

Cervical Spinal Epidural Abscess Due to *Mycobacterium tuberculosis* without Osseous Involvement

A Case Report

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Abstract

Case: We present a rare case of cervical spinal epidural abscess due to *Mycobacterium tuberculosis* without osseous involvement that was treated with decompression and arthrodesis in a 2-stage procedure.

Conclusion: Spinal epidural abscess due to *Mycobacterium tuberculosis* is the least common of the various forms of spinal tuberculosis. This abscess represents a severe infection of the epidural space that can compromise neural elements and can require urgent surgical intervention to avoid permanent neurological deficits. Early diagnosis and early decompression remain the 2 most important predictors of a successful neurological outcome.

Tuberculosis has been around for many centuries, and signs of the disease stretch as far back as ancient Egypt. The most objective evidence dates back to 1000 A.D.¹. In the 21st century, this disease remains a major public health problem in developing countries and represents a major cause of death due to infectious disease worldwide². The human immunodeficiency virus (HIV) has triggered a resurgence of tuberculosis in parts of the world where the disease was sporadic or unknown in the recent past³. In 2013, an estimated 9.0 million people developed tuberculosis and 1.5 million died from the disease, 360,000 of whom were HIV-positive⁴. In Portugal, the average incidence was 21.1 per 100,000 inhabitants in 2013. Oporto had the highest rate in the country, with 52.9 per 100,000 inhabitants being diagnosed with tuberculosis in 2013⁵. The worldwide resurgence of tuberculosis has made this disease a topic of interest for orthopaedic surgeons in developing as well as developed nations.

Spinal epidural abscess due to *Mycobacterium tuberculosis* is the least common of the various forms of spinal tuberculosis⁶. Epidural abscess represents a severe infection of the epidural space that can compromise neural elements and usually requires urgent surgical intervention to avoid permanent neurological deficits. Early diagnosis and early decompression remain the 2 most important predictors of a successful neurological outcome⁷. Delayed etiological diagnosis and treat-

ment have been associated with substantial morbidity and mortality rates^{6,8,9}.

We describe a rare case of cervical spinal epidural abscess due to *M. tuberculosis* without osseous involvement. The patient was informed that data concerning the case would be submitted for publication, and he agreed.

Case Report

A 57-year-old male construction worker was referred to our orthopaedic service with signs of cervical myelopathy that had been progressing for the previous 5 months without an established diagnosis. At the time of admission, neurological examination revealed spastic paraparesis with hyperreflexia and a Babinski sign without sensory alterations. Functional status was classified as Nurick grade II (gait impairment with no compromised work capacity)¹⁰.

Hematological investigation revealed a hemoglobin level of 13.9 g/dL, a hematocrit of 38.6%, an erythrocyte sedimentation rate of 16 mm/1st hr, a white blood-cell count of $9.4 \times 10^3/\mu\text{L}$, a platelet count of $277/\text{mm}^3$, and a C-reactive protein level of $<7.5 \text{ mg/L}$. The enzyme-linked immunosorbent assay (ELISA) for HIV-1 and HIV-2 was negative.

Radiographs of the cervical spine revealed signs of degeneration (osteophytosis and reduced disc height), more exuberant at the C4-C5 and C5-C6 levels, and grade-I (of IV) anterolisthesis¹¹ at the C3-C4 level (Figs. 1-A and 1-B).

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Fig. 1-A



Fig. 1-B

Figs. 1-A and 1-B Lateral and anteroposterior radiographs of the cervical spine showing signs of degeneration (osteophytosis and reduced disc height), more exuberant at C4-C5 and C5-C6, and grade-I (of IV) anterolisthesis at C3-C4.

Computed tomographic (CT) scans showed C3-C4 stenosis due to the presence of an epidural intracanal posterior mass (Figs. 2-A and 2-B).

Magnetic resonance imaging (MRI) scans showed cervical compression at the C3-C4 and C4-C5 levels due to disc herniation and a posterior mass occupying the epidural space at the C3 and C4 levels. The vertebral tissue and the adjacent soft tissue were normal (Figs. 3-A and 3-B).

The decision was made to perform anterior and posterior cervical decompression with associated anterior arthrodesis in a 2-stage procedure. First, the patient underwent anterior decompression with C4 corpectomy and C3-C5 arthrodesis with a tantalum cage and plate fixation.

