

# Tuberculosis of the axial skeleton mimicking malignancy

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## Abstract

Multifocal bony lesions involving vertebral bodies and cancellous bones commonly occur in metastases and haematological malignancies. However, tuberculosis being a 'great mimic', can have a similar presentation. We present a young Indian female who had bony lesions involving multiple cancellous bones, without constitutional features. Extensive search for a neoplastic cause revealed negative results. Histopathological examination of the involved tissue revealed diagnosis of tuberculosis, which was not suspected. The patient improved remarkably with antitubercular therapy. Tuberculosis of the spine commonly presents with destructive spondylitis (Pott's spine), leading to spinal deformity. Multifocal involvement of the skeleton is an atypical presentation of musculoskeletal tuberculosis. This case highlights the fact that tuberculosis should always be considered in patients with multifocal bony lesions in countries where it is endemic, like India, even in the absence of constitutional features.

**Keywords:** tuberculosis, metastasis, malignancy, mimic, cancellous bone, lytic lesions

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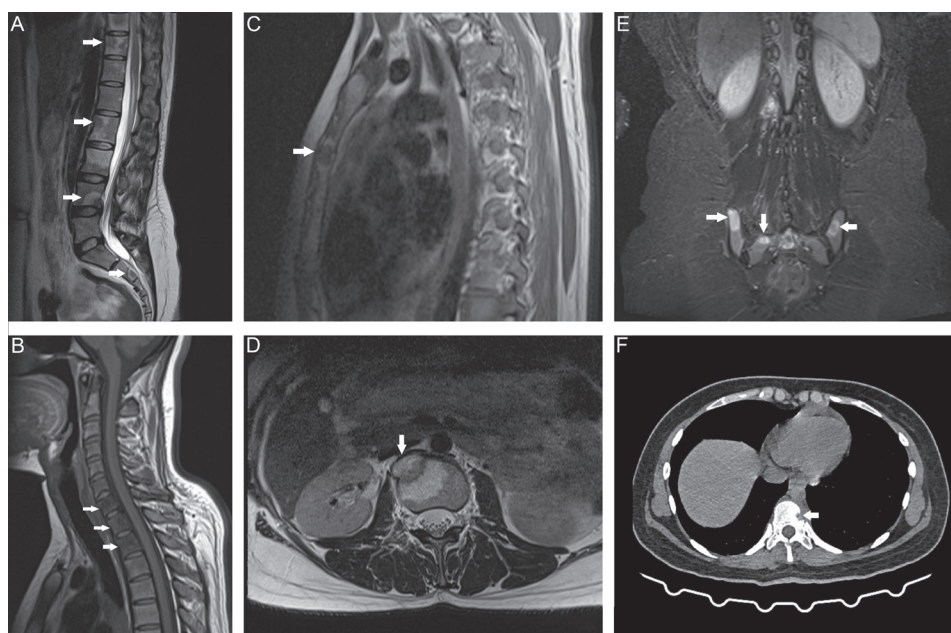
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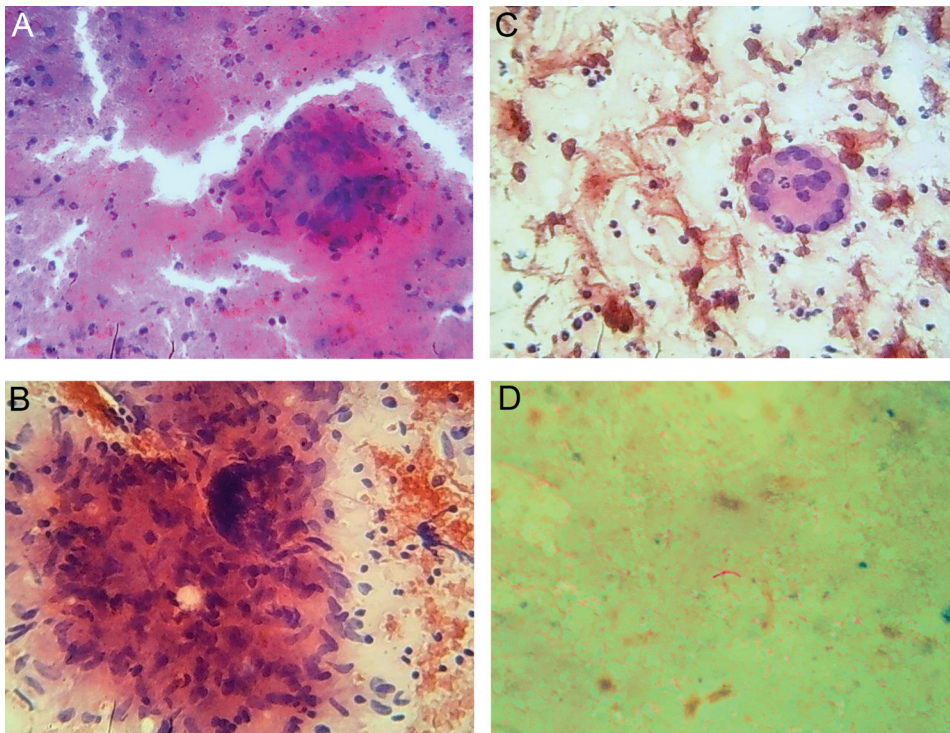
A 29-year-old gynaecologist had pain in the lower back and neck for the previous month. The pain did not change with rest or activity, was poorly localised and dull-aching. She did not have fever or pain in peripheral joints. She had a normal appetite and stable weight. Physical examination was unremarkable. Laboratory results showed haemoglobin

