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Original Research Article

Cytological Spectrum of Breast Lesions on Fine Needle Aspiration Cytology at a Tertiary Care Center in Western Rajasthan

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Abstract:

Background: Breast carcinoma poses a significant health challenge in India, with a rising incidence of approximately 50% between 1965 and 1985. In India, breast cancer constituted 13.5% of all cancer cases in 2020. Diagnostic procedures, like fine needle aspiration cytology (FNAC), play a crucial role in evaluating breast lesions. FNAC, recommended by the National Cancer Institute, aids in determining the nature of lesions, guiding treatment decisions. The study aims to explore the cytological spectrum of breast lesions at their institution.

Methods: The current study was a hospital based retrospective descriptive study conducted for the period of one years between July 2022 and June 2023. Patients attending the hospital with palpable breast masses, whose FNACs were done at our department or at the department of radiation oncology, and the smears were sent to the Department of Pathology were included in the study as per the inclusion and exclusion criteria. The FNAC smears were properly fixed by 95% ethanol and stained with H&E and examined under light microscope. Clinical details of the patients were obtained from the requisition form or medical records, including age, habits, clinical examination, clinical diagnosis and noted in the prefixed format / Performa.

Results: We received a total of 1750 FNAC smears out of which, breast FNAC's accounted for 216 cases. 200 (10.95%) cases were included. Youngest patient was 16 years and oldest being 77 years old accounting for range of 61. Mean 42.22, median 39.50 and standard deviation being 15.55. Maximum number of patients were in the age group 21-30 years, followed by age group 31-40 years. Least number of patients were seen in both extremes of ages with 12 (6%) cases in 11 – 20 years age group and only 10 (5%) patients in age beyond 70 years. Most common type of lesions were benign lesions with 92 (46%) cases followed by 84 (42%) were malignant and 24 (12%) were inflammatory. Left sided beast lesions were slightly more common than right sided breast lesion. Left sided lesions were 1.08 times more common. Benign lesions were more common in younger age group and malignant lesions were more common in older age group and the difference in the age distribution is statistically highly significant with p value of < 0.0001. On analysing the occurrence of benign and malignant lesions based on the laterality of lesion. We did not find any significant association between the occurrence of breast lesion to any specific side of breast (p-value=0.620). On cytology examination most common individual diagnosis was malignant lesion with 84 (42%) of all breast lesions. Benign breast disease with 32 (16%) was second most common followed by fibroadenoma in 32 (16%) cases.

Conclusions: Fine needle aspiration cytology is an efficient, rapid, inexpensive, safe and reliable diagnostic method. It causes minimum morbidity with very less complications and has excellent patient acceptance. It helps to take the decision for the mode of surgery. Despite of its few limitations, FNAC has got high levels of diagnostic accuracy when performed by experienced pathologist.

Keywords: FNAC, Breast, Fibroadenoma, Mastitis.

Introduction

Breast carcinoma, a malignancy arising from the cells of the breast tissue, is a significant public health concern in India. As one of the most prevalent cancers affecting women, breast carcinoma has emerged as a major health challenge, demanding attention from researchers, healthcare professionals, and policymakers alike. The burden of breast cancer in India has been steadily rising. Breast cancer (BC) stands as the most prevalent form of malignancy among women worldwide. In 2020, it outpaced lung cancer to become the primary cause of global cancer

incidence, with an estimated 2.3 million new cases, constituting 11.7% of all cancer diagnoses [1].

Epidemiological research indicates that the global burden of BC is projected to reach nearly 2 million cases by 2030 [2]. In India, there has been a notable increase in incidence, rising by approximately 50% between 1965 and 1985[3]. Over the past 26 years, the age-standardized incidence rate of BC in females saw a rise of 39.1% (with a 95% uncertainty interval of 5.1 to 85.5) from 1990 to 2016, and this increase was observed across all states of the country [4].

According to Globocan data for 2020, BC accounted for 13.5% (178,361) of all cancer cases in India, contributing to 10.6% (90,408) of all deaths with a cumulative risk of 2.81 [5].

Breast diseases have a broad spectrum and can include malignant neoplasms as well as benign epithelial and stromal proliferations, inflammatory lesions, and developmental abnormalities. [6] The most frequent symptom of these lesions is the presence of palpable lumps, though they can sometimes be discovered accidentally.

