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Clinicopathological correlation of inflammatory lesions of breast-A tertiary care centre experience

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Abstract

Introduction: Inflammatory lesions of breast are close mimickers of malignancy clinically and therefore warrant a thorough examination and histopathological report for final diagnosis and treatment. Granulomatous mastitis may arise from bacterial, viral, mycobacterial infections, and systemic granulomatous diseases.

Materials and Methods: This study was conducted retrospectively by retrieving the medical records during the past 3 years. All cases that were histopathologically diagnosed as inflammatory lesions were included included in the study and the clinical and histopathological findings were analysed.

Results: The highest number of cases were seen during the year 2023.The age of the patients ranged from 23 to 73 years, with majority of the patients in the age group of 20 to 40 years**.** The presenting complaints of the patients included pain, swelling in breast and nipple discharge. The histopathological diagnoses of the patients included the following inflammatory lesions: Abscess, Granulomatous mastitis, Cystic neutrophilic granulomatous mastitis, plasma cell mastitis, and Periductal mastitis. Granulomatous mastitis was the most common histopathological diagnosis in the study population. In patients who presented with complaints of pain, the most common histopathological diagnosis was abscess. Twelve patients gave a history of recurring breast lump after incision and majority of these cases were reported as granulomatous mastitis. Out of the cases that showed a duration of more than one month, majority were reported as granulomatous mastitis.

Conclusion: This study shows that majority of cases of inflammatory lesions have been noted in the reproductive age group and the most common histopathological diagnosis was granulomatous mastitis.

Keywords: Mastitis, Granulomatous, Inflammatory lesions, Breast

1. Introduction

Inflammatory lesions of the breast are commonly encountered and pose a diagnostic dilemma as they mimic malignant lesions clinically and radiologically. The lesions range from acute

inflammatory lesions to chronic inflammatory lesions with well-formed granulomas. Inflammatory lesions are classified based on clinical features, morphology, and radiological findings [1].

Core biopsies or wide local excisions are performed to eliminate the possibility of a malignant lesion. Histopathological diagnosis remains the gold standard in classification of the inflammatory lesions.

The histopathological findings aid in classifying the inflammatory lesions into different categories including cystic neutrophilic granulomatous mastitis, IgG4 mastitis, granulomatous mastitis, fat necrosis, duct ectasia, non-specific chronic inflammatory lesions and abscess. Cystic neutrophilic granulomatous mastitis was previously synonymously used with granulomatous mastitis but studies have shown that they are two different entities and need to be reported separately. Granulomatous mastitis has different etiologies including bacterial, viral and mycobacterial infections, and also systemic granulomatous diseases [2]. There have been studies linking the incidence of granulomatous mastitis to Corynebacterium infection [3,4].

Most of the cases of granulomatous mastitis have been reported in the reproductive age group. Pregnancy, lactation or use of oral contraceptives have not been shown to be predisposing factors to the development of the lesion [5]. Histopathologically, the lesion shows the presence of non-necrotising granulomas predominantly in lobules. Cystic vacuoles when present within the granulomas and lined by neutrophils have been termed cystic neutrophilic granulomatous mastitis [6]. Sometimes, gram positive Corynebacterium bacilli can be noted within the cystic vacuoles. Special stains are performed to rule out causes of granulomatous mastitis including infection with fungal elements or acid-fast bacilli [7].

Breast abscesses are more commonly encountered during lactation but have also been reported in non-lactating patients [8,9]. Ductal stasis is the underlying mechanism involved in the development of breast abscess and core biopsies or excision biopsies are necessary to rule out a malignant etiology. Improper latching during breast feeding is the most common cause of development of breast abscess in lactating women [10]. 70-90% of patients with a smoking history have been shown to develop breast abscess [11-13].

Obesity and diabetes are also strong risk factors for the development of abscesses. Histopathologically, abscesses show a mixed inflammatory infiltrate with a predominance of neutrophilic collection in the initial stage. During the resolution, the lesion shows chronic inflammatory cells and granulation tissue formation.

