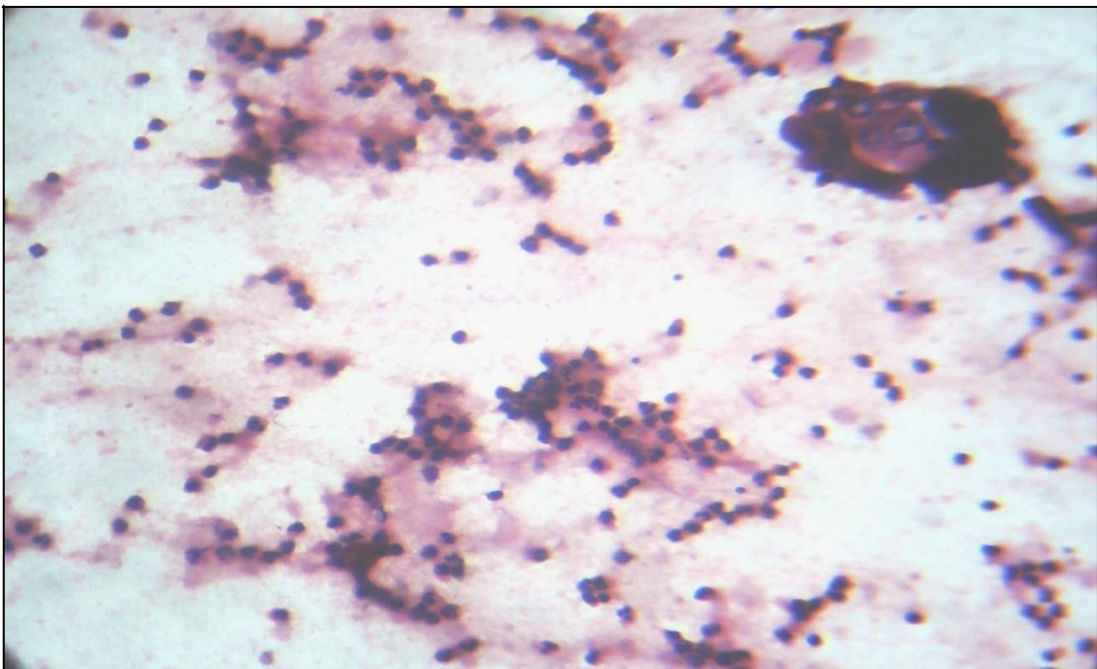


Figure 2: Cytology: Abundant neutrophils along with a cluster of ductal epithelial cells showing reactive change. 40x, H & E

