

A Case Report of Thoracic Spondylodiscitis Caused by *Staphylococcus aureus* with Spinal Epidural Abscess and Paraspinal Abscess: Surgical Management or Medical Treatment Alone?

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Abstract

Spinal epidural abscess (SEA) is a severe vertebral infection that may lead to catastrophic neurologic sequelae. The choice between surgical management and medical treatment alone for SEA is still controversial. We report a case of SEA managed with medical treatment alone at our institute. The patient was a 70-year-old male merchant who had *Staphylococcus aureus* spinal osteomyelitis and discitis in T8–T9 extending into the paraspinal and epidural region. He received parenteral oxacillin (2000 mg every 4 h) for 2 months, which was then switched to an oral dicloxacillin (750 mg every 6 h) after the serial follow-up erythrocyte sedimentation rate became normalized. The total duration of antibiotic treatment was 8 months. Accurate diagnosis and adequate treatment of bacterial SEA can improve outcomes. Undoubtedly, the neurological status at the time of presentation is a major factor in treatment decision making and patient outcome. The management decisions involve individual patient considerations. We hope that the decision-making algorithm presented here will be a valuable tool for clinicians. (J Intern Med Taiwan 2015; 26: 303-308)

Key Words: Spinal epidural abscess, Osteomyelitis, Discitis, Paraspinal abscesses, *Staphylococcus aureus*, Decision-making, Algorithm

Background

Spinal epidural abscess (SEA) is a rare suppurative infection localized to the extradural space. Its most frequent cause is *Staphylococcus aureus* infection. The estimated incidence of SEAs is approxi-

mately 1 per 10,000 hospital admissions¹; however, the incidence has been increasing gradually during the recent decade^{2,3}. Diabetes mellitus, older age, end-stage renal disease, illicit intravenous drug use, alcohol abuse, and use of immunosuppressive agents predispose patients to spondylodiscitis and

result in SEA⁴⁻⁹. Prompt and accurate diagnosis is crucial for selecting appropriate treatment, reducing neurologic sequelae and optimizing outcomes. The treatment for SEA is laminectomy with debridement in combination with long-term antibiotic treatment. Paralysis may develop or progress during antibiotic therapy; thus, initial surgical management remains the treatment of choice¹⁰. However, increasing evidence suggests that certain patients with bacterial SEAs may respond well to appropriate antimicrobial therapy alone without therapeutic drainage^{11,12}.

The treatment of choice for primary SEA is surgery, whereas secondary SEA can be managed surgically or conservatively¹³. Meanwhile, the lesion site of SEA is one of the important factors in the decision to perform surgical intervention. The space between the spinal cord and the cervical or thoracic spine is smaller than that between the spinal cord and the lumbar spine; hence, patients whose SEA lesion is located in the thoracic or cervical spine often need surgical decompression. There are few studies that evaluated the surgical management of SEAs in the thoracic and cervical spines.

Here, we report a case of thoracic spondylodiscitis caused by *S. aureus* in a patient complicated with SEA and paraspinal abscesses. This patient received medical treatment alone at our institute.

Case presentation

A 70-year-old male merchant visited our institute with complaints of acute neck pain of 4 days' duration. The pain worsened progressively and became incapacitating before his admission. Fever with rigors, fatigue, malaise, and profuse night sweating also developed. Neurological examination revealed C4-5 radicular hypoesthesia, hyperactive deep tendon reflexes, and no meningeal irritation signs. He was admitted under the impression of C4-5 compression fracture with spinal stenosis and root compression based on spinal magnetic resonance imaging (MRI). The results of the blood

tests revealed *S. aureus* (2 sets/2 sets) on the second admission day. The white blood cell count (WBC), erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) level were 9100/mm³, 48 mm/h, and 3.4 mg/dL, respectively. A whole-body Ga-67 scan revealed increased gallium uptake at the T8 vertebra. MRI of the thoracic spine (Figure 1) revealed vertebral osteomyelitis and discitis in T8-T9, extending into the paraspinal and epidural region with focal spinal stenosis. The risk assessment for medical treatment failure is low. The prescribed antibiotics included parenteral oxacillin (2000 mg IV every 4 h) for better coverage of *S. aureus* spinal osteomyelitis with SEA. The patient refused to undergo surgical debridement. He received parenteral oxacillin for 2 months. The treatment protocol was changed to oral dicloxacillin (750 mg every 6 h) after a decrease in ESR level at follow-up. There were no neurologic sequelae during the treatment course. The total duration of antibiotics was 8 months until the ESR level became normal, and the patient recovered well with medical treatment alone after 1 year of follow-up.

