Case Report

A rare complication of cervical spinal epidural abscess while receiving conservative treatment

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Abstract

Cervical spinal epidural abscess (CSEA) is a rare disease that requires prompt diagnosis and early surgical intervention with appropriate antibiotic therapy to ensure better neurologic outcome. However, some patients may forego surgery in some scenarios if they have prolonged neurologic deficits that are unlikely to improve with surgery. We present the first case of CSEA in which hydrocephalus developed while the patient was receiving medical treatment. A 55-year-old female with diabetes mellitus presented to our emergency department with progressive weakness and eventual paralysis. Spinal magnetic resonance imaging revealed CSEA with spinal cord compression. After 1 week of antibiotic treatment, hydrocephalus developed. The patient regained consciousness after emergent external ventricular drain. For sepsis source control, she received corpectomy with abscess drainage; however, there was no obvious neurological improvement. Emergency department crowding has become a widespread problem. Due to prolonged emergency department stay of patients, emergency physicians tend to face late response or complication of treatments, and witness the progression of diseases. This case demonstrates that hydrocephalus may occur in patients with CSEA receiving nonoperative treatment, and caregivers must be alert for any change in patient's consciousness.

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1. Introduction

To date, the definitive treatment for epidural abscess is eradication of the causative pathogen and early surgical decompression. Timely surgical intervention is required once neurologic deficits develop or are in progress. Neurologic recovery is unfavorable if paralysis is present for >24 hours before surgical intervention is performed.1,2 For patients with complete paralysis for >72 hours before a diagnosis of spinal epidural abscess, a surgical intervention is unlikely to improve the neurological outcome, and therefore medical treatment is recommended.3 Therefore, some patients will forego surgery if they have prolonged neurologic deficits that are unlikely to improve with surgery. In addition, some patients will select a more conservative treatment due to underlying conditions. We present the first case of cervical spinal epidural abscess (CSEA) in which hydrocephalus developed while the patient was receiving medical treatment.

2. Case report

Here we report the case of a 55-year-old female with a history of diabetes mellitus with poor medical compliance. Besides, she had a medical history of liver abscess and was discharged from our hospital 2 months before this admission.
The patient visited our emergency department due to progressive malaise and weakness with urinary retention. Upon her arrival, the body temperature was 37.3°C, blood pressure was 158/87 mmHg, pulse rate was 123 beats per minute, respiratory rate was 17 breaths per minute, and oxygen saturation was 99% while breathing ambient air. There was no complaint of neck pain, headache, or fever. Besides appearing ill, the patient's initial physical examination was unremarkable. On her neurologic examination, she was alert and oriented, and her memory was intact, as was her naming ability. Her speech was normal. She had no episode of diplopia during the ophthalmologic examination. She has no facial droop. The remaining cranial functions were normal. Her upper and lower limbs’ muscle power were graded 2/5.

The laboratory results revealed no leukocytosis. Besides high blood glucose level, other laboratory results were unremarkable. Blood culture later yielded *Klebsiella pneumoniae*.

The patient suffered from progression of muscular weakness with respiratory distress during her admission. Muscle power downgraded to 0/5 over four limbs. The sensations of a light touch, pinprick, vibration, and joint position were lost. The patient received emergent endotracheal intubation, and an emergent magnetic resonance imaging revealed pyogenic osteomyelitis change over C4 and C5 with epidural abscess formation, complicating with spinal cord compression (Figure 1A and 1B). A neurosurgeon was consulted, but the patient and her family decided to receive conservative treatment.

After 1 week of antibiotic therapy, paralysis persisted and the patient became drowsy. Emergent magnetic resonance imaging was performed, showing dilatation of ventricles (Figure 1C). There was no enhancement over meninges and ventricles. Under the diagnosis of hydrocephalus, emergent external ventricular drain was performed, and the patient regained consciousness on the following day. The culture result of cerebrospinal fluid was negative. Partial C4 and C5 corpectomy with abscess drainage was performed for sepsis source control. Unfortunately, there was no improvement in the patient's paralysis.

3. Discussion

This case demonstrates that hydrocephalus may occur in patients with CSEA receiving nonoperative treatment. The

![Figure 1. (A) Cervical spinal MRI, T2 weighted. There is abscess formation over the paravertebral space, epidural space, and disk space at C4–5 level (arrowhead). The epidural abscess is bulging and compressing the spinal cord (arrow). (B) Cervical spinal MRI, T2 weighted with contrast. The C4 and C5 vertebrae depict increased signal intensity, compatible with pyogenic osteomyelitis change (arrowheads). The epidural abscess is bulging and compressing the spinal cord (arrow). (C) Brain MRI, T2-weighted FLAIR (Fluid-attenuated inversion recovery). The fourth ventricle is markedly dilated, compatible with obstructive hydrocephalus (arrow). MRI = magnetic resonance imaging.](https://example.com/figure1.png)
presence of neurologic deficits in patients with epidural abscess indicates that the mass effect of abscess is significant. Anatomically, the space is smaller in the cervical region than in the thoracic and lumbar regions. We proposed that progression of cervical epidural abscess might lead to obstruction of cerebrospinal fluid flow and subsequent hydrocephalus, as in our case.

The classical diagnostic triad for spinal epidural abscess consists of fever, spinal pain, and neurologic deficits. However, only 13% of patients have all three components at presentation. As a consequence, a delayed diagnosis of spinal epidural abscess is not uncommon. High clinical suspicion of this rare disease is, therefore, crucial for clinicians to make an early diagnosis to avoid its potential catastrophic complications. Patients who were complicated with prolonged neurologic compromise are faced with the dilemma of treatment options. This case indicates that hydrocephalus may develop, although as a rare complication, in patients receiving conservative treatment.

Although some case reports and case series support conservative treatment, recent studies demonstrate that favorable outcome results from timely surgical decompression combined with antibiotic therapy. For example, Patel et al demonstrated that the failure rate was >41% in medical treatment patients, who eventually required surgical decompression. In addition, neurologic outcomes in patients receiving delayed surgical treatment were worse than those in patients receiving early surgery. Back to our case, at the time when we made the diagnosis of CSEA, we were anticipating a more timely surgical intervention, as the neurologic deterioration could be considered to be in progression.

Although rare, case reports have described epidural abscess as the complication of K. pneumoniae infection. Since hematogenous spread of K. pneumoniae is common, a great variety of presentations may exist in those patients, and caregivers should remain highly alert, especially of neurologic complaints.

There is no doubt that early surgical decompression combined with antibiotic therapy is the mainstay of treatment for epidural abscess. Inevitably, there would be some scenarios where nonoperative treatment is recommended. If a CSEA is to be treated medically, great caution and vigilance must be maintained to monitor the progression of neurologic deficits. Since hydrocephalus may develop, caregivers must be alert to any change in the patient's consciousness.

**Conflicts of interest**

The authors have no conflicts of interest, received no financial support, and no connection to any companies or products mentioned in the article.

**References**