Atypical Forms of Spinal Tuberculosis: Case Report and Review of the Literature

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OBJECTIVE
The object of this report is to highlight some of the less known atypical features of spinal tuberculosis (TB) in the hope of facilitating early diagnosis. Pure neural arch and sacral TB is rare and the co-existence of these two as widely separated skip lesions in the same patient is even rarer.

CLINICAL PRESENTATION
An unusual case of tuberculous process affecting the sacrum as well as the neural arches of upper cervical vertebrae is presented. Neither the clinical features nor the imaging techniques, including radiography, bone scintigraphy, computed tomography, and magnetic resonance imaging, were helpful in establishing the diagnosis. The destructive lesion of the sacrum with a rectally palpable presacral mass was thought to be a chordoma or chondrosarcoma until the patient developed upper cervical cord compression with an extradural myelographic block. Development of this second destructive lesion involving the posterior spinal elements (the neural arch) led to a diagnosis of malignant spinal metastasis. The true diagnosis was only revealed by the histology of the solid tumor-like extradural mass in the upper cervical region and demonstration of acid-fast bacilli (AFB) in the lesion. Anti-TB chemotherapy resulted in complete resolution of sacral and cervical lesions as well as the neurologic deficits.

CONCLUSION
Differential diagnosis of the obscure spinal lesion should include tuberculosis, specifically the atypical forms; especially because complete cure is possible with early treatment and neurologic morbidity is high in neglected cases. © 1999 by Elsevier Science Inc.

KEY WORDS
Spinal tuberculosis, spinal tumors, atypical spondylitis, sacral tuberculosis, chordoma, neural arch tuberculosis, skip lesions, sacral tumors.

Ever since Percival Pott [15] gave the first full description, the typical textbook description of spinal TB has remained unchanged [6,7]. Classically, there is destruction of the anterior parts of the adjacent vertebral bodies and intervertebral discs leading to the kyphotic deformity [6,7,14,19]. Diagnosis of classical TB of the spine is readily made because of the typical radiographic findings [6,7,19], although its differentiation from other infections of the spine [5,6,17], especially brucellar and aspergillar spondylitis may still pose problems [6,10,16]. Atypical forms of spinal TB are uncommonly reported and because of insufficient emphasis and description in the medical literature, still continue to be a source of diagnostic delays and errors [1,11-13]. The delay in the diagnosis may account for some of the continuing morbidity of an otherwise curable disease. The atypical features of spinal TB [11-13,19]; namely, (1) involvement of the posterior elements (neural arch) of the spinal column with complete sparing of the anterior elements (vertebral bodies and discs), (2) skip lesions separated far enough apart to involve the two extremities of the spine (sacrum and upper cervical spine), (3) extradural spinal cord compression without radiographic evidence of bony involvement and, (4) destructive lesion of the sacrum with palpable pelvic mass; are all exemplified in a single case to be presented here. It is hoped that increased awareness of these atypical features and inclusion of these atypical forms of spinal TB in the differential...
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**Case Report**

A 30-year-old man was initially evaluated for a 6-month history of pain in the low back and sacrum. While being investigated, the patient developed paraesthesias in perineum and both legs along with intermittent urinary incontinence and some bowel difficulties.

Neurologic examination on admission revealed diminished sensation in the saddle area, patchy hypoesthesia in the back of legs and soles of feet, and bilaterally absent ankle jerks. Rectal examination revealed a firm palpable mass that replaced the front of the sacrum. Plain radiographs of the lumbosacral spine were unremarkable. Computed tomography (CT) scan of the sacrum showed an area of bone destruction and a large presacral soft tissue mass with extension of the sacral tumor into the spinal canal (Figure 1). CT myelogram of the lumbosacral spine showed a complete block below S1 caused by an extradural mass filling the sacral canal, as well as extension of the tumor into the pelvic cavity (Figure 2). Technetium-99 and Gallium-67 bone scanning was undertaken but was found to be unremarkable and nondiagnostic. Magnetic resonance imaging (MRI) of the lumbosacral spine (Figure 3A, B) showed abnormal signal intensity of the S1–S3 segments with a modest degree of gadolinium enhancement. The ventral and dorsal cortical outline of these sacral segments was eroded and interrupted. Rudimentary discs between S1/S2 and S2/S3 were spared (Figure 3). The presacral soft tissue mass with high signal intensity on T2-weighted images showed some septations and contiguity with the destructive sacral lesion (Figure 3). An enhancing intraspinal component that compressed the dura was consistent with an extradural tumor in the sacral canal (Figure 3). Axial images with gadolinium showed erosive changes and bony destruction of the front of the sacrum. CT-guided needle biopsy was inconclusive and transrectal biopsy of the presacral mass also failed to establish a diagnosis. Based on the CT scan and MRI findings of sacral tumor eroding the bone and extending into the pelvic cavity and spinal canal and in accordance with the radiologist's report, a provisional diagnosis of chordoma or chordosarcoma was made. While the therapeutic options of surgical resection and irradiation were being discussed, the patient developed upper cervical pain and spastic tetraparesis. Plain X-rays of the cervical spine were normal. Cervical myelogram revealed a complete block caused by an extradural mass that extended from C2 to C4 on the left side (Figure 4). CT scan following myelo-
MRI of the lumbosacral spine (A, B) showing abnormal signal intensity of S1, S2 and S3 segments, the presacral and intraspinal soft tissue mass (M), and erosion of the sacrum. Note the sparing of rudimentary discs between S1/S2 and S2/S3 in A and high signal intensity of the mass (M) in B.

