Tubercular Spinal Epidural Abscess of the Lumbosacral Region without Osseous Involvement: Comparison of Spinal MRI and Pathological Findings of the Resected Tissue

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Abstract

We herein present a case of tubercular spinal epidural abscess (SEA) without osseous involvement that mimicked an acute bacterial abscess. This case manifested quite unusual findings not only radiographically, but also clinically compared with previously reported cases of tubercular SEA.

Key words: spinal epidural abscess, tuberculosis, magnetic resonance imaging, osseous involvement

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Introduction

Spinal epidural abscess (SEA) is a rare infectious disorder that often has a delayed diagnosis and is associated with significant morbidity and mortality rates. Therefore, early diagnosis is crucial for a better treatment outcome. Approximate half of all SEA cases are hematogenously seeded from non-adjacent primary infectious sources or sepsis. Furthermore, 10-30% of SEA is directly extended from adjacent vertebral osteomyelitis and/or discitis. Although the most frequently identified pathogen is *Staphylococcus aureus* (60%), the identification of *Mycobacterium* is quite rare (less than 1%) (1). We herein present an extremely rare case of tubercular SEA involving the lumbosacral region without any other active infectious regions, even in the adjacent vertebral body and disc.

Case Report

A 77-year-old man visited our outpatient clinic in August 2014 with a 1-month history of severe pain in his right leg. On examination, he presented sensory disturbance and motor weakness of the right lower limb (L5-S1 nerve area). The patient's right Achilles reflex slightly decreased, however,

other deep tendon reflexes were normal. The right Straight Leg Raising (SLR) test was positive, however, we could not observe any pathological reflexes, such as Babinski, Oppenheim, or Chaddock reflexes. Additionally, the patient exhibited no symptom of meningeal irritation (headache, nuchal stiffness, and Kernig's sign). According to these clinical manifestations, the patient was suspected to have lumbar disc herniation and a CT scan was performed. CT images revealed an isodense mass lesion in the right epidural space, compressing and distorting the dural sac and Rt S1 nerve (Fig. 1). Further MRI images revealed a relatively lowintensity mass lesion on the T1-weighted image extended from the L5-S2 vertebral body level (Fig. 2C). The mass was partially heterogeneous on the T2-weighted and Short ΤI Inversion Recovery (STIR) images (Fig. 2A, B, D, and E).

He also had a temperature of 38° C, and his laboratory investigations showed WBC 7,500 cu.mm (normal range: 3,500-9,500); neutrophil 84.2% (normal range: 40-75); erythrocyte sedimentation rate (ESR) 65 mm/1 hr (normal range: 0-15); and C-reactive protein (CRP) 46.3 mg/L (normal range: 0-8). He had a previous history of tubercular pneumonia, however, a chest X-ray and CT scan could not identify active tuberculosis (TB) region. Furthermore, blood and sputum examinations did not indicate any bacterial in-

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Figure 1. Axial CT (A, B) imaging of the L5/S1 disc (A) and cranial side of sacral spine (B). These images show a mass lesion demonstrating isodensity (black arrowheads) in the right epidural space, compressing and distorting the dural sac and right S1 nerve root.



Figure 2. Axial (A, B) and sagittal (C, D, E) MR imaging of the lumbosacral spine. T1-weighted image (C) shows a relatively low-intensity mass lesion (white arrowheads) in the spinal canal, extending from the L5-S2 vertebral body. T2-weighted (A, B, D) and short TI inversion recovery (E) images reveal partially heterogeneous iso-intensity.

fection, including TB.

According to the patient's clinical course and laboratory data, we suspected acute bacterial SEA and performed evacuation under microendoscopic spinal surgery. Microendoscopic spinal surgery is a novel, less invasive surgical technique, which results in decreased pain and operative time and achieves a faster recovery after surgery (2, 3). Thus, this technique is the most suitable for weakened infec-



Figure 3. Histopathology. Macroscopic findings of a resected capsule of the epidural abscess. Light brown color shows the region for caseous necrosis (arrows) (A). Hematoxylin and Eosin staining shows granulomatous inflammation with Langhans giant cells surrounding the caseous necrosis (arrows) (B).

tious disease patients and/or patients of advanced age.

