

Vertebral Localization of Multifocal Skeletal Tuberculosis: Case Report and Literature Review

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Abstract

Multifocal skeletal tuberculosis is a rare condition. The diagnosis is difficult and the treatment is delayed in the vast majority of cases. A 30-year-old immunocompetent jobless male complained of thoracic and lumbar spine pain for several weeks, associated with progressive weight loss without fever. Neurological examination was normal. CT scanning demonstrated hypodense multifocal lesions of the spine and the hip. Vertebroplasty was performed successfully. But a pathological examination of the biopsy of spinal lesions was not conclusive. One month later, the patient developed an acute spinal cord compression syndrome. Emergency decompression surgery was performed, which demonstrated the purulent epidural abscess and osteolysis. The pathological examination was in favor of tuberculosis. Despite surgical stabilization and cementoplasty, anti-TB therapy and kinesitherapy, the patient was still significantly limited a few months later with a flaccid paraplegia. TB infection was cleared at the end of the two-phase regimen. Atypical tuberculosis or multifocal TB poses diagnostic problems especially with metastases, malignant lymphoma, and multiple myeloma. We report this rare case of multifocal skeletal tuberculosis to show the place of vertebroplasty in the management of spinal tuberculosis or if there is indeed a potential role that vertebroplasty could have played in spreading spinal lesions. The patient was informed that non identifying information from the case would be submitted for publication, and he provided consent.

Keywords

Multifocale, Vertebroplasty, Skeletal Tuberculosis, Diagnosis, Treatment

1. Introduction

Vertebral tuberculosis is the typically spondylodiscitis. Progress in medical im-

aging technology revolutionised the understanding and the description of multifocal tuberculosis. Tuberculous spondylitis is less common and yet the most dangerous form of skeletal tuberculosis [1]. There has been a resurgence of *Mycobacterium tuberculosis* worldwide in recent years and the future looks gloomy, given the increase incidence of HIV [2] [3]. Multifocal bone involvement seldom men counted in the developed world, is still reported in countries where tuberculosis remains endemic [4]. Multifocal skeletal tuberculosis is a rare condition which makes the diagnosis difficult and the treatment is delayed in the vast majority of cases. We report this rare case of a 30-year-old immunocompetent jobless male with vertebral localization of multifocale skeletal tuberculosis. It is the authors' view that this case raises issues related to the diagnosis and management of multifocal skeletal tuberculosis, and a potential role that vertebroplasty could have played in spreading spinal lesions.

2. Case report

A 30-year-old immunocompetent jobless male complained of thoracic and lumbar spine pain for several weeks, associated with progressive weight loss without fever. We failed to ascertain a history of tuberculosis (TB) in the patient's inner circle, but a PPD (purified protein derivative) test was positive. Neurological examination was normal apart from percussion tenderness over his thoracic and lumbar spinous processes. Spinal MRI showed hypointense and hyperintense lesions on T1 weighted and T2 weighted imaging respectively, without obvious cord compression syndrome. Unfortunately, due to some technical issues in the MRI suite, only bone windows were made available despite repeated requests from the neurosurgical team. A panoramic scan of the axial skeleton showed multiple skeletal lesions including the spine and the pelvic bone which were hypodense (**Figure 1**). Protein electrophoresis was normal. Top differential diagnoses for these multifocal skeletal lesions are tuberculosis, histoplasmosis, metastasis, malignant myeloma and osseous primitive tumour (**Figure 2**). Local current protocols for skeletal TB management require at least three strong criteria (history of TB in the inner circle, positive PPD test and a positive biopsy for mycobacteria) before anti-TB drugs are delivered to the patient. Therefore, an open kyphoplasty (for biopsy, pain relief and instability correction) was warranted but in our case, economic strain on patient's finances compounded with inadequate hospital equipment and the lack of a reliable blood bank, meant that the procedure could not be performed. As a result, the patient condition deteriorated with a 3/5 paraparesis whilst waiting for necessary funding to undergo any procedure (percutaneous sampling or open biopsy and stabilisation) which could have led to an early definite diagnosis. Urgent vertebroplasty was indicated instead, given its reduced cost and accessibility in the region. The immediate postoperative course was uneventful and the patient was discharged a few days later pending further results from the examination of spinal lesions. But a pathological examination of the biopsy of spinal lesions was not conclusive. We could not unfortunately ascertain from the laboratory report, why in an endemic