Plate 2
Acute on chronic mastitis

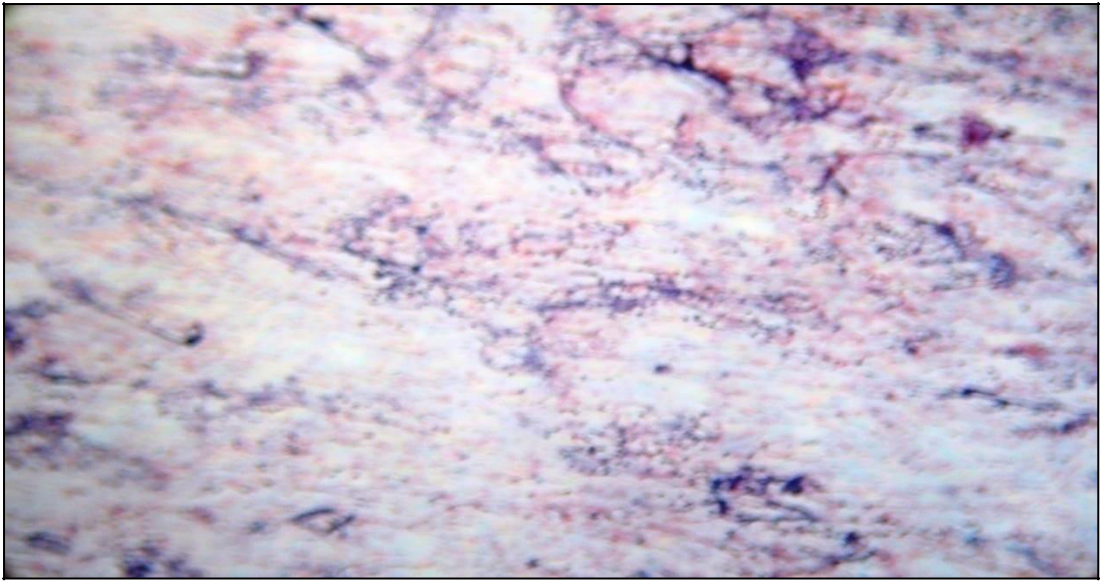


Figure 5: Cytology: Smear showing sheets of inflammatory infiltrates. 10x, H & E.

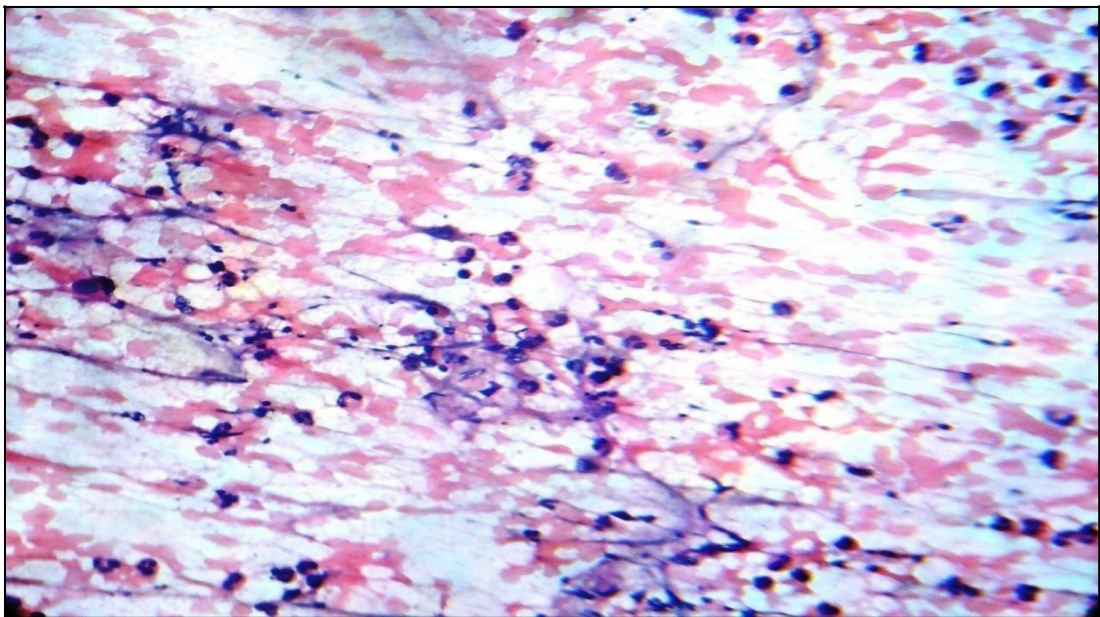


Figure 6: Cytology: Mixed inflammatory cell infiltrates comprising of neutrophils, lymphocytes and histiocytes. 40x, H & E.

