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Brief Communication

Ultrasound review of seven cases of breast tuberculosis

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ABSTRACT: Tuberculosis of the breast is a rare entity. Etiologically it can be divided into Primary Breast Tuberculosis and Secondary Breast Tuberculosis. On ultrasound, three different appearances of breast tuberculosis have been described, depending upon the imaging morphology visualized on sonomammography. The most common type is nodular type, followed by diffuse type, and sclerosing type. Clinical relevance lies in their potential to mimic breast malignancy. Hence an awareness of the different patterns is essential. This article reviews the ultrasound findings in seven cases of clinico-pathologically and microbiologically proven cases of breast tuberculosis that presented in the imaging department in the last 24 months. Secondary tuberculosis was more common than the primary form and the most common pattern on ultrasound was the nodular pattern. Pathological as well as Microbiological studies were in agreement in three cases only Microbiological studies were positive in two cases; only the Pathology report was positive in one case and in one case local site Microbiological as well as Pathological reports were negative although it was a case of abdominal tuberculosis.

KEY WORDS: ***Breast Tuberculosis; Primary; Secondary; Ultrasound; Acid Fast Bacilli; Pathology; Microbiology; Imaging***

INTRODUCTION

Breast tuberculosis (BTb) is an uncommon entity in the developed world. Even in developing nations which are supposed to be the breeding grounds of pulmonary as well as extra pulmonary tuberculosis, BTb is rare.[1] Worldwide it forms just 0.1% of breast lesions that present for surgical opinion in the developed world and a lot more of around 4.5% of the breast disease workload of the developing world.[1-4] Coexistence with malignancy, bilateral involvement and a female predilection are known. Commonly affected age group is between 20 and 50 years of age.[5,6] On ultrasound, the imaging findings of BTb are not unique and hence a battery of clinico-pathological and microbiological studies is warranted for confirmation.

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METHODOLOGY

Ultrasound features, clinical workup, microbiological and fine needle aspiration cytology (FNAC) data of all cases that were finally treated as BTb during the last 24 months was reviewed. Appropriate consent from the respective patients was obtained for this review.

Breast ultrasound was done with patient in supine position and both hands resting below the head such that the axilla too could be scanned. A 7.5 MHz linear array probe was used to scan each breast systematically. Nipple areola complex, upper and outer quadrant, upper and inner quadrant, lower and outer quadrant and lower and inner quadrant as well as each axilla was scanned in horizontal as well as vertical axis. Grey scale as well as Color Doppler ultrasound was performed in each case. The ultrasound findings were divided into three groups: nodular, diffuse and sclerosing. Nodular group included multiple round to oval focal hypoechoic lesions in breast (**Figure 1**). When abnormal hypoechoic irregular areas were seen spanning the entire breast parenchyma, the lesion was included under the category of diffuse

form (**Figure 2**). Lesions with heterogenous irregular hyperechoic areas inside the breast lesions were included as the sclerosing variant (**Figure 3**).