The clinical symptoms of the patients with inflammatory lesions vary from person to person. Most patients present with features of pain and swelling in the breast of varying sizes with or without associated lymph node enlargement and sometimes nipple discharge and skin erythema [14].

A recent study conducted in Taiwan showed that there was an increased incidence of breast cancer in patients with history of mastitis. This has implied that there could be a correlation between the inflammatory process and the development of malignancy [15]. A study has stated that the inflammatory response that is developed as a protective mechanism can lead to the detection of acute phase reactants in the ductal fluid and this can be an indication of chronic inflammatory lesion leading to pathological mechanisms including breast cancer development [16].

The clinicopathological correlation of breast lesions can aid in the early diagnosis and management of patients with inflammatory lesions of the breast. In this study, we aim to evaluate the trend in inflammatory lesions of the breast as seen in our hospital during the past three years.

2. Materials and Methods

This was a retrospective study conducted in the Department of Pathology of KMCT Medical College. Sixty-five patients were included in this study who attended the OPD of General Surgery for the examination of a breast lump from January 2022 to December 2024. The histopathological records of the patients were obtained from the archives in the Department of Pathology. All cases reported as inflammatory lesions were included, and clinical details were gathered. Data including histopathological diagnoses, clinical details and age were tabulated in Microsoft Excel and analyzed.

Inclusion criteria: All cases that presented to the Department of Surgery with history of swelling or pain in breast.

Exclusion criteria: All cases radiologically identified as BIRADS V were excluded from the study.

No additional tests were performed as the study was retrospective and conducted using the reports and

details available at the Department of Pathology.

3. Results

Out of the 65 patients included in the study,16 cases (24.6%) were reported from tru-cut biopsies of the breast while the rest were reported from wide excision specimens. Twenty-two patients attended the OPD and showed a histopathological diagnosis of an inflammatory lesion of breast during the year 2022. Twenty-four cases were seen during the year 2023 and 19 cases were seen in the year 2024.The frequency of cases in the last 3 years as shown in Figure 1 shows the highest number of cases in the year 2023 and the lowest in the year 2024.

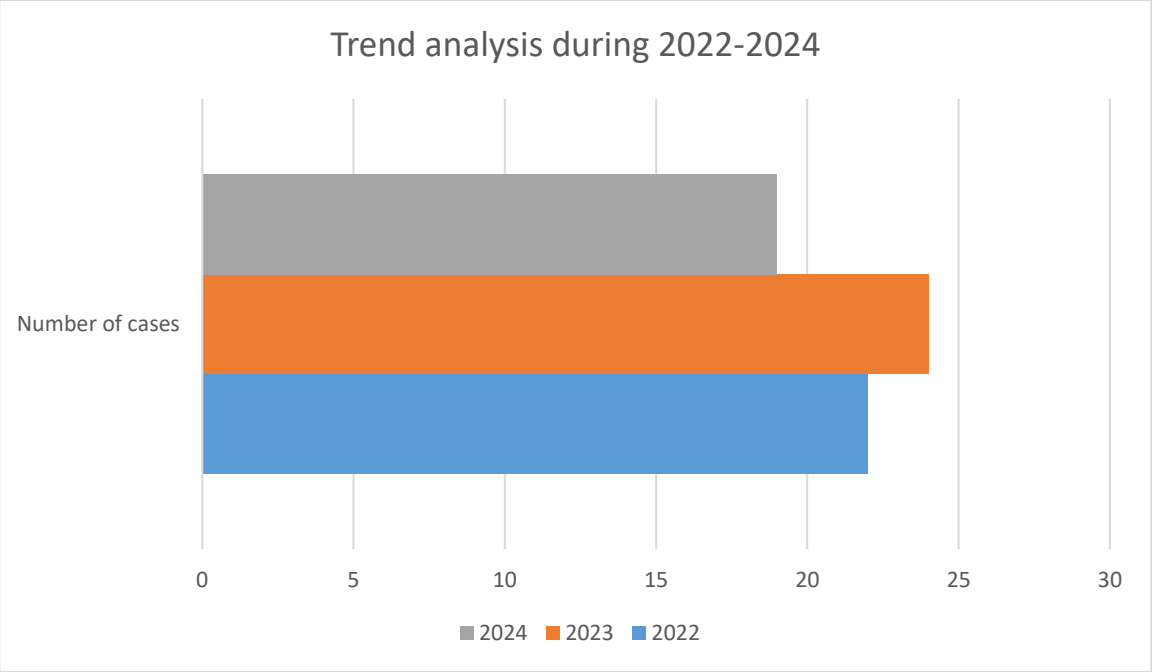

Figure 1. Trend analysis of the number of cases of inflammatory breast lesions during the years 2022-2024

