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Case Report

Cervical spondylodiscitis caused by *Aspergillus* in a non-immunocompromised patient: a case report

Anand P. Nair*, Tinu Ravi Abraham, Alekhya Erubothu

Department of Neurosurgery, Government Medical College, Kottayam, Kerala, India

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***Correspondence:**
Dr. Anand P. Nair,
E-mail: anandnair455@gmail.com

ABSTRACT

Spondylodiscitis caused by *Aspergillus spp*. is a rare but serious infection, making it particularly challenging to diagnose and manage. We report a case of a 53-year-old man presenting with neck pain and progressive quadriparesis. Neurological examination revealed power of 3/5 in the upper limbs and 1/5 in the lower limbs, with a modified Nurick grade VI and mJOA score of 9. He had chronic liver and kidney disease but no known immunosuppression. Laboratory investigations showed normal white blood cell (WBC) count, elevated erythrocyte sedimentation rate (ESR) (83 mm/hour), C-reactive protein (CRP) (33 mg/dl), and thrombocytopenia. Initial imaging suggested C5-C6 spondylodiscitis with vertebral destruction and an epidural abscess. A presumptive diagnosis of tubercular spondylodiscitis was made. The patient underwent C5-C7 laminectomy with evacuation of the abscess. Histopathology revealed fungal hyphae of *Aspergillus* and *Candida* (PAS and GMS positive). Cultures confirmed *Aspergillus* spp. He was started on liposomal Amphotericin B and Voriconazole. Due to persistent cord compression on follow-up magnetic resonance imaging (MRI), he underwent C5-C6 corpectomy with iliac crest bone graft fusion and anterior plating. Intraoperatively, C5-C6 vertebrae were destroyed with surrounding inflammatory tissue. Postoperative antifungal therapy continued for two months. This case emphasizes that *Aspergillus* spondylodiscitis, although rare, should be considered in culture-negative or non-resolving spinal infections, especially in patients with chronic illnesses. Early imaging, histopathology, and timely antifungal therapy with surgical intervention are crucial for favorable outcomes.

Keywords: *Aspergillus*, Cervical spine, Spondylodiscitis

INTRODUCTION

Aspergillus osteomyelitis is an uncommon form of invasive aspergillosis occurring outside the lungs, with the spine being the most frequently affected bone.[1] Despite its infrequency, spinal aspergillosis is a serious and often overlooked condition. It may develop through one of three proposed mechanisms: direct extension from nearby pulmonary infections, spread through the bloodstream, or introduction via medical procedures or trauma.[1,2]

The symptoms are usually vague, with persistent back pain being the most common complaint. Imaging may reveal bone destruction, involvement of the intervertebral discs, and collections in the epidural space. Although it is primarily seen in immunocompromised individuals - such as those with organ transplants, hematologic cancers, neutropenia, or on immunosuppressive therapies - cases have also been reported in patients without obvious immune deficits.[1,3] If untreated, the infection can lead to neurological impairments and spinal instability.[3]

Prompt diagnosis through culture or histopathological examination of tissue samples is essential for timely intervention.[1,3] All affected patients require targeted antifungal therapy, and many benefit from surgical procedures for debridement or spinal stabilization.[1-3] However, due to the rarity of this condition, standardized diagnostic criteria and treatment guidelines remain lacking.

This case report discusses a rare instance of cervical *Aspergillus* spondylodiscitis, with the aim of highlighting clinical features, diagnostic challenges, and treatment strategies involving both medical and surgical approaches.

CASE REPORT

A 53-year-old man presented with neck pain one month before admission and had features suggestive of cervical compressive myelopathy with power in both upper limbs as 3/5 and both lower limbs 1/5 with bilateral weak hand grip and bilateral plantar extensor. He had a medical history of chronic liver disease and chronic kidney disease. He was afebrile. The peripheral white blood cell (WBC) count was 5,000/mm^3 and the erythrocyte sedimentation rate (ESR) was 83 mm/hour. He had thrombocytopenia with a platelet count of 75,000. The C-reactive protein (CRP) was 33 mg/dl. Cultures of the blood, urine and sputum were negative for *Aspergillus/Candida* species and tuberculosis. Initial lateral cervical radiograph revealed diminution of the intervertebral space between C5 and C6, associated with a destructive process involving corresponding vertebral bodies (Figure 1). Magnetic resonance (MR) imaging of the cervical spine was compatible with a diagnosis of infective spondylodiscitis at C5-6 with associated vertebral osteomyelitis and epidural abscess characterized by low signal intensity on T1-weighted image and high signal intensity on T2-weighted image, with well enhancement after gadolinium administration (Figures 2 and 3). The surrounding epidural space, retropharyngeal space and paravertebral space of cervical spine were similar to MR imaging. A presumptive diagnosis was spondylodiscitis due to tuberculosis.

