CASE REPORT

Granulomatous Mastitis Mimicking Breast Carcinoma: A Diagnostic Challenge in a Young Female – A Case Report

Dr. Mohith S Reddy[1], Dr. Karthikeyan S[2]*, Dr. Kambala Prasanna Kumar[3], Dr. Sasikumar Pattabi[4]

[1]Post graduate, General Surgery, Department of General Surgery, Sree Balaji Medical College and Hospital, Chennai-600044, India, Email Id: mohithsreddy@gmail.com

[2*]Associate professor, General Surgery, Department of General Surgery, Sree Balaji Medical College and Hospital, Chennai-600044, India, Email Id: drsk1287@gmail.com

[3]Assistant professor, General Surgery, Department of General Surgery, Sree Balaji Medical College and Hospital, Chennai-600044, India, Email Id: drprasannakumarkambala@gmail.com

[4]Dean, Sree Balaji Medical College and Hospital, Chennai-600044, India, Email Id: psk_66in@yahoo.com

Abstract

Granulomatous mastitis is a rare inflammatory disease of the breast that frequently mimics malignancy both clinically and radiologically. A 30-year-old female presented with a painful lump in the left breast for three months associated with skin changes and sinus formation. Imaging suggested mastitis with possible abscess formation, and subsequent biopsy confirmed granulomatous mastitis with histopathological features favoring tuberculous etiology. Despite negative microbiological tests including AFB smear, GeneXpert, and culture, clinicopathological correlation supported the presumptive diagnosis of tuberculous mastitis. The patient was treated with anti-tubercular therapy and showed clinical improvement. This case highlights the diagnostic difficulty of granulomatous mastitis and emphasizes the importance of histopathological evaluation in distinguishing it from malignancy and other inflammatory breast diseases.

Keywords: Granulomatous mastitis, Breast tuberculosis, Breast lump, Inflammatory breast disease, Case report

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Introduction

Granulomatous mastitis (GM) is an uncommon benign inflammatory condition of the breast characterized by granuloma formation within the breast lobules. First described by Kessler and Wolloch in 1972, the disease often presents as a unilateral breast mass that clinically and radiologically resembles breast carcinoma, leading to diagnostic confusion and potentially unnecessary aggressive treatment [1]. The condition most commonly affects women of reproductive age, particularly those with a history of recent pregnancy or lactation [2].

The etiology of granulomatous mastitis remains uncertain and includes infectious causes such as *Mycobacterium tuberculosis*, *Corynebacterium* species, autoimmune mechanisms, and idiopathic forms [3]. In tuberculosis-endemic countries, breast tuberculosis must always be considered as a differential diagnosis because it may present with similar features including breast lumps, abscesses, sinus tract formation, and regional lymphadenopathy [4].

Breast tuberculosis itself is rare, accounting for less than 1% of all breast diseases in developed countries but occurring more frequently in regions where tuberculosis is endemic [5]. The disease is often paucibacillary, and microbiological confirmation is frequently negative, making histopathology an essential diagnostic tool [6]. Imaging modalities such as ultrasound and mammography may demonstrate features suggestive of mastitis or abscess but cannot reliably differentiate granulomatous mastitis from carcinoma [7].

Histopathological examination typically reveals granulomatous inflammation composed of epithelioid histiocytes, multinucleated giant cells, and lymphocytic infiltration centered around lobules [8]. Management strategies vary depending on the underlying cause and may include antibiotics, corticosteroids, surgical excision, or anti-tubercular therapy in cases suspected to be tuberculous [9].

Because granulomatous mastitis frequently mimics malignancy, accurate diagnosis requires careful clinical evaluation combined with imaging, microbiological tests, and histopathology. Misdiagnosis may lead to unnecessary surgery or inappropriate treatment [10]. Therefore, documenting such cases is important for improving awareness among clinicians and aiding early diagnosis and appropriate management.

This report describes a young female presenting with a breast lump with sinus formation that was eventually diagnosed as granulomatous mastitis favoring tuberculous etiology based on histopathology and clinical correlation.

Case Presentation

A 30-year-old female presented with complaints of a lump in the left breast for three months associated with intermittent pricking pain. The swelling was insidious

*Author for Correspondence: Email:drsk1287@gmail.com

in onset and gradually increased in size. She also reported skin changes over the breast for the past fifteen days and a history of intermittent low-grade fever one week prior to presentation. The patient had previously received antibiotics at another hospital without significant improvement. There was no history of nipple discharge, nipple retraction, sudden increase in lump size, cyclical mastalgia, weight loss, chronic cough, or systemic symptoms suggestive of malignancy or tuberculosis. There was no similar swelling in the contralateral breast or elsewhere in the body.