The age of the patients ranged from 23 to 73 years, with the majority of the patients in the age group of 20 to 40 years constituting 70.76% of the study population. There were only 3 cases where the patients age was observed to be more than 60 years constituting 4.6% of the study population while the rest of the study population was in the age group of 41 to 60 years.

The presenting complaints of the patients included pain, swelling in the breast and nipple discharge. The frequency of each presenting complaint as observed in the study population is given in Table 1.

Table 1. Frequency of clinical presentations of cases in the study population

Presenting complaint	Number(N)	Frequency
Pain	12	18.4%
Swelling	64	98.4%
Nipple discharge	10	15.4%

Swelling in the breast on self-examination was seen in 64 patients and was the most common presenting complaint. Ten out of 65 patients had complaints of nipple discharge constituting 15.4% of the study population. All the 10 patients had complaints of swelling in breast that was palpated during self-examination. Twenty-seven patients had complaints of both pain and swelling in the breast.

The histopathological diagnoses of the patients included the following inflammatory lesions: Abscess, Granulomatous mastitis, Cystic neutrophilic granulomatous mastitis, plasma cell mastitis and periductal mastitis. The frequency of each

histopathological diagnosis is given in Table 2 and Figure 2.

Table 2. Frequency of lesions in the study population as confirmed by histopathology

Histopathological diagnosis	Number(N)	Frequency[%]
Abscess	19	29.2%
Granulomatous mastitis	20	30.8%
Cystic neutrophilic granulomatous mastitis	15	23.1%
Periductal mastitis	10	15.4%
Plasma cell mastitis	1	1.5%
Total		100%

