

Beyond Mastitis: Unveiling A Case of Breast Tuberculosis

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ABSTRACT

Breast tuberculosis is an uncommon form of extrapulmonary tuberculosis and remains a diagnostic challenge, particularly in its primary presentation. We report the case of a 35-year-old previously healthy woman who presented with breast pain, purulent discharge, and a nodule in the left breast. She initially received antibiotic therapy for mastitis without improvement, progressing to abscess formation. Imaging studies and biopsy excluded malignancy, reporting chronic granulomatous mastitis; however, lack of response led to further evaluation. Ziehl-Neelsen staining ultimately confirmed *Mycobacterium tuberculosis*, establishing the diagnosis of primary breast tuberculosis. The patient completed standard antitubercular therapy with full clinical resolution and complete healing of the lesion. This case highlights the importance of including breast tuberculosis in the differential diagnosis of persistent breast lesions, even in immunocompetent patients without a history of tuberculosis.

KEYWORDS: Breast tuberculosis, extrapulmonary tuberculosis, granulomatous mastitis, breast carcinoma, case report.

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I. INTRODUCTION

Tuberculosis is one of the oldest and most persistent infectious diseases, caused by *Mycobacterium tuberculosis*. While the lungs are the most frequently affected organs, the disease may involve virtually any site, leading to what is known as extrapulmonary tuberculosis. Among its various clinical forms, breast tuberculosis is an uncommon presentation, with a significantly lower incidence compared to other extrapulmonary locations such as lymph nodes, pleura, or the genitourinary tract. Despite its rarity, it remains a diagnostic challenge for clinicians, mainly due to the absence of specific clinical features that distinguish it from other breast disorders ^{1,2}.

Reported incidence varies according to geographic region. In developed countries, breast tuberculosis accounts for approximately 0.025% to 0.1% of breast pathologies, while in developing nations it may reach 3–4.5%. In Latin America, its frequency ranges from 0.1% to 0.52%. In Mexico, there are no official registries, although tuberculosis continues to be endemic, which suggests that mammary tuberculosis

might be underdiagnosed or misinterpreted as other breast conditions ^{1,3,7}.

The first description of this disease was made by Astley Cooper in 1829, under the term “scrofulous swelling of the bosom.” Since then, fewer than one thousand cases have been published worldwide, reflecting not only the rarity of the condition but also the diagnostic difficulties associated with it. Clinical presentation often mimics other diseases, particularly idiopathic granulomatous mastitis or breast carcinoma, which leads to significant delays in diagnosis and to the prolonged use of ineffective treatments prior to establishing the correct diagnosis ^{2,3,5}.

From a pathophysiological perspective, two clinical forms are recognized: primary and secondary. Primary breast tuberculosis is extremely rare and occurs through direct inoculation via nipple cracks, cutaneous lesions, or during lactation. In contrast, the secondary form results from hematogenous or lymphatic spread, or direct extension from pulmonary or extrapulmonary foci. This classification has

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clinical relevance, as primary disease is usually diagnosed with greater delay due to the lack of obvious risk factors, whereas secondary disease is more easily suspected in patients with a history of tuberculosis or immunosuppression^{3,6,8}.

Clinical manifestations are diverse and are classically divided into nodular, disseminated, and sclerosing forms. The nodular type presents as a slow-growing breast mass, frequently mistaken for fibroadenoma or carcinoma. The disseminated type involves multiple foci within the mammary tissue, often progressing to fistulous tracts and skin ulcerations. The sclerosing type, which predominates in older women, shows marked fibrosis and nipple retraction, closely mimicking inflammatory breast carcinoma. In all cases, the lack of pathognomonic signs contributes to diagnostic delay^{2,4,5,9}.

First-line diagnostic tools such as mammography and ultrasound provide limited value, as their findings are nonspecific. Magnetic resonance imaging may yield additional data but is not conclusive in differentiating malignancy from infection. Therefore, definitive diagnosis relies on histopathological and microbiological confirmation. The presence of granulomas with caseous necrosis is highly suggestive, while Ziehl-Neelsen staining and culture remain reference methods, although with low sensitivity (12–25%). In this context, molecular techniques such as PCR have been proposed as a more sensitive diagnostic option^{3,6,10}.

