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Original Research Article

Granulomatous mastitis: difficult to differentiate from tuberculous mastitis

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ABSTRACT

Background: Granulomatous mastitis (GM) is a rare, chronic inflammatory breast disease of unknown etiology, characterized by controversial treatment options and a high recurrence rate. Its clinical and radiological presentation often overlaps with other conditions, particularly tuberculous mastitis (TBM), making differentiation challenging. This study aimed to differentiate granulomatous mastitis from tuberculous mastitis in patients presenting with chronic breast abscess.
Methods: A prospective observational study was conducted at the Department of Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh, from January to December 2023. Twenty women with symptoms and signs of breast abscess were selected from outpatient and inpatient departments. Each case underwent triple assessment: clinical evaluation, imaging and histopathology.
Results: Among the 20 cases, 16 were diagnosed as non-lactational bacterial abscesses, 3 as granulomatous mastitis and 1 as tuberculous mastitis. Non-lactational abscesses healed with scarring within six weeks. All three GM cases recurred within five months; one developed steroid-related complications and two developed painful breast lumps after treatment. The single TBM case recurred after six months, with associated breast deformity and pain.
Conclusions: Granulomatous mastitis is difficult to treat and clinically mimics tuberculous mastitis. Accurate diagnosis requires histopathological confirmation alongside clinical and imaging assessment to guide appropriate therapy.

Keywords: Granulomatous mastitis, Tuberculous mastitis, Breast abscess

INTRODUCTION

Granulomatous mastitis (GM), specifically idiopathic granulomatous mastitis (IGM), is a rare, benign and chronic inflammatory disease of the breast parenchyma. First described by Kessler and Wolloch in 1972, its etiology remains poorly understood and its clinical course is characterized by an unpredictable duration and a propensity for recurrence.[1] The absence of a universally accepted management strategy further complicates the clinical approach to this condition, with treatment recommendations ranging from antibiotics and corticosteroids to immunosuppressants and surgical intervention, all with variable success rates.[1]

IGM predominantly affects parous women of reproductive age, with a significant history of recent lactation, suggesting a potential pathogenic link. It is hypothesized that extravasated lactational secretions may incite a localized granulomatous inflammatory response.

Associations with hyperprolactinemia and the use of oral contraceptive pills have also been suggested, although a definitive causal relationship remains unestablished.[1,2] In

contrast, other inflammatory conditions like periductal mastitis are linked to heavy smoking, a correlation not demonstrated for GM.[2] The clinical presentation of GM typically involves a unilateral, palpable, tender breast mass or a chronic abscess, which are nonspecific features overlapping with other breast pathologies, posing significant diagnostic challenges.[3,4]

GM can closely mimic inflammatory breast cancer, infectious conditions such as tuberculous mastitis and fungal infections, as well as non-infectious granulomatous diseases including sarcoidosis and Wegener's granulomatosis.[5] Radiologically, ultrasonography is important but lacks pathognomonic features; common findings include irregular hypoechoic masses that can also suggest carcinoma or tuberculosis. Thus, imaging alone often fails to establish a definitive diagnosis.[6,7]

Histopathological examination from core needle or excisional biopsy remains the diagnostic cornerstone, revealing non-caseating granulomas centered on breast lobules, accompanied by mixed inflammatory infiltrates including lymphocytes, plasma cells, multinucleated giant cells and sometimes micro abscesses. This histopathological profile aids differentiation from other breast diseases and guides appropriate management.[4,8]

A confident diagnosis of IGM is one of exclusion, mandating the meticulous ruling out of other granulomatous conditions, particularly tuberculosis, through a combination of histology, microbiological culture, acid-fast bacilli (AFB) staining and molecular tests like PCR or GeneXpert.[9,10]

This diagnostic challenge is particularly acute in regions endemic for tuberculosis, such as Bangladesh, where TBM is not uncommon. Misdiagnosis can lead to severe consequences: inappropriate steroid therapy in TBM may exacerbate infection, while unnecessary anti-tubercular treatment in GM subjects may lead to significant drug-related morbidity.

Therefore, a precise, multidisciplinary diagnostic approach integrating clinical assessment, imaging and conclusive histopathological and microbiological correlation is imperative to guide appropriate and effective therapy for these complex inflammatory breast disorders.

METHODS

This prospective observational study was conducted in the Department of Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh, over 12 months from January to December 2023.

From a total of 72 women presenting to the outpatient (OPD) and inpatient (IPD) departments with symptoms and signs suggestive of breast abscess, a final cohort of 20 patients with chronic breast abscess was selected based on predefined criteria.

Inclusion criteria

Inclusion criteria included individual aged 20-45 years, and individual having chronic breast abscess, breast lump, breast ulcer, breast discharging sinus.