Plate 3
Breast abscess

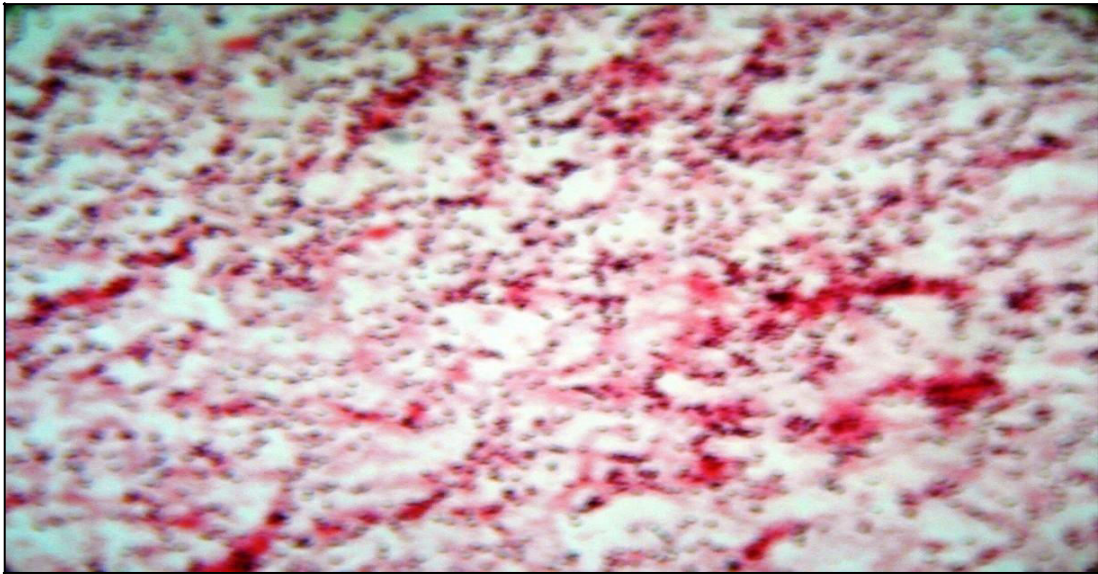


Figure 3: Cytology: Cellular smear showing sheets of neutrophils in a necrotic background. 10x, H & E.

Figure 4: Cytology: Smear showing numerous polymorphonuclear leukocytes in a debris background. 40x, H & E