One week later, the patient underwent posterior decompression with partial laminectomy at C3 and C4 (Fig. 4). A collection of pus was found and drained. The purulent material was sent for culture and histopathological examination. Acid-fast bacilli were grown on culture of pus collected during surgery, and histopathological examination revealed necrotic tissue (Fig. 5). The culture was positive for *M. tuberculosis*. After the surgical procedure, immobilization was maintained with a cervical collar.

Nine days postoperatively, the patient developed a cough and low-grade evening fever. A radiograph of the chest revealed a right hilar infiltrate, suggestive of lung tuberculosis. The patient was managed with 4 antibiotics (isoniazid, rifampicin, pyrazinamide, and ethambutol) for 2 months and then with

isoniazid and rifampicin for 4 more months. Complete neurological recovery was achieved after 4 weeks, and the patient remained asymptomatic at 14 months.

Cervical MRI scans that were made 2 months postoperatively showed no sign of medullary compression (Figs. 6-A and 6-B).

Discussion

Tuberculosis can present with a variety of clinical and radiographic findings and has a known propensity for dissemination from its primary site, mimicking a number of disorders¹².

The spine is a common site of involvement for extrapulmonary tuberculosis, representing 50% of cases of osteoarticular tuberculosis⁷, and was first described in the European population by Sir Percivall Pott^{7,13}.

Any level of the spine can be affected, but lesions are more frequently found in the lower thoracic region, with the lumbar and cervical regions being less frequently affected⁹.

Spinal infection due to *M. tuberculosis* most commonly involves the anterior elements. The spondylodiscitis form is associated with disc and vertebral body destruction and pus collections in the prevertebral and paravertebral spaces. The pus can further pass through the intervertebral foramen and can compromise neurological structures^{14,15}.

Spinal epidural abscess is a rare disorder, accounting for 0.2 to 2 cases per 10,000 hospital admissions⁶. When the



Fig. 2-A



Fig. 2-B

Figs. 2-A and 2-B Axial and coronal CT scans showing C3-C4 stenosis due to an epidural intracanal posterior mass.



Fig. 3-A

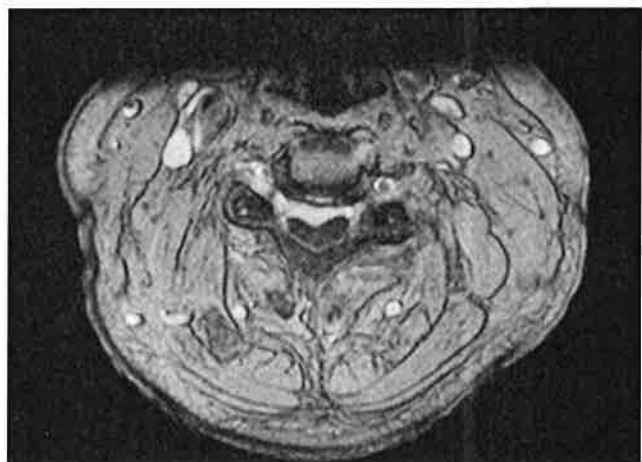


Fig. 3-B

Figs. 3-A and 3-B Axial and coronal T2-weighted cervical MRI scans showing cervical compression at C3 and C4 due to disc herniation and a posterior node occupying the epidural space at C3 and C4.



Fig. 4
Postoperative radiograph of the cervical spine made 3 weeks after C4 corpectomy, C3-C5 arthrodesis with a tantalum cage and plate fixation, and partial laminectomy at C3 and C4.

etiological agent is *M. tuberculosis*, the disorder is usually secondary to the involvement of the vertebral body or its appendages but rarely may develop by hematogenous spread from any primary focus in the body^{12,14,15}. An atypical presentation of this form may pose a diagnostic and therapeutic dilemma for treating clinicians¹⁶, resulting in a delay in diagnosis¹⁷, as in the case of our patient.

The majority of patients with spinal epidural abscess have one or more predisposing conditions such as a compromised immune system (due to diabetes mellitus, AIDS (acquired immune deficiency syndrome), chronic renal failure, alcoholism, cancer, etc.), recent spinal surgery, trauma, or soft-tissue infection. None of these conditions were found in our patient¹⁸.

Spinal epidural abscess must be differentiated from other pyogenic infections, malignant metastatic lesions, and disorders of ligamentous structures. Symptoms are often insidious and can include malaise, loss of appetite and weight, and night sweats. In the early stages of disease, some of these symptoms and signs may be absent. Rarely, neurological deficits may present as the first symptom, as in the case of our patient. Later, the involved region of the spine may become stiff and painful on movement, with a localized humpback. It may take 3 to 4 months for a spinal tuberculosis lesion to become visible on radiographs. MRI is sensitive for the early detection of inflammation¹⁹.