Exclusion criteria

Exclusion criteria included lactating mother, pregnant women, breast cancer patients, history of breast trauma, galactorrhea, chronic systemic autoimmune disease and regular steroid use or drug-induced hyperprolactemia.

The study procedure involved a standardized triple assessment for all enrolled patients: detailed clinical history and breast examination, imaging evaluation with ultrasonography for all and mammography for patients aged >40 years, and definitive histopathological diagnosis via incision or excision biopsy.

To differentiate granulomatous mastitis from tuberculous mastitis, a comprehensive panel of investigations was employed to rule out tuberculosis, including chest X-ray, mantaux, pus culture and sensitivity, Ziehl-Neelsen staining for acid-fast bacilli, GeneXpert testing and fine-needle aspiration cytology (FNAC) from any associated axillary lymphadenopathy. Informed consent from all participants before enrollment and investigation. Data were analyzed descriptively, with results presented as frequencies and percentages for categorical variables and as means and ranges for continuous variables.

RESULTS

A total of 20 patients with breast abscess were included in this observational study. The mean age of study population was 32.5 years (range 20 to 45 years) (Table 1).

Table 1: Demographic profile of study population.

Parameter	Value
Age range (years)	20-45
Side of breast abscess	Right: 14(45%)
	Left: 5
	Bilateral: 1
Recurence	2 cases
Lactational status	All non-lactating status
Breast feeding	All patient had history of breast feeding of 16-18 months

Incidence more in reproductive age and history of lactation. All patient had given birth at least once and had nursed for an average 16-18months, patients had no history of smoking, where all patient had history of oral contraceptive pill used. At the time of diagnosis none of the patient were pregnant, lactating or had a history of breast trauma, galactorrhea, chronic systemic autoimmune disease or regular steroid use or drug induce hyperprolactemia. Previous history of tuberculosis had 1

in number patient. The most common clinical presentation was breast abscess 10 in number and lump 6 in number (Figures 1 and 2).

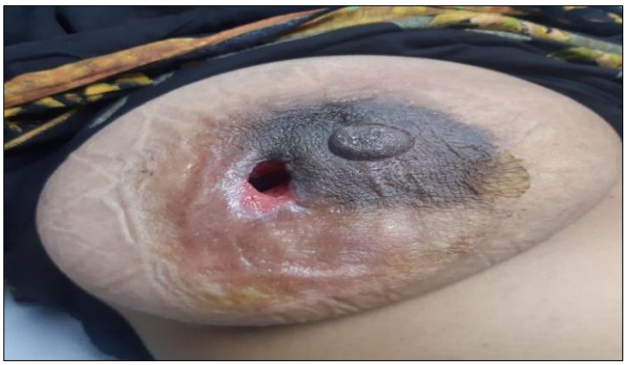

Figure 1: Chronic breast abscess is confused with GM and TBM.

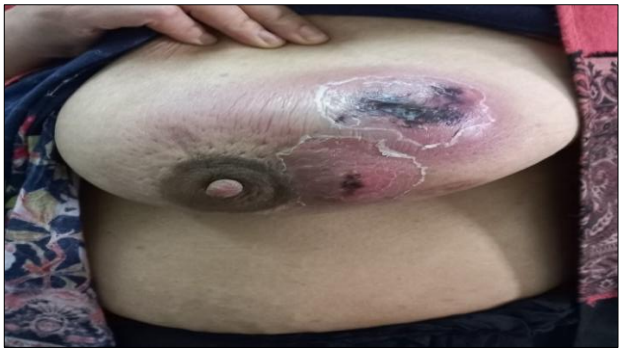

Figure 2: Breast abscess with lump.

Ulcer in 2 patients and discharging sinuses were noted in 2 patients (Table 2 and Figure 3). Unilateral involvement was present in the right breast in 14 patients, left breast in 5 patient,1 patient had bilateral breast involvement. All patient did the ultrasonography (USG) of both breast and axilla. Ultrasonographic finding was Ill -defined, irregular, heterogenous hypoechoic mass in 5 patients, well-circumscribed hypoechoic mass in 3 patients, multiloculated abscess in 10 patients, discharging sinus in 2 patient and reactive ipsilateral lymphadenopathy was noted in 15 patients (Table 3).

Mammography did only 10 patient age >40 years. Mammography findings were irregular hypoechoic focal mass in 5 patients, heterogenous hypoechoic mass in 5 patients, asymmetrical increased breast density in 1 patient, calcification in 2 patients and axillary lymphadenopathy in 10 patients (Table 4). After histopathological examination of 20 in number cases showed most common cases diagnosis as non-lactational bacterial abscess 16 in number, granulomatous mastitis 3 in number and tubercular mastitis was in 1 case (5%). All FNAC from axillary lymphadenopathy showed reactive lymphadenitis (Table 5).

