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Spine tuberculosis with an intercurrent active pulmonary location in a high incidence country: A rare case report

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Abstract

Spinal tuberculosis usually presents as destroyed contiguous vertebral bodies associated with intervertebral discs and paravertebral or psoas abscesses. Atypical forms are uncommonly reported. Vertebral involvement without disk destruction is a rare form that improves satisfactorily after appropriate medical management. We report the case of a 36-year-old male who had spine tuberculosis without disk involvement, associated with intercurrent active pulmonary location with good clinical improvement after treatment and follow-up imaging showing spectacular regression of bone lesions. By reporting this case, we also review the literature on this rare form of tuberculosis.

Keywords

Tuberculosis, spondylitis, spine, metastases

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Introduction

Both in underdeveloped and industrialized countries, tuberculosis (TB) continues to be a serious public health issue. It can involve pulmonary as well as extrapulmonary sites. The latter has reached 20%–40% as reported in recent studies.[1] 10%–25% of tuberculosis patients have musculoskeletal involvement, with tuberculous spondylitis accounting for about 50% of cases and being its most prevalent form.[2] Intercurrent active pulmonary TB is only seen in about one-half of the patients.[3] The first step in diagnosing musculoskeletal TB is usually a radiological evaluation. We report the case of a 36-year-old man who presented for a thoracic computed tomography (CT) scan with fever, night sweats, and blood-streaked sputum associated with diffuse back pain. We discovered signs of active pulmonary tuberculosis with diffuse lytic lesions of the spine evoking the musculoskeletal location of TB.

Case report

We report the case of a 36-year-old male, non-smoking and never treated for tuberculosis, BCG-vaccinated in childhood. He gave a 1-month history of gradually increasing back and lumbar pain treated with analgesics. Other symptoms began to develop 2 weeks later, with intermittent fever, night sweats, and dyspnea with no cough noted. The patient also reported a weight loss of 5 kg during that month. Due to the lack of improvement, the patient presented to the Department of Orthopedics. Clinical examination found an accelerated respiratory rate of 26 breaths per minute with fever but no neural deficit was present. His pulse rate was normal at 76 beats per minute. The patient's elevated sedimentation rate was 73 mm/h and C-reactive protein at 70 mg/L. The immunodeficiency virus (HIV) antibody screening test was negative as well as CA19-9.

A lumbar spine X-RAY showed lytic changes in the spine. The patient was then referred for a CT scan. The bone window revealed multiple lytic lesions of the axial and peripheral skeleton with cortical destruction in some of the lesions (Figure 1). These findings were associated with centrilobular