The diagnostic procedure called, fine needle aspiration cytology (FNAC) is now used to determine the type of palpable breast lesions. [7,8] Due to its simplicity, ease of use, speed, and cost-effectiveness, it plays a significant role in the pathological assessment. Additionally, it aids in the planning of breast lump treatment. [2] Additionally, FNAC is accurate in diagnosing both malignant and non-malignant breast masses with a strong sensitivity, specificity as high as 95%, and precision. Multiple samples taken from various angles and the use of ultrasonic guiding in very small lumps can also increase accuracy. [8]

Because of its predictive significance, the National Cancer Institute (NCI) has advised FNAC for breast cancer patients who receive preoperative chemotherapy or radiotherapy. The grading of breast cancer determined by fine-needle aspiration (FNA) provides insight into the nature of the condition and potential outcomes, which aids in choosing the most appropriate treatments and subsequent management.

For the evaluation of any breast lesions prior to surgery, aspiration cytology is a crucial test. However, the FNA report often does not grade breast cancer. The purpose of this study was to examine the cytological spectrum of breast lesions at our institution.

Materials and Method

The current study was a hospital based retrospective descriptive study, carried out at the Department of Pathology, Sardar Patel Medical College and Associated Group of Hospitals, Bikaner conducted for the period of one years between July 2022 and June 2023.

Patients attending the hospital with palpable breast masses, whose FNACs were done at our department or at the department of radiation oncology, and the smears were sent to the Department of Pathology were included in the study as per the inclusion and exclusion criteria. The FNAC smears were properly fixed by 95% ethanol and stained with H&E and examined under light microscope. Clinical details of the patients were obtained from the requisition form or medical records, including age, habits, clinical examination, clinical diagnosis and noted in the prefixed format / Performa.

Inclusion criteria

1. All adequate and representative FNAC smears from breast lesions received at Department of Pathology.
2. Specimens from female patients.

Exclusion criteria

1. Degenerative specimens
2. Inadequately preserved specimens
3. Specimens from male patients.

Results and Discussion

This is a one-year study from September 2022 to August 2023 conducted at SPMC, Bikaner and PBM Hospital. FNAC's were received from the P. B. M. Hospital, Acharya Tulsi Regional cancer centre and associate hospitals of SPMC, Bikaner. We received a total of 1750 FNAC smears during the study period out of which, breast FNAC's accounted for 216 cases.

We included a total of 200 cases according to the inclusion and exclusion criteria. The overall percentage of breast FNAC's as per the attendance of cases is 10.95%. In our study, youngest patient was 16 years and oldest being 77 years old accounting for range of 61. Mean 42.22, median 39.50 and standard deviation being 15.55.

