



# When Meningitis is Just Not Meningitis-A Case of Spinal Epidural Abscess - A Diagnostic Challenge

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## Abstract

Epidural abscesses, rare and potentially life-threatening infections located between the dura mater and vertebral wall, can cause severe neurological deficits due to spinal cord compression or vascular compromise. This condition is classified into spinal epidural abscess (SEA) and intracranial epidural abscess (IEA). Despite its rarity, SEA carries a high mortality rate (4.6%–31%). We report a case of a 70-year-old diabetic, hypertensive male with a history of ischemic heart disease who presented with fever, altered mental state, and meningeal signs. Initially diagnosed and treated as meningitis, the patient's condition persisted despite antibiotic therapy. Further investigation revealed a cervical SEA, with an abscess causing spinal cord compression, confirmed by MRI. The infection was found to be caused by methicillin-sensitive *Staphylococcus aureus* (MSSA), and the patient underwent successful surgical debridement and drainage. Post-surgical recovery was marked by significant improvement. This case underscores the importance of considering dual brain and spine involvement in patients with neurological symptoms, even in the absence of classic risk factors. Early spinal imaging is crucial in diagnosing SEA and preventing irreversible neurological damage. Physicians should maintain a high index of suspicion for spinal epidural abscess in patients with persistent fever and neurological symptoms, regardless of initial diagnosis.

**Keywords:** Epidural abscesses; Meningeal signs; Immunosuppression; Injection cephalexin; MRI

## Abbreviations

SEA: Spinal Epidural Abscess; IEA: Intracranial Epidural Abscess; MSSA: Methicillin-Sensitive *Staphylococcus Aureus*.

## Introduction

Epidural space is the area between the dura mater and the vertebral wall. Collection of purulent material in this space

leads to spinal cord injury either via compression of the spinal cord or vascular compromise. It is a rare condition that can be life-threatening if left untreated; the abscess enclosed within the bony confines of the skull or spinal column can expand to compress the brain or spinal cord and cause severe symptoms like back pain, fever, or neurological deficit, leading to permanent complications. Epidural abscess is of two types: spinal epidural abscess (SEA) and intracranial epidural abscess (IEA). A large academic hospital in the

United States conducted a retrospective study from 2004 to 2014 and found that the incidence of SEA was 5.1 cases per 10,000 admissions [1]. SEA is uncommon; it is an unusual disease but has a high mortality rate ranging from 4.6% to 31% [2].

## Case

A 70-year-old male who is known to be diabetic and hypertensive and has a history of ischemic heart disease, presented with complaints of a high-grade fever of approximately 101 degrees Fahrenheit for the past 4 days. He also experienced an episode of sudden onset loss of consciousness, which was followed by an altered mental state, tremulousness, and irrelevant talking. He was under treatment outside our institute, suspected of meningitis (antibiotics had already started), and referred to our institute for further management (with no improvement being noted). The examination findings revealed that the patient was confused, febrile, and exhibited meningeal signs-Kernig's and Brudzinski signs were positive. Furthermore, the cranial nerve, motor, sensory, and cerebellar examinations were grossly unremarkable. A detailed neurological examination was not possible due to the patient's altered mental sensorium. He was febrile, was hemodynamically stable with no focal deficit. We started the patient with empirical intravenous antibiotics, suspecting meningitis as the probable diagnosis. The blood tests showed that the person had 11 grams of haemoglobin per Liter, 18200 white blood cells per cubic millimetre, 3.9 nanograms of procalcitonin per millilitre, 20.9 milligrams of CRP per liter, and 1.4 milligrams of serum creatinine per decilitre.

Serum electrolytes and liver function tests were within normal limits. We did a lumbar puncture and cerebrospinal fluid (CSF) study showed that there were 90 cells per cubic millimetre, with 62% neutrophils and 23% lymphocytes, 655 milligram/decilitre of protein, and 89 milligram/decilitre of glucose. However, further microbiological examination did not show growth of any particular organism, and even the CSF culture, including urine and blood culture were sterile. The entire fever workup, which included dengue, malaria, and typhi Dot IgM, was non-contributory. Markers for vasculitis were negative. The patient continued to receive treatment for meningitis (Ceftriaxone and vancomycin) and continued to stay febrile. On day three of admission, he developed a cough, chest discomfort, and wheezing. We performed an HRCT chest and detected a bilateral pleural effusion with foci of ground glass opacity and centrilobular nodules. Sputum examination was within normal limits. Cardiac evaluation was unremarkable. His persistent fever prompted a repeat blood culture, revealing the growth of methicillin-sensitive *Staphylococcus aureus* (MSSA). This led to a change in antibiotics to injection cephalexin and teicoplanin. On day

five of admission, the patient had consistent complaints of increased neck pain and was unable to move his neck. He also developed urinary retention; however, there was no new focal neuro-deficit. An MRI of the spine showed discitis between the vertebrae C5 and C6 and C6 and C7; cervical epidural, paravertebral and prevertebral abscess from C2 to T3 vertebrae (Figure 1). This caused the cervical cord to be compressed. After consulting a spine surgeon, the patient underwent disc debridement and iliac crest bone grafting besides draining of the abscess. The abscess's microbiological examination revealed the growth of MSSA, prompting treatment with injections of cephalexin and teicoplanin. Post-surgery, the patient improved significantly with the help of intravenous antibiotics, physiotherapy, and supportive management, and there was no residual neuro-deficit.