Her past medical history was unremarkable. She had undergone lower segment cesarean section in 2020 and had breastfed for 1.5 years. There was no history of diabetes mellitus, hypertension, tuberculosis, thyroid disease, or other chronic illnesses.

On general physical examination, the patient was conscious and oriented with stable vital signs. No pallor, icterus, clubbing, cyanosis, lymphadenopathy, or edema was noted.

Breast examination revealed symmetrical breasts. Inspection of the left breast showed multiple sinus openings over the outer lower quadrant with surrounding erythema and peau d'orange appearance. No nipple retraction, nipple discharge, or dilated veins were noted. The nipple-areola complex appeared normal.

Palpation revealed a firm irregular lump measuring approximately **7 × 5 cm** involving the upper and lower outer quadrants (2–5 o'clock position). The lump was tender with localized warmth and induration of the surrounding skin. Multiple sinus tracts were noted over the lesion. The mass was fixed to breast tissue but not to the chest wall. A mobile, firm, non-tender lymph node measuring approximately **1 × 1 cm** was palpable in the left axilla. The right breast and axilla were normal.

Investigations

Ultrasonography of the bilateral breasts with axillary evaluation revealed findings suggestive of **left-sided mastitis with a possible early abscess formation measuring approximately 4 mL**. Needle aspiration yielded about 1 mL of pus, which was sent for culture and sensitivity testing but showed **no bacterial growth**.

The patient was treated with antibiotics; however, the symptoms persisted. A repeat ultrasound examination demonstrated **mass-forming mastitis without obvious fluid collection**, raising suspicion for infective or granulomatous pathology. Ultrasound-guided core biopsy was therefore performed.

Histopathological examination demonstrated granulomatous inflammation composed of epithelioid histiocytes and multinucleated giant cells consistent with **granulomatous mastitis**. Excision biopsy was recommended for further confirmation.

Additional investigations were performed to rule out tuberculosis. Mantoux test was negative. Acid-fast bacilli smear, culture, and GeneXpert testing were negative. CBNAAT testing for *Mycobacterium tuberculosis* was also negative. Interferon-gamma release assay (IGRA) and sputum examination for AFB were negative.

Surgical Management

An **excision biopsy of the left breast lump under general anesthesia** was performed. The excised tissue and pus were sent for microbiological and histopathological evaluation.

Intraoperative findings demonstrated inflammatory breast tissue with multiple sinus tracts (Figure 1). The excised specimen showed granulomatous inflammation with epithelioid histiocytes, Langhans giant cells, and chronic inflammatory infiltrates. Histopathological examination confirmed **granulomatous mastitis favoring tuberculous etiology**.

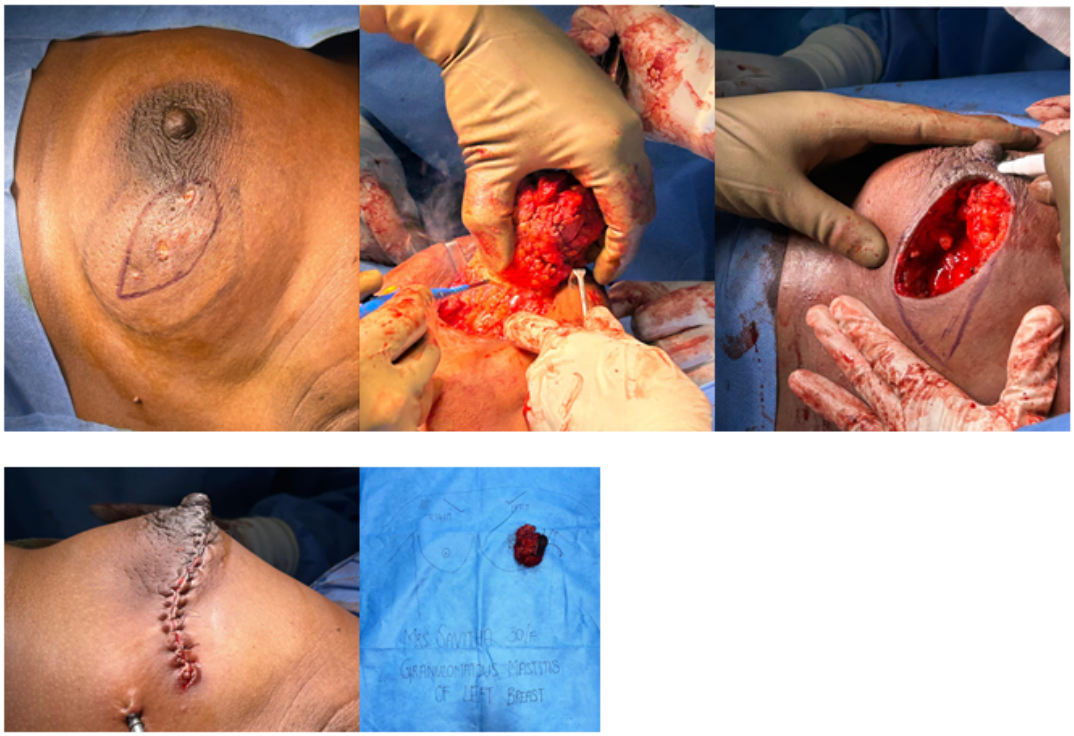

Figure 1: Intraoperative view of the breast lesion showing inflammatory tissue and sinus tracts.