Discussion

We reported a case of thoracic spondylodiscitis caused by *S. aureus* complicated with SEA and paraspinal abscesses, and the patient received medical treatment alone at our institute. Historically, drainage of abscesses is a treatment principle shared by surgical and infectious diseases specialists¹⁰. Prompt diagnosis and appropriate empirical antimicrobial therapy combined with surgery are associated with an excellent prognosis. The improvements in medical imaging and medical laboratory tests have made possible the early diagnosis of thoracic spondylodiscitis and SEA¹⁴. Often, the epidural involvement is not severe or chronic. The space between the spinal cord and the cervical or thoracic spine is smaller than that between the spinal cord and the lumbar spine; hence, SEAs in the cervico-thoracic spines often need surgical decompression. In our

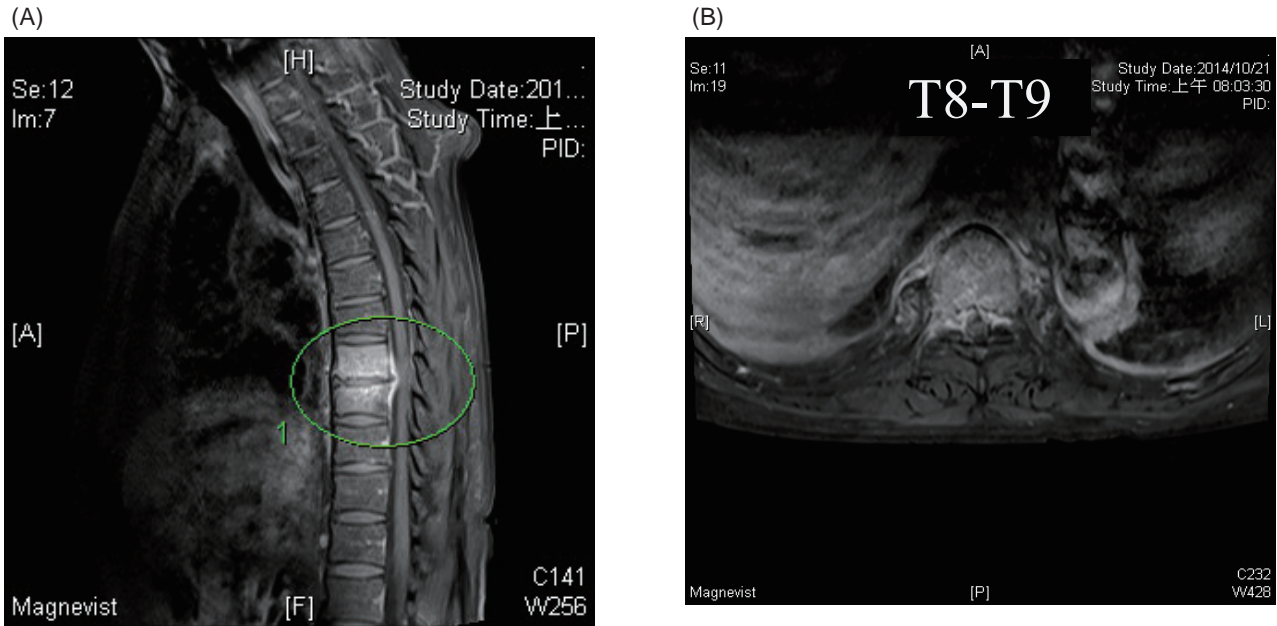


Figure 1. Findings of magnetic resonance imaging.

