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Case report

Multifocal bone tuberculosis presenting as a breast mass: CT and MRI findings

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Abstract. Chest wall involvement is an uncommon manifestation of musculoskeletal tuberculosis. We present computed tomography and magnetic resonance imaging findings in a case with multifocal musculoskeletal tuberculosis presenting as a breast mass. These radiological modalities are not diagnostic without histopathological confirmation, but they are valuable guides to surgery in defining the extent of disease involvement.

Key words: Tuberculosis – Skeletal – CT – MR imaging

Introduction

Tuberculosis (TB), which is one of the major health problems in underdeveloped or developing countries, is now increasing in frequency in the developed world due to increased world migration and AIDS epidemics. In addition to classical pulmonary TB, atypical disease presentation is becoming more common. We present a case of musculoskeletal TB with chest wall involvement. Musculoskeletal TB accounts for 1–5 % of all TB infections. Of these infections, 50 % involve the vertebral column and only 0–5 % involve ribs [1]. Rib TB is seen in only 0.1 % of all TB infections [2]. Computed tomography findings of chest wall involvement have been described, but to our knowledge, there is no previous report about MRI findings.

Case report

An 18-year-old female student presented with a mass in her left breast for 2 weeks. There was no cough, hemoptysis, dyspnoea or fever. On physical examination, there was a non-tender fixed mass deep in the left breast. Ultrasound examination showed a cystic mass in the retromammary region. The breast parenchyma was otherwise normal. Chest radiograph revealed a mass with signs of extrapleural involvement (Fig. 1). A CT examination showed a left-sided 5 × 10-cm anterior chest wall soft tissue mass with a thick, contrast-enhancing capsule and necrotic centre. There was subjacent pleural reaction and rib erosion (Fig. 2). There was no lymphadenopathy or parenchymal lesion. A similar smaller chest wall lesion was present on the right side. There was a hypodense paraspinal lesion in the erector spinae muscles (Fig. 4 a). An MRI examination 1 week after the CT study showed that the chest wall mass was accompanied by increasing bilateral pleural effusion (Fig. 3). The paraspinal lesion became larger with contiguous involvement of the adjacent thoracic vertebra corpus (Fig. 4 b). Percutaneous US-guided aspiration of the left-sided mass on the anterior chest wall and the paraspinal lesion revealed acid-fast bacilli. Aspiration cytology of the pleural effusion was negative for malignant cells and acid-fast bacilli. A trial of antituberculosis drugs was started before surgical débridement.

Discussion

Musculoskeletal TB is due mainly to haematogenous dissemination [1–3]. Tuberculous involvement of ribs may also occur by direct extension from lungs [1, 3] or rupture into lung or pleural space [2]. Active or reinfection type of pulmonary TB is not often seen in association with rib TB [2]. The main clinical feature of rib TB is a subcutaneous swelling on the chest wall with or without fever. It should be kept in mind that the lesion may be confused with a breast mass in women, as in our case. A retromammary soft tissue mass on the anterior chest wall, with peripheral rim enhancement and a necrotic centre, should raise suspicion of TB; however, the differential diagnosis should

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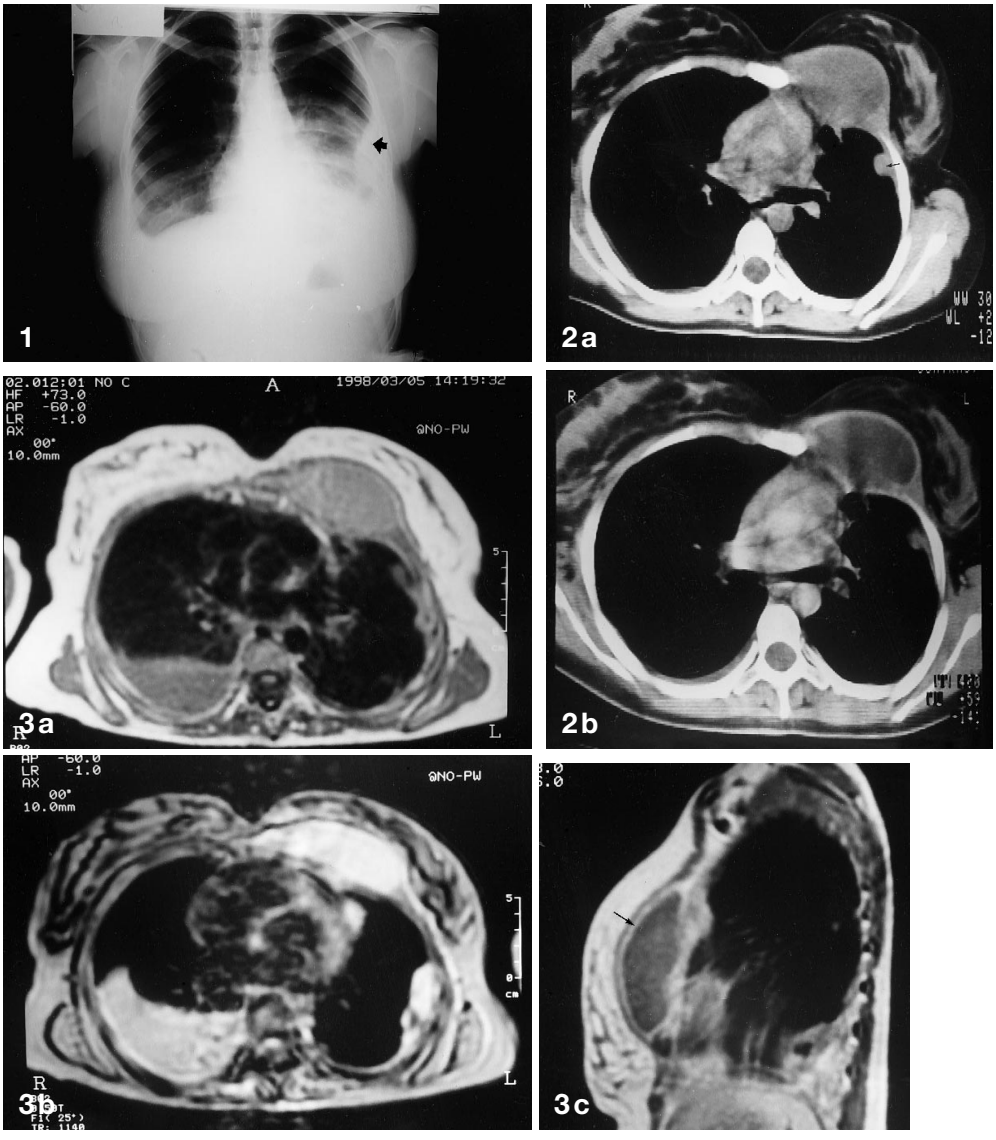