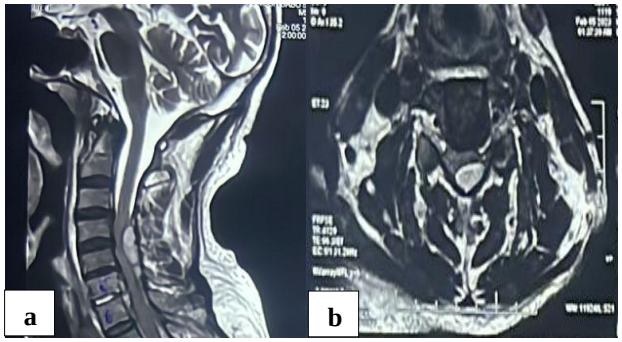

Figure 1 (a and b): Magnetic resonance imaging of the cervical spine was compatible with a diagnosis of infective spondylodiscitis at C5-6 with associated vertebral osteomyelitis and epidural abscess posteriorly characterized by low signal intensity on T1-weighted image and high signal intensity on T2-weighted image.

He underwent C5, C6, C7 laminectomy with evacuation of epidural collection. Pus was sent for biopsy and culture, and sensitivity. Histopathology revealed a mixed inflammatory pattern with fungal hyphae of *Aspergillus* and *Candida* (PAS and GMS positive). He was started on liposomal Amphotericin B and Voriconozole with a follow-up MRI suggestive of collection and soft tissue component compressing the cervical cord with cord myelopathy. He then underwent C5/C6 corpectomy with left iliac bone graft fusion. At surgery, the C5 and C6 vertebral body were found to be destroyed and inflammatory tissue seen as greyish white highly vascular fibrous tissue with superior endplate of C5 and inferior endplate of C6 destroyed. Therefore, the patient underwent corpectomy of C5, C6 vertebral bodies with subtotal resection of surrounding infectious tissues and anterior interbody fusion with left iliac bone and metal plate. The pathologic findings of the removed necrotic materials were consistent with chronic inflammation. The culture of biopsy specimen yielded *Aspergillus*. Postoperatively, antifungal treatment started with amphotericin B 25 mg daily intravenously for 14 days and Voriconazole 200 mg daily orally for 2 months.

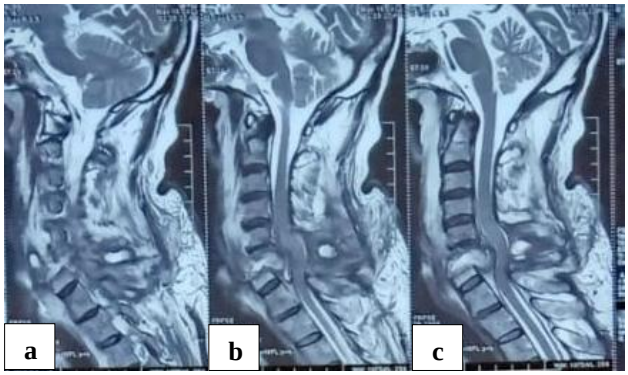

Figure 2 (a-c): Post-op MRI at 2 months-sagital T2w.

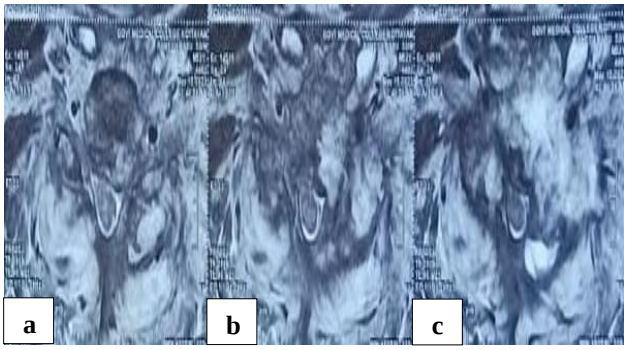

Figure 3 (a-c): Axial view -T2w.