The cornerstone of treatment is antitubercular chemotherapy, generally following the same protocols as for other extrapulmonary forms. Surgery is reserved for resistant cases, large abscesses, persistent fistulas, or situations with diagnostic uncertainty. Case series report cure rates above 90% when adequate medical therapy is provided, highlighting the importance of early suspicion and a multidisciplinary approach^{2,6,9}.

In summary, breast tuberculosis is a rare but clinically significant condition. Its importance lies in the diagnostic challenge it poses and in its ability to mimic malignant breast disease. Lack of awareness often results in misdiagnosis and inappropriate treatments, prolonging morbidity. Therefore, reporting clinical cases is essential to raise awareness among clinicians and to emphasize the inclusion of breast tuberculosis in the differential diagnosis of persistent breast lesions in women^{1,3,7,8}.

II. CASE REPORT

We present the case of a 35-year-old woman, previously healthy, with menarche at age 10, obstetric history G2P1C1A0, and bilateral tubal ligation as contraceptive method. She had no relevant medical or surgical history, no known exposure to tuberculosis, and no family history of

breast cancer. She was neither pregnant nor breastfeeding at the time of presentation, although she had breastfed two years earlier without complications.

The patient initially presented to a primary care center with severe pain in the left breast, associated with erythema and a progressively enlarging nodule in the nipple region. She also reported thick, yellow, non-fetid discharge from both nipples, predominantly on the left side. Pain intensity was rated 8/10 on the visual analogue scale, with tenderness in the ipsilateral axillary region. She denied fever or systemic symptoms.

On physical examination, the left breast showed hyperemia with a palpable 1 cm nodule in the midclavicular line near the nipple. Palpation was markedly painful, and thick yellow discharge was expressed from the nipple. The right breast presented deep tenderness with a similar discharge but no nodules or erythema. Vital signs were within normal limits, except for mild hypotension (97/55 mmHg).

An initial diagnosis of acute mastitis was made, and empirical antibiotic therapy was prescribed. However, there was no improvement, and the lesion evolved into an abscess. Further investigations were requested: laboratory tests showed elevated C-reactive protein, while breast ultrasound revealed a left-sided abscess and right breast cysts with ductal ectasia, categorized as BIRADS 4A.

The patient was referred to a secondary care hospital, where HIV infection was ruled out. Surgical drainage of the abscess was performed, along with a tru-cut biopsy. Histopathological examination revealed chronic and acute mastitis with granulomas, focal fat necrosis, ductal hyperplasia, and microglandular adenosis, but no evidence of malignancy. She was discharged with a diagnosis of chronic mastitis and treated with antibiotics, yet her condition persisted with worsening purulent discharge.

Given the lack of response, the patient was reassessed by infectious disease specialists. Ziehl-Neelsen staining tested positive for *Mycobacterium tuberculosis*, establishing the final diagnosis of primary breast tuberculosis.

Antituberculous treatment was initiated: a two-month intensive phase with isoniazid, rifampicin, pyrazinamide, and ethambutol, followed by a four-month continuation phase with isoniazid and rifampicin. Regular monitoring of hepatic and renal function was conducted without major adverse effects. After six months of therapy, the patient achieved full recovery, with complete clinical resolution, skin healing, and no recurrence during follow-up.

III. METHODS

This study was conducted as a case report, a descriptive observational design aimed at documenting the clinical presentation, diagnostic approach, and therapeutic outcome of a patient with primary breast tuberculosis. Data were obtained from medical records across different levels of care and complemented with laboratory, imaging, and histopathological results obtained during the diagnostic process. All information was carefully reviewed and organized chronologically to provide an accurate reconstruction of the clinical sequence.

Relevant gynecologic-obstetric, surgical, personal, and family history were collected, along with detailed findings from physical examination. The patient's clinical course was followed from her initial presentation with breast-related symptoms to the final diagnostic confirmation, including the empirical antibiotic treatments initially administered and the subsequent interventions such as abscess drainage and biopsy. Symptom progression, response to therapies, and associated findings such as pain, discharge, and abscess formation were systematically recorded.