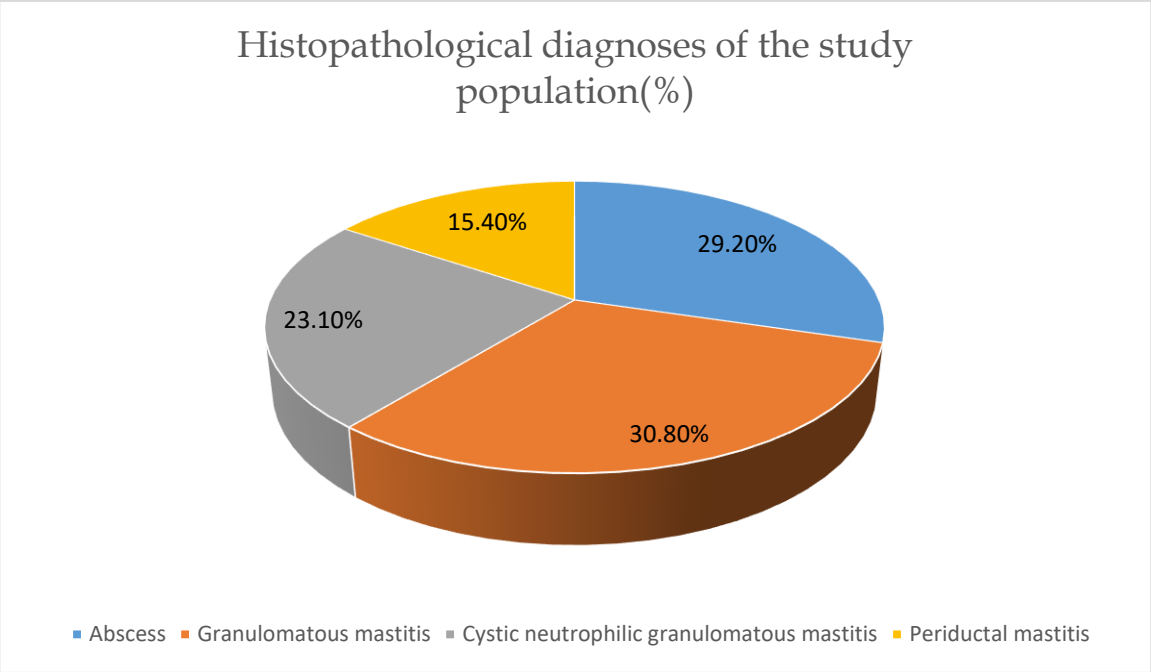

Figure 2. Histopathological diagnoses observed in the study population

Nineteen cases were reported as breast abscess while 20 cases of granulomatous mastitis and 15 cases of cystic neutrophilic granulomatous mastitis were reported. 10 cases showed periductal mastitis and a single case of plasma cell mastitis was reported.

Out of the 28 cases that presented with complaints of pain, the most common histopathological diagnosis was that of abscess seen in 10 patients. Granulomatous mastitis was reported in 9 cases, cystic neutrophilic granulomatous mastitis in 5 cases and periductal mastitis in 4 cases.

Out of the 10 cases that presented with complaints of nipple discharge, 3 cases each were histopathologically reported as abscess, cystic neutrophilic granulomatous mastitis and granulomatous mastitis while one case was reported as periductal mastitis.

Only one case presented with history of pain without a palpable breast swelling on self-examination. Core biopsies sent from this case was reported as abscess

Twelve patients gave a history of recurring breast lump after incision and drainage was done and a course of antibiotics was given. Out of these 12 patients, 6 cases were reported as cystic neutrophilic granulomatous mastitis ,4 as granulomatous mastitis and one case each of periductal mastitis and abscess.[Figure 3]

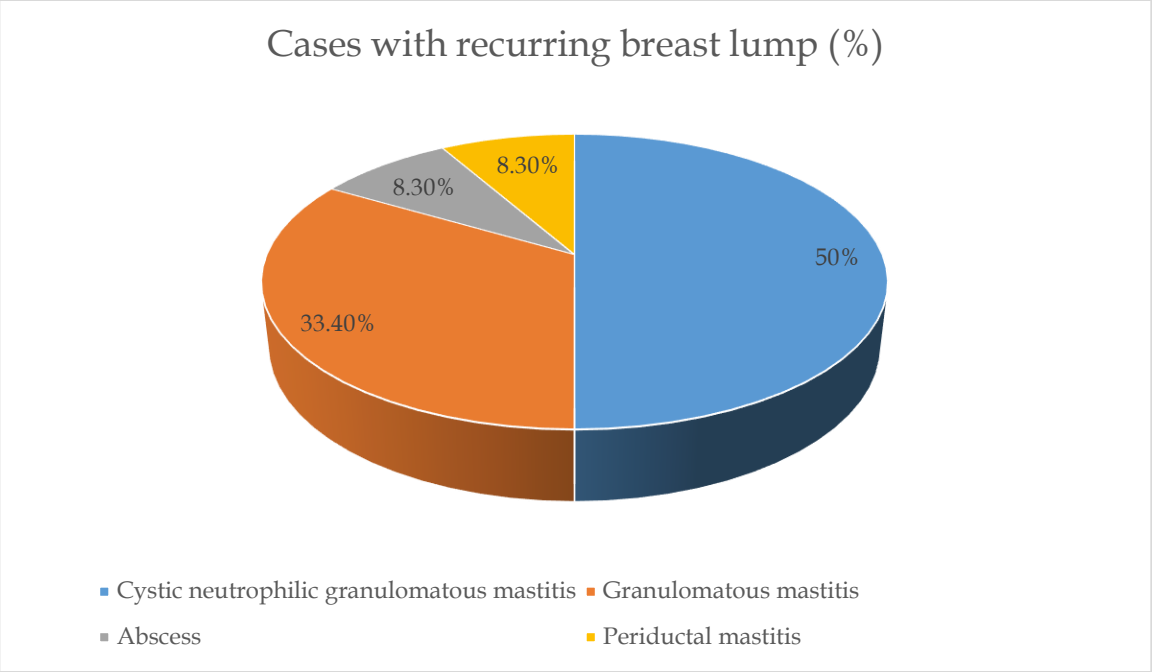

Figure 3. Histopathological diagnoses of cases clinically presented as recurring lump in the breast