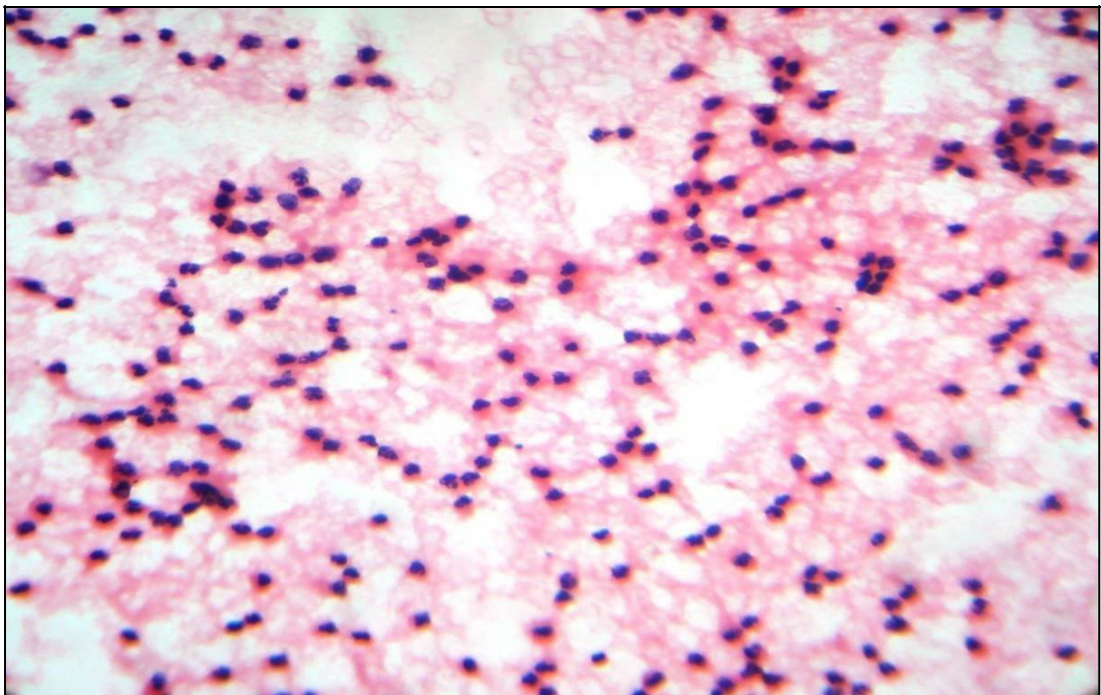


Plate 4
Galactocele

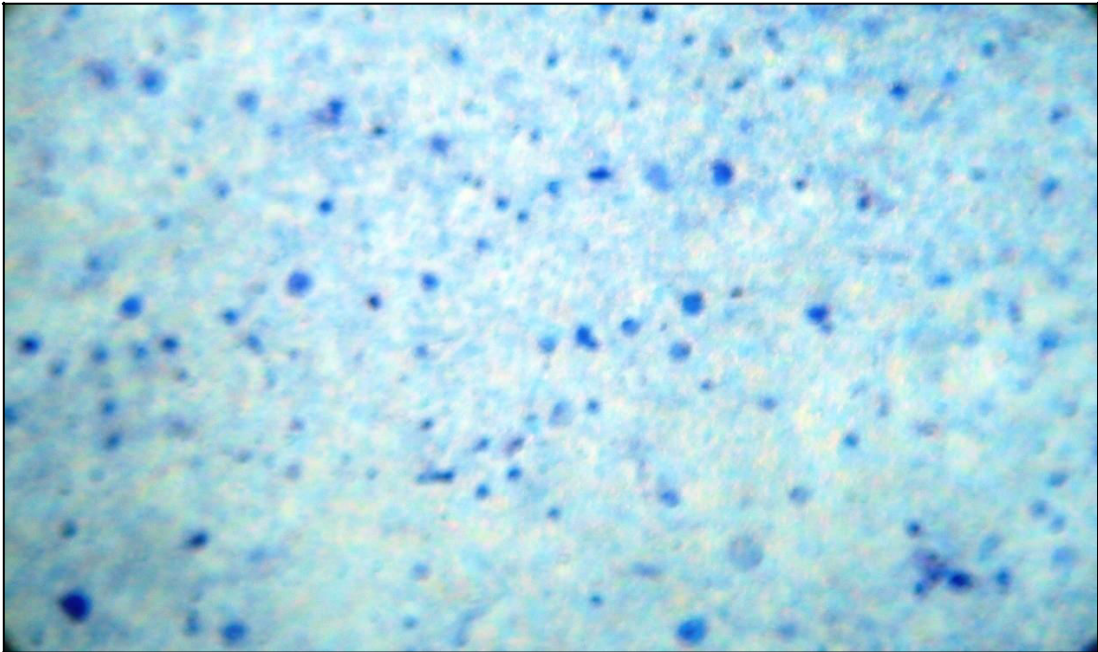


Figure 7: Cytology: Smear showing sheets of epithelial cells in a milky background. 10x, MGG.