The diagnostic approach included routine laboratory testing such as complete blood count, biochemical profile, and liver and renal function tests. HIV serology was also performed to rule out underlying immunosuppression, given its association with extrapulmonary tuberculosis. Imaging studies included mammography and breast ultrasound, both interpreted according to the BIRADS classification system. These examinations helped guide the initial suspicion and defined the need for further evaluation.

A tru-cut biopsy of the breast lesion was subsequently performed. Tissue samples were processed with different histopathological techniques, including hematoxylin-eosin staining for tissue characterization, periodic acid-Schiff (PAS) to rule out fungal infections, and Ziehl-Neelsen staining for acid-fast bacilli. The latter confirmed the tuberculous etiology. Histological findings were interpreted in conjunction with clinical and imaging data to establish the final diagnosis.

Treatment followed the standard regimen recommended by national and international guidelines for extrapulmonary tuberculosis. The patient underwent a two-month intensive phase with isoniazid, rifampicin, pyrazinamide, and ethambutol, followed by a four-month continuation phase with isoniazid and rifampicin. Regular follow-up visits were scheduled to monitor therapeutic response, adherence, and potential adverse effects. Liver and renal function were periodically evaluated to ensure safety during therapy.

From an ethical perspective, this study was conducted in accordance with the principles of the Declaration of Helsinki.

Written informed consent was obtained from the patient, who authorized the use of her clinical information for academic and scientific publication purposes. Confidentiality and anonymity were guaranteed by omitting personal identifiers and coding clinical data. The presentation of this case was carried out with a strictly academic objective, without financial benefit for the investigators or additional risk for the patient.

IV. RESULTS

The patient initially presented with severe breast pain, erythema, and purulent discharge. Physical examination revealed a 1 cm palpable nodule in the left breast, tender and associated with thick yellow discharge. The right breast showed no nodules but presented deep tenderness and similar nipple discharge.

Initial laboratory tests showed a complete blood count within normal limits with mild neutrophilic leukocytosis and elevated C-reactive protein. Serum chemistry revealed hyperglycemia, with preserved renal and hepatic function. HIV screening was negative, ruling out associated immunosuppression.

Imaging studies demonstrated findings consistent with an inflammatory process. Bilateral mammography revealed increased density and skin thickening in the left breast, while ultrasound showed an approximately 50 cc fluid collection, suggestive of abscess, and right breast simple cysts with ductal ectasia, categorized as BIRADS 4A (Figures 1 and 2).

Given the persistence of symptoms, surgical drainage of the abscess was performed along with an ultrasound-guided tru-cut biopsy. Initial histopathological evaluation reported chronic mastitis with acute inflammation, focal fat necrosis, ductal hyperplasia, and microglandular adenosis, with no evidence of malignancy. PAS staining was negative for fungi, and the first Ziehl-Neelsen staining did not reveal acid-fast bacilli.

Due to lack of clinical improvement, a new biopsy was obtained with additional stains. On this occasion, Ziehl-Neelsen staining was positive, confirming the presence of acid-fast bacilli consistent with *Mycobacterium tuberculosis* (Figure 3). This finding established the definitive diagnosis of primary breast tuberculosis.

Standard antitubercular therapy was initiated, consisting of a two-month intensive phase (isoniazid, rifampicin, pyrazinamide, and ethambutol), followed by a four-month continuation phase (isoniazid and rifampicin). During follow-up, the patient progressively improved: pain subsided within the first week, purulent discharge ceased within six weeks, and by the end of treatment, complete clinical resolution was

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observed, with skin healing and disappearance of the nodule (Figure 4).

No relapses or complications were reported during immediate post-treatment follow-up.

