***Case report***

**Breast tuberculosis in a 21-year-old female patient: A case report**

**ABSTRACT**

**Introduction** - Primary mammary tuberculosis is a rare form of extrapulmonary TB, typically spreading to the breast from nearby lymph nodes, ribs, or pleura. It's uncommonly the initial infection site and is predominantly found in multiparous women during their reproductive or lactating years.

**Case presentation -** A 21-year-old woman presented with left breast pain and a 3x3 cm palpable lump, alongside unexplained weight loss. Examination showed a firm, mobile mass in the upper outer quadrant of an enlarged left breast, with no associated skin changes or swollen lymph nodes with no other significant positive history.

**Discussion -** Breast ultrasound revealed a lesion with inflammatory changes, but initial aspiration yielded no bacterial growth. Subsequent analysis of persistent discharge confirmed *Mycobacterium tuberculosis* through ZN stain and CBNAAT, leading to ATT initiation. The patient later developed abdominal and rifampicin-resistant cerebral tuberculosis, necessitating an MDR regimen.

**Conclusion -** Breast tuberculosis is treated with a six-month anti-tubercular chemotherapy regimen, with surgery reserved for specific indications like diagnosis or abscess drainage. Suspicion should be made in unresponsive breast abscess or presenting with a fistulae or nodules.

**Keywords**: Breast ultrasound, mammary tuberculosis, dyspnea, Mycobacterium tuberculosis

**Introduction**

 Tuberculosis stands as the most widespread infectious ailment in developing nations globally. While pulmonary involvement is most common, extrapulmonary forms of TB can occur, and among these, primary mammary tuberculosis is a rare and unusual presentation. This specific form of the disease typically spreads to the breast via several pathways: from the internal mammary or axillary lymph nodes, through direct extension from osteitis of the ribs and sternum, or rarely from pleural effusions1.

 It is particularly uncommon for breast tuberculosis to be the initial site of infection without any other organs being affected. When it does occur, this condition is observed predominantly in women during their reproductive years, particularly those who are multiparous and also during the lactation period2.

**Case presentation**

 A 21-year-old female patient presented with left breast pain of three weeks' duration and a palpable lump in the same breast for two weeks. She also reported an unexplained weight loss of approximately 5-6 kg over the preceding two months. The patient denied a history of nipple discharge, breast trauma, cough, fever, dyspnea, low back ache, or the presence of lumps in the contralateral breast or bilateral axillary regions. No integumentary changes, such as erythema or dimpling, were observed overlying the palpable lump. Her family medical history and menstrual history were unremarkable.

 On physical examination, the left breast appeared notably fuller and larger than the right, with a distinct fullness noted in the upper outer quadrant. The nipple-areola complex (NAC) was deemed normal. Palpation revealed a 3x3 cm mass situated in the upper outer quadrant of the left breast, approximately 2 cm from the NAC. Lump was firm in consistency and mobile along with the breast tissue. There was no evidence of nipple discharge, skin involvement, palpable axillary or cervical lymphadenopathy.

**Discussion**

 Ultrasound imaging of the left breast revealed a hypoechoic mass containing a dense internal collection. This lesion, measuring 3x3x2 cm and located at the 10 o'clock position, had an approximate volume of 10 cubic centimeters, with surrounding inflammatory changes consistent with mastitis.

 The collected fluid was aspirated for culture and sensitivity, and the patient received a course of broad-spectrum antibiotics; however, no bacterial growth was identified. Approximately two weeks later, the patient re-presented with a yellowish discharge emanating from the site of the previous aspiration. Due to a high index of suspicion for tuberculosis, the discharge was subsequently analyzed using both Ziehl-Neelsen (ZN) staining and a Cartridge-Based Nucleic Acid Amplification Test (CBNAAT). The ZN stain confirmed the presence of acid-fast bacilli, and the CBNAAT specifically identified *Mycobacterium tuberculosis*.

 The patient was started on antitubercular treatment (ATT). Three months into treatment, Patient presented with non-specific abdominal pain and an abdominal tuberculosis diagnosis was also confirmed via diagnostic laparoscopy, which revealed enlarged mesenteric lymph nodes. The patient successfully completed the prescribed course of ATT. Subsequently, the patient developed intermittent headaches and vomiting. Evaluation, including a magnetic resonance imaging (MRI) scan, identified a space-occupying lesion (SOL) in the left frontal cerebral region. A craniotomy and biopsy of the same confirmed cerebral tuberculosis that exhibited resistance to rifampicin. Consequently, the patient was initiated on a multidrug-resistant (MDR) tuberculosis regimen.

 Tuberculosis affecting the breast remains an uncommon clinical entity, even in geographical regions characterized by a high burden of pulmonary tuberculosis. This suggests that despite the widespread presence of the bacterium, the mammary gland is not a frequent site for primary or secondary involvement. However, lactating women face a heightened risk, likely due to increased blood supply and dilated milk ducts, which make them more susceptible to injury and infection. Typically, this condition is unilateral and rarely affects male patients, though it warrants consideration in individuals with weakened immune systems, such as those with HIV.

 When *Mycobacterium tuberculosis* disseminates throughout the body, it typically does so via the hematogenous route, often originating from a primary pulmonary focus. This systemic spread can lead to multi-organ involvement, affecting various anatomical sites beyond the lungs. However, it is exceptionally rare for tuberculosis to present primarily as an extrapulmonary manifestation and subsequently disseminate widely without a clear, initial pulmonary component. Routes of dissemination to the breast include the bloodstream, lymphatic system, direct extension from the chest wall or axillary lymph nodes, or even direct inoculation through skin abrasions or nipple ducts.