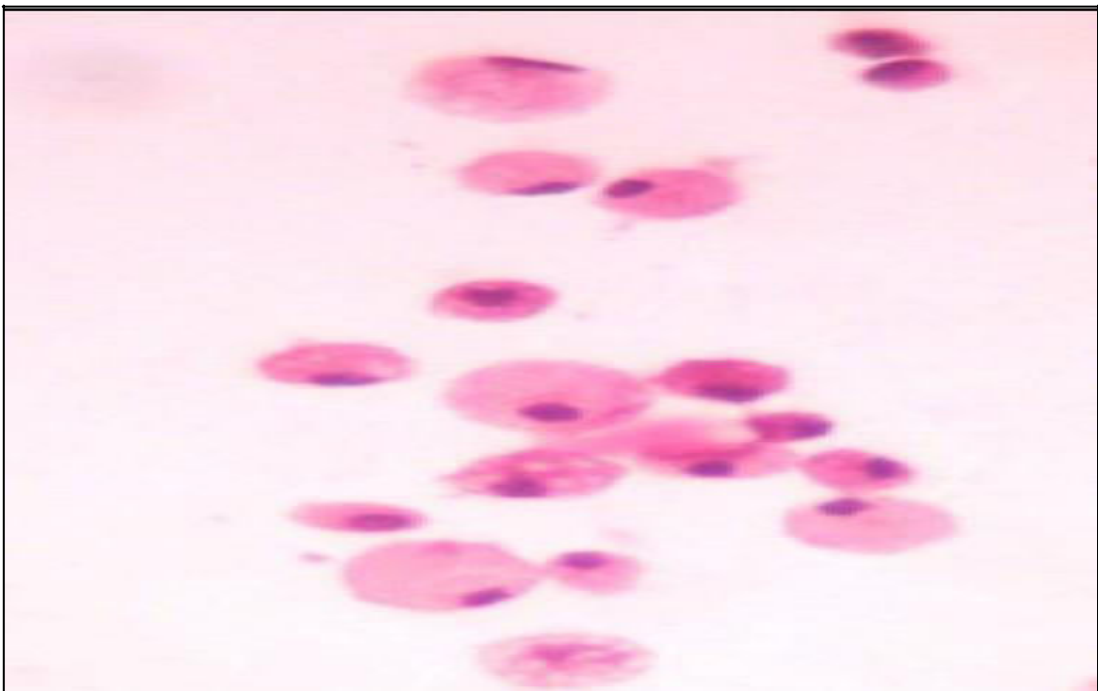


Figure 8: Cytology: Numerous foam cells with small vacuoles and degenerated acinar cells. 40x, H & E

Plate 5
Fibrocystic
change

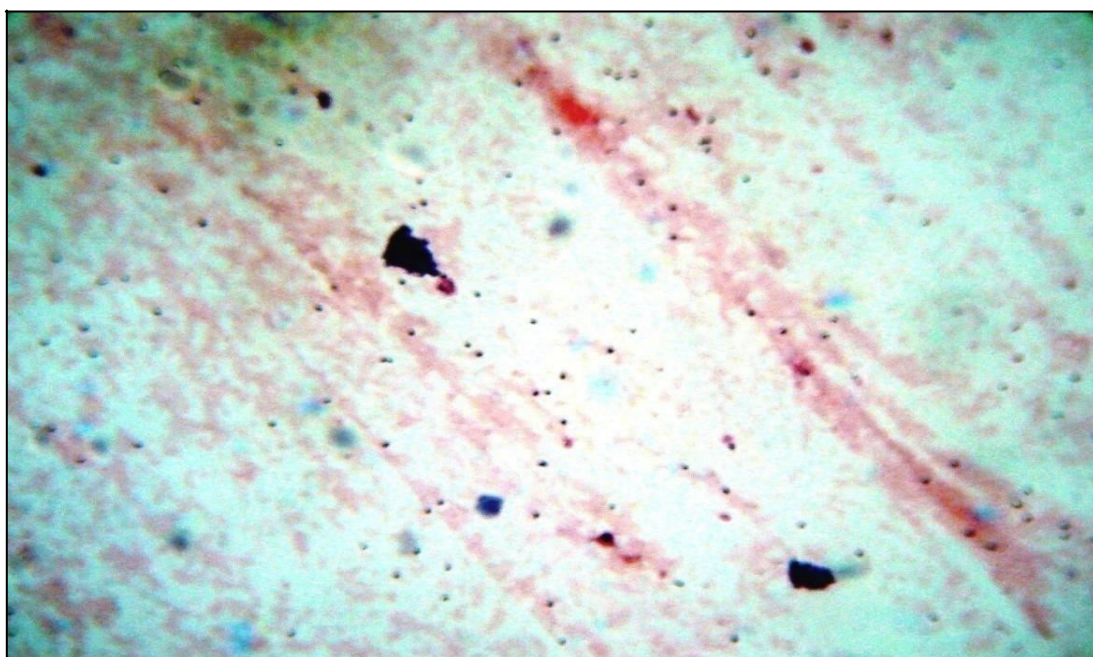


Figure 9: Cytology: Cohesive clusters of epithelial cells and bare nuclei in background of fluid. 10x, H &E.