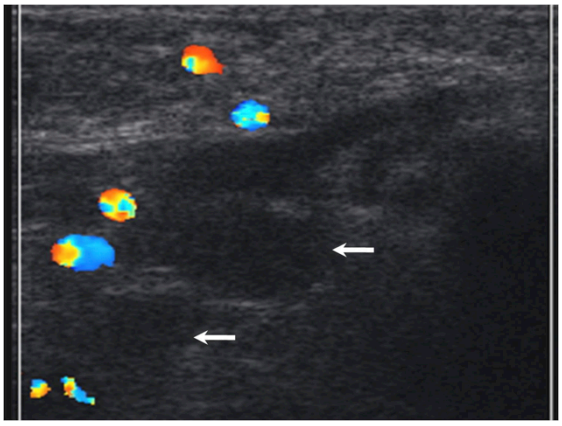

Figure 1: Sonomammogram image of nodular breast tuberculosis

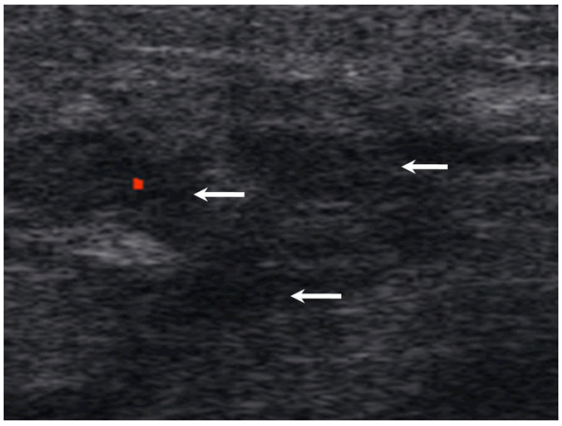

Figure 2: Sonomammogram image of diffuse breast tuberculosis

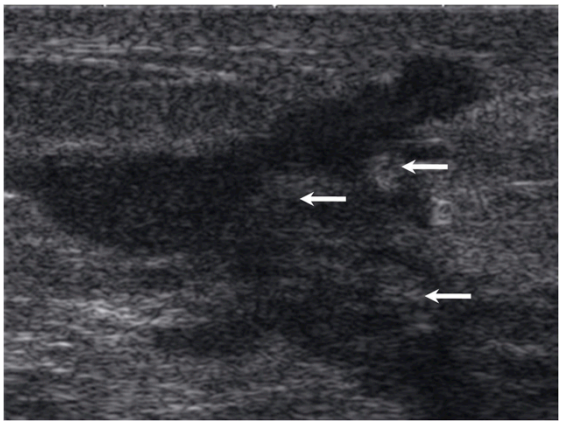

Figure 3: Sonomammogram image of sclerosing breast tuberculosis

When Ziehl Neelsen staining of the material from the lesion demonstrated acid fast bacilli, the lesion was considered as BTb based on the microbiological evidence. On fine needle aspiration cytology (FNAC), a granulomatous lesion with caseous necrosis was taken as a case of BTb. The case was labelled as Primary Breast Tuberculosis when history, clinical examination and imaging studies suggested no other organ or body part involvement by this disease process. Routine imaging in such conditions involved plain radiograph of chest and ultrasound of abdomen and pelvis. Secondary Breast Tuberculosis was diagnosed when history, clinical examination and imaging studies suggested other organ or body part involvement by this disease process; prior to breast complaints e.g. positive chest radiograph and sputum microscopy and culture or clinically doughy abdomen with abdominal ultrasound findings suggestive of suggesting Koch`s abdomen.

RESULT

In a span of 24 months, out of all the cases that presented for sonomammography; only 7 cases were diagnosed and treated as BTb. Only one was from the parent institute while six were referred from nearby private practitioners. All were females and in the age group of 17-49 years. Upper and outer quadrant was the most commonly affected quadrant (5 cases - 71.42%) followed by lower and inner quadrant (14.28%) and upper and central portion – the nipple areola complex (14.28%) that was seen involved in one case each. None of the patients had lesions in axilla. Secondary tuberculosis was (57.2%) more common than primary form (42.8%). Commonest site of origin (primary site) in cases with secondary BTb was the lung (28.6%) followed by the abdomen (14.3%) and the neck (14.3%). Pathological as well as microbiological studies were in agreement in 3 cases (42.8%). Only microbiological studies were positive in two cases (28.6%), and in them FNAC demonstrated only inflammatory changes without any granulomatous lesions. Only the FNAC was positive in one case (14.3%) and both Microbiological as well as Pathological reports were negative in one case (14.3%). The various patterns that we could retrospectively identify on ultrasound were the nodular pattern (57.14%), followed by the diffuse (28.5%) and the sclerosing pattern (14.3%).

Table 1 summarizes, compares and contrasts the clinico-patho-microbiological and ultrasound review of breast tuberculosis found in our series.