The complaints as explained by the patients showed a duration ranging from 4 days to 1 year. Out of the 21 cases that showed a duration of more than one month, 13 cases were reported as granulomatous mastitis,3 as periductal mastitis, 3 as cystic neutrophilic granulomatous mastitis and 2 as abscess. [Figure 4]

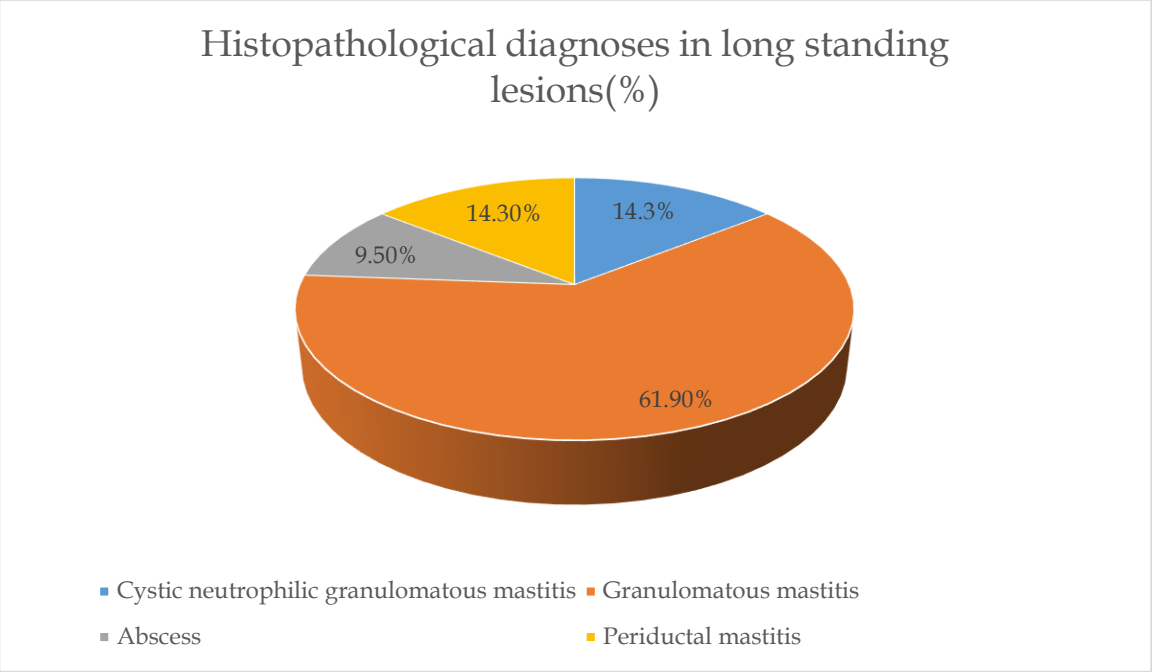

Figure 4. Histopathological diagnoses of cases presenting as long standing lump of the breast

One case that was histopathologically reported as plasma cell mastitis presented in a 32-year-old patient as swelling in the breast of 2 weeks duration.

Out of the 35 lesions reported as either granulomatous mastitis or cystic neutrophilic granulomatous mastitis, 82.8% of cases were in the age group of 20 to 40 years while only one case was seen in the age group of more than 60 years.

Out of the 19 cases reported as breast abscess 9 cases [47.4%] were in the age group of 20-40 years, while 5 cases were in the age group of 41-60 years, and 2 cases with ages more than 60 years.

The majority of cases that were reported as periductal mastitis including plasma cell mastitis were in the age group of 20 to 40 years [80%], while there were no cases seen in the age group of more than 60 years. An age-wise distribution of lesions is depicted in Figure 5.