During the operation we observed a tubercular abscess with caseous necrosis, and the pathologically findings of the capsule confirmed it was a tubercular spinal epidural abscess (Fig. 3). Additionally, we endoscopically checked the L5/S1 disc space, however, no apparent infection was observed. Furthermore, a bacterial culture of the pus identified the presence of *Mycobacterium tuberculosis*. Immediately after the operation, the patient's leg pain was relieved, and anti-TB chemotherapy was started. Two weeks after the operation the patient was discharged from our hospital and was able to walk without any assistance.

Discussion

A spinal tubercular infection is a relatively rare disease in medically advanced countries. On the other hand, this pathological status is more common in developing countries. Even in advanced countries, tuberculosis is becoming a new threat due to its acquisition of multi-drug resistance and against immunocompromised individuals.

The typical infectious patterns of spinal TB are spondylodiscitis or spondylitis with disk involvement (4). The contiguous vertebrae are frequently involved. Although epidural involvement and/or epidural spread are also observed in more than 60% of all cases (5), tubercular SEA without osseous involvement is extremely rare. Only two cases have been previously reported. Arora et al. reported the case of an immunocompetent 35-year-old man who presented with subacute cauda equine syndrome. The patient had been diagnosed with pulmonary TB infection 15 days prior to developing neurological symptoms. Baallal et al. reported the case of an immunocompetent 58-year-old man who presented with paraplegia (6). In both cases, it extended into the wide vertebral levels (former: T5-S2, latter: C7-L2), however, both cases were successfully cured by combination therapy of surgery and anti-TB chemotherapy.

Although our case showed relative narrow segment of extension (L5-S2), it was also subsequently cured with the combination of surgery and anti-TB chemotherapy. Generally, the onset of spinal TB is chronic (7), however, the case reported by Arora et al. and our case showed a relative acute onset. Therefore, a subacute onset of symptoms (2-4 weeks) might be one of the clinical characteristics of tubercular SEA without osseous involvement. This onset is quite similar to that of other bacterial SEA, such as *Staphylococcus aureus*, thus this clinical course appears to be difficult to diagnose as tubercular SEA.

Similarly, it was difficult to diagnose tubercular SEA without osseous involvement based on the laboratory data. A normal or slightly increased WBC count may help to suspect this pathological status because other bacterial SEA generally show higher WBC counts (15,700 cu.mm on average) (8); the case by Arora et al. and our case did not show such an increased WBC count (former: 13,600, latter: 7,500).

From the MRI findings described from previously reported cases and our case, an isointensity signal on T2weighted and/or STIR images is one of the discriminating features of tubercular SEA from other bacterial SEA. Usually, the central part of other bacterial SEA exhibits a waterequivalent signal intensity on T2-weighted and/or STIR images (homogenous high-intensity signal) (9-11). This difference mainly occurred in the thick granular membrane of tubercular SEA. In our case, a thick granular membrane was also confirmed by the pathological examination. On the other hand, Jung et al. reported that thin and smooth enhancement of the abscess wall and a well-defined, paraspinal abnormal signal were frequently observed in tuberculous spondylitis (12). The thick granular membrane observed during tubercular SEA confirmed in our report might protect against the spread of infection into the vertebrae and/or disc space, and tubercular SEA without osseous involvement may subsequently arise from the primary epidural infection. If we find a heterogeneous isointensity signal on the T2weighted and/or STIR images, then we should consider tubercular SEA without osseous involvement as the differential diagnosis.

Due to the recent aging society, cases of older, immunocompromised patients with a previous history pulmonary TB are rapidly increasing. Unfortunately, the clinical, laboratorial, and imaging features of tubercular SEA without osseous involvement is not completely distinguishable from other bacterial SEA. However, the heterogeneous isointensity signal on the T2-weighted and/or STIR images may help clinicians consider the possibility of tubercular SEA.

The authors state that they have no Conflict of Interest (COI).

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