8.9g/dl, total leucocyte count 5000/mm<sup>3</sup> (70% polymorphs and 20% lymphocytes), erythrocyte sedimentation rate (ESR) 67 mm/hr and C-reactive protein (CRP) 48.5mg/l. Liver and kidney function tests were normal. Magnetic resonance imaging (MRI) of the spine was remarkable for focal areas of heterogeneous signals in the bodies of



**Figure 1** Sagittal T2-weighted MRI of lumbar spine showing heterogeneous lesions with surrounding oedema in thoracic, lumbar and sacral vertebrae (1A). Sagittal T1-weighted MRI of cervical spine showing hypodense vertebral bodies of C7, T1 and T2 vertebrae (1B). Similar lytic lesion noted in manubrium sterni (1C). Paravertebral soft-tissue lesion adjacent to the intra-osseous lesion seen on axial T2-weighted MRI (1D). Coronal section of pelvis showing hyperintense lesions in sacrum and ilium on both sides on STIR (1E). Axial CT scan showing osteolytic lesion in the vertebral body (1F).

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**Figure 2** Photomicrographs of the paravertebral collection. A: Giemsa-stained photomicrograph at 100X magnification showing epithelioid cell granuloma in the background of necrosis; B: Giemsa-stained photomicrograph at 400X magnification showing epithelioid cell granuloma; C: Giemsa-stained photomicrograph at 100X magnification showing a Langerhans giant cell; D: Ziehl-Neelsen-stained photomicrograph at 1000X magnification showing an acid-fast bacillus