Contrast-enhanced T1-weighted axial (A) and sagittal (B) images with fat saturation showing well-enhanced lesions at the T8–T9 disc, vertebral bodies, epidural region, and bilateral paraspinal regions, compatible with discitis, osteomyelitis, epidural involvement, and paraspinal abscess.

case, the patient received medical treatment alone to control the infection.

Different studies have found that for patients with SEA, medical treatment alone or in combination with computed tomography (CT)-guided percutaneous needle drainage resulted in comparable or greater rates of complete recovery or minimal residual motor weakness compared with treatment with prolonged antibiotics plus surgical intervention^{5,7-9,11,12}. Accordingly, decompression combined with prolonged intravenous antibiotic treatment has long been considered the cornerstone of the management of spinal epidural abscess¹⁰. In addition, many factors had been described, including motor deficits¹⁹, abscess location (e.g., cervico-thoracic level)^{19,20}, thrombocytopenia (platelet count, $<100 \times 10^3/\mu\text{L}$)²⁰, intravenous drug use⁸, positive blood culture⁸, old age^{21,22}, traumatic spinal cord injury²³, diabetes mellitus²², methicillin-resistant *S. aureus* infection²², and inflammatory markers (such as WBC $\geq 14,000/\text{mL}$, CRP $\geq 11.5 \text{ mg/dL}$, and ESR $\geq 110 \text{ mm/h}$)^{8,19,20,24}, as significant indicators of the

need for surgical intervention or poor outcome. The risk assessment of surgical treatment for SEA is still without consensus.

Because of possible reporting bias in the literature, a precise determination of the success of nonsurgical treatment of SEA is difficult^{2,3,5-8,19-24}. Cases may have been selectively reported, and unsuccessful attempts at conservative management not reported. Another limitation of each study is the relatively small number of patients in each of the outcome subgroups.

After reviewing the literature and our experience, an algorithm for the diagnosis and treatment of SEA was suggested for treatment decision making^{2-8,19-24} (Figure 2). Patients with suspicious spondylodiscitis should receive appropriate blood examinations and MRI examinations. If the imaging results suggest SEA, the decision for operative management should be based on the initial risk assessment for the failure of medical treatment. For those patients receiving medical treatment alone, they may receive CT-guided drainage of the target

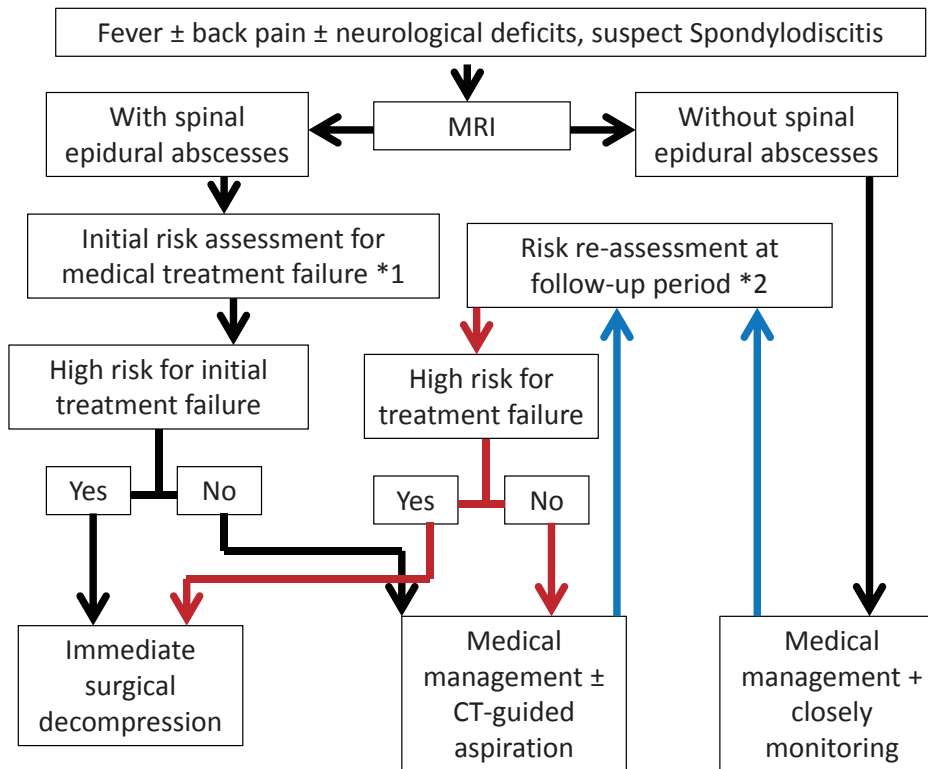


Figure 2. Algorithm for the diagnosis and treatment of spinal epidural abscesses.

