

Mammographic features of isolated tuberculous mastitis

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ABSTRACT

Objective: To present the mammography findings in 8 patients with tuberculosis (TB) of the breast, with a review of the literature.

Methods: This study is a retrospective data collection. Each chart with confirmed breast TB based on bacteriology or pathologic findings was analyzed for clinical presentation, gender, nationality, demographic data, prior history of TB, investigation, management, mammographic findings and ultrasound, when available. Mammograms were reviewed by 2 consultant radiologists without knowing the previous diagnosis or the nature of the study. The study was carried out at The State Tuberculosis Registry and Radiology Department, Hamad General Hospital, State of Qatar, from 1990 to 2002.

Results: Out of 13 females with TB mastitis, only 8

cases had mammograms preoperatively. The incidence of breast TB in Qatar is rare (1/1000 mammograms per year). Three types of TB mastitis were identified in our study; the nodular (50%), the diffuse (37.5%) of which 77% were limited to one sector of the breast and the sclerosing (12.5%) mastitis. Three patients (43%) were reported as carcinoma.

Conclusion: Although mammography identified 3 types of TB, it was not helpful in differentiating TB from carcinoma of the breast. However, the careful evaluation of the degree of density and trabecular thickening of the mass in relation to its size might reduce the number of false positive cases of carcinoma diagnosed with mammograms. Biopsy specimen remains the best diagnostic tool in TB mastitis.

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Sir Astley Cooper reported the first case of tuberculosis (TB) of the breast in 1829 and named it "Scrofulous swelling of the bosom". Since then more than 800 cases have been reported.¹ The TB involvement of the breast is classified as primary "isolated" without identifiable other site or secondary with involvement of other organ(s). Tuberculosis of the breast is rare, with an overall incidence of <0.1% in the Western countries of all breast lesions that were submitted for histological examination² and 3-4.5% of all surgically treated breast diseases in the highly endemic areas of developing world.^{3,4} In Qatar, the incidence is approximately 0.4% per year.⁵ Tuberculosis of the breast may occur with cancer of the breast, but there was no clear evidence of association.⁶ The diagnosis of TB of the breast is difficult as it

masquerades as carcinoma in the elderly and as pyogenic abscess in the young. Although some authors advocate the usefulness of the mammographic signs in diagnosis of tuberculous mastitis, most investigators agree that diagnosis should be based on biopsy specimen.⁷ Treatment of tuberculous mastitis is best achieved by conservative surgery and anti-TB chemotherapy.⁸⁻¹⁰ Hamit and Ragsdale³ described 3 types of tuberculous mastitis: nodular, disseminated (diffuse) inflammation, and sclerosing. Nodular TB is the most common form and in its early stage presents as painless, slowly growing well-circumscribed mass with or without axillary lymphadenopathy. The lesion progresses with time to involve the overlying skin and may ulcerate or discharge its contents through a sinus; hence, becomes painful. This form

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resembles carcinoma or fibroadenoma and makes differentiation, either clinically or by mammogram difficult.^{8,9} However, a useful clue is the correlation between the mammogram and the clinical size of the lump and absence of classical halo sign. Disseminated (diffuse) TB is characterized by multiple foci through out the breast that confluence together and discharge their contents through multiple sinuses. They usually involve the overlying skin and ipsilateral axillary lymph nodes. The mammography resembles inflammatory carcinoma. Sclerosing TB is a slowly growing hard, painless mass with nipple retraction, usually affecting older women. Caseation of the lesion is rare, but ulceration and multiple sinuses have been shown to occur and may produce a painful indurate breast. The mammography shows the dense lesion with evidence of more fibrosis and less caseation, mimicking cirrhotic carcinoma; however, there is no micro-calcification. We report the mammographic findings in 8 cases with primary tuberculous mastitis.