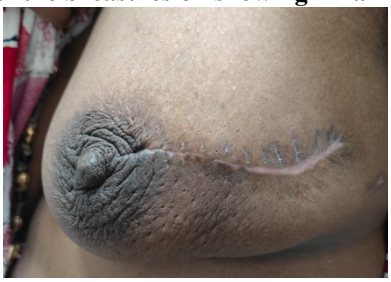

Figure 2: Follow-up clinical photograph demonstrating healing after treatment.

Treatment and Follow-up

Although microbiological investigations were negative, the histopathological findings suggested granulomatous mastitis with features favoring tuberculosis. Considering the endemic prevalence of tuberculosis and the clinicopathological findings, the patient was started on **empirical anti-tubercular therapy (ATT)**.

The patient responded well to treatment with reduction in pain, inflammation, and sinus discharge. Follow-up examination demonstrated clinical improvement with healing of the breast lesion (Figure 2).

Discussion

Granulomatous mastitis is an uncommon benign inflammatory breast disease that often presents as a breast lump resembling carcinoma both clinically and radiologically. Because of its rarity and variable presentation, diagnosis is frequently delayed or misinterpreted [1].

The disease typically affects women of childbearing age, particularly within a few years after pregnancy or breastfeeding. Hormonal changes and ductal epithelial damage during lactation are believed to contribute to the development of granulomatous inflammation within breast lobules [2]. The present case involved a young multiparous woman with a history of breastfeeding, which is consistent with the demographic profile reported in previous studies.

The differential diagnosis of granulomatous mastitis includes idiopathic granulomatous mastitis, tuberculous mastitis, sarcoidosis, fungal infections, and inflammatory breast carcinoma [3]. Among these, breast tuberculosis remains an important consideration in developing countries where tuberculosis is endemic [4].

Breast tuberculosis accounts for approximately 0.1–1% of all breast lesions and commonly affects women aged 20–40 years [5]. Infection may reach the breast through lymphatic spread from axillary nodes, hematogenous dissemination, or direct extension from adjacent structures. Clinical features include breast lump, abscess formation, sinus tract formation, and axillary lymphadenopathy [6].

Radiological investigations such as ultrasound and mammography are useful for detecting breast masses but lack specificity for distinguishing granulomatous mastitis from malignancy [7]. In the present case, ultrasonography initially suggested mastitis with early

*Author for Correspondence: Email:drsk1287@gmail.com

abscess formation, emphasizing the limited diagnostic specificity of imaging.

Histopathological examination remains the gold standard for diagnosis. Typical findings include granulomas composed of epithelioid cells, multinucleated giant cells, and lymphocytic infiltration centered around breast lobules [8]. The absence of caseation necrosis does not exclude tuberculosis because breast tuberculosis is often paucibacillary and may lack classical histological features.

Microbiological confirmation of tuberculosis in breast tissue is often difficult because of the low bacterial load. Studies have shown that culture and molecular tests may remain negative in many cases, and diagnosis may rely on clinicopathological correlation [9]. In the present case, all microbiological tests including AFB smear, GeneXpert, and CBNAAT were negative. However, histopathology demonstrated granulomatous inflammation suggestive of tuberculosis.

Management of granulomatous mastitis depends on the underlying cause. Idiopathic granulomatous mastitis may be treated with corticosteroids or immunosuppressive therapy, whereas infectious forms require targeted antimicrobial treatment [10]. Surgical intervention is usually limited to diagnostic biopsy or drainage of abscesses.

In tuberculosis-endemic regions, empirical anti-tubercular therapy may be initiated when histopathology suggests tuberculosis and other causes have been excluded. The favorable clinical response to ATT in this patient further supported the presumptive diagnosis of tuberculous mastitis.

This case illustrates the diagnostic challenges posed by granulomatous mastitis and highlights the importance of considering tuberculosis in the differential diagnosis of chronic breast inflammatory lesions.

Conclusion

Granulomatous mastitis is a rare inflammatory breast disease that can mimic breast carcinoma clinically and radiologically. Histopathological examination remains essential for accurate diagnosis, particularly when microbiological tests are negative. In tuberculosis-endemic regions, empirical anti-tubercular therapy may be justified when clinicopathological findings support a tuberculous etiology.

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