Notes:

*1 : Diabetes mellitus, age >65 years, moderate to severe neurological deficits, end-stage renal disease, intravenous drug use, alcohol abuse, use of immunosuppressive agents, methicillin-resistant *Staphylococcus aureus* [Shweikeh F, et al. *Neurosurg Focus*.2014; 37: E9; Arko L 4th, et al. *Neurosurg Focus*. 2014; 37: E4; Tuchman A, et al. *Neurosurg Focus*. 2014;37:E8; Patel AR, et al. *Spine J*. 2014; 14: 326-30; Connor DE Jr, et al. *J Neurosurg Spine*.2013; 19: 119-27; Chao D, et al. *Am Fam Physician* 2002; 65: 1341-6.]

*2 : New neurological deficits, persistent fever, persistence of elevated CRP/ESR/WBC, persistent positive culture, and deterioration on MRI/CT.

Abbreviations: CRP, C-reactive protein levels; CT, computed tomography; DM, diabetes mellitus; neuro, neurological; ESR, erythrocyte sedimentation rate; MRI, magnetic resonance imaging; WBC white blood cell count.

lesions. They also need to be monitored and reassessed for signs of medical treatment failure. If signs of medical failure are detected, surgical decompression should be promptly arranged.

Accurate diagnosis and adequate treatment of bacterial SEA can improve outcomes. Patients with multiple risk factors—diabetes mellitus, older age, end-stage renal disease, intravenous drug use, alcohol abuse, and use of immunosuppressive agents—are susceptible to SEAs and tend to have worse outcomes. Those selected for conservative treatment without surgery should be monitored closely with serial clinical examinations (at least

weekly), ESR determinations (every 2–4 weeks), and MRI or CT (every 2–4 weeks to assess the abscess size and extent, until resolution). Optimum care involves early diagnosis with MRI, administration of appropriate antibiotics with or without surgery, and risk assessment of concurrent conditions. Emergency surgical decompression should be initiated for patients with infection-induced moderate to severe neurologic compromise at the duration of antibiotic treatment.

Although management with decompression was associated with lower mortality rates and better outcomes in the literature, this case report supports

the use of antibiotic therapy alone. Undoubtedly, the neurological status at the time of presentation is a critical factor in treatment decision making and patient outcome. In conclusion, individualized consideration for each patient with SEA is essential, and we hope that the algorithm in Figure 2 will be a valuable tool for physicians.

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金黃色葡萄球菌引發之胸椎骨髓炎合併硬脊膜外膿腫與脊髓旁膿腫的病例報告：外科清創或是內科治療即可？

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摘 要

硬脊膜外膿腫，是一種嚴重的脊椎感染，可能導致嚴重神經系統後遺症。外科清創手術治療或單獨抗生素藥物治療仍有爭議。我們報告一例金黃色葡萄球菌脊椎骨髓炎和椎間盤炎並且合併硬脊膜外膿腫與脊髓旁膿腫。一個70歲的男性商人發生胸椎金黃色葡萄球菌脊椎骨髓炎和椎間盤炎合併硬脊膜外膿腫與脊髓旁膿腫。他接受針劑oxacillin兩個月治療。然後轉換成口服dicloxacillin繼續治療，抗生素治療的總時間為8個月。我們建議，如果沒有接受外科清創手術選擇選用保守治療的患者，需要密切觀察臨床症狀，監測erythrocyte sedimentation rate，和需要時候安排核磁共振或斷層掃描。如果神經學症狀有惡化，則可能需要安排緊急手術減壓治療。