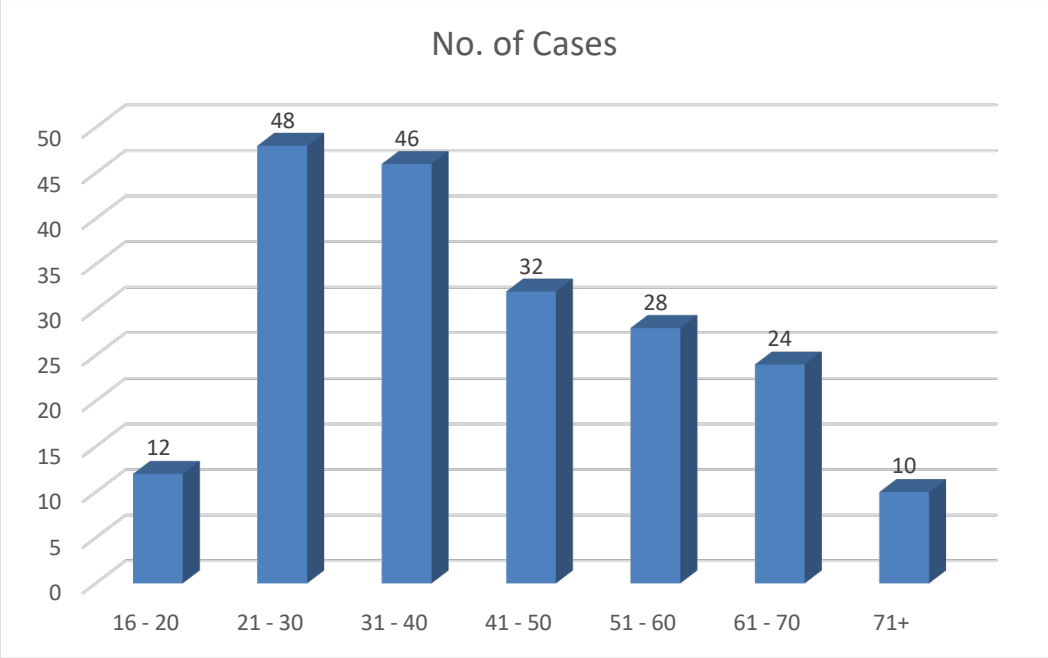

Image 1: Age group wise distribution of cases

According to age wise distribution, maximum number of patients was in the age group 21-30 years with total 48 (24%) patients, followed by age group 31-40 years with 46 (23%) patients. Least number of patients was seen in both extremes of ages with 12 (6%) cases in 11 – 20 years age group and only 10 (5%) patients in age beyond 70 years. [Image 1]

Based on type of lesion, most common type of lesions were benign lesions with 92 (46%) cases followed by 84 (42%) were malignant and 24 (12%) were inflammatory. [Image 2]

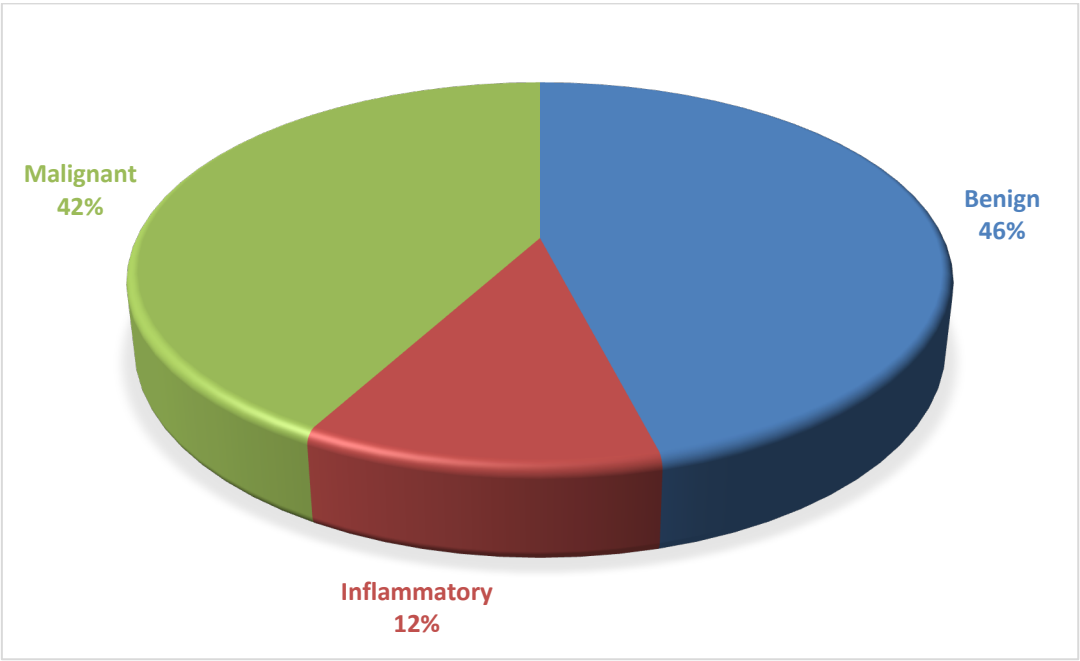

Image 2: Distribution of cases according to type of lesion on FNAC

In the present study, left sided beast lesions were slightly more common than right sided breast lesion. Left sided lesions were 52% and right sided lesions were 48% that is left side was 1.08 times more common. [Image 3]

