CASE REPORT

Aspergillus Spondylodiscitis in an Immunocompetent Patient following Spinal Anesthesia

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Introduction

The term spondylodiscitis refers to primary infection of the disc space followed by involvement of the end plates of the adjacent vertebra. It is mainly caused by bacterial pathogens, fungal causes are extremely rare¹. The reported incidence of fungal spondylodiscitis in many large series is only 0.5% to 1.6%². *Aspergillus* species, which are normal inhabitants of the respiratory tract, are commonly responsible for fungal spondylodiscitis. These fungi invade the spine when the immune status of the host is compromised such as in organ transplant patients, patients on chronic steroid treatment or patients receiving chemotherapy^{3,4}. There are only a handful of published case reports reporting aspergillus spondylodiscitis in immune competent persons^{5,6}. Tubercular and pyogenic spondylodiscitis are so common that fungal causes are often ignored^{1,2}. In addition, nonspecific clinical presentations often make the diagnosis challenging and delays in diagnosis cause more spinal destruction with devastating consequences. We here report a case of aspergillus spondylodiscitis in an immune competent woman and describe the diagnostic dilemma and management of the patient along with a brief review of published reports.

Case Report

A 33-year-old woman presented with dull, aching, low back pain of 3 weeks duration. The pain had been insidious in onset, was constantly present and progressively increasing. It had started 2 weeks after she had undergone caesarean section under spinal anesthesia. Examination revealed tenderness over the L₂₋₄ spine region but there were no neurological deficits. Radiographs showed no pathology in the lumbar spine (Fig. 1). MRI revealed hypointense T₁WI and hyperintense

T₂WI in the L₂ and L₃ vertebral bodies near the disc space (Fig. 2). This radiological feature is consistent with infective spondylodiscitis of the L_{2,3} region. Blood tests showed an increased erythrocyte sedimentation rate (ESR, 48 mm/1 h) and C-reactive protein (CRP) concentration of 24 mg/dL. A CT-guided biopsy was taken from the site of the lesion, but no organisms were isolated. Polymerase chain reaction (PCR) for tuberculosis was also negative. Broad spectrum antibiotics and an analgesic were prescribed for 3 weeks, but her symptoms persisted. On re-evaluation with X-rays and MRI, the lesion was found to have progressed in severity (Figs 3,4). Closed percutaneous transpedicular biopsy was performed but again the culture report, histology and tubercular PCR were inconclusive. In the meantime, the patient had an episode of urinary tract infection, for which she received a five-day course of nitrofurantoin based on a culture sensitivities report, and vaginal candidiasis, which responded to local application of clotrimazole.

Three weeks after the second biopsy, the patient presented with severe intolerable back pain. X-ray and MRI showed increased destruction of L₂ and L₃ vertebra and the intervening disc space (Figs 5,6). Hematological investigation showed increased ESR (110 mm/1 h) and CRP (96 mg/dL). The patient underwent debridement, L₂₋₃ discectomy and posterolateral fusion with pedicle screw posterior stabilization. Tissue sent for culture and sensitivity showed growth of *Aspergillus fumigatus*. Chest X-ray films did not show any abnormality, excluding the possibility of pulmonary aspergilloma. Because the symptoms had developed following spinal anesthesia, it was believed that the fungus had been introduced through a spinal route. She was treated with i.v. voriconazole 200 mg twice daily for one week followed by oral voriconazole

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Fig. 1 Radiographs of lumbo-sacral spine on initial presentation appear normal.

200 mg twice daily for 11 weeks. At one year follow-up, the patient was asymptomatic and the L₂ and L₃ vertebra had completely fused with no evidence of recurrence (Fig. 7).

Discussion

Aspergillus species are saprophytic molds that are ubiquitous in nature. In humans, aspergillus has been found in the respiratory tract without any evidence that it has produced disease. The spectrum of aspergillus infection ranges from

noninvasive forms, such as allergic bronchopulmonary aspergillosis and pulmonary mycetoma, to invasive and disseminated disease that may involve any organ system^{1,2}. In the immunocompetent host, invasive aspergillosis is rare; however, it has been reported in the immunocompromised patient⁷⁻¹². Three common modes of spread of aspergillus infection to the spine have been described; namely, hematologic seeding after invasive bronchopulmonary aspergillosis in adults, contiguous spread (a route more commonly seen in children) and direct

Fig. 2 Hypointense T₁W images in coronal sections of MRI.