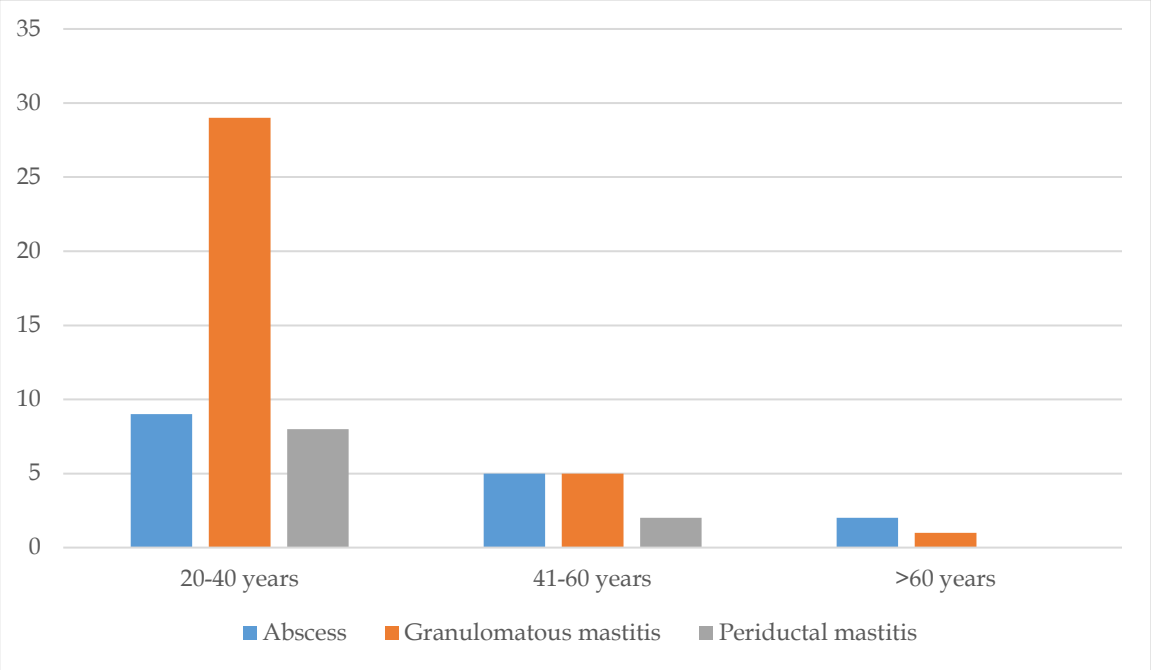

Figure 5. Distribution of cases presenting with inflammatory lesions of breast in different age groups

Eight cases were clinically recorded as suspicious for malignancy. Out of these 8 cases, 4 cases were reported as periductal mastitis, 3 cases as granulomatous mastitis and 1 case as breast abscess.

4. Discussion

According to the WHO, mastitis is inflammation of the breast tissue and may or may not be associated with an infection [17]. It presents with the clinical symptoms of pain, swelling and redness and sometime associated with lymph node enlargement [18].

Inflammation of breast tissue can be due to infectious and non-infectious etiologies, and the probability of a malignant cause should be ruled out before initiation of treatment. The clinical and radiological features may closely resemble malignancy and core biopsies are suggested before treatment is started.

A study conducted in Afghanistan showed that 18.8% of cases were of inflammatory origin and these were predominantly seen in the age group of 26-35 years [19]. In the present study, the age distribution was mainly concentrated around the reproductive age group of 20-40 years.

The clinical presentation can vary from a lump without pain or discharge to an inflamed lesion with skin involvement and retracted nipple, with or without nipple discharge. In our study the most common presenting complaint was the palpation of a swelling in the breast during self-examination (98.4%), followed by pain associated with swelling and nipple discharge associated with swelling.

Idiopathic granulomatous mastitis was first described in 1972 as a rare, chronic inflammatory disorder [20]. The incidence rate has been reported to be approximately 0.37% with an annual prevalence of

2.4/100,000 [21]. It has also been termed as "lobular granulomatous mastitis", and the etiology remains unsolved with suggestions on effect of milk stasis and autoimmune diseases [22]. Carcinoma breast remains a close differential with non-specific findings on imaging. Histopathological report with identification of well-formed granulomas remains the key to diagnosis and initiation of treatment [23]. Case reports have shown the lesion to present with a swelling in the breast and associated features of nipple retraction, axillary lymph node enlargement and "orange peel" appearance [22,24].