Methods. Data were collected retrospectively from the State TB Registry from 1990 to 2002. All files with confirmed diagnosis of breast TB were reviewed in relation to clinical presentation, gender, nationality, demographic data, prior history of TB, investigation, management, mammographic findings and ultrasound when available. The diagnosis of TB was confirmed if the histology showed necrotizing granulomata with at least one of the following; presence of caseation, presence of acid fast bacilli (AFB) on the histology slides, positive AFB smear or culture, positive purified protein derivative (PPD) of 15 mm or more or evidence of TB in other organ. All patients fulfilling these criteria were included if they had mammography. The mammography reports were noted, and the films were reviewed by 2 consultant radiologists among other mammograms without knowing the outcome of previous reports or the nature of the study. All the mammograms were performed by GE Senographe DMR machine with facilities of stereotactic localization, and ultrasound was performed by Siemens Sonoline SI-250. All patients started directly observed anti-TB therapy (DOT) with 4 drugs Isoniazid (H), Streptomycin (S), Rifampin (R), Pyrazinamide (Z) for 2 months then either HRZ or HR for at least 4 months. They were followed up for 5 years clinically and mammogram was requested if recurrence were suspected.

Results. Seven out of 13 females with confirmed diagnosis of tuberculous mastitis had mammograms prior to surgical procedures. One of them had a relapse in the other breast after 6 months of therapy, so it was included in our study. There was one case of TB of the breast per 1000

mammograms per year, representing an overall rate of 0.001%. However, there was 1-2 cases of tuberculous mastitis out of 220-250 cases of all breasts lesions that were submitted for histological examination per year. This represents an overall incidence of 0.4% (0.2% Qatar nationals and 0.2% non-Qatar nationals). The mean age was 38 years. All were multi-parous with 4-6 children. Two (29%) patients had diabetes mellitus (**Table 1**) and one patient had pulmonary TB based on sputum culture although the smear was negative. The chest radiography was normal and she was asymptomatic (case 2). The mean duration of the symptoms was 3 months. Inflammatory breast lesion, other than TB, was suspected clinically in 3 (37.5%) cases, TB mastitis in one (relapsed case 5) and cancer in the rest (50%). Diagnosis of TB mastitis was confirmed by the presence of caseating granulomas with or without AFB using fine needle aspiration in 6 patients (75%) and another procedure was needed in the rest, such as incision and drainage or excision biopsy. Seven (87.5%) patients underwent surgical procedures prior to anti-TB chemotherapy.

Radiological findings. The chest radiographs were normal in all the 7 patients. The most common mammography finding was an ill defined hyperdense mass found in 4 patients, followed by diffuse irregular density in 3 patients in which one involved the whole breast and the other 2 involved one quadrant (sector) of the breast. Lastly, an ill-defined hyperdense mass with nipple retraction was found in one patient. The primary reports carcinoma in 3 cases, non-specific inflammation in 4 cases and one TB mastitis in the relapsed case. Both retrospective reviewers agreed on the possibility of cancer in 4 cases including the relapsed case. The other 4 cases were diagnosed as non-specific inflammatory, but one of the reviewers diagnosed a case 3 as inflammatory carcinoma. The Gallium scan was performed on one patient. It showed increase uptake in the involved breast pre that normalized post treatment (surgery and anti-TB therapy) (**Table 2**).

Discussion. This paper provides an insight to the mammographic features of tuberculous mastitis. The incidence in the state of Qatar is more than in the western countries but much less than that previously reported from developing countries.³ However, the incidence was much lower than that reported from Saudi Arabia.¹¹ These differences between the incidence per histology submitted and per mammograms per year reflect the fact that not all TB mastitis, and even breast lump undergoes mammography. In our study, only 8 (62%) out of the 13 patients with TB mastitis underwent mammography. All our patients were multi-parous, and 2 were lactating which is similar to previous studies.¹²⁻¹⁵ The duration of symptoms in our

Table 1 - Clinical presentation, radiological and pathological findings.

Cases	Age	Symptoms	Duration (months)	Clinical diagnosis	Radiological diagnosis	Pathological diagnosis	Last pregnancy	Culture	Diagnostic test	Surgical treatment	Outcome
1	40	Left breast mass	5	Cancer	? Cancer	AFB (-) and CGs	2 years	Negative	FNA	Excision biopsy	Cure
2	38	Left breast mass	1	Breast abscess	? inflammatory	AFB (+) and CGs	6 months	Negative	FNA	I & D	Cure
3	28	Right breast mass	4	Breast abscess	? inflammatory	AFB (+) and CGs	Lactating	Negative	I & D	I & D	Cure
4	34	Left breast mass	3	Breast abscess	? Cancer	AFB (+) and CGs	Pregnant	Negative	Excision biopsy	Segmental mastectomy	Cure
5	39	Left breast mass	1	? Cancer	? inflammatory	AFB (-) and CGs	2 years	Negative	FNA	Excision biopsy	Relapse
Relapse	39	Right breast mass	1	? TB mastitis	? TB mastitis	AFB (-) and CGs	2.5 years	Negative	FNA	Excision biopsy	Cure
7	45	Left breast mass and discharge	1	? Cancer	? inflammatory	AFB (-) and CGs	Lactating	Positive	FNA	None	Cure
8	40	Right breast mass	1	? Cancer	? Cancer	AFB (-) and CGs	2 years	Negative	FNA	Lumpectomy	Cure