Fig. 3 After 3 weeks of antibiotic therapy, radiographs show decrease in L₂₋₃ disc space and mild end plate irregularities.

inoculation^{13,14}. Direct introduction of the organism to the spine usually occurs following spinal surgical procedures, lumbar puncture or epidural procedures^{1,2}. It accounts for 10% of cases of spondylodiscitis and may be seen in immune competent persons^{1,2}. We presume that our case was infected with *A. fumigatus* during administration of spinal anesthesia through a spinal needle.

Clinical presentations of pyogenic spondylodiscitis vary from dull aching pain to severe, sharp, aching back pain. There

may be malaise, fever and percussion tenderness over the affected area^{1,2}. With the aid of radiology, the diagnosis is clearly established. However, fungal spondylodiscitis rarely has these classical presentations. The presentation is usually insidious and fever and malaise are uncommon. Clinically, the most reliable physical findings are low back pain with paravertebral tenderness and increased ESR². MRI is crucial in diagnosing the condition, allowing for early medical intervention^{1,2}. However, the causative organism of spondylodiscitis is very

Fig. 4 MRI shows irregularities of end plates with disc space reduction at L₂₋₃ region (hypointense T₁W and hyperintense T₂W).

Fig. 5 Radiographs showing gross reduction of L₂₋₃ disc space with end plate erosions and mild kyphotic deformity.

difficult to identify unless tissue biopsy or culture is positive for it. Closed or CT-guided biopsies frequently fail to isolate the organism because of difficulty in accessing a representative area of the lesion. In the present case, two biopsies failed to yield the causative organism. The first biopsy was taken under CT guidance and the other was a closed vertebral biopsy under image intensifier. The infective pathogen was eventually isolated from material obtained during an open surgical procedure.

An early diagnosis is essential to prevent morbidity from spondylodiscitis. Reports have clearly shown that early diagnosis and treatment with antifungal agents lead to remission of the disease, obviating the need for surgical intervention. Delay in diagnosis causes progressive damage and erosion of end plates, leading to instability². Most patients in the advanced stage need spinal stabilization and fusion. Historically, the mainstay of antifungal therapy has been amphotericin B and surgical debridement. A review found that, of six cases treated

Fig. 6 MRI showing advancement of the spondylodiscitis L₂₋₃ lesion with indentation on the thecal sac.

Fig. 7 One year after surgical debridement and fusion of L_{2, 3} using a pedicle screw system, the lesion has completely fused and the height is restored.

with amphotericin B alone, only two recovered and four died¹⁵. The poor response to amphotericin B is attributable to its poor bone penetration and renal toxicity. Flucytosine penetrates bone well¹⁵. A comparative study has demonstrated that initial therapy with voriconazole is more effective than the previously standard approach of initial therapy with amphotericin B^{5,16}. Some case reports have shown that voriconazole is effective against bone and joint infections¹⁶. Most patients treated with voriconazole alone or in combination antifungal regimens recover from their infections.

Surgical intervention is needed to relieve neurologic compression, correct instability and/or deformity, treat overwhelming infection and obtain a tissue diagnosis¹⁵. The surgical approach can be anterior, posterior or combined. The anterior approach has the advantage of providing direct access to the disc and allowing radical treatment of infection. However, this is considered an aggressive approach to the lumbar spine. In our patient, we achieved debridement of the anterior vertebral elements posteriorly through an extracavitary approach. In cases with severe anterior destruc-

tion, serious instability may result from laminectomy alone, with development of progressive kyphosis and even spinal dislocation. Posterior decompression without fusion should be performed only for isolated posterior epidural collections without anterior vertebral element involvement. Surgical debridement expedites control of infection; medical therapy without surgical debridement is associated with more prolonged infection. Therefore, combined medical and operative interventions are recommended for management of aspergillus spondylodiscitis¹⁵. Our patient responded to medical treatment after surgical intervention, becoming completely asymptomatic.

Aspergillus spondylodiscitis is a diagnostic and therapeutic challenge. Although fungal spondylodiscitis affecting immunocompetent patients is rare, this differential diagnosis should be always kept in mind and, as a protocol, tissue samples should always be investigated for fungal growth. A combination of surgical debridement and antifungal therapy is inevitable to prevent rapid progression of invasive aspergillosis and neurological damage.

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