Non-lactational bacterial abscesses were treated with incision and drainage, regular dressing and antibiotic according to culture and sensitivity. All chronic bacterial abscess cured within 6 weeks with scar. Granulomatous mastitis's were treated with incision and drainage, regular dressing and antibiotic according to culture and sensitivity. 3 number of cases of granulomatous mastitis completely cure. 2 in number of cases developed steroid related complication like raised BP, glucose intolerance and weight gain.1 number of cases developed constant pain and lump.

Tubercular mastitis's were treated with incision and drainage, regular dressing and. Anti-TB drugs for 6 to 9 months. During follow up 1 in number of cases of Tubercular mastitis's recured with constant pain and breast deformity (Tables 6 and 7).

Table 2: Clinical presentation.

Clinical features	Frequency (n=20)	Percentage (%)
Abscess	10	50
Lump	6	30
Ulcer	2	10
Discharging sinus	2	10

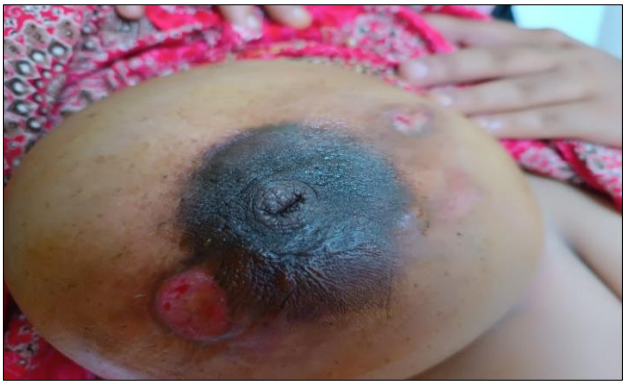

Figure 3: Chronic breast ulcer.

Table 3: Ultrasonography of breast and axilla.

Findings	Frequency (n=20)	Percentage (%)
Multiloculated abscess	10	50
Ill -defined, irregular, heterogenous hypoechoic mass	5	25
Well-circumscribed hypoechoic mass	3	15
Discharging sinus	2	10
Axillary lymphadenopathy	15	75

Table 4: Mammography.

Findings	Frequency (n=10)	Percentage (%)
Irregular hypoechoic focal mass	5	50
Heterogenous hypoechoic mass	5	50
Calcification	2	10
Asymmetrical increased breast density	1	5
Axillary lymphadenopathy	10	100

Table 5: Histopathological findings (distribution of breast abscess types).

Findings	Frequency (n=20)	Percentage (%)	Diagnosis
Chronic inflammatory cells –macrophages, monocyte, lymphocytes with fibrosis	16	80	Non-lactational breast abscess
Non- caseous granuloma with multinucleated giant cells with neutrophilic background, epithelioid histocytes lymphocytes and plasma cells	3	15	Non-caseating granulomas (1), lobulocentric granulomas (1), chronic granulomatous inflammation (1)
Caseous necrosis with granuloma with multinucleated giant cells, epithelioid histocytes, lymphocytes and plasma cells	1	5	Tubercular mastitis

Table 6: Treatment and outcomes.

Diagnosis	Frequency (n=20)	Treatment	Follow up	Outcome
Non-lactational breast abscess	16	Incision and drainage, regular dressing and antibiotics	6 weeks	Recovery with scar
Granulomatous mastitis (GM)	3	Incision and drainage, regular dressing, antibiotic, steroid and wide local excision+ steroid (recur 2 case)	5 months	1 case develop steroid related complication 2 cases breast lump and constant pain
Tuberculous mastitis (TBM)	1	Incision and drainage, regular dressing, antibiotic and anti-TB drug (6-9 months)	6 months	recur during this follow up and develop constant pain and breast deformity

Table 7: Clinical characteristics of granulomatous.

Parameter	Case 1	Case 2	Case 3
Age (years)	32	30	27
Side involved	Left	Left	Right
Symptoms	Pain, lump	Sinus formation	Recurrent breast abscess
Response to antibiotic	Poor	Poor	Poor
Histopathology	Lobucentric granulomas	Chronic granulomatous inflammation	Non-caseating granuloma
Final diagnosis	GM	GM	GM

GM-Granulomatous mastitis

DISCUSSION

GM is a rare and benign chronic inflammatory lesion of the breast.[2] The etiology of IGM is not clear. It should be differentiated from other chronic inflammatory breast disease like mammary duct ectasia, Wegner's gralumatosis, sarcoidosis, tuberculosis and histoplasmosis and many agents such as local irritants, viruses, mycotic, parasitic infections, hyperprolactinemia, DM, alfa-1 antitrypsin deficiency and autoimmune reaction. These lesions usually present clinically and radiologically with palpable breast mass in young reproductive women and it is difficult to differentiate GM from early onset breast carcinoma and tuberculous mastitis (TM).[2,11]

GM commonly occurs in patient with history of recent pregnancy and lactation. Extravasated lactational secretions may elicit a local granulomatous response with lymphocyte and macrophage migration. Extravasations of luminal secretion may occur secondary to local trauma or

infection cause damage to ductal epithelium.[12] A chemical induced reaction associated with use of oral contraceptive pill (OCP) has also been suggested.[11] In our data, all patients had used OCP and each mother gave birth at least one child and most of them history of lactation. In the western countries, TM is rare. In developing countries like India, Bangladesh, it constitutes approximately 3%.[2] Physician must be cautions when examining patient from high-risk populations in endemic areas.

