An Illustrative Case
Isolated Posterior Spinal Arch Tuberculosis

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ABSTRACT
Affection of posterior spinal elements in isolation rarely occurs in tuberculosis. Therefore, presentation of a very demonstrative example in a 39-year-old Caucasian female seems worthy. In this very rare type of spinal tuberculosis, a part to almost whole of the neural arch had disappeared at the time of diagnosis. Usually, an extradural metastatic tumor is suspected prior to surgery. However, with demonstration of the caseous material during the surgery, diagnosis of tuberculosis is made and this can be only confirmed in the department of pathology. Excellent outcome after surgery is almost always seen. This is in contrast to the poor outcome of an extradural metastatic mass that is foreseen before surgery.

KEY WORDS: Atypical, Classification, Posterior spinal elements, Spinal tuberculosis

INTRODUCTION
Tuberculosis infection is seen with increasing frequency both in developed as well as undeveloped countries. Although this infection is usually confined to the respiratory system, spinal involvement is not uncommon and occurs in approximately 1/5% of all infected cases (8).

The vertebral body is the most frequent site of involvement in spinal tuberculosis. Concomitant affection of vertebral body and the posterior spinal arch is called global lesion which occurs infrequently (1,3,15). However, posterior element involvement in tuberculosis is rarely seen in isolation and is usually estimated to occur in about 0/2% to 2% of all spinal cases (1,3-5,7,8,12,14,16,17). Although in an exceptional report it was regarded to occur in 8% of all Koch’s spine cases (2).

This atypical form of tuberculosis ultimately results in cord or cauda equina compression (4). The unusual imaging features of this condition usually result in delay in diagnosis and management (2). However, dramatic functional recovery is mostly seen after surgery despite the severity of preoperative neurological impairment.

Herein, a 39-year-old female with this atypical and rare form of spinal tuberculosis will be presented.

CASE REPORT
A 39-year-old white female was referred to our department for evaluation of progressive weakness of her lower extremities. She had a history of back pain in the last three months which had increased in intensity during the last few weeks. The mid-thoracic region was painful on palpation and she has mild spastic paraparesis with upgoing plantar reflex. Dorsal spine plain radiographs revealed destruction of the posterior element at T7 vertebra. T1-weighted MRI in sagittal images revealed a hypointense mass lesion at T7 which had almost destructed the posterior elements (Figure 1A) T2-weighted sagittal MR images showed a posteriorly located hyper intense mass at T7. Axial images demonstrated that the hyperintense mass had replaced the majority of the posterior elements particularly on the left side and only a part of the right lamina was preserved (Figure 1B,C) On laboratory examination, the sedimentation rate was 50, and CRP was +++ positive.

Subsequently, CT scan was done and this showed
massive destruction and disappearance of the posterior neural arch (Figure 2A,B).

With diagnosis of primary or an extradural metastatic spinal tumor, surgery was decided. At operation after routine mid-line incision and dissection, a caseating soft tissue mass was found mostly compatible with tuberculosis. Dura was covered with a granulation tissue and it was freed till normal pulsation appeared. The histopathology report revealed typical tubercular granulomatous inflammation. The patient tolerated the procedure very well and her neurology became normal within a few days. She was discharged a week later under four–drug antitubercular therapy including Rifampin, Isoniazid, Pyrazinamide and Ethambutol. Now six months after the surgery she is doing very well and has started her previous activities.

Figure 1: A) T1-weighted sagittal MR image showing posteriorly located isointense mass replacing the posterior elements. B) T2-weighted sagittal image demonstrates that the mass is hyperintense. C) T2-weighted axial image shows that most of the posterior element is replaced by a hyperintense mass.

Figure 2: A) Axial CT showing massive destruction of the posterior element with only a small part of one facet remaining. B) An oval tissue has replaced the posterior vertebral arch.
DISCUSSION

The spine is a common site for extrapulmonary involvement. In spinal T.B, a vertebral column is mostly affected in three distinct patterns, paradiscal, central and anterior in decreasing frequency (1,8). The classical picture of the spinal T.B is paradiscal pattern in which two adjacent vertebral bodies are affected with or without paravertebral and epidural collections (1,8). This pattern is the most common type of vertebral tuberculosis and is readily diagnosed particularly in endemic areas. In the central type the vertebral body is affected without spreading to adjacent vertebrae and might mimic the picture of a destructive tumor shown as vertebra plana. In the anterior type, T.B spreads along the anterior longitudinal ligament.