AFB - acid fast bacilli smear form surgical specimen, CGS - caseating granulomas from surgical specimen, FNA - fine needle aspiration, I & D - incision and drainage, TB - tuberculosis

Table 2 - Mammographic features.

Cases	Intramammary mass effect	Stromal changes	Skin changes	Nipple retraction	Lymphadenopathy	Ultrasound	Type of tuberculosis mastitis
1	III defined hyperdense mass	No disruption of surrounding trabeculae No macro/microcalcification	None	No	Large left axillary adenopathy non-specific	Hypoechoic mass Irregular margin Measure the same clinical size	Nodular mastitis
2	III defined hyperdense mass	Thickening of the coopers ligaments extending to skin No macro/microcalcification	Thickened areola and skin overlaying the mass	Yes	Large left axillary	III Defined heterogenous echotexture	Sclerosing mastitis
3	Irregular diffuse density of the right breast	No disruption of surrounding trabeculae No macro/microcalcification	Thickened areola and skin overlaying the mass	No	Large right axillary adenopathy non-specific	Not available	Disseminated (diffuse) mastitis
4	III defined hyperdense mass	No disruption of surrounding trabeculae No macro/microcalcification	None	No	Bilateral axillary adenopathy non-specific	Not available	Nodular mastitis
5	Irregular diffuse density of upper outer quadrant left breast	Thickening of the coopers ligaments No macro/microcalcification	None	No	Bilateral axillary adenopathy non-specific	Not available	Sector mastitis
Relapse	III defined hyperdense mass right lateral upper quadrant	Thickening of the coopers ligaments No macro/microcalcification	None	No	No axillary lymphadenopathy	III Defined heterogenous echotexture	Nodular mastitis
7	Irregular diffuse density of upper outer quadrant left breast	Thickening of the coopers ligaments extending to skin No macro/microcalcification	None	No	No axillary lymphadenopathy	Not available	Sector mastitis
8	III defined hyperdense mass right outer lower quadrant	No disruption of surrounding trabeculae No macro/microcalcification	None	No	No axillary lymphadenopathy	III Defined heterogenous echotexture	Nodular mastitis

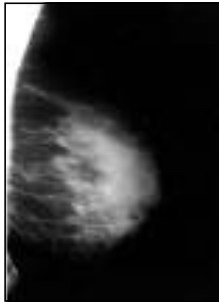


Figure 1 - Mammography of nodular mastitis
a) cranio-caudal view
b) medio-lateral view.



Figure 2 - Diffuse (disseminated) mastitis.



Figure 4 - Sector mastitis.



Figure 3 - Sclerosing mastitis.



Figure 5 - Ultrasound of the tuberculosis mastitis.

patients was shorter than that reported in the literature,¹²⁻¹⁵ probably due to the fact that our health care system is free, hence, rapid access to medical care. The retrospective evaluation of the mammogram findings revealed the 3 types of tuberculous mastitis as reported by Hamit and Ragsdale.³ Nodular mastitis (50%, **Figures 1a and 1b**), diffuse (disseminated) mastitis (37.5%, **Figure 2**) and sclerosing mastitis (12.5%, **Figure 3**). However, 2 patients out of 3 diffuse mastitis had only one sector of the breast involved which we referred to as sector mastitis (25%, **Figure 4**). Those probably represent an early phase of diffuse mastitis, as their duration of symptoms was short (one month). Micro or macro-calcification was always absent. The halo of lucency that usually surrounds fibroadenoma and cyst in mammography was also absent in our patients as reported previously.^{6,8} The skin bulge and sinus tract sign that was reported by Mankanjuola et al,¹⁰ and recently by the Egypt group,¹⁶ was also absent in our study.