GM and TM have similar clinical symptoms including solitary breast mass, Ulcer, chronic discharging sinus or an abscess.[12] A breast mass is the common presentation in GM. The nipple retraction, sinus formation and axillary lymphadenopathy also seen as in GM. These findings were also observed in TM and IBM. Patients commonly present with lump, breast pain and overlying skin erythema usually present in unilateral but also present in bilateral involvement has been reported. In this study commonly unilateral breast involvement was seen and no difference was detected between right and left breast.[13]

Breast USG and MMG was done to rule out other breast disease, especially breast carcinoma. In this study, MMG was done in 10 patient suspected breast cancer. USG of IGM showed hypoechoic tubular or nodular mass, hypoechoic nodular structure, parenchymal distortion without mass lesion, lobulated mass, multiple clustered often contiguous with large hypoechoic mass and enlarged axillary lymhpnode frequently sonographic feature.[2,4,14] These are also the most common US findings of both breast carcinoma and TB. MMG showed Irregular hypoechoic focal mass, heterogenous hypoechoic mass,

Asymmetrical density of breast, calcification and axillary lymphadenopathy. Sometimes confused with benign mass from malignant. For this reason, cytological and histological examination were required in addition to imaging modalities for diagnostic accuracy.[9]

Because clinical and imaging studies of GM and TM are non-specific, definitive diagnosis is made using histopathology. Also did other investigation like chest X-ray, pus for culture and sensitivity and for ZN stain for AFB, Gene-Xpert and FNAC from all axillary lymphadenopathy.

The cytological diagnosis of GM is sometimes difficult because the features overlap with other etiologies like TM, carcinoma and there was no specific feature. The cytopathological of TM reveals epithelioid, histocytes, Langerhans giant cell, granulomas and caseous necrosis.[10] Microbiological investigations positive culture for acid fast-bacilli confirms the diagnosis of TM. The presence of neutrophil is not common in TM.[1,12] A diagnosis of GM should also be considered. When high number of epithelioid histocyte are seen in smear, in the absence of granulomas, other feature like absence of necrosis predominantly neutrophil background infiltrate, granulomatous information with multinucleated Giants calls, fat necrosis and eosinophil.[1,12]

In this study most of the patients present with abscess surgical drainage was performed initially and treated with an antibiotic and anti-inflammatory drug of an average 14 days (range 10-21 days), regular dressing and control comorbid diseases. Incision or excision biopsy were done in all patients. After received histopathological report, we continued the treatment according to diagnosis.

Corticosteroids compromise the treatment of choice as conservative management.[15] Corticosteroid therapy of prednisolone 2-30 mg/day is recommended for at least 6 or 8 weeks should be continued until complete remission and followed by tapering schedule, the mean duration of steroid treatment was 28 days. Corticosteroids may accelerate infectious disease of breast. Before start the steroid treatment, infection must be completed. The side effects of steroid therapy include glucose intolerance, cushingoid features. None of patient those were received steroid therapy showed side effects except two.

Treating TM with steroids would aggravating the infection whereas giving unnecessary antituberculosis drug in IGM may cause numerous side effects. All of the patients with TM received anti- tuberculous therapy compromising rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months followed by rifampicin and isoniazid for 6 months (dose adjusted according to weight of patient). Extended treatment for 9 months was needed in 1 patient.

Recurrence developed in 3 patients with GM. Once again treated with steroid and cured. The mean age was 32.5years and breast lump was successfully treated with wide local excision. Two patients of GM developed constant Breast pain and mass. Those 2 patients did wide local excision and treated with steroid. One patient with TM experienced recurrence after 10 months of discontinued the anti -tubercular drug. The recurrence was successfully treated by restarting of anti-tubercular therapy. Breast pain and deformity developed in 1 patient after anti -tubercular drug received.

CONCLUSION

It is difficult to differentiate GM from TM based on clinical information and radiographic features. The diagnosis of GM must be based on a multidisciplinary approach. The cytological diagnosis of GM is difficult because the features overlap with other etiologies including tuberculosis. Diagnosis of GM by FNAC cannot be made confident diagnosis may require histopathological samples, negative microbiological investigation and clinical correlation. However, histological confirmation and negative microbiological investigation are still required for a positive diagnosis and determination of an appropriate treatment regimen.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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