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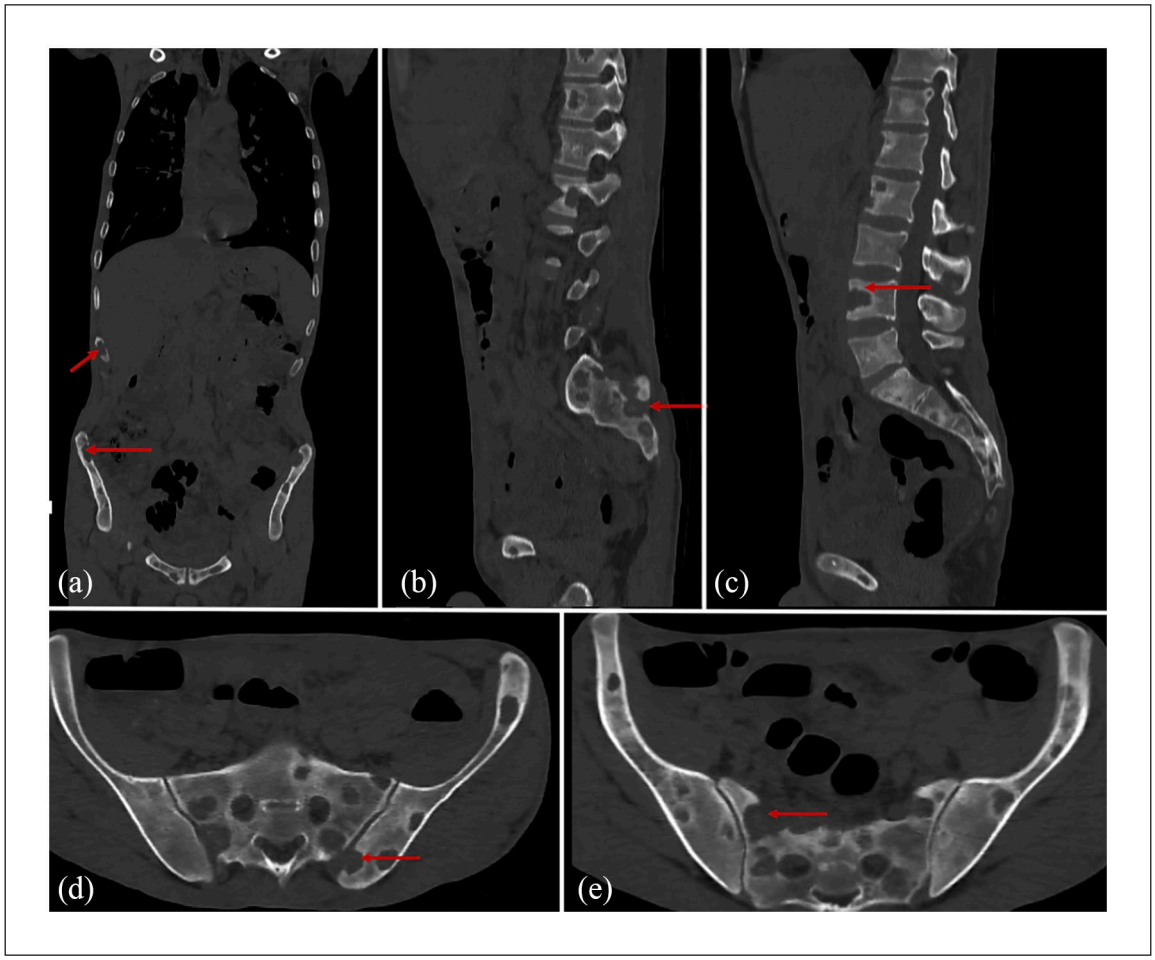

Figure 1. Coronal (a), sagittal (b) and (c), and axial (d) and (e) planes of a chest, abdomen, and pelvis computed tomography scan (bone window) revealing multiple lytic lesions of the spine with cortical destruction (red arrows).

small nodules, branching linear and nodular opacities forming a tree-in-bud appearance with some lobular areas of consolidation, and irregular cavitation (Figure 2). Pulmonary tuberculosis was suspected with spine involvement. Sputum samples were collected for three successive days, with the result being positive for acid-fast bacilli (AFB). The culture was realized in Löwenstein–Jensen solid medium, with the result being positive for mycobacterium and reverse transcription polymerase chain reaction (RT-PCR) detected the *Mycobacterium tuberculosis* complex. Test drug susceptibility showed susceptibility to streptomycin, isoniazid, rifampicin, ethambutol, and pyrazinamide.

A spine magnetic resonance imaging (MRI) was then performed to look for discal involvement (Figure 3). It showed only osseous lesions and the diagnosis of pulmonary tuberculosis with osseous involvement was then made. The patient was started on antituberculosis treatment, scheduled for a 9-month duration, with four drugs (rifampicin, ethambutol, isoniazid, and pyrazinamide) for 2 months, followed by two drugs (rifampicin and isoniazid) for 7 months. He had clinical improvement and underwent a follow-up CT scan 4 months after starting therapy. The imaging improved with more condensed bone compared with the pretherapy pattern (Figure 4). Back and lumbar pain disappeared, and the patient gained 6 kg after 5 months. He also had a clinical follow-up during his final month of treatment, which noted no particularities.