Fig. 1. Chest radiograph shows a mass of homogeneous density *(arrow)* with a broad base suggesting an extrapleural mass

Fig. 2. **a** Non-contrast and **b** contrast-enhanced CT scans show a large anterior chest-wall soft tissue mass with rim enhancement and low-attenuation centre. There is an adjacent pleural-based soft tissue mass (*arrow* in **a**)

Fig. 3. **a** T1- and **b** T2-weighted axial, and **c** gadolinium-enhanced, sagittal T1-weighted MR images show the cystic nature of the lesion with rim enhancement (*arrow* in **c**). Note the increasing bilateral pleural disease compared with the previous CT study

include metastasis, multiple myeloma, Ewing's sarcoma, invasive peripheral lung cancer, actinomycosis and pyogenic infections [4]. A direct fistulous connection with the pleura or a destroyed rib fragment in the abscess as revealed by CT can be helpful in the differential diagnosis of other infectious types of retromammary abscess [5]. A CT examination is valuable in demonstrating the skeletal lesion and in the assessment of response to treatment [1]. These patients usually do not respond to antituberculous therapy and need surgical resection [6]. A CT examination is a valuable guide to surgery demonstrating the extent of disease. Magnetic resonance imaging added no further information to CT, for the chest wall mass in our case, but clearly showed the bone and soft tissue involvement of TB spondylitis.

The origin of TB spondylitis may be haematogenous spread or a primary focus in the paraspinal soft tissue which extends directly into the adjacent vertebral bodies and disks [7]; the latter seems to be the possible site of origin in our case. The size of paraspinal masses are larger in TB than in pyogenic abscesses and are proportionally larger than bone destruction [7, 8]. Magnetic resonance imaging is the main imaging modality of TB spondylitis. The MRI characteristics of TB spondylitis are: (a) contiguous involvement of two vertebrae; (b) subligamental spread of paraspinal abscess; (c) destruction of endplates with herniation of the infected disk into the vertebrae; and (d) intermediate or low T1 signal intensity and high T2 signal intensity. Use of Gd-DTPA usually does not facilitate diagnosis [7].

Fig. 4. a Contrast-enhanced CT and **b** MR show a paraspinal mass lesion with a thick, enhancing capsule and necrotic centre (*thin arrow* in **a** and **b**). There is contiguous involvement of the adjacent vertebral body (*thick arrow* in **b**)

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Book review

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Thurmond A.S.: Atlas of Infertility: Diagnostic and Therapeutic Radiology. Malden-Massachusetts, Oxford: Blackwell Science, 1997, 99 pages illustrated, £ 62.50, ISBN 0-63204-305-9

The *Atlas of Infertility* by A. S. Thurmond aims to give an overview on the imaging techniques, on pathologic findings and on therapeutic techniques in female infertility. It focuses on imaging findings which may be associated with infertility, with the emphasis on hysterosalpingography (HSG). The book is organized in five chapters which end with a short yet representative overview of the literature.

Chapters 1 and 2 cover the cervical canal, uterine cavity, and fallopian tubes, including normal, congenital, acquired, and postoperative findings. In chapter 3 sonographic findings of the ovaries associated with infertility and pelvic masses are described. Chapter 4 renders basic information on assisted reproductive technologies, including in vitro fertilization, on ovarian stimulation and complications of ovarian stimulation. Finally, chapter 5 describes the techniques, contraindications and complications of procedures for the diagnosis and treatment of infertility, including HSG, sonohysterography, radioisotope HSG, fallopian tube catheterization, and MRI. Of special practical use is the recommended imaging strategy based on the clinical presentation at the beginning of the book.

This teaching atlas allows a valuable multimodality approach in the diagnosis and treatment of female infertility written by an experienced radiologist. The chapters are short, but render concise and practically useful information. Furthermore, it is a pleasure to look at the excellent images of HSG and sonography.

In summary, the author succeeds in giving an excellent overview on imaging in infertility emphasizing on HSG and sonography. To my opinion, the MRI could be covered more extensively. Especially the excellent illustrations make the price acceptable, and the *Atlas of Infertility* is recommended to radiologists interested in gynecologic imaging and especially radiologists and gynecologists involved in female infertility. R. Forstner, Salzburg