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Case series on variable presentations of tuberculosis of the breast

Tharun Ganapathy Chitrabalam , Jeyakumar Sundaraj,
Pradeep Joshua Christopher , Ramyasree Paladugu

General Surgery, SRM Institute of Science and Technology, Kattankulathur, India

Correspondence to
Dr Tharun Ganapathy Chitrabalam;
tharungc@srmist.edu.in

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SUMMARY

Tuberculosis (TB) of the breast is extremely rare and is often mistaken for benign or malignant lesions of the breast. They are rare even in countries which are endemic for TB, like India. The most common type of clinical presentation is a vague lump in the breast, but there are even other types of presentations which are documented. In olden days, there was a lot of dilemma and challenge in diagnosing TB of the breast, but thanks to improved pathological knowledge and the advent of investigations such as QuantiFERON-TB gold and GeneXpert, TB can be diagnosed early nowadays and treated accordingly. In this study series, we report 10 cases of TB of the breast with variable clinical presentations as fibroadenosis, breast abscess, duct ectasia and breast lump on evaluation, and the challenges encountered in establishing the diagnosis.

BACKGROUND

Breast involvement in tuberculosis (TB) is rare as breast tissue provides resistance to the survival and multiplication of tuberculous bacilli.^{1 2} TB of the breast is a rare extrapulmonary presentation accounting for less than 1% of all diseases of the breast. Incidence of this disease is higher in countries endemic for TB, such as the Indian subcontinent, where it may be as high as 4%.^{1 3} It occurs far more frequently in women, especially in their reproductive age, and is uncommon in prepubescent and elderly women.⁴ The age at diagnosis ranges from 17 to 42 years, with mean of about 33 years. Tuberculous mastitis (TM) is a form of granulomatous mastitis caused by *Mycobacterium tuberculosis* infection of the breast. TM can be due to direct inoculation of bacilli through lactiferous ducts or secondary to primary infection elsewhere in the body, and rarely due to direct extension from the chest wall.^{5 6} TM has been called the ‘great masquerader’ due to its multifaceted presentations.

CASE PRESENTATION

This is a retrospective study series on 10 cases of TB of breast encountered in a tertiary care hospital over a period of 1 year. Majority of the patients in the study population were middle-aged reproductive women with mean age of 34.2 years. The most common symptoms at presentation among the study population include breast lump, breast pain, fever, nipple discharge and discharging sinuses. None of the patients had a history of TB in the past. Five variable types of presentation were noticed among the 10 cases as depicted in [table 1](#).

Presentation (type I)—3 of 10 patients presented only with a lump in the breast, which was evaluated for benign or malignant lesion; (type II)—1 of 10 patients presented with a lump, pain and fever, which was suspected to be breast abscess over benign/malignant lesion ([figure 1](#)); (type III)—2 of 10 patients presented with painless lump and nipple discharge, evaluated for duct ectasia; (type IV)—1 of 10 patients presented as cyclical mastalgia with glandular breast suggestive of fibroadenosis and (type V)—3 of 10 patients who were non-lactating presented as classical breast abscess without a lump.

INVESTIGATIONS

In addition to blood routines, all patients were subjected to ultrasonogram of the breast and for patients over the age of 40 years, an additional digital mammogram of the breast was done. All the patients were screened prospectively or retrospectively for sputum acid-fast bacilli (AFB), Mantoux test and CT of the chest, and pulmonologist’s opinion was sought to look for the presence of pulmonary TB. There was no evidence of active/old pulmonary TB in any of the patients in the study population.

Two of 10 patients who had ‘nipple discharge’ were processed for AFB staining, mycobacterium growth indicator tube (MGIT) testing, culture sensitivity and malignant cells.

Four of 10 patients who had a ‘demonstrable lump’ followed the breast lump algorithm: (a) fine needle aspiration cytology (FNAC), if inconclusive followed by (b) core needle biopsy, if inconclusive followed by (c) incision/excision biopsy under anaesthesia.

Four of 10 patients presented as ‘breast abscess’ and were taken to the operation theatre for incision and drainage ± biopsy under anaesthesia. As we hail from a TB endemic area, we routinely take samples in two containers, one in formalin for histopathological examination (HPE) and one in saline for GeneXpert to look for TB in all suspected cases as none of the patients with breast abscess were lactating.

TREATMENT

In presentation type III, 2 of 10 patients (suspects) who presented with nipple discharge, the samples for AFB smears and cultures were positive for *M. tuberculosis* and were negative for malignant cells. No further testing was done. Antituberculous therapy (ATT) was started.