In this study we found the frequency of occurrence of granulomatous mastitis among inflammatory lesions of the breast to be 53.9%. Studies have suggested that IGM predominantly affects the reproductive age group of 20-40 years [25,26]. while other studies show an increase in cases in the pre-menopausal age group [27,28]. Our study showed a predominance of cases in the age group 20-40 years. Use of steroids have been found to reduce the complications related to excision procedures [29] with a recurrence rate of about 16-50%, while limited excision shows a recurrence rate of 50% [30].

The available treatment options include mastectomy, wide local excision, incision and drainage, use of antibiotics or steroids and immunosuppression with methotrexate [31, 32]. Studies have suggested that a wait-and-watch technique works effectively in most cases [33, 34]. A study conducted in 2024 showed a lower recurrence rate in cases treated with methotrexate combined with steroids [35].

In our study out of the 12 cases that presented with a recurring breast lump after prior incision and drainage, 10 cases were reported as granulomatous mastitis, including cystic neutrophilic granulomatous mastitis. This emphasizes the need for adopting an effective treatment plan to reduce the recurrence of the lesion. Numerous studies have linked the role of corynebacterium in development of the disease, especially C. kroppenstedtii [36,37]

Breast abscess is still an issue in developing countries in spite of improved hygiene conditions and better maternal care. In the present study 29.2% cases were reported as breast abscess. Studies have shown that 0.4 to 3 % of cases with mastitis can develop breast abscess [38].

Incision and drainage is the common treatment modality but poses difficulty in post procedure follow up. 10-38% cases are found to recur [39]. In our study out of 12 cases with recurrence, only one case was reported as breast abscess. Study done in 2023 showed a recurrence rate of 5.8% [40]. Studies have shown that aspiration along with use of oral antibiotics can give a cure rate of 82-85% [41].

Mastitis mostly develops in the first six weeks of breast feeding, although it can occur at any time during breastfeeding. Cracked nipples and improper feeding techniques have contributed to the development of the condition. In our study majority of cases were in the age group of 20- 40 years,that is in the child-bearing age.

The most commonly seen causative organism in mastitis is Staphylococcus aureus with increasing incidence of Methicillin resistant Staphylococcus aureus and even E coli and Hemophilus influenza [42,43].

Periductal mastitis is a chronic inflammatory lesion of the breast and diagnosed with the presence of dilated ducts, chronic inflammatory infiltrate which may be accompanied by abscess formation. The incidence of the same has been found to increase in the past years. The present study showed that 16.9% of the population that presented with inflammatory lesion was diagnosed as periductal mastitis and plasma cell mastitis. The terms "duct ectasia" and "plasma cell mastitis" have been synonymously used in the past for this condition**.**The exact etiology of the disease remains unknown although associations with obesity, diabetes and smoking have been mentioned although no studies conducted on a large population based analysis**.**Expression of IF-ɣ and IL-12A have been found to be increased in the stromal cells as compared to normal breast tissue [44].

This study has shown that granulomatous mastitis has been reported more frequently than other inflammatory lesions of the breast. The close differential of carcinoma, both clinically and radiologically, cause a diagnostic dilemma for clinicians. The recurrence and long-standing nature of the inflammatory lesions have also been evaluated. The clinicopathological correlation of inflammatory lesions provide insight to the presentation of different lesions and is helpful in timely management as studies have shown a strong correlation between the inflammatory process and risk of malignant transformation.

5. Conclusion

This study shows a predominance of inflammatory lesions of breast in the reproductive age group with the majority of patients diagnosed as granulomatous mastitis. Most of the cases have presented with a

palpable breast swelling with or without pain and nipple discharge. Future studies are needed to evaluate the etiopathogenesis of inflammatory lesions on a large population.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research as no additional investigations were done for the patients.

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Author's contributions

The authors equally contributed to preparing this article.

Conflict of interest

There are no conflicts of interest.

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