An extremely rare and atypical feature of spinal T.B is isolated posterior elements affection which due to its rarity is not brought into the classifications (1-5,9,14,17). The exact incidence of isolated posterior spinal arch tuberculosis is not known. The literature contains a few case reports or small series of two to three cases and exceptionally nine (1-5,9,12,14,17). Nonetheless the incidence is estimated to be 0.04%, 0.2%, 0.45%, 2% and 8% according to Tuli, Adendorff, Dobson, Kumar and Acharya retrospectively (2, 3,7,9,16). The current case was the only isolated posterior vertebral arch tuberculosis encountered among 91 surgically treated patients with Koch’s spine in our hospital in the last 15 years. Further, since a question regarding a similar case from the members of the corresponding societies by a text message failed to reveal any similar case, it might probably be the first example in our country (Kumar in 1985 has stated that they have 6 patients from south east of Iran in India but whether these cases has had isolated or circumferential T.B has been not verified). The current case was the only isolated posterior vertebral arch tuberculosis encountered among 91 surgically treated patients with Koch’s spine in our hospital in the last 15 years. Further, since a question regarding a similar case from the members of the corresponding societies by a text message failed to reveal any similar case, it might probably be the first example in our country (Kumar in 1985 has stated that they have 6 patients from south east of Iran in India but whether these cases has had isolated or circumferential T.B has been not verified). In contrary, it is so common in some countries like India that all single level vertebral arch osteolytic lesions with or without cord and cauda equina compression are primarily supposed to be tuberculosis unless proven to be another pathology (2,9).

It should be added that in recent decades, atypical forms of tuberculosis including isolated posterior vertebral arch affection are reported in increasing frequency in HIV immunocompromised subjects (11,13).

Tuberculous infection in isolation is more common in non-white subjects. It mostly affects the thoracolumbar region and it rarely involves the posterior arch of the cervical spine (2,4).

Clinically, it usually mimics a neoplasm mostly resembling an extradural metastatic tumor with compressive effect on the cord or quad equina (2). The course of the disease is usually insidious with chronic onset but rarely it might present with acute neurological deficit.

The posterior isolated lesions are very difficult to diagnose by clinical and radiological methods in non-endemic regions.

Plain radiography and CT play an important role in defining the typical forms of spinal tuberculosis.8,10,14 Various degree of vertebral destruction, associated local as well as general kyphosis, abnormal calcification and concomitant affection of the posterior elements are the main features that can be detected by both of these tools. In isolated Koch’s spine, once the patient is advised to undergo imaging, the disease is usually in the late stages. At this stage, massive destruction of the posterior arch which is due to resorption of the posterior bony element is the cardinal picture (8,10,12,14).

It should be noted that MRI with regard to exquisite detail, multiplanar capabilities, superior soft tissue display, is the most useful method and diagnostic tool of choice in all types of spinal tuberculosis, particularly if the advantages of the contrasted MRI in detection of paravertebral abscess and epidural collection is added (6).

In isolated tuberculosis of the posterior elements, various parts of the vertebral arch are vanished and usually replaced by the granulomatous mass. Therefore hypointense or isointense soft tissue consistency is seen instead of osseous tissue in T1-weighted images. However, in T2–weighted images, it is presented as a hyperintense mass (1,8). However, the lesion is not characteristic of infection but might mimic a neoplasm. This is more confusing if we consider the clinical feature which also resembles the extradural malignancies (2).

Due to the nonspecific clinical and radiological pictures, diagnosis of isolated posterior arch tuberculosis is mostly made with delay, particularly in non-endemic areas. Removal of the remnants of posterior bony elements, epidural granulation tissue and liquefied caseous material with reappearance of dural pulsation mean appropriate decompression.
Pedicle instrumentation of the spine is only justified when the surgeon is suspicious about instability. This might be required particularly in mobile thoracolumbar and lumbar region, while it might be unnecessary in the lesions affecting the thoracic spine.

The ultimate diagnosis of posterior arch T.B. is only based on histological examination (8).

Anti-tuberculous therapy with combination of Isoniazid, Pyrazinamide, Ethambutol and Rifampin is proposed to be started soon after establishment of diagnosis and should be continued for at least nine months to a year (1,8).

With regard to the outcome, even in the patient with severe neurological deficit, decompressive surgery results in dramatic recovery (2,8).

In conclusion, isolated tuberculosis of the neural arch should be considered in the differential diagnosis with massive destruction of the posterior spinal arch, once only a ghost of the posterior elements remains. Decompressive surgery followed with antituberculous therapy is the accepted mode of management.

REFERENCES


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