In presentation type I and IV, 4 of 10 patients (suspects) who presented as breast lump/mass, FNAC was found to be inconclusive in two patients, one patient showed features of inflammatory changes



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Table 1 Variable type of case presentations in the study population: types I–V with test reports

PT	Age	Type	Clinical diagnosis	Radiological diagnosis	AFB	MGIT	FNAC	HPE	CBNAAT
1	38	I	Benign/malignant lesions	Benign/malignant lesions	Not applicable	Not applicable	–	+	Not done
2	42	I	Benign/malignant lesions	Benign/malignant lesions	Not applicable	Not applicable	–	+	Not done
3	49	I	Benign/malignant lesions	Benign/malignant lesions	Not applicable	Not applicable	–	+	Not done
4	35	II	Breast abscess with benign/malignant lesion	Breast abscess with benign/malignant lesion	+	+	–	+	+
5	26	III	Duct ectasia	Duct ectasia	+	+	–	–	Not done
6	31	III	Duct ectasia	Duct ectasia	+	+	–	–	Not done
7	29	IV	Cyclical mastalgia	Fibroadenosis	Not applicable	Not applicable	+	Not done	Not done
8	37	V	Breast abscess	Breast abscess	+	+	Not done	–	+
9	25	V	Breast abscess	Breast abscess	–	–	Not done	+	+
10	30	V	Breast abscess	Breast abscess	–	+	Not done	–	+

–, negative for tuberculosis; +, positive for tuberculosis; AFB, acid-fast bacilli; CBNAAT, cartridge-based nucleic acid amplification test; FNAC, fine needle aspiration cytology; HPE, histopathological examination; MGIT, mycobacterium growth indicator tube; PT, patient.

without any caseations and one patient showed features of clusters of ductal cells in the background of caseous necrosis, which was typically acellular, amorphous with no typical epithelioid granulomas suggestive of tuberculous infection for whom ATT was started straightaway with the FNAC report. Three patients with undiagnostic FNAC underwent excision/incisional biopsy and all three showed evidence of TM on HPE. ATT was started per protocol.

In presentation type II and V, 4 of 10 patients (suspects) who presented as breast abscess, underwent AFB staining, MGIT testing from breast cultures and biopsy (figure 2) for histopathology and GeneXpert. AFB smear was positive for TB in two of four patients, MGIT was positive in three of four patients, HPE was positive for TM in two of four patients and GeneXpert was positive for *M. tuberculosis* with no drug resistance in all four of four patients. ATT was started in all four patients.

OUTCOME AND FOLLOW-UP

All the patients were started on ATT for 6 months; 2 months of intensive phase with isoniazid, rifampicin, pyrazinamide and ethambutol (HRZE) followed by 4 months of continuation phase with isoniazid and rifampicin (2 HRZE+2HR). All patients were followed up for a minimum period of 1 year (figure 3) where they showed significant improvement in terms of pain, discharge and resolution of lumps, were without residual collection/abscesses on screening ultrasonogram, and were all symptom-free and leading a normal life.

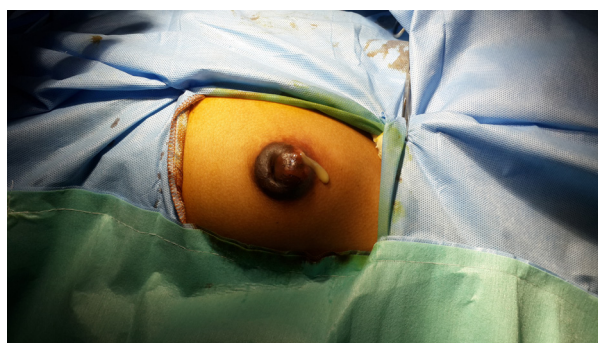


Figure 1 A case of breast abscess with mass prior to surgery (presentation type II: acid-fast bacilli test and mycobacterium growth indicator tube test were positive for tuberculosis).

DISCUSSION

TB of the breast is rare and is often mistaken for benign or malignant lesions of the breast. The first case of mammary TB was seen by Sir Astley Cooper in 1829, who called it the ‘scrofulous swelling of the bosom’.⁷ Mckeown and Wilkinson classified breast TB as primary when the breast lesion is the only manifestation of TB, and secondary when there is a demonstration of TB elsewhere in the body. Sixty per cent of reported cases are primary TB of the breast and TB infection was not made out from any other site/source other than breast.^{4,8} In our case series, all 10 patients were found to be primary TB of the breast without any pulmonary involvement or any other source of extrapulmonary involvement.

FNAC is considered to be the first investigation of choice for diagnosing various breast diseases; and in case of TB of the breast, caseating granuloma is often seen in the aspirates from the breast.¹⁵ The detection of AFB on smears and MGIT culture and sensitivity technique remain the most simple and gold standard technique of diagnosing TB. In cases of clinical suspicion of TB, where FNAC is inconclusive, biopsy should be considered.⁹ Newer diagnostic studies such as GeneXpert are helpful in diagnosis and adding information on drug resistance.¹⁰ As TB is a paucibacillary disease, it can be identified in GeneXpert even if there are 100 bacilli/mL of sample, where a minimum of 10^4 to 10^5 bacilli are needed to diagnose in AFB smear.¹ Limitation of GeneXpert is false negativity due to the reason that polymerase enzyme inhibitors are present in about 20% of cases as the specimen is collected from an extrapulmonary source, and thereby even GeneXpert-negative patients cannot be ruled out of TB of the breast.¹⁰ In our case series, most of the cases of TB of the breast were diagnosed by simple tests like

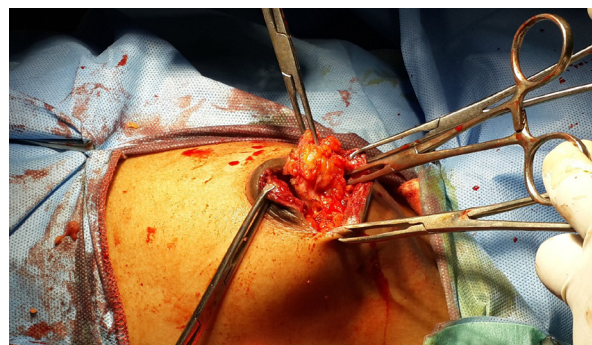


Figure 2 Excision biopsy was done. Histopathological examination and GeneXpert confirmed tuberculous mastitis.