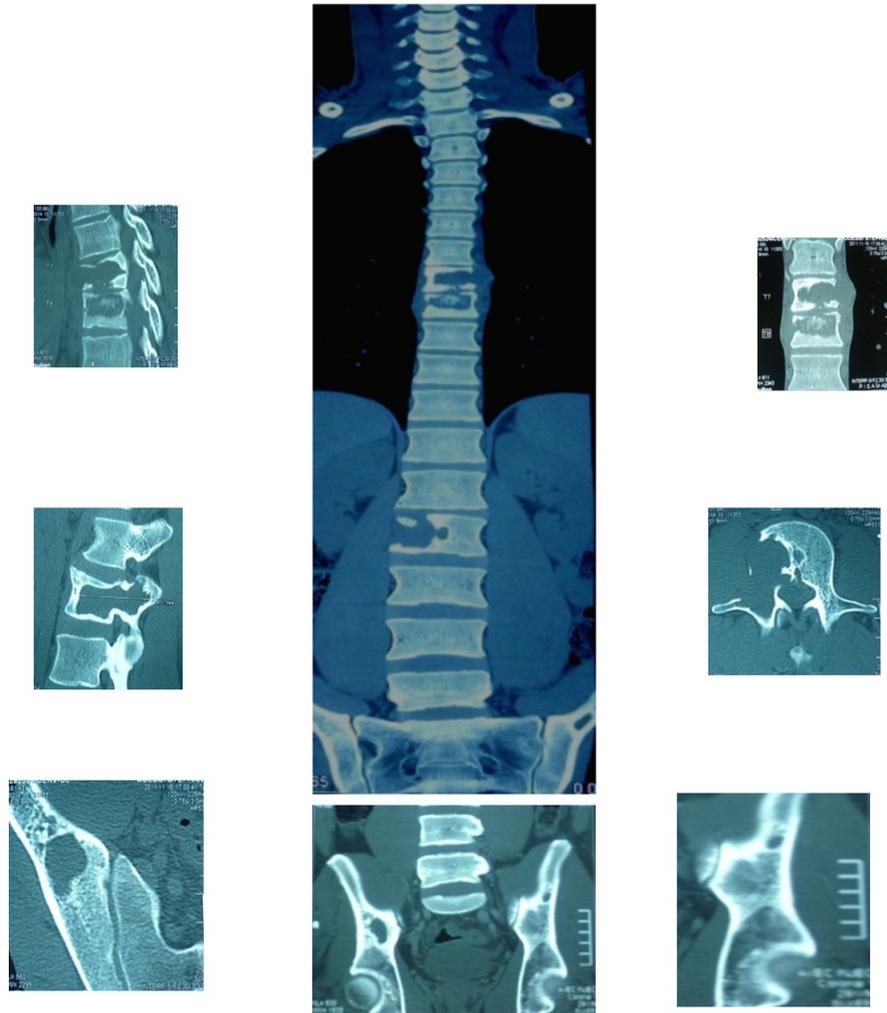


Figure 1. Skeletal CT Scan showing osteolytic lesion caused by mycobacterium tuberculosis.

area of TB, the cultures and stains of this initial specimen were negative. A month later the patient developed an acute spinal cord compression syndrome. Neurologic examination demonstrated a 0/5 flaccid paraplegia. Professional counselling was provided and the patient expectations about the likelihood of recovery, if any, were addressed. Emergency decompression surgery was warranted to stop spinal cord suffering and carry out direct biopsy of spinal lesions. The surgery was performed on January 5th 2013 and demonstrated a purulent epidural abscess and osteolysis. Biopsy of spinal lesions was undertaken. The pathological examination was in favor of tuberculosis (**Figure 3**). Despite surgical stabilization and cementoplast, anti-TB therapy and kinesitherapy, the patient was still significantly limited a few months later with a 0/5 flaccid paraplegia. TB infection was cleared at the end of the two-phase regimen. The patient sought legal advice and sued the hospital for negligence because to his legal team, it is the hospital legal responsibility to acquire adequate equipment to avoid delayed diagnosis and treatments.