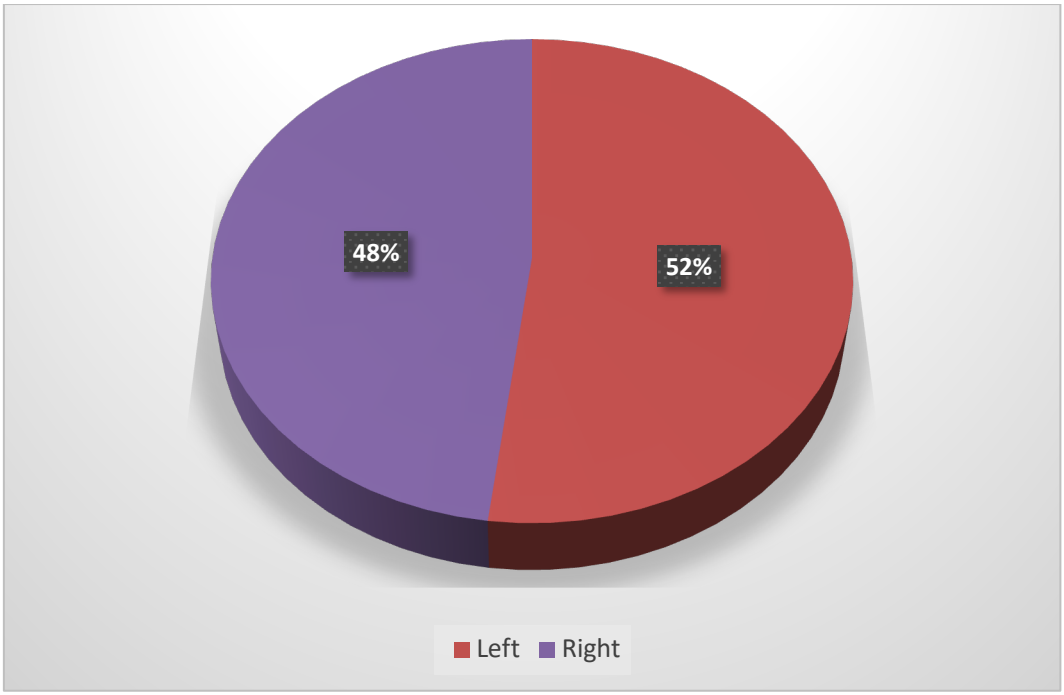

Image 3: Distribution of cases according to laterality of lesion

Table no. 1: Distribution according to age group and type of lesions.

Age Group	Benign	Inflammatory	Malignant	Total
11 - 20	10	0	2	12
21 - 30	26	12	8	46
31 - 40	28	10	9	47
41 - 50	12	0	20	32
51 - 60	8	0	22	30
61 - 70	5	2	19	26
71+	3	0	4	7
Total	92	24	84	200

Chi-squared	65.61
DF	12
Significance level	P < 0.0001

In the present study as seen in age distribution of breast lesions benign lesions were more common in younger age group and malignant lesions were more common in older age group and the difference in the age distribution is statistically highly significant with p value of < 0.0001. [Table 1] On analysing the occurrence of benign and malignant lesions based on the laterality of lesion. We did not find any significant association between the occurrence of breast lesion to any specific side of breast (p-value=0.620).

Table 2: Cytological spectrum of lesions in the present study

Cytological Diagnosis	No. Of Cases	Percent
Acute Mastitis	22	11.0%
Granulomatous Mastitis	2	1.0%
Benign Breast Disease	32	16.0%
Phylloids Tumors	2	1.0%
Duct Hyperplasia	10	5.0%
Fibroadenoma	32	16.0%
Fibrocystic Disease	8	4.0%
Gynecomastia	8	4.0%
Malignant	84	42.0%
Total	200	