Figure 3 Follow-up at 1 year.

AFB staining, MGIT testing and FNAC. But in few cases with high clinical suspicion where breast aspirates were unavailable and with inconclusive FNAC, biopsy (core needle/excision/incisional) for HPE and GeneXpert played a major role in establishing the diagnosis and deciding treatment regimen. Early diagnosis and treatment prevent disfigurement of the breast.

In presentation of a mass/lump in the breast, it is of paramount importance to differentiate TM from idiopathic granulomatous mastitis (IGM). IGM commonly occurs after pregnancy and has a possible relation to oral contraceptive pills. IGM presents as a unilateral tender lump at any site of the breast sparing the

Learning points

- ▶ We noted that all the cases in our study series were primary tuberculosis (TB) of breast without pulmonary TB or coexistent extrapulmonary TB. We emphasise the suspicion of TB of breast in middle-aged patients presenting with vague lump, persistent nipple discharge or as breast abscess irrespective of the presence or absence of pulmonary TB in endemic areas.
- ▶ In case scenarios where acid-fast bacilli smears, mycobacterium growth indicator tube testing and fine needle aspiration cytology are inconclusive and of high clinical suspicion, core needle biopsy/incisional biopsy for histopathology and GeneXpert is helpful in diagnosis and in deciding the treatment regimen.
- ▶ There is a considerable overlap of idiopathic granulomatous mastitis (IGM) with tuberculous mastitis in clinical presentation. It is necessary to rule out the presence of TB before starting the treatment for IGM, as the treatment for IGM is steroid therapy which could flare up TB.

subareolar area. TM has no relation to pregnancy and can present as a hard mass involving any site of the breast with or without acute inflammatory signs. Bilateral presentation and constitutional symptoms are common in TM. In histology, the presence of granulomas composed of histiocytes, Langhans giant cells, lymphocytes, plasma cells and eosinophils with fat necrosis, and fibrosis are common for IGM and TM. In IGM, only the lobules of the breast are affected with granulomas, whereas any component of the breast tissue can be affected with granulomas in TM. Caseation necrosis is a pathognomonic feature of TM.⁵ It is necessary to rule out the presence of TB before starting the treatment for IGM, as the treatment for IGM is steroid therapy which could flare up TB.

Twitter Pradeep Joshua Christopher @15jo12

Contributors TGC is the major contributor of this study. Study design, data analysis, interpretation, drafting, critical revision and final approval of the article were done by him and he is completely accountable for the research work. JS, PJC, RP and Sundeep Selvamuthukumaran has helped in planning and reporting, extending administrative support, technical writing and proofreading.

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ORCID iDs

Tharun Ganapathy Chitrabalam <http://orcid.org/0000-0003-4644-5550>
Pradeep Joshua Christopher <http://orcid.org/0000-0002-1949-9652>

REFERENCES

- 1 Sinha RTK, Dey A, Agarwal S. Tuberculous mastitis diagnosed on cytology - case report of a rare entity. *J Cytol* 2017 ;;34:162–4.
- 2 Mukerjee P, George M, Maheshwari HB, et al. Tuberculosis of the breast. *J Indian Med Assoc* 1974;62:410–2.
- 3 Tse GMK, Poon CSP, Ramachandram K, et al. Granulomatous mastitis: a clinicopathological review of 26 cases. *Pathology* 2004;36:254–7.
- 4 Hamit HF, Ragsdale TH. Mammary tuberculosis. *J R Soc Med* 1982;75:764–5.
- 5 Baharoon S. Tuberculosis of the breast. *Ann Thorac Med* 2008;3:110–4.
- 6 Gupta PP, Gupta KB, Yadav RK, et al. Tuberculous mastitis: a review of seven consecutive cases. *Indian J Tub* 2003;50:47–50.
- 7 Cooper A. *Illustration of the diseases of the breast: Part I*. Orme, London: Longmans, Brown & Green, 1829: 73.
- 8 Jalali U, Rasul S, Khan A, et al. Tuberculous mastitis. *J Coll Physicians Surg Pak* 2005;15:234–7.
- 9 Singal R, Bala J, Gupta S, et al. Primary breast tuberculosis presenting as a lump: a rare modern disease. *Ann Med Health Sci Res* 2013;3:110–2.
- 10 Sriram K, Moffatt D, Stapledon R. Tuberculosis infection of the breast mistaken for granulomatous mastitis: a case report. *Cases J* 2008;1:273.

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