**Figure 1:** MRI of the spine showing C5-C6, C6-C7 discitis (marked using blue arrow) with cervical prevertebral, paravertebral and epidural abscess at C2-T3 level (marked with the red arrow) leading to cervical cord compression.

## Discussion

Spinal epidural abscesses (SEAs) are rare, heterogeneous, and associated with increased mortality and morbidity, potentially leading to a life-altering disorder. Only 18% to 36% of SEA admissions localize to the cervical spine, a relatively lower rate than infection in the lumbar or thoracic spine [3].

Similar to thoracic and lumbar SEA, cervical SEA can be caused by risk factors such as intravenous drug use (25%), diabetes (15%), obesity (13%), and immunosuppression from chronic steroid use or malignancy [4]. Risk factors that may be preferentially associated with cervical SEA include pharyngeal abscess and a history of neck radiation, hematogenous spread from an infected joint outside the spine, direct spread from oral and/or pharyngeal infections, spread from a urinary tract infection, and bacterial endocarditis; some may not have a definite source of infection. Nearly one-third of cases of cervical SEA commonly identify *Staphylococcus aureus*, with methicillin-susceptible *Staph aureus* being more common than methicillin-resistant *Staph aureus* (58% vs. 13%) [5,6].

The typical clinical presentation includes back pain, fever, nerve root pain, motor weakness, and sensory changes. It can also result in paralysis, which is extremely dangerous because once paralysis occurs, it can become irreversible. Therefore, prompt identification and intervention are necessary.

Prevertebral abscess, spinal epidural abscess, and vertebral osteomyelitis are rarely associated with concomitant bacterial meningitis. Usually, the etiology suggests either hematogenous seeding, direct spread via dura perforation, or vice versa [7,8]. Bacterial meningitis is renowned for its ability to cause focal neurologic deficits, as well as complications such as septicemia, hydrocephalus, cranial nerve palsies, and seizures, all of which can be fatal and life-threatening. Spinal cord involvement is rare, with an estimated incidence of approximately 2% in some case series [9]. A study by Abdallah et al. has reported that spinal cord dysfunction and polyradiculopathy are rare but severe complications of pneumococcal meningitis [10].

In our case, the patient, a known diabetic (reasonably controlled) and hypertensive, presented with symptoms that clinically appeared to indicate meningitis. It was a very usual presentation, and the patient had already been started on intravenous antibiotics for the bloodstream infection, but he later developed neck pain and bladder dysfunction, which was also a usual presentation for the cervical spine pathology. However, it is crucial to remember that both the spine and the brain are actively involved. Our case is actually a very good example of cognitive bias, which is commonly responsible for not considering and/or missing the possible alternatives once an initial diagnosis is made.

The patient presented with altered mental sensorium, leading to the suspicion and initiation of meningoencephalitis management. As previously mentioned, all cultures were initially sterile, possibly due to the patient's prior use of intravenous antibiotics. He was under strict monitoring

and later developed bladder involvement. The neck rigidity was not caused by meningeal involvement, but rather by the involvement of the cervical vertebrae, which resulted in a progression rather than an improvement in the patient's symptoms. During the initial stages of the patient's presentation, we did not perform an MRI of the spine, which led to the initial missed diagnosis of an epidural abscess. Spinal epidural abscesses can present in a variety of ways, and even cases that initially appear to be meningitis may actually involve more severe spinal involvement. It becomes very important to regularly follow the patient, and if the patient continues to be febrile and develops headache, neck pain, or back pain, CT or MRI of the spine should be done immediately, and appropriate action should be taken without any delay. Doing the MRI of the spine early in patients presenting with meningitis will not only help in diagnosing the spinal pathology but also help us to understand the underlying etiology. Dual involvement of the brain and spine is not limited to high-risk individuals; it can also occur in patients like ours who have reasonable control over their diabetes and blood pressure, and have no other comorbidities.

This case further demonstrates the seriousness of Staphylococcal infections. It can infect various parts of our body and have a totally different focus than we expect it to have. Bacterial meningitis with septicemia can lead to spinal cord dysfunction, but it can also manifest as a spinal epidural abscess. Our main motive for bringing this case is to tell every health care provider to monitor the clinical signs of a patient with meningoencephalitis and consider imaging of the spine at the earliest suspicion.

Even if the presentation is typical for a specific medical condition and there are no traditional risk factors, physicians must maintain a high index of suspicion and a low threshold for spinal abscess when fever cannot be controlled with intermittent spikes along with pain over the spine.

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