Discussion

The global burden of TB is greater today than ever before [4,9]. There is a huge increase in tuberculous infections of the spine in the underdeveloped countries as well as in the developed countries because of the epidemic of AIDS, the aging population, and other conditions rendering patients immunocompromised [4,6,9].

Despite the existence of good means of diagnosis and anti-TB drugs, morbidity from spinal TB continues to be high, with a 23% incidence of paraplegia in some reports [14]. Medical awareness of Pott's disease has decreased more than the actual incidence of the disease itself [19]. An entire generation of physicians has been led to believe that
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The gross appearance of the upper cervical lesion, as seen at the time of surgery, was indistinguishable from a solid spinal extradural tumor. Atypical tissue reaction to *Mycobacterium tuberculosis* resulted in a firm, solid, tumor-like mass with no evidence of abscess formation. Similarly, transrectal surgical exploration of the sacral lesion failed to reveal any abscess or pus formation.
SACRAL LESION
Sacral involvement in spinal TB is extremely rare [7,14,19]. Thus, none of the 69 cases of spinal TB from Nigeria [14] and 123 patients with TB of the spine from Saudi Arabia [19] had a sacral lesion. Because of this rarity of sacral TB, it was not suspected, and the sacral lesion in our patient was thought to be a chordoma or a chondrosarcoma. The clinical finding of a large, soft tissue presacral mass on rectal examination and the radiologic appearance of bone destruction on CT scan (Figure 1) were thought to be characteristic of chordoma [18]. Interestingly, the vertebral disc is spared in sacral chordomas [3], as was seen in our patient (Figure 3). The MRI appearance of high-signal intensity on T2-weighted images and septa within the tumor reported to be characteristic of chordoma [2] and seen in our case (Figure 3), also supported this diagnosis.

NEURAL ARCH LESION OF UPPER CERVICAL SPINE
Extension of the tuberculous process from the vertebral bodies to the adjoining pedicles is not uncommon [14], but TB of the neural arch only, as seen in our case, is rare [1,11-14,16]. Apart from a few reports [1-13], there has been little reference to the tuberculous process localized to various elements of the vertebral neural arch alone with complete sparing of the vertebral bodies and discs. Thus, none of the patients in large series of spinal tuberculosis had only a neural arch lesion [7,14].

SKIP LESIONS
Skip lesions, i.e., two or more regions of spinal TB separated by uninvolved vertebrae, are rare [14]. This feature of the disease has been observed in Asians [19], Africans [14], and non-Caucasian immigrants in Britain [8]. Most of the large series of spinal TB include few patients with skip lesions [7,14,16]. In one study [14] only 2 out of 69 (3.0%) patients with spinal TB showed skip lesions but the two areas of spinal involvement in these two patients were separated by only a few uninvolved vertebrae. Skip lesions at the two extremities of the spine, as seen in our patient, have not been described before. Similarly, the co-existence of a widely separated skip lesion along with neural arch TB has also not been reported before [12,13].

In these atypical forms, especially neural arch TB, because of the absence of involvement of anterior vertebral elements, there is no vertebral collapse nor the classical kyphotic deformity. For this reason, nerve root compression and intercostal pain, a common early warning sign in classical TB may be absent and neurologic deficit may be the presenting feature in the majority of cases [11-13]. More extensive encroachment of the spinal canal and early spinal cord compression in the absence of radiographic evidence of bony involvement supports the diagnosis of atypical TB. Early decompression, however, leads to complete recovery of the neurologic deficit because as the anterior spinal artery, so commonly compromised in classical TB, is not involved [13].

Although some radiological features to differentiate the tuberculous spondylitis from other forms of infective spondylitis have been described [6,10,16], the differential diagnosis of atypical forms of spinal TB from primary or secondary spinal tumors remains difficult [12,13,19]. Diagnostic difficulties of the atypical forms of spinal TB are illustrated by the present case.

Thus, the clinical and radiological diagnosis of our patient's destructive sacral lesion, despite using a host of imaging modalities including radiography, scintigraphy, CT-myelography and MRI, was chordoma or chondrosarcoma. CT-guided needle aspiration biopsy and even transrectal biopsy of the presacral mass proved inconclusive. The diagnosis was changed to "malignant metastasis" after the appearance of the second lesion that destroyed the posterior vertebral elements of the upper cervical spine. Even at operation the lesion was solid with no sign of abscess formation and, even to the experienced eyes, looked like a tumor. The true diagnosis was established only by histopathology and demonstration of the tubercle bacilli.

CONCLUSION
Radiological features of classical TB of the spine are well known and are so typical that diagnosis is not in doubt in majority of cases [6,7,14,16,19]; but atypical forms of spinal TB are often misdiagnosed as primary or metastatic tumors of the spine [12,13,19]. Awareness and prompt management of these atypical forms will help in reducing the continuing morbidity of this disease due to serious secondary effects on the spinal cord.

REFERENCES
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The authors have presented an interesting case study of atypical forms of spinal tuberculosis affecting different levels, and have emphasised the difficulties in arriving at the correct diagnosis. There is need for greater awareness throughout the world of the possibility of tuberculosis being the cause of bizarre symptomatology.

What applied to syphilis 50 years ago is applicable to tuberculosis now. Boyd, in his Textbook of Pathology, wrote "There is no organ that [tuberculosis] cannot affect, there is no symptom that it cannot produce, and there is no disease that it cannot simulate." It is an unwritten law in all the tropical countries that in every situation with a difficult diagnosis, tuberculosis should be on top of the list in the differential. Unfortunately, in Western diagnostics, tuberculosis rarely enters the picture, and much time and effort are lost before reaching a diagnosis. With tuberculosis becoming frequent even in prosperous countries for various reasons, Western teaching needs to emphasise the inclusion of tuberculosis in diagnostic considerations.

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