many vertebrae with surrounding oedema (Figures 1A and 1B). A similar lesion was present in the manubrium sterni (Figure 1C). Paravertebral lesions were noted adjacent to the intraosseous lesions at some vertebral levels (Figure 1D). Short-tau inversion-recovery (STIR) hyperintensities were seen in iliac bones and the sacrum; the sacroiliac joints were normal (Figure 1E). A suspicion of spinal metastasis or lymphoma was raised. Peripheral smear examination did not show atypical or immature cells. There was no breast lump; speculum examination was normal. Computed tomography (CT) of the abdomen did not reveal any abnormality. CT scan of the chest showed pretracheal, subcarinal and hilar lymph nodes; the thyroid, breasts and lungs were normal. Lytic lesions were noted in some of the thoracic vertebrae (Figure 1F). CA-125, CA-19-9 and alpha-fetoprotein were negative. She had normal thyroid function and serum thyroglobulin. CT-guided fine-needle aspiration cytology was performed from the paravertebral lesion along the fifth thoracic vertebra, which revealed viscous, purulent material. Histopathological examination showed necrosis and granulomatous inflammation; acid-fast bacilli staining was positive. Polymerase chain reaction of the pus revealed a positive result for *Mycobacterium tuberculosis*. There was no evidence of neoplasia. Serology for human immunodeficiency virus and cultures for pyogenic and fungal infections were negative. A diagnosis of multifocal skeletal tuberculosis was made and the patient was started on rifampicin, isoniazid, ethambutol and pyrazinamide. The pain in the neck and back improved significantly and ESR and CRP normalised by the fourth month of treatment. The treatment was continued for 12 months.


The most frequent causes of lytic lesions in the vertebrae are neoplastic. A MRI appearance of well-circumscribed, hypodense lesions on both T1 and T2-weighted sequences

in many vertebral bodies, along with bony lesions involving sternum and ilium (as in our patient), is highly suggestive of metastasis or haematological malignancy. In addition, extension of the intraosseous lesions into the paravertebral space suggests invasiveness. However, imaging and biochemical parameters did not show evidence of a primary malignancy in our patient. Raised ESR and CRP in the absence of constitutional features raise the possibility of a rheumatological disease. Rarely, atypical cases of sarcoidosis can present with lytic lesions in the spine.<sup>1</sup> Although mediastinal lymph nodes were present in our patient, serum calcium and angiotensin-converting enzyme levels were normal. Histopathological examination of the paravertebral collection revealed extensive necrosis, which is unusual in sarcoidosis.

The spine is the commonest site for skeletal tuberculosis. Typical cases of tubercular spondylitis (Pott's spine) present with psoas abscess due to drainage of pus along psoas major muscles. There is severe destruction of the vertebral body involved, resulting in spinal deformity. Rarely, intraosseous abscesses can be seen in multiple vertebral bodies, as in our patient.<sup>2</sup> Tubercular spondylitis commonly involves the lower thoracic or lumbar spine affecting a few contiguous vertebrae. Multifocal involvement of the spine with small paravertebral collections is an uncommon presentation.

Skeletal tuberculosis frequently lacks the typical constitutional features. Moreover, atypical presentations further blur the suspicion of tuberculosis. Such patients are frequently subjected to a battery of investigations in an attempt to find a sinister cause for the clinical features. Histopathological examination is the most important investigation in establishing the correct diagnosis.

Ringshausen et al. reported a case where the diagnosis of tuberculosis was missed and the patient was incorrectly treated with radiotherapy for suspected metastatic spine disease based on imaging, and finally succumbed.<sup>3</sup> Our patient belongs to a country where tuberculosis is endemic with occupational exposure to the disease. However, she was immunocompetent, had no past history of tuberculosis, did not have classical constitutional features and had multifocal lytic lesions in several vertebral bodies with focal paravertebral collections. In addition, she had lesions in multiple cancellous bones. These features made us think of possibilities other than tuberculosis like metastasis, lymphoma or sarcoidosis. Evidence of tuberculosis was revealed on histopathological examination and she improved remarkably with antitubercular therapy.

Healthcare providers in India are at constant risk of developing tuberculosis, given the high degree of exposure. Thorough hand-washing and universal precautions are followed routinely to reduce the risk. Correct mask practices should be observed by healthcare providers and patients. Isolating infected patients and disinfection of secretions generated from them are essential to prevent the spread of the disease. Wards and emergency departments should have adequate ventilation. Healthcare providers should be screened for latent tuberculosis so that appropriate treatment can be administered to those at higher risk. National tuberculosis health programs should plan more effective surveillance measures at the community level, like obtaining a radiograph of the chest and performing microscopic examination of sputum in those suspected to be suffering from tuberculosis. 

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