Table 1: Clinico-Patho-Microbiological and Ultrasound Review of Breast Tuberculosis

Sr #	Age	Sex	Clinical Appearance	Microbiology AFB Status	Breast FNAC Appearance	Ultrasound Appearance	Final Diagnosis
1	32	F	Breast Lump	AFB + ve	Inflammatory Lesion	Sclerosing	Primary Breast Tb
2	29	F	Breast Lump Cough	AFB - ve	Granulamatous Lesion	Nodular	Secondary Breast Tb
3	46	F	Breast Heaviness Doughy Abdomen	AFB -ve	Inflammatory Lesion	Diffuse	Secondary Breast Tb
4	17	F	Breast Ulcer Cough	AFB + ve	Granulamatous Lesion	Nodular	Secondary Breast Tb
5	38	F	Nipple Discharge	AFB + ve	Granulamatous Lesion	Nodular	Primary Breast Tb
6	21	F	Breast Induration	AFB + ve	Granulamatous Lesion	Diffuse	Primary Breast Tb
7	49	F	Breast Lump Neck Nodes	AFB +ve	Inflammatory Lesion	Nodular	Secondary Breast Tb

DISCUSSION

Tuberculosis affects the breast directly (primary BTb) or as a spread from another system that is already involved (secondary BTb).[4] BTb is known to be associated with reconstructive surgery and nipple piercing.[1-3] Abrasions on the skin as well as ductal openings on the nipples in women of reproductive age are also known pathways of infection entry .[7-9]

Although the reported incidence of BTb is 0.06% to 1.78% cases in the developed nations, it constitutes a staggering 4.5% in the developing nations.[1,4,6] The clinical presentation of BTb is as a mass that is often painful though sometimes painless, edema, or local abscess that is insidious in onset and is gradually progressive .[2,4,5]

On ultrasound three morphologic forms of BTb are known[6] and they are the nodular pattern which may be mistaken for a fibroadenoma or carcinoma[12 (10)], diffuse form that results in caseation and sinus formation, and a sclerosing form which manifests as dense, fibrotic breast tissue and is slow growing in the absence of any suppuration. In our study the nodular pattern (57.1%), was the commonest; followed by the diffuse (28.6%) and the sclerosing patterns (14.3%) respectively. The sonomammography as well as the x- ray mammography findings are nonspecific and depend very much upon the morphological subtype.[3,5] If there is an abscess, then bulging of the overlying skin with or without formation of the 'sinus tract sign' may be noted on a mammogram as well as ultrasound.[14 (11)]

Ultrasound alone is not definitive for diagnosing BTb and the confirmation of Acid Fast Bacillus positive status from microbiological studies or evidence of chronic granulamatous disease on FNAC studies is a must before labeling the patient as a case of BTb. Although one would expect the FNAC and Microbiological reports to be affirmative in confirmative cases of BTb, but it is not the rule and in fact affirmation from either of them is seen more often than.[4,10(12), 13] In our study results of both tests were affirmative only in 42.8% and both were negative from the breast in one case 14.3%, which was a case diagnosed on ultrasound as abdominal tuberculosis and it responded well to the medical Anti-tubercular Treatment (ATT).

Other conditions that resemble BTb on FNAC are sarcoidosis, leprosy, syphilis, actinomycosis, typhus, and cat scratch disease[5,6,11(14)] and can be readily differentiated by other associated findings.

Usually BTb presents as benign looking lesions that do not respond to routine antibiotics. The nonspecific clinical, imaging, microbiological as well as histopathological findings can cause a delay in diagnosis. Tuberculosis and cancer may co-exist.[15] While the nodular form is the most difficult to differentiate from carcinoma[16]; the diffuse form may mimic inflammatory carcinoma.[16]

Treatment is by institution of anti-tuberculous therapy using standard regimes. No specific guidelines have been advocated for treating BTb. In cases of primary BTb the indicated treatment consists of the surgical removal of the mass and the anti-tuberculosis therapy with isoniazid, pyrazinamide, ethambutol and rifampicin for the period mostly for about 6 months but may extend upto 9 months.[17-19] Second line drugs like Ofloxacin and Kanamycin are indicated in cases with multidrug resistant tuberculosis.[20] Surgery may be required for patients with abscess or sinuses.

An added advantage of ultrasound is that it can be used for follow up of these cases and to visualize response to ATT. Ultrasound demonstration of unhealed lesion even after adequate ATT aids in deciding whether surgery should be done.

CONCLUSION

Thus ultrasound is not a diagnostic imaging modality for breast tuberculosis as the appearance of different types of tubercular lesions affecting the breast is not specific or characteristic. But ultrasound imaging can be used for follow up of already diagnosed cases of breast tuberculosis and to visualize response to ATT as well as to decide whether surgery should be done if ultrasound demonstrates unhealed lesions even after adequate ATT.

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