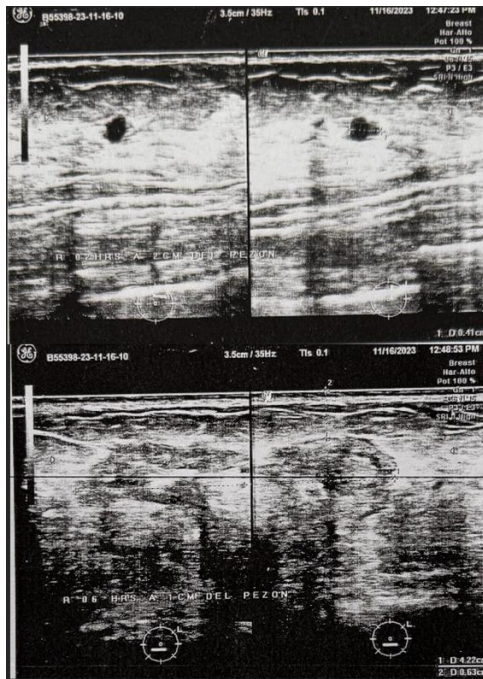


Figure 1. Breast ultrasound demonstrating simple cysts in the right breast and a hypoechoic collection in the left breast consistent with abscess.

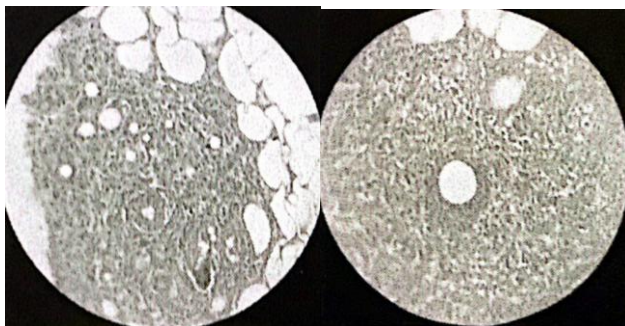


Figure 2. Histopathological microphotograph of the left breast showing ductal hyperplasia and microglandular adenosis.



Figure 3. Clinical image of the left breast prior to antitubercular therapy, showing skin erythema, induration, and purulent discharge.



Figure 4. Comparative clinical image of both breasts after six months of antitubercular treatment, showing complete resolution of lesions and restoration of skin integrity.

V. DISCUSSION

Breast tuberculosis is an uncommon form of extrapulmonary tuberculosis and is rarely considered in daily clinical practice. Its incidence varies significantly across regions: in developed countries it represents only 0.025–0.1% of breast diseases, whereas in developing nations it may account for up to 3–4.5%. In Latin America, available series report a frequency of 0.1–0.52%, confirming its unusual but clinically significant nature^{1,2,7}.

Clinical manifestations are nonspecific and often mimic both benign and malignant breast conditions. The most common presentation is a unilateral firm and painful breast mass, usually located in the upper outer quadrant, sometimes associated with nipple retraction, erythema, or peau d'orange-like skin changes. In some cases, it progresses to cold abscesses or fistulous tracts, further complicating the distinction from inflammatory carcinoma or idiopathic granulomatous mastitis^{2,3,4}.

Several authors have highlighted that reproductive age, multiparity, and lactation are major predisposing factors. Physiological changes during this stage increase breast vascularization and susceptibility to trauma, favoring inoculation or dissemination of *Mycobacterium tuberculosis*. Nevertheless, the disease may also appear in postmenopausal women and, in rare cases, in men, suggesting that no single epidemiological pattern is exclusive^{3,5,7}.

From a pathogenic perspective, breast tuberculosis can be classified as primary or secondary. Primary disease, extremely rare, results from direct inoculation through nipple cracks or cutaneous microtrauma. Secondary disease is more frequent and arises from hematogenous spread, retrograde lymphatic dissemination from infected axillary nodes, or direct extension from pulmonary or pleural foci. This distinction is clinically relevant, as primary disease is usually diagnosed later due to the absence of obvious tuberculosis history^{2,6,8}.

Diagnosis remains the greatest challenge. Imaging studies such as mammography and ultrasound lack specificity, as findings including hypoechoic masses, skin thickening, or abscesses cannot be distinguished from carcinoma or granulomatous mastitis. Up to 40% of cases may even be categorized as BIRADS 4 or 5, raising suspicion of malignancy. Therefore, histopathological confirmation is indispensable, with granulomas showing caseous necrosis as the hallmark feature. Nevertheless, Ziehl-Neelsen staining and culture are limited by low sensitivity, positive in only 12% and 25% of cases respectively. Molecular techniques such as PCR have been explored as more sensitive alternatives ^{3,4,9,10}.