 Diagnosing breast tuberculosis involves various tests. While the Mantoux test confirms exposure to *M. tuberculosis*, it doesn't provide a definitive diagnosis. Mammography is often not helpful, especially in young women due to dense breast tissue, and in elderly women, its findings are generally indistinguishable from breast carcinoma3. Ultrasonography can reveal a hypoechoic mass in a significant percentage of patients and may sometimes identify a fistula or sinus tract. Computed tomography (CT) and magnetic resonance imaging (MRI) are used to assess the lesion's extension beyond the breast, particularly towards the thoracic wall3,4. The gold standard for diagnosis involves detecting *M. tuberculosis* through Ziehl-Neelsen staining or culture; however, culture results can be delayed and yield false negatives. Fine needle aspiration cytology (FNAC) is crucial for detecting epithelioid cell granulomas and necrosis, leading to a definitive diagnosis in many cases. Polymerase chain reaction (PCR) is highly sensitive and recommended for cases with negative culture results or for differentiating from other granulomatous mastitis.

 The most frequent clinical sign of breast tuberculosis is a breast lump, which may or may not be painful and is often found in the central or upper outer quadrant of the breast. This lump can strikingly mimic breast cancer, presenting as a hard, irregularly bordered mass fixed to the skin, muscle, or even the chest wall5. While fistula formation, nipple retraction, or skin retraction may occur, breast discharge is uncommon. The lump can progress to inflammation, abscess formation, skin ulceration, and diffuse mastitis. Recurrent breast inflammation and abscesses in young women that do not respond to surgical drainage and standard antibiotic therapy should raise strong suspicion. Systemic symptoms like fever, malaise, night sweats, and weight loss are present in less than 20% of cases6,7. Based on radiological and clinical characteristics, the disease can be categorized into three forms: nodular (a well-circumscribed lump often indistinguishable from cancer on mammography), disseminated (multiple lesions with sinus formation, mimicking inflammatory breast cancer), and sclerosing (characterized by excessive fibrosis, typically seen in elderly women). Ultimately, histopathology showing chronic granulomatous inflammation with caseous necrosis and Langhans-type giant cells is a key diagnostic tool8,9.

 Despite significant advancements in antitubercular chemotherapy and supportive medical care, the mortality associated with disseminated tuberculosis can remain substantial, reaching as high as 25%. This underscores the severe nature of the disease, especially when it becomes widespread. To improve patient outcomes, it is crucial to enhance clinical awareness of this complex disorder and maintain a high index of suspicion for its diagnosis, particularly in atypical presentations or in endemic areas, to facilitate early detection and prompt, appropriate therapeutic intervention.

**Conclusion**

 Breast tuberculosis is treated with a six-month anti-tubercular chemotherapy regimen. This includes an initial two-month phase with four oral drugs (ethambutol, pyrazinamide, rifampicin, isoniazid), followed by a four-month continuation phase with isoniazid and rifampicin10. Surgery is indicated for diagnosis, drainage of abscesses, removal of residual lesions, or in extensive cases requiring mastectomy. One should suspect breast tuberculosis in cases of unresponsive breast abscesses or presenting with fistulae and nodules11.

**References**

1. Ramaema DP, Buccimazza I, Hift RJ (2015) Prevalence of breast tuberculosis: Retrospective analysis of 65 patients attending a tertiary hospital in Durban, South Africa. S Afr Med J 105(10):866–869
2. Hale JA, Peters GN, Cheek JH (1985) Tuberculosis of the breast: rare but still extant: review of the literature and report of an additional case. Am J Surg 150(5):620–624
3. Rodriguez-Takeuchi SY, Renjifo ME, Medina FJ (2019) Extrapulmonary tuberculosis: pathophysiology and imaging findings. Radiographics 39(7):2023–2037
4. Longman C, Campion T, Butler B et al (2017) Imaging features and diagnosis of tuberculosis of the breast. Clin Radiol 72(3):217–222
5. Thimmappa D, Mallikarjuna M, Vijayakumar A (2015) Breast tuberculosis. Indian J Surg 77(3):1378–1384
6. da Silva B.B., Lopes-Costa P.V., Pires C.G., Pereira-Filho J.D., dos Santos A.R. Tuberculosis of the breast: analysis of 20 cases and a literature review. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2009;103:559–563.
7. Teo T.H., Ho G.H., Chaturverdi A., Khoo B.K. Tuberculosis of the chest wall: unusual presentation as a breast lump. Singapore Medical Journal. 2009;50:e97–e99.
8. Akcay M.N., Saglam L., Polat P., Erdogan F., Albayrak Y., Povoski S.P. Mammary tuberculosis – importance of recognition and differentiation from that of a breast malignancy: report of three cases and review of the literature. World Journal of Surgery and Oncology. 2007;5:67.
9. del Agua C., Felipo F., Paricio J., Equizabal C., Delgado M. Tuberculosis of the breast as a pseudotumoral image. Breast Journal. 2006;12:180.
10. Madhusudhan K.S., Gamanagatti S. Primary breast tuberculosis masquerading as carcinoma. Singapore Medical Journal. 2008;49:e3–e5.
11. Tewari M., Shukla H.S. Breast tuberculosis: diagnosis, clinical features and management. Indian Journal of Medical Research. 2005;122:103–110.

 Fig 1 - Discharging sinus after aspiration over Left breast



Fig 2 - Aspiration of collection from left breast

 Fig 3 - Acid fast bacillus seen on ZN stain