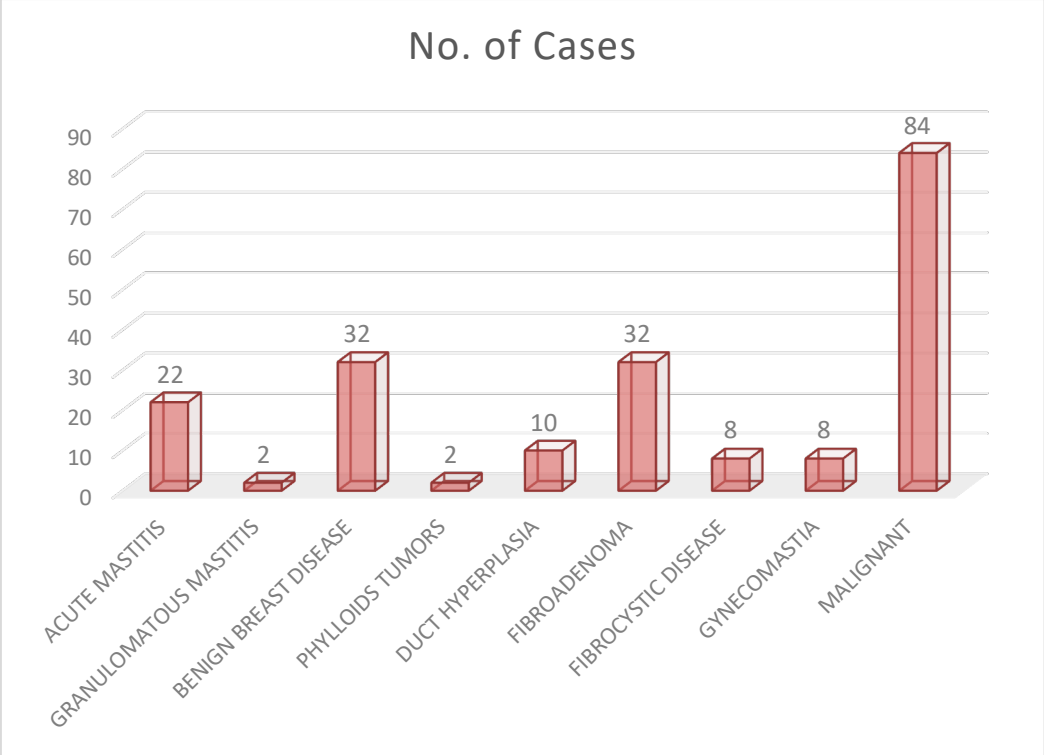

Image 4: Cytological spectrum of lesions in the present study

In our study, on cytology examination most common individual diagnosis was malignant lesion with 84 (42%) of all breast lesions. Benign breast disease with 32 (16%) was second most common followed by fibroadenoma in 32 (16%) cases.

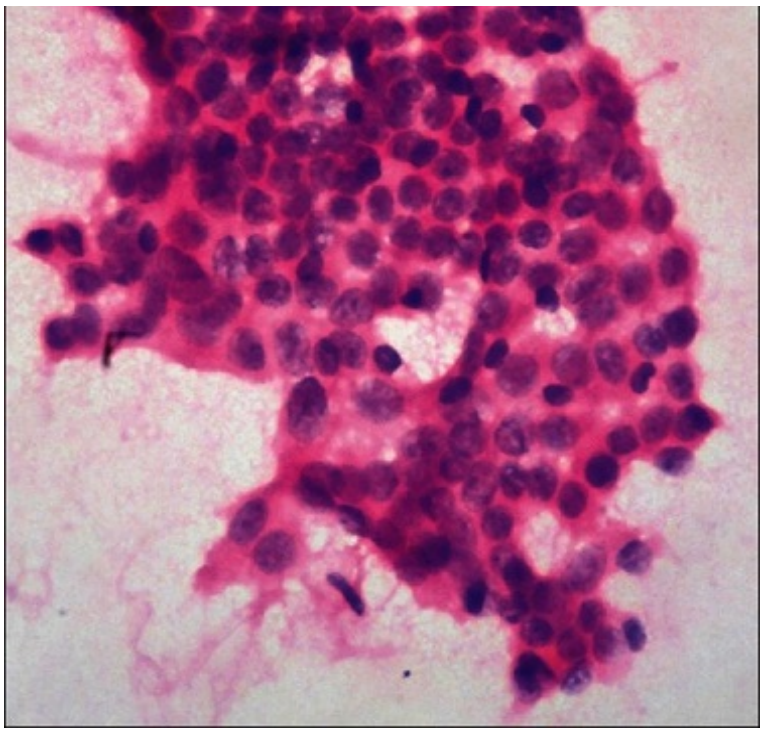

Image 5: FNAC smear showing Fibrocystic Disease (H&E, 40x)