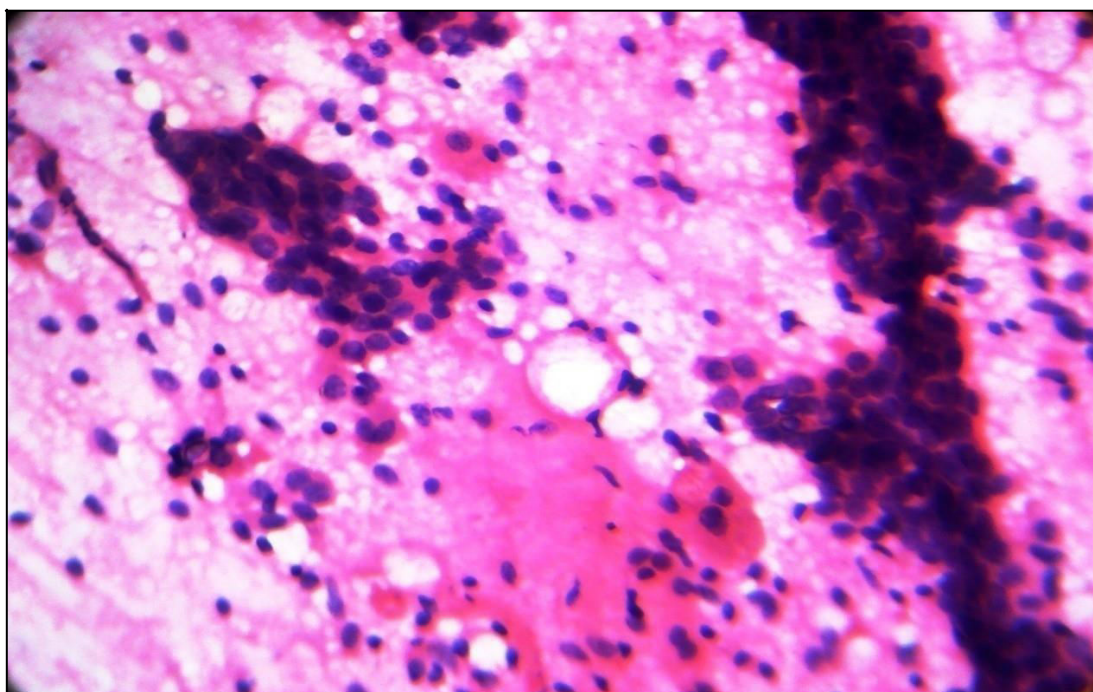


Figure 10: Cytology: Smear showing epithelial fragments in clusters and cystmacrophages. 40x, H & E.

DISCUSSION

In the present study 150 breast lumps detected at clinical examination were subjected for cytohistopathological examination. The age of the patients with lump in the breast ranged from 6 to 80 years with majority in the 21-40 yr age group.

Singh et al ⁶ in their study of 101 breast cases, reported majority of breast lesions in the age group 21-40yrs which comprised of 68%.

Bukhari et al ⁷ in their study of 425 breast cases, documented majority of lesions occurring in the age group 21-40yrs to be of 57%.

In the present study, 50% of cases belonged to age group 21-40yrs and the results are comparable with both the above mentioned studies.

In the present study, majority of the cases belonged to benign breast lesions (102 cases) constituting 82.25% and malignant lesions (22 cases) accounting for 17.74%.

Khanna et al, ⁸ Ochicha et al ⁹ and Bukhari et al ⁷ in their studies reported a high incidence of malignancy comprising of 38.7%, 27% and 36% respectively.

Malik et al ¹⁵ documented 89% and 11% incidence of benign and malignant lesions respectively, which is comparable with the present study which constituted 82.25% and 17.74% incidence of benign and malignant lesions respectively.

Malik et al in their study of 1276 breast lesions documented 71.4% and 28.4% incidence of benign and malignant lesions respectively.

Singh et al in their study of 101 breast lesions reported a 91.2% and 8.8% incidence of benign and malignant lesions respectively.

Bukhari et al in their study of 425 breast cases documented 77.6% and 22.4% incidence of benign and malignant breast lesions respectively.