Discussion

Morocco has an incidence estimated by the WHO in 2021 at 35,000 cases, corresponding to an incidence rate of 94 per 100,000 inhabitants.[4] Maghreb countries record the highest rates of extrapulmonary tuberculosis in the world (approximately 45%–60%) with this extrapulmonary tuberculosis occurring in 20%–40% of cases of tuberculosis.[5] The musculoskeletal system is involved in 1%–3% of those cases and its direct manifestations include spondylitis, septic arthritis, osteomyelitis, myositis, bursitis, subcutaneous abscesses, and tenosynovitis.[2,6] As for spinal tuberculosis, also known as Pott's disease, it was first reported by Percival Pott in 1779 and is the most common extrapulmonary form of TB,

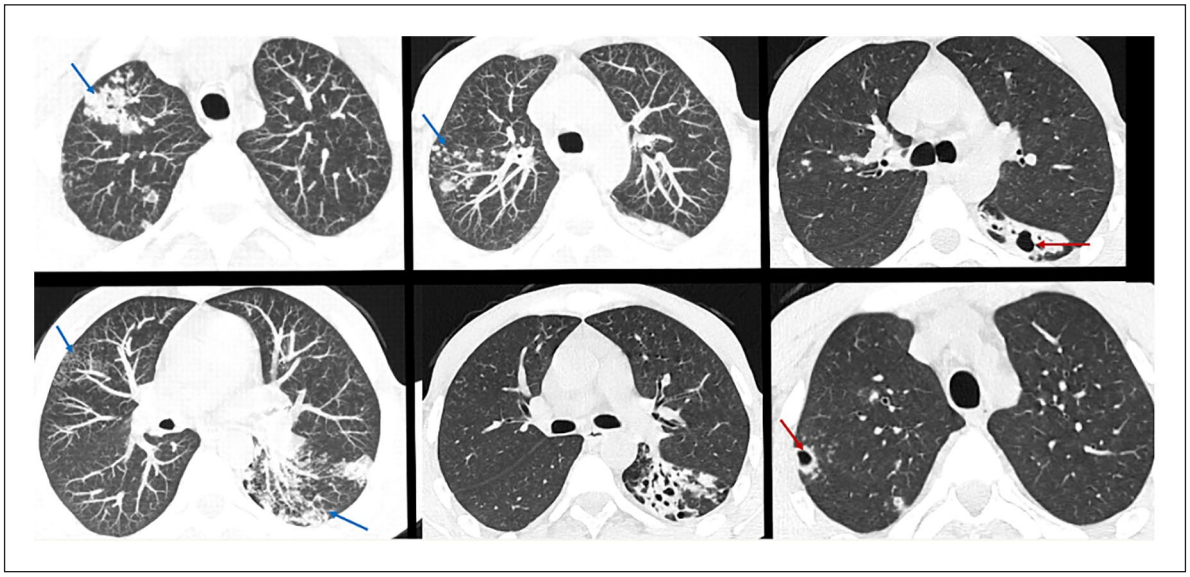

Figure 2. Axial planes of the lung window show left centrilobular small nodules, branching linear and nodular opacities in apical areas (blue arrows), and irregular cavitation (red arrows).

Figure 3. Sagittal T2 and STIR (short tau inversion recovery) weighted images show multiple high-signal spine lesions with no disk involvement.

accounting for 1% of all TB cases, and 50% of musculoskeletal tuberculosis.[7] Risk factors of extrapulmonary tuberculosis are mainly primary or secondary immunodeficiencies (e.g., HIV infection, diabetes mellitus, viral hepatitis). However, as was the case with our patient, the process can also develop without previous comorbidities.[8] Spinal tuberculosis is usually a destructive form of tuberculosis, more common in children and young adults.[9] Its classic form corresponds to tuberculous spondylodiscitis being usually secondary to hematogenous spread from a primary site of infection (most commonly the lungs).[10] The *paradisical* region is the most frequently involved vertebral site because the *paradisiacal* arteries normally supply the subchondral bone on each side of the disc space.[11] The remaining types of involvement are non-osseous (presenting with the abscess), posterior (involving the posterior structures principally), and central (with predominant involvement of the vertebral body).[12] Progressive vertebral destruction leads to spinal kyphotic deformity and instability.