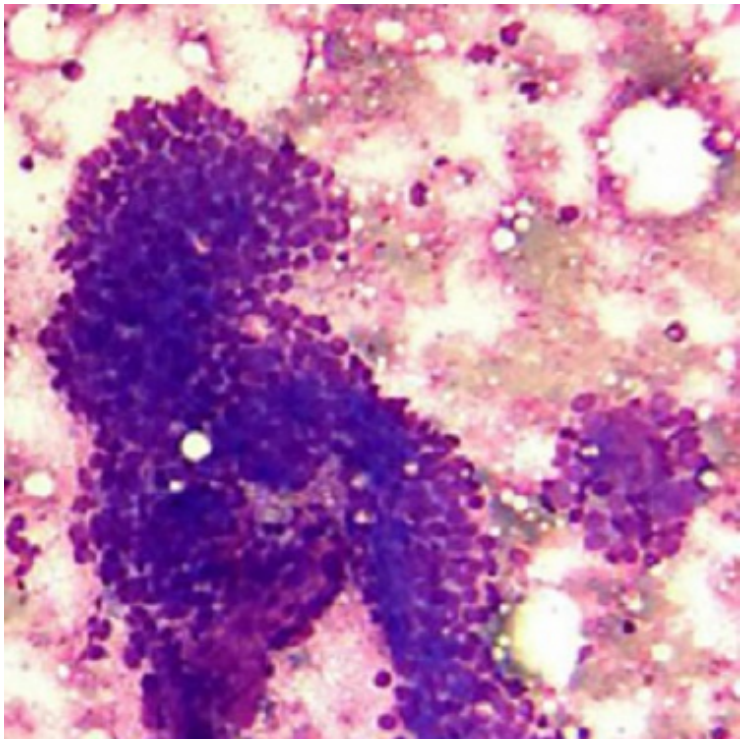

Image 6: FNAC smear showing features suggestive of FIBROADENOMA. (H&E, 40x)

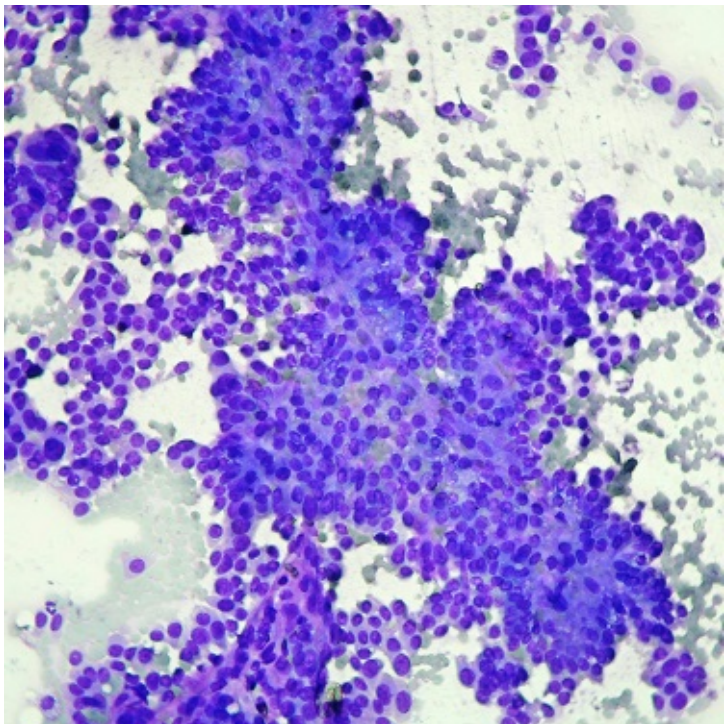

Image 7: Malignant Breast Lesion (Ductal Carcinoma) (H&E, 10x)

Discussion

Fine-needle aspiration cytology is widely used in the diagnosis of breast cancer because it is an excellent, safe, and cost-effective diagnostic procedure. FNAC of the breast can reduce the number of open breast biopsies.

The present study is conducted to study the cytological features of breast lesions by FNAC. We included 200 cases with palpable breast lumps in the present study according to inclusion and exclusion criteria. In the present study the age ranged from 16 to 79 years with the majority in 21 to 30 years of age group. Majority of the lumps were involving left breast. Nidhi Gupta et al [9], Hussain et al. [10] and Khemka A [11] also reported left breast as the most common side of involvement. However, the variation in laterality of

breast lesion has no surgical importance since the treatment and patient selections are not dictated by involvement of any particular side of breast.[11] In the present study, on comparing occurrence of inflammatory, benign or malignant lesions in left of right side of breast, we did not find any statistically significant difference between left and right side.