In the present study of 150 breast cases, a incidence of 85% and 15 % of benign and malignant lesions were noted. The present study is comparable to the study done by Bukhari et al.

Godwins E et al in their study of 315 breast tissue biopsies, reported benign breast disease in 211 cases and fibroadenoma was the most common diagnosis observed in 45% of cases followed by fibrocystic changes which constituted 31.8%.¹

In the present study, out of 150 cases, benign breast disease accounted for 108 cases and fibroadenoma was the most common diagnosis observed in 40.7% of cases followed by fibrocystic change in 27.77%. The present study can be compared with the study done by Godwins et al.

Kishore et al in their study during a period of two years documented a 4.45% incidence of inflammatory lesion of breast which included cases of acute mastitis, acute on chronic mastitis and tubercular mastitis.¹¹

Malik et al in their study documented 17.5% incidence of inflammatory and related breast lesions which included mastitis, breast abscess, granulomatous mastitis, galatocoele, duct ectasia and fat necrosis with a mean age of 36 years.²

There was 27.2% incidence of inflammatory and related breast lesions in the study done by Singh et al. These included breast abscess, galatocoele and duct ectasia.

In the present study, there were 16.66% were inflammatory and related breast lesions, which included mastitis, breast abscess and galatocoele with a mean age of 40 years.

The present study is comparable to the study by Malik et al.

Non proliferative breast lesions.

Malik et al in their study have found an incidence of 6.7% non proliferative breast lesions which included fibrocystic change with a mean age of 35 years.²

Singh et al documented 11.7% incidence of non proliferative breast lesions which included fibrocystic change.⁶

In the present study there was an 29.62% incidence of non proliferative breast lesions which included fibrocystic change and Gynecomastia. Mean age of the patient was 32 years.

Proliferative breast lesions.

Gangopadhyay et al studied the usefulness of FNAC in diagnosing breast ductal proliferations that fell short of invasive cancer (atypical hyperplasia and insitu carcinoma) and concluded that three dimensional ductal cell clusters, swirling pattern of growth, sublumens, cell discohesions and nuclear overlapping indicate moderate ductal hyperplasia. Ductal atypia should be diagnosed only on such nuclear features as anisonucleosis, irregular nuclear membranes, clumped chromatin and eosinophilic macronucleoli as these progressed to invasive carcinoma.¹²

Malik et al have reported 0.8% incidence of proliferative breast lesion which included epithelial hyperplasia.²

In the present study there was a 0.9% incidence of proliferative breast lesions which included epithelial hyperplasia.

The present study is comparable with the studied conducted by both Malik et al and Singh et al.

c) Benign breast tumors

The incidence of benign breast tumors in the present study was 49.07 % comprising of fibroadenoma, lipoma, adenomyoepithelioma, spindle cell lesion and hemangioma. Malik et al in their study recorded an 41.6% incidence of benign breast tumors comprising of fibroadenoma and lactating adenoma.²

Singh et al have reported an 45.1% incidence of benign breast tumors comprising of fibroadenoma.⁶ The present study is comparable to the study done by Malik et al.

i) Fibroadenoma

On clinical examination when there is a well circumscribed and freely mobile mass in a young woman and the cytological study shows staghorn clusters of ductal cells, fibromyxoid stroma and numerous bare nuclei, a specific cytological diagnosis of fibroadenoma can be offered confidently.²⁷

In the present study cytological features of FA were studied in detail and compared with the study done by Kollur et al.⁹

In the present study, the total number of cases diagnosed cytologically as fibroadenoma was 42. All were female patients with a mean age of 30 years. Cytologically staghorn pattern, monolayered sheets and fibromyxoid stroma was noticed in majority of cases.

All biopsied fibroadenomas (22 cases) correlated with the FNA diagnosis, giving a sensitivity of 100%.