Clinically, spinal tuberculosis can manifest in a variety of presentations, depending on the duration of the disease and its severity, the site of the lesion, and the existence of any related complications, such as deformity or neurological deficiency.[13] In uncomplicated conditions, it usually presents with back pain, while patients with complicated diseases present with deformity, instability, and neurodeficiency.[13] In patients with tuberculosis, back pain may be caused by the active disease itself (due to inflammation), instability, and bone destruction.[12]

Mycobacterium cultures are the gold standard for tuberculosis diagnosis; nevertheless, the TB bacillus is fastidious, and relying only on positive cultures for diagnosis may result in low sensitivity.[14] Alternate laboratory reference standards for diagnosis include histological proof of classic caseating granulomas histopathological, staining of smears to identify AFB, serological inflammatory markers, immunological testing, and molecular diagnostic techniques.[12,14]

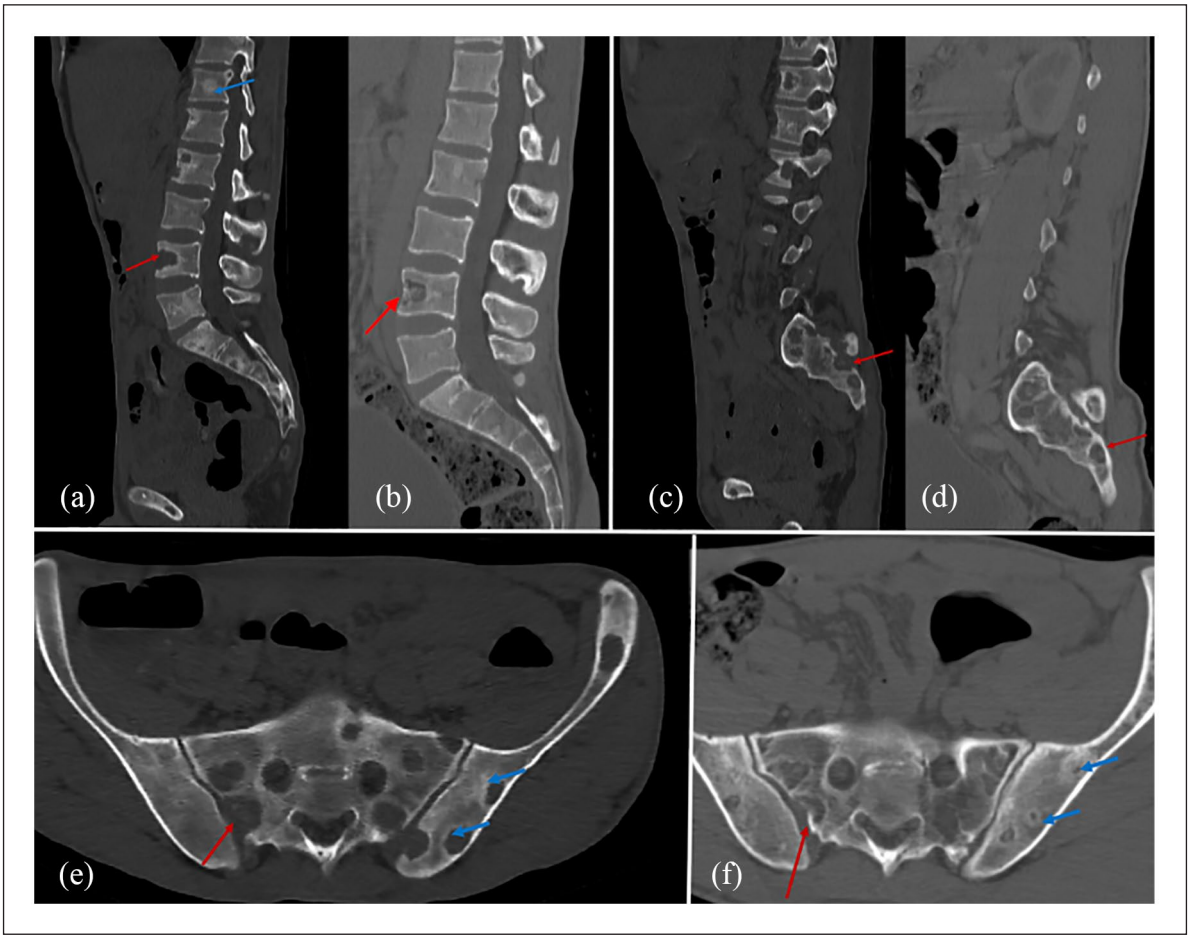

Figure 4. Pre-anti-tuberculous therapy computed tomography scans (a), (c), and (e) and 4 months of follow-up (b), (d), and (f) show cortical repair (red arrows) with more bone condensed lesions (blue arrows).