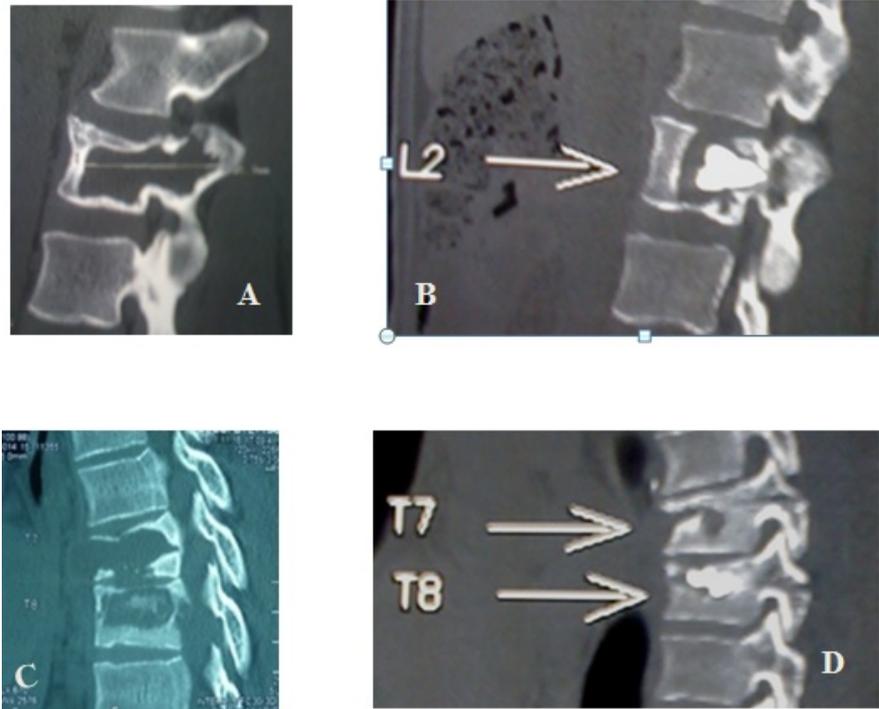


Figure 2. Post vertebroplasty CT Scan control. There is not enough cement in te cavities.

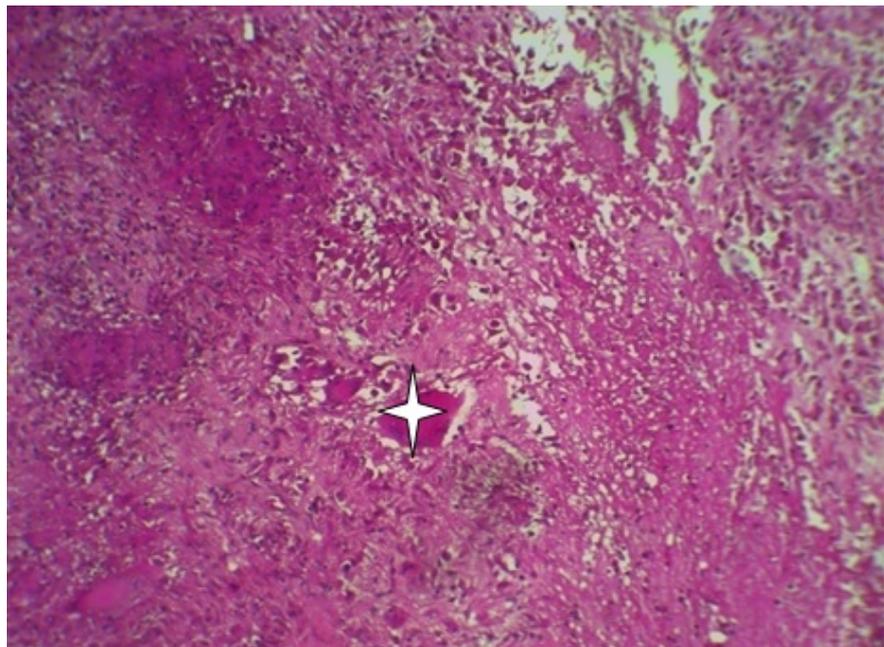


Figure 3. (HEX100) Histologic examination of resected infectious tissue (☆) revealing granulomatous inflammation with caseous necrosis and typical multinucleated giant cells.