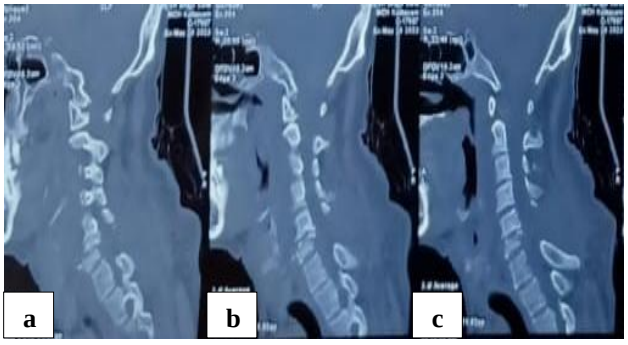

Figure 4 (a-c): CT-sagital view.

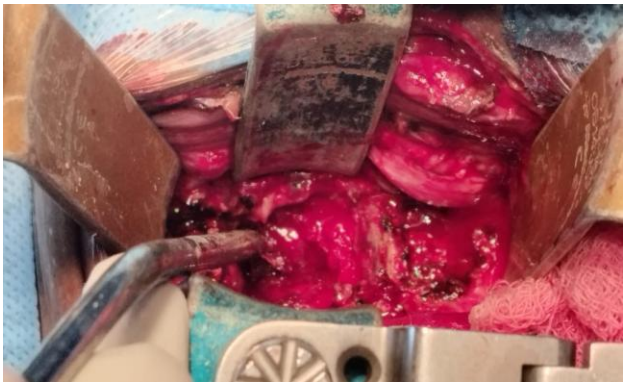

Figure 5: Intraoperative picture of lesion.

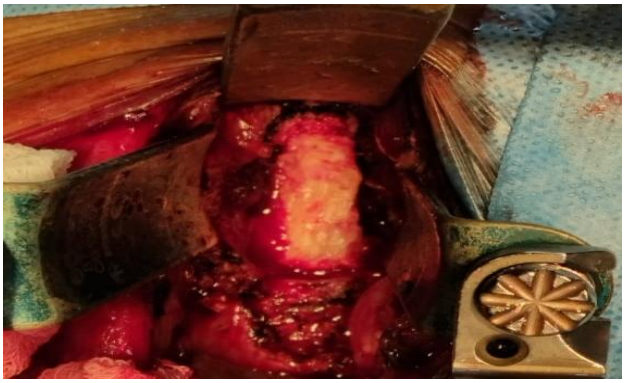

Figure 6: Iliac bone graft.

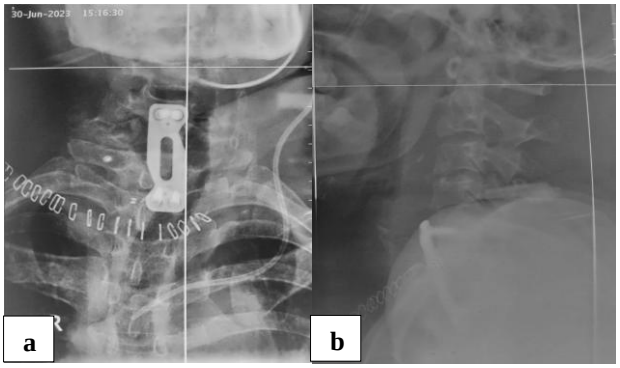

Figure 7 (a and b): Postop-X-ray.

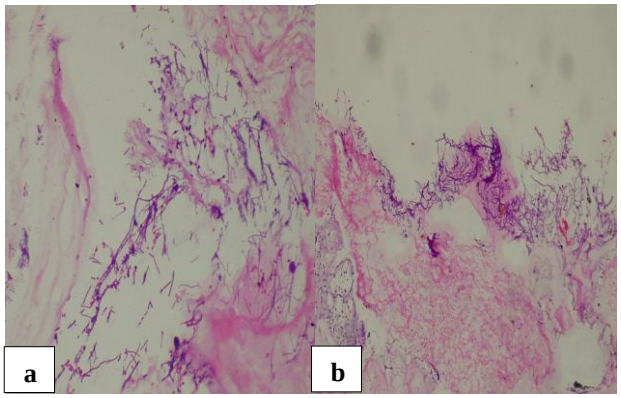

Figure 8 (a and b): H and E staining.