MRI is the most effective technique in the diagnosis of spinal TB, with 100% sensitivity and 80% specificity.[15] It best detects the extent of soft tissue enhancement, the location of the abscesses, and spinal canal impairment.[12] Non-contiguous vertebral involvement can also be identified with the aid of screening sequences involving the entire spine.[7,15]

Multiple unusual features have been documented in the literature despite the typical presentation of spinal tuberculosis. Atypical spinal TB is mainly represented by involvement of the posterior elements of the vertebrae, no intervertebral disc involvement, and extradural spinal cord compression without bony involvement.[16] Vertebral involvement without disc destruction is the most commonly reported atypical form of spinal TB.[17] Momjian and George, in their review of the literature, summarized the MRI presentation as signal abnormalities in the vertebral body with a preserved disc.[18] They added that it is difficult to differentiate the lesion from lymphoma or metastases. Therefore, physicians seeking a diagnosis should consider the patient's medical history, general symptoms, laboratory screening results, and imaging findings. A low-grade fever, night sweats, and weight loss are common signs and symptoms of tuberculosis. For the diagnosis of spinal TB, the CT- or ultrasonography-guided needle biopsy technique is also frequently employed.[19] A typical form of pulmonary tuberculosis with osseous involvement associated with positive laboratory test findings may also evoke the diagnosis. However, sometimes, even when associated with pulmonary tuberculosis, spine findings may be atypical, which was the case with our patient, in that case, confirmation of spine tuberculosis is often obtained by its response to therapy.

The treatment of this kind of atypical spinal TB is mainly chemotherapy, although some patients may require surgery. Indications for surgery are represented mainly by the presence of definitive spinal cord compression and a deteriorating neurological condition, persistent neurological deficits despite medical treatment, vertebral destruction leading to spinal instability, severe kyphotic deformity, and large paravertebral or retro-pharyngeal abscesses.[7]

Monitoring the response to anti-tuberculous therapy is usually based on clinical evaluation and imaging. When osseous involvement is present, plain radiographs and bone scans may be useful in identifying signs of healing.[20,21] Common signs of healing that are described include[22] (i) sclerosis, which should be seen within 5 months of treatment, considered as a sign of healing when early disease was purely osteolytic. Sharpening of articular and cortical margins, (ii) paravertebral soft tissue masses decrease, if present initially, can be a sign of healing. These masses often reach maximum size within one and half months of presentation, (iii) sharpening of articular and cortical margins, (iv) remineralization and reformation of bony trabeculae, and (v) bony ankylosis, which is believed to be a sure sign of healing (seen in around 50% of patients).[23]

Conclusion

Tuberculosis remains a major health problem in the world, with Africa being one of the regions with the highest prevalence. Spinal tuberculosis is a common extrapulmonary tuberculosis and may lead to complications such as spinal deformity and neurological disability. Multiple contiguous spinal vertebral bodies and their intervertebral discs are altered in the usual radiological imaging of TB, which is easily detectable and diagnosable. When there is no intervertebral disc involvement, noncontiguous multi-segmental TB mimics other illnesses, including neoplasms or other spinal infections. Physicians' awareness and prompt management of TB spine will help in reducing the continuing morbidity of this disease.

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Author contributions

Y. E. H. was responsible for the manuscript concept, design, editing, and literature search. K. I. helped in manuscript editing and literature search, manuscript editing, and manuscript review. C. F. contributed to the conception and design. N. M. B. contributed to acquisition, analysis, and interpretation. I. N. critically revised the manuscript and gave final approval.

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Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

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