Standard treatment consists of antitubercular therapy with isoniazid, rifampicin, pyrazinamide, and ethambutol for two months, followed by isoniazid and rifampicin for an additional four months. Surgery is currently reserved for exceptional cases such as persistent abscesses, painful fistulas, or when malignancy cannot be ruled out. Simple mastectomy is rarely required today, since medical therapy alone achieves cure rates above 90% in most reports ^{1,6,9}.

In the case presented, the patient experienced a typical delay in diagnosis, initially managed as bacterial mastitis with poor response to antibiotics. This course is consistent with literature reports, where definitive diagnosis is often reached only after several unsuccessful interventions. Confirmation with Ziehl-Neelsen staining and favorable response to standard therapy highlight the importance of considering breast tuberculosis in the differential diagnosis of chronic breast lesions, even in immunocompetent women without clear tuberculosis history ^{2,3,5}.

In conclusion, although rare, breast tuberculosis should be suspected in women presenting with persistent, antibiotic-resistant breast lesions. A combination of careful clinical assessment, imaging studies, and histopathological confirmation is essential to avoid diagnostic delays. Reporting cases such as this one is vital to increase awareness among clinicians of a condition that, though infrequent, remains of clinical significance ^{1,2,8}.

CONCLUSIONS

Breast tuberculosis remains a rare disease in clinical practice, yet its impact is significant due to the diagnostic difficulties it presents and the consequences of delayed management. Its low prevalence often results in clinicians failing to include it in the initial differential diagnosis of breast lesions, leading to substantial delays in the initiation of specific therapy. This lack of awareness frequently subjects patients to multiple courses of antibiotics, repeated surgical drainage, or successive biopsies, all of which prove ineffective until tuberculosis is finally suspected and confirmed.

The present case clearly illustrates this challenge. A young woman with no relevant medical history presented with symptoms consistent with mastitis and was initially treated as such, without clinical improvement. Progression to recurrent abscesses, persistent pain, and purulent discharge necessitated imaging studies and biopsies. Even with findings of granulomatous mastitis, the final diagnosis was only established after the demonstration of acid-fast bacilli, confirming *Mycobacterium tuberculosis*. This clinical sequence exemplifies how the absence of early suspicion prolongs patient suffering and delays effective treatment.

Evidence from the literature suggests that this is not an isolated event but rather a common pattern in breast tuberculosis: a disease that hides behind more frequent diagnoses and only emerges after prolonged diagnostic processes. Early recognition, particularly in women of reproductive age with chronic or antibiotic-resistant breast lesions, has the potential to drastically change clinical outcomes and reduce the need for invasive interventions.

Another key reflection concerns the role of diagnostic tools. Mammography, ultrasound, and MRI fail to provide specific findings to differentiate this entity from other pathologies, making histopathology and microbiology the gold standard. Despite the limited sensitivity of Ziehl-Neelsen staining and culture, these methods remain essential, while molecular techniques have emerged as promising alternatives for earlier and more accurate diagnosis, warranting broader integration into clinical practice.

With respect to treatment, this case reaffirms what has been consistently documented: standard antitubercular therapy is highly effective, even in patients without comorbidities or immunosuppression. The patient achieved complete clinical resolution after six months of medical treatment, without the need for major surgery or functional sequelae. This favorable outcome supports the notion that surgery should be reserved for complicated cases rather than used as a first-line approach, as was common in past decades.

In summary, breast tuberculosis is a rare condition, but its rarity does not diminish its clinical importance. It serves as a reminder of the need to maintain broad diagnostic perspectives, particularly in patients with persistent breast conditions that fail to respond to conventional therapy. Reporting cases such as this not only enriches the medical literature but also plays a crucial educational role, raising awareness among healthcare professionals of a disease that, while uncommon, continues to be relevant and has a significant impact on women's health. Building awareness, refining diagnostic strategies, and ensuring timely treatment remain the cornerstones for reducing morbidity and

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preventing this “forgotten diagnosis” from being overlooked in everyday clinical practice.

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