We noticed that the density of the mass and degree of trabecular thickening and distortion in TB mastitis was less than what would be expected from a carcinoma of similar size. Ultrasonography was hypochoic in 25% (**Figure 5**) and heterogeneous echo-texture in 75%. This increased density was probably due to the thick abscess (caseous material) and septation in the necrotizing granulomatous cavity, as reported previously.¹⁰

The diagnosis of TB mastitis is difficult as 50% are reported as carcinoma by radiologists and clinicians. This was similar to previous reports.^{11,12,14} The value of Gallium scan cannot be evaluated on the basis of one case. The culture of the breast specimen was successful in one (12.5%) patient, which was similar to previous reports.⁴ The histological diagnostic success by FNA was 75% in our study, which is similar to 52 cases reported recently from India.¹⁷

In conclusion, although mammography identified 3 types of TB, it was not helpful in differentiating TB from carcinoma of the breast including the inflammatory and scirrotic type. We suggest that careful evaluation of the density of the mass and the degree of trabecular distortion, and thickening in

relation to its size might reduce the number of false positive cases of carcinoma diagnosed with mammogram. Early detection of TB mastitis means complete cure, not to mention the effects of rapid exclusion of carcinoma on the morale of a patient with a lump in the breast. Biopsy specimen remains the best diagnostic tool in TB mastitis.

References

1. Wapnir IL, Pallan TM, Gaudino J. Latent mammary tuberculosis: A case report. *Surgery* 1985; 5: 976-978.
2. Haagensen CD. Infection in the breast, in disease of the breast. 2nd ed. In: Haagensen CD, editor. Philadelphia (PA): Saunders; 1971. p. 335-36.
3. Hamit HF, Ragsdale TH. Mammary tuberculosis. *J R Soc Med* 1982; 75: 764-765.
4. Guillet JL, Salmon RJ, Durand JC, Pilleron JP. Mammary tuberculosis. *Lancet* 1982; 2: 166-169.
5. Gransman RL, Goldman MI. Tuberculosis of the breast: Report of 9 cases including 2 cases of co-existing cancer and tuberculosis. *Am J Surg* 1945; 67: 48-50.
6. Tabor L, Kett K, Nemeth A. Tuberculosis of the breast. *Radiology* 1976; 118: 587-589.
7. Shinde SR, Chandawarkar RY, Deshmukh SP. Tuberculosis of the breast masquerading as carcinoma: a study of 100 patients. *World J Surg* 1995; 19: 379-381.
8. Hale JA, Peters GN, Cheek JH. Tuberculosis of the breast: rare but still extant. *Am J Surg* 1985; 150: 620-623.
9. Al-Soub H, Chacko K. Tuberculous mastitis: a rare disease. *Br J Clin Pract* 1996; 50: 50-51.
10. Mankanjuola D, Murshid K, Al-Sulaimani S, Al-Saleh M. Mammographic Features of Breast Tuberculosis: The Skin Bulge and Sinus Tract Sign. *Clinical Radiology* 1996; 51: 354-358.
11. Wilson TS, MacGregor JW. The diagnosis and treatment of tuberculosis of the breast. *Can Med Assoc J* 1963; 89: 1118-1124.
12. Goksoy E, Duren M, Durgun V, Uygun N. tuberculosis of the breast. *Eur J Surg* 1995; 161: 471-473.
13. Divan RV, Shinde SR. Tuberculosis of breast-a clinico-radiologic study. *Ind J Radiol* 1980; 34: 275.
14. Mukerjee F, Cohen RV, Niden AH. Tuberculosis of the breast. *Am Rev Resp Dis* 1971; 104: 661-667.
15. AlMarri MRHA, AlMoslsh AW, AlMoslmani Y. Primary Tuberculosis of the Breast in Qatar: Ten Year Experience and Review of the Literature. *Eur J Surg* 2000; 166: 687-690.
16. Sakr AA, Fawzy RK, Fadaly G, Bakry MA. Mammographic and sonographic features of tuberculous mastitis. *Eur J Radiol* 2004; 51: 54-60.
17. Khanna R, Prasanna GV, Gupta P, Kumar M, Khanna S, Khanna AK. Mammary tuberculosis: report of 52 cases. *Postgrad Med J* 2002; 78: 422-424.