On cytological examination, in the present study we observed that most common type of lesion were benign and inflammatory (116 cases, 58%) followed by malignant lesions (84 cases, 42%). Nidhi Gupta et al. [9] in their study reported Benign (81.3%) as the most common type of lesions whereas malignant lesions accounted only for 6.6% cases. On comparing with other previous studies, the prevalence of benign lesions of breast was much less in our study as shown in table no. 3 below. However, Bukhari et al [12], and Feichter et al [13] results are near to our present study.

Occurrence of comparatively higher percent of malignant cases in our study is because our centre is a tertiary care regional cancer centre and patients from many nearby cities visit the hospital for treatment of malignancies, which increased the overall prevalence of malignant lesions in our study.

Table 3: Comparative analysis of benign breast lesions

Study	Benign and Inflammatory lesions (%)
Panwar H et al [8]	82.6%
Nidhi Gupta et al [9]	81.3%
Bukhari et al [12]	60%
Feichter et al [13]	68.1%
Present study	57 %

In the present study we observed that younger patients have comparatively more benign lesion as compared to elderly age groups in which malignant lesions were more common and the difference was statistically significant (p-value<0.0001).

Benign lesions were common in age group of 31 to 40 years followed by 21 to 30 years. This finding is similar to the study done by Khemka A[11] and the studies of Nidhi Gupta et al [9] and Bukhari et al.[12] also showed near similar results with younger age groups had more benign lesions.

In the present study, there were 12% inflammatory lesions including, 22 cases of acute mastitis and 2 case of granulomatous mastitis. Nidhi Gupta et. al.[9] also reported 11% inflammatory lesion which included 3.7% cases of tubercular mastitis. Pawar H et. Al.[8] reported 7% inflammatory lesions in their study. The results of these studies are in concordance with our study. However, in the study done by Bukhari et al.[12] and Rahman et al.[14] they reported 20% and 21.15% of inflammatory lesions respectively which is slightly higher than our study.

Fibroadenoma was the most common lesion reported in this study accounting for 16 % which was also common in studies of Bukhari et al. [12] and Pradhan and Dhakal [14] showed only 16% and 8% of fibroadenoma cases respectively. Our study showed much lower rate of fibroadenoma when compared to the study of Nidhi Gupta et al [9] who reported 49.24% cases of fibroadenoma.

Fibrocystic change accounted for 4% cases in our study. Rahman et al. [14] and Nidhi Gupta et. al [9] reported incidence of 11.81% and 10.6%, which is close to our result. In the study done by Kumar et al [16], fibrocystic disease comprised of 41.2% which is substantially higher than the current study. The incidence of FCD was also found to be higher (58%) in other study done by Singh A et al [17]. The reason of this may be explained by the fact that we are a tertiary care regional cancer center and receive primarily a bulk of cancer patients from the neighboring areas.

There were 5% cases of ductal hyperplasia which is similar to the study by Pradhan and Dhakal [14] reported 2.3% and Ahmed et al. 2.5%. However, Bukhari et al. [12] reported a higher incidence of 11.42%.

In malignant category, we reported 84 (42%) cases with cytological features of malignancy. Malignant lesions were most common in 6th and 7th decade of life. We observed that malignant lesions occurred in elder age groups as compared to benign and inflammatory lesion. The difference was statistically significant. Nidhi Gupta et al. [9], Rahman et al[14] and Khemka A et al [11] reported 7 . 5 % , 14.17% and 22% of malignant cases respectively which were close to our study. The reason of higher incidence of malignant lesion in our study being a tertiary referral cancer center.

Table 4: Comparative analysis of malignant breast lesions

Study	Number of cases (%)	Peak age group
Khemka A et al. [11]	22%	40-44
Bukhari et al. [12]	31%	51-60
Rahman MZ et al [14]	14.17%	31-40
Singh A et al. [17]	8.82%	41-60
Present study	42%	51 - 60

Conclusion

Fine needle aspiration cytology is an efficient, rapid, inexpensive, safe and reliable diagnostic method. It causes minimum morbidity with very less complications and has excellent patient acceptance.

It helps to take the decision for the mode of surgery. Despite of its few limitations, FNAC has got high levels of diagnostic accuracy when performed by experienced pathologist.

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