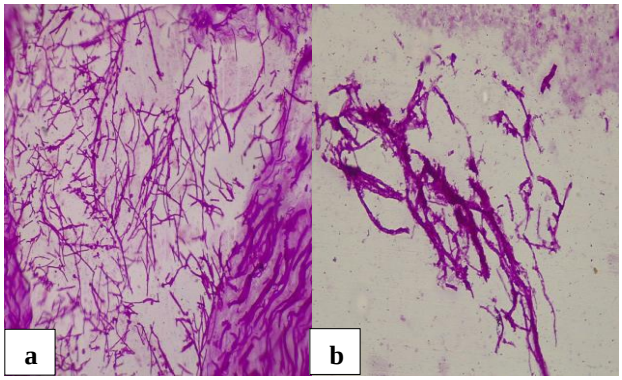

Figure 9: PAS staining.

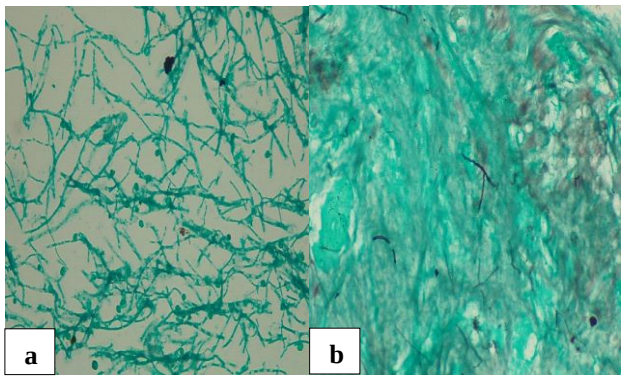

Figure 10: Gomori methanamine silver staining.

DISCUSSION

Fungal spondylodiscitis is a rare but serious condition that often necessitates prolonged antifungal therapy and, in many cases, surgical intervention.[1,3] *Aspergillus* infections, while uncommon - with an estimated incidence of 12 cases per million annually - are particularly rare in the spine, leaving clinicians with limited data to guide diagnosis and treatment.[4]

Aspergillus species are environmental fungi, commonly found in soil and decaying organic material.[4,5] Invasive infections typically arise in individuals with compromised immune systems.[4,5] Due to the slow and subtle onset of fungal infections, they frequently present with vague symptoms, contributing to delayed diagnosis.[7]

Over 20 *Aspergillus* species are known to cause disease in humans, with *A. fumigatus* being the most common, followed by *A. flavus*, *A. niger*, and *A. nidulans*.[5] *A. fumigatus* is both the most prevalent and the most virulent species. A growing concern is the emergence of resistance to azole antifungals, especially in regions like the Netherlands and the UK, likely linked to agricultural azole use.[5] However, resistance rates remain relatively low in other regions. Therefore, species identification and antifungal susceptibility testing, including minimum inhibitory concentration (MIC) determination, are critical for effective management.

As the population of immunocompromised individuals has grown, the clinical burden of invasive *Aspergillus* infections has increased.[5] Recommended antifungal therapies include triazoles and amphotericin B (both fungicidal), and echinocandins (fungistatic).[6,7] Voriconazole, introduced in 2003, has become the first-line treatment due to its efficacy and lower nephrotoxicity compared to amphotericin B compounds.[8-10] Although amphotericin B is a potent broad-spectrum antifungal, its toxicity - particularly renal side effects - limits prolonged use. Liposomal formulations have helped mitigate these issues but still require caution during extended treatment.[10]

Surgical intervention should be considered when there is spinal instability, worsening neurological function, or progression of infection despite medical therapy.

CONCLUSION

The present case report has shown that spondylodiscitis caused by *Aspergillus* spp. represents a very challenging clinical entity, requiring a multidisciplinary approach since, in some cases, surgical intervention may be necessary. Proper medical AFT, based on susceptibility testing, when feasible, and surgical intervention, when required, seem to be the current standard management, while a prolonged period of AFT seems to be necessary. Fungal species should be routinely investigated in culture negative spondylodiscitis, especially in immunocompromised patients. Since these infections have poor prognosis and a relative high mortality rate, early diagnosis for targeted medical therapy is of utmost importance. More research and information are needed, since these infections are rare, focusing mainly on proper treatment.

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