The sensitivity of FNAC in diagnosing fibroadenoma in the present study is comparable to the study by Kollur et al, who have reported a sensitivity of 97%.

ii) Lipoma

Abhijit et al in their study of 110 benign breast diseases reported only 1 case of lipoma.¹⁴

In the present study out of 108 cases of benign breast lesions, there were 4 cases of lipoma i.e. (3.7%). All the cases in the present study were elderly females with mobile, firm lump in the breast. Clinically one of the cases was diagnosed as carcinoma, however turned out to be lipoma on cytological examination and was confirmed histopathologically.

i) Hemangioma

Malik et al in their study of breast lesions reported 1 case of hemangioma in a child less than 10 yr old who presented with a lump in the breast.²

In the present study also there was 2 case of hemangioma in a 6 yr old male child with a lump in the right breast of 1 month duration which however was clinically diagnosed as Gynecomastia.

ii) Spindle cell lesion

Khanna et al in their study encountered 1 case of spindle cell lesion on FNAC which was subtyped as neurofibroma on histopathology.⁸

In the present study also there was 1 case of spindle cell lesion of the breast on FNAC in a 55 yr old patient who presented with a firm lump in the right breast of 2 months duration. However, typing of this lesion could not be made as the material was not available for histopathological study.

II] Malignant breast tumors:

Malik et al in their study of 1276 breast cases reported 140 cases of malignant lesions which constituted (11%).¹⁵

Khanna et al, Ochicha et al and Bukhari et al in their studies reported a high incidence of malignancy comprising of 38.7%, 27% and 36% respectively.

In the present study out of the total 150 cases, malignant breast tumors was reported in 27 cases which constituted (17.71%), IDC formed the major type with 18 cases (66.67%) followed by Infiltrating Lobular Carcinoma with 3 cases (11.11%) and Malignant Phyllodes tumor with 1 case (3.7%).

The present study is comparable to the study done by Malik et al.

a) Infiltrating Ductal carcinoma.

Malik et al studied 271 cases of breast cancer, which comprised of 269 females and two males. IDC was encountered in 199 (71%) cases. The mean age of presentation of breast carcinoma was 44.1 years.²

In the present study IDC comprised of 27 cases thus constituting an incidence of 81.8%. The mean age of presentation was 47 years. The ipsilateral axillary lymph

nodes were received in 16 cases. 8 out of 18 cases showed lymph node metastasis. 3 cases showed reactive hyperplasia and remaining 5 cases were unremarkable. The present study can be compared with the study done by Malik et al.

Infiltrating Ductal Carcinoma, Mucinous type: Mucinous carcinoma of the breast is relatively rare. Pure form accounts for 2% of all breast cancers. The common age is postmenopausal age.¹⁶

In the present study, one case of mucinous carcinoma was diagnosed on FNAC in a 35 year old female. FNAC showed increased cellularity in the background of abundant mucin, intracellular mucin and discohesive malignant ductal epithelial cells. Mastectomy specimen was received and histopathological examination showed malignant ductal epithelial cells floating in the sea of mucin and the diagnosis was confirmed histopathologically. 4 ipsilateral axillary lymph nodes studied were unremarkable.

Comparison of cytological grading in Infiltrating breast carcinoma

The evaluation of cytologic features of Infiltrating Ductal Carcinoma in FNAC material is valuable.

In the present study, cytological grading using Robinson's grading was carried out in 21 cases which were diagnosed as malignant on FNAC. Majority of cases were reported as grade II.

CONCLUSION

Both benign and malignant breast lesions can present with a lump in the breast or discharge from the nipple, and any lump in the breast, no matter how benign it appears on clinical examination, should be referred to pathological examination as soon as possible to detect any malignant change. In this scenario, FNAC is the method that is most highly recommended because it is an initial outpatient procedure that is straightforward, risk-free, quick, and reliable. Additionally, it contributes to an early preoperative detection of any lump in the breast. In cases where the clinical and cytological diagnoses do not concur, as well as in cases where the diagnosis of malignancy based on cytological examination is suspicious, it is mandatory to perform a biopsy and then have it subjected to histopathological examination prior to performing a mastectomy. This is due to the fact that there is an occasional false positive case.

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Conflict of Interest

None

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