Spinal epidural abscess due to *M. tuberculosis* is amenable to both nonoperative and operative treatment, depending on the individual case. Directed antibiotics remain the mainstay of treatment for tubercular infection or abscess and should be started as soon as the diagnosis has been made¹⁷. The British Thoracic Society recommends a total of 6 months of antibiotic treatment (pyrazinamide, rifampicin, isoniazid, and ethambutol for 2 months, followed by rifampicin and isoniazid for another 4 months), irrespective of age²⁰. Ramachandran et al., in a retrospective study of 34 patients with spinal tuberculosis, suggested that a 9-month course of antituberculous chemotherapy is more effective than 6 months for preventing relapse²¹.

The indications for surgical intervention include neurological involvement, the failure of medical treatment to control the disease process, spinal instability, and the need to obtain diagnostic tissue if no clear diagnosis was obtained on the basis of previous studies or percutaneous biopsy¹⁶.

There are several options for the surgical treatment of cervical compression—including anterior, posterior, and combined approaches—depending on the compression site, instability, the presence of other spinal conditions, and the general medical condition. Anterior cervical corpectomy and discectomy with arthrodesis is a reliable anterior option, and laminoplasty or laminectomy with arthrodesis (in cases of previous instability or if instability results of the surgical procedure) are reliable posterior options. In our patient, we decided to perform a combined approach as a 2-stage procedure to allow for the effective decompression of both the anterior and posterior compression as well as for the treatment of disc herniation and the spinal epidural abscess. Cervical spine stabilization was obtained by means of the anterior arthrodesis²²⁻²⁵.

This case report illustrates the diagnosis and early treatment of spinal epidural abscess due to *M. tuberculosis*. A high index of suspicion based on a careful patient examination and the correct complementary tests is essential in order to obtain the correct diagnosis. It is important to keep in mind that

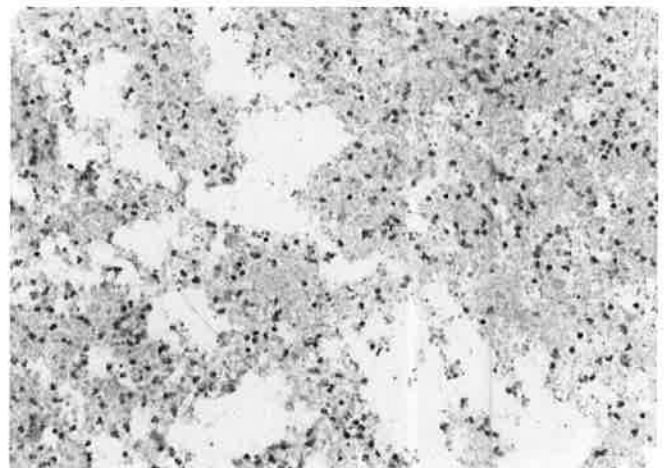


Fig. 5
Photomicrograph showing a necrotic and inflammatory reaction (hematoxylin and eosin, $\times 20$).



Fig. 6-A

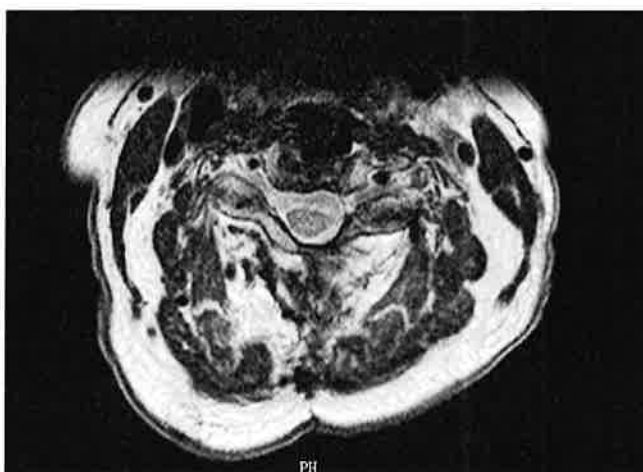


Fig. 6-B

Figs. 6-A and 6-B Axial and coronal T2-weighted cervical MRI scans, made 2 months postoperatively, showing no signs of medullary compression.

atypical presentations of common diseases are more common than typical presentations of uncommon diseases. ■

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