3. Discussion

Several cases of extensive spinal tuberculosis have been reported [2] [4]-[13]. In most series, cervical, thoracic and lumbar spines have been equally affected. There are three reasons why this present case is relevant.

The first reason is the place of CT scan in the diagnosis of multifocal skeletal tuberculosis. A few cases reported in the literature have hinged on the fact that multifocal skeletal tuberculosis diagnosis remains difficult. The clinical picture is that of insidious onset with no relevant medical history or physical signs. In light of the present case, osteoarticular tuberculosis must be considered in patients with insidious musculoskeletal symptomatology. Our detailed Medline database search revealed that multifocal osteoarticular tuberculosis, unlike other forms of extra-pulmonary tuberculosis, is not associated with HIV infection. Differential diagnosis are tumors, metastasis, malignant lymphoma or multiple myeloma, other infections such as bone localization of histoplasmosis, vertebral histoplasmosis mimicking tuberculosis spondylodiscitis in the context of rheumatoid arthritis [6] [14] [15] [16] [17] [18]. Histoplasmosis is very difficult to be differentiated clinically, radiologically and microbiologically from tuberculosis. Other spondylitis or spondylodiscitis especially those caused by brucellosis are similar to the tuberculosis. Clinically, the evolution of the disease is insidious and imaging studies show collapsed vertebral body in approximately 5% of all cases of skeletal Tuberculosis [19] [20] [21]. The diagnosis of multifocal skeletal tuberculosis is frequently delayed due to its rarity and non specific symptoms [9] [18]. Tuberculous spondylitis must be differentiated from those caused by a non-specific germ [22] [23]. Difficulties in diagnosis often lead to delayed treatment with devastating consequences for patients [12].

The second reason is a potential role that vertebroplasty could have played in spreading spinal lesions. The extant medical literature is crowded with seminal works claiming to have observed a direct link or indeed a close relationship between vertebroplasty and the spreading of TB lesions involving the spine [22]-[28]. Our patient underwent cementoplasty following an acute spinal cord compression syndrome. After a two-phase TB-therapy the TB infection was cleared and the hypothesis that vertebroplasty could have spread spinal TB lesions became indefensible. Kang *et al.* concluded that, given the controversies surrounding the relationship between vertebroplasty and spinal TB, misdiagnosis or complications should be discussed instead [29].

The third reason is the treatment of spinal tuberculosis [3] [12] [13]. Surgical treatment of spinal tuberculosis is controversial, because of a good understanding of TB drug resistance alongside newer modalities of spinal instrumentation. Indications for surgery need to be redefined in this context. Typical initial treatment includes a 9-month, two-phase combination therapy with four drugs (Isoniazid, Rifampin, Pyrazinamid, Ethambutol or Streptomycin) because of the above reasons. Partial synovectomy and other surgical procedures should be restricted to joints with severe cartilage destruction, large abscesses, joint deformity, multiple drug resistance, or atypical mycobacteria. Our patient benefitted from a vertebroplasty procedure. In any doubt, treatment should be tailored based on physician's own experience and individual patient's needs so to maximize the chances of recovery. It is the author's view that more cement might be needed in vertebroplasty for spinal tuberculosis.

4. Conclusion

Multifocal skeletal tuberculosis must be considered in patients with insidious musculoskeletal symptomatology. Tuberculosis should be the first differential diagnosis of multiple destructive bone lesions especially in patients from regions where tuberculosis is endemic. Our detailed medline database search revealed that multifocal osteoarticular tuberculosis, unlike other forms of extra-pulmonary tuberculosis, was not associated with HIV infection. Several cases of spinal tuberculosis thought to have been spread by vertebroplasty have been reported in the extant medical literature. But the scientific evidence to support such relationship is very controversial. Further research will have to be carried out to establish whether or not previous observations are misdiagnosis or just dreadful complications. Patient selection for kyphoplasty should be robust when there is a history of focal or systemic TB infection. The clinical picture of spinal TB is often nonspecific, and clinicians should be aware of this entity. Actively investigating TB with microbiological and histologic examination is paramount so to avoid any delay in diagnosis and treatment. It is the author's view that tuberculous spondylodiscitis in adults can be well managed conservatively in the vast majority of cases, and indications for surgery are few and should be specific.

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