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Lumbar Pathological Fracture Due to Salmonella Osteomyelitis Mimics Compression Fracture

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We describe a patient with Salmonella vertebral osteomyelitis who presented with severe low back pain. An initial diagnosis of compression fracture was based on clinical symptoms and signs, as well as imaging studies. During hospitalization, the patient developed a fever. A repeat MRI, positive blood cultures, and abscess culture results obtained during an operative procedure confirmed the diagnosis of Salmonella vertebral osteomyelitis. Salmonella vertebral osteomyelitis is rare, and its clinical presentation may mimic other common diseases such as compression fracture. This case illustration suggests that in patients with rapidly progressive low back pain, fever, and poor response to treatment, vertebral osteomyelitis should be considered. Surgical debridement with appropriate antibiotics provided an excellent outcome. (Tw J Phys Med Rehabil 2004; 32(4): 203 - 208)

Key words: salmonella osteomyelitis, compression fracture, lumbar spine

INTRODUCTION

Salmonella osteomyelitis is rare except in patients with sickle cell disease.^[1] Vertebral involvement is reported to constitute 22.6% of all cases of Salmonella osteomyelitis.^[2] There are few reports of healthy hosts with Salmonella vertebral osteomyelitis (SVO), but most of these involve children and adolescents.^[3-5] Most patients with SVO present with fever and back pain. Diagnosis is often based on image studies and subsequently confirmed through blood and tissue (bone, abscess) cultures.^[6]

Recently, we encountered an elderly patient who presented with low back pain after a trivial trauma. The initial clinical presentations and imaging studies were similar to those of patients with compression fractures

frequently encountered in rehabilitative outpatient clinics. SVO was suspected after the development of fever during hospitalization and confirmed by blood and abscess cultures. Compression fracture is a common disease among the elderly, particularly in patients with osteoporosis. However, low back pain among osteoporotic patients who suffer from low back pain is not necessarily a result of compression fracture. In this case report, we determined that the low back pain resulted from a pathologic fracture due to Salmonella osteomyelitis, a rare etiology of osteomyelitis. We discussed the pathophysiology of Salmonella osteomyelitis and the principles of diagnosis and treatment.

CASE REPORT

An 82-year-old male was admitted to our ward with

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of progressive low back pain for one-week after falling down on a bus. He had a history of abdominal aortic aneurysm and underwent partial excision of the aneurysm with tubular graft 8 years prior to the admission; otherwise, his general condition was fair before this episode.

After the fall, he visited an orthopedic clinic and an unknown non-steroidal anti-inflammatory drug (NSAID) was prescribed. However, the pain deteriorated progressively. He visited our outpatient clinic and was admitted. On the day of admission, physical examination was unremarkable except for local tenderness over the lumbosacral area. Neurological examination was normal. His temperature was 37 degrees, and he denied gastrointestinal symptoms. The complete blood cell count was within normal limits. Serum biochemistry, including glucose, aminotransaminase, alkaline-phosphatase, blood urea nitrogen, and creatinine were normal. A lateral plain roentgenogram of the thoracolumbar spine revealed a normal height of vertebrae L-2~L-4. Magnetic resonance images (MRI) of the lumbar spine showed a reduction of the height of L-2~L-4, and a homogenous decreased signal lesion in the vertebrae body of L-3 on both T1 and T2 weighted images (Figure 1). The initial diagnosis was compression fracture of the lumbar spine. Complete bed rest was prescribed along with oral celecoxib (Celebrex) and intramuscular calcitonin (Miacalcic).

Unfortunately, the low back pain exacerbated rapidly, and fever rose to 38.1 degrees on the fifth day of admission. Dysuria was also found. Urinalysis revealed pyuria, and the white blood cell count was elevated. Blood cultures and urine cultures were obtained, and empiric antibiotics, including garamycin and cephalothin were administered. The pain persisted despite strong analgesics, and the fever continued to spike intermittently. A subsequent chest film was normal. Unexpectedly, both blood and urine cultures yielded *Salmonella* O4 group B. An MRI repeated on the 10th day of admission revealed a heterogeneous decreased signal lesion in the vertebrae of L-3 on T1-weighted image, and an increased signal lesion in L-3 on T2-weighted image. The lesion was not seen on the previous MRI study. (Figure 2) Vertebral osteomyelitis with abscess formation and septicemia were highly suspected. Intravenous ciprofloxacin was administered immediately. The patient received a laminectomy and a corpectomy of L-3, a dissection of L-3 and L-4, and

debridement of the psoas abscess. The results of the abscess cultures were the same as those of the blood cultures. Following surgery, intravenous ciprofloxacin was maintained, and the patient recovered well from surgery. The low back pain improved, and the white blood cell count returned to normal. The fever subsided and the patient was discharged with an oral form of ciprofloxacin after 38 days of hospitalization.

DISCUSSION

Salmonella causes a broad spectrum of human illnesses from gastroenteritis, typhoid fever, and bacteremia (with or without metastatic seeding) to the asymptomatic carrier state.^[7] *Salmonella* vertebral osteomyelitis is an uncommon complication of *Salmonella* infection. Al Soub et al.^[8] reported that among twenty-eight vertebral osteomyelitis patients, only 2 exhibited *Salmonella* infection (7.1%). The other pathogens included tuberculosis (57.2%), *Brucella* (21.4%), *Staphylococcus aureus* (10.7%), and *Pseudomonas* (3.6%). In a review article by Santos et al.,^[6] about two-thirds of SVO patients were male, and nearly 90% had fever or spinal pain, while only 16% had gastrointestinal symptoms. Half of the patients experienced lumbar spine involvement. This description is applicable to our patient – that is, a male with fever, back pain, no gastrointestinal symptoms, and lumbar spine involvement. The diagnosis of SVO is often delayed because the clinical findings are often non-specific.^[5] In the Santos report,^[6] the WBC count was > 11,000/mm³ in 41% of SVO patients, the stool culture was positive in 36%, and the urine culture was positive in 23%. The most commonly utilized imaging procedure was plain radiography which revealed abnormalities in 65% of the study patients. CT and MRI scans were increasingly utilized in the latter years and showed abnormalities in 88% and 83% patients, respectively. In our patient, there was no marked leukocytosis, and plain radiography revealed only a compression fracture. Thus, our experience is compatible with the literature that supports use of CT or MRI plus microbiological evidence to enhance non-specific clinical findings. The positive blood culture and abscess cultures, and a repeat MRI study confirmed the diagnosis of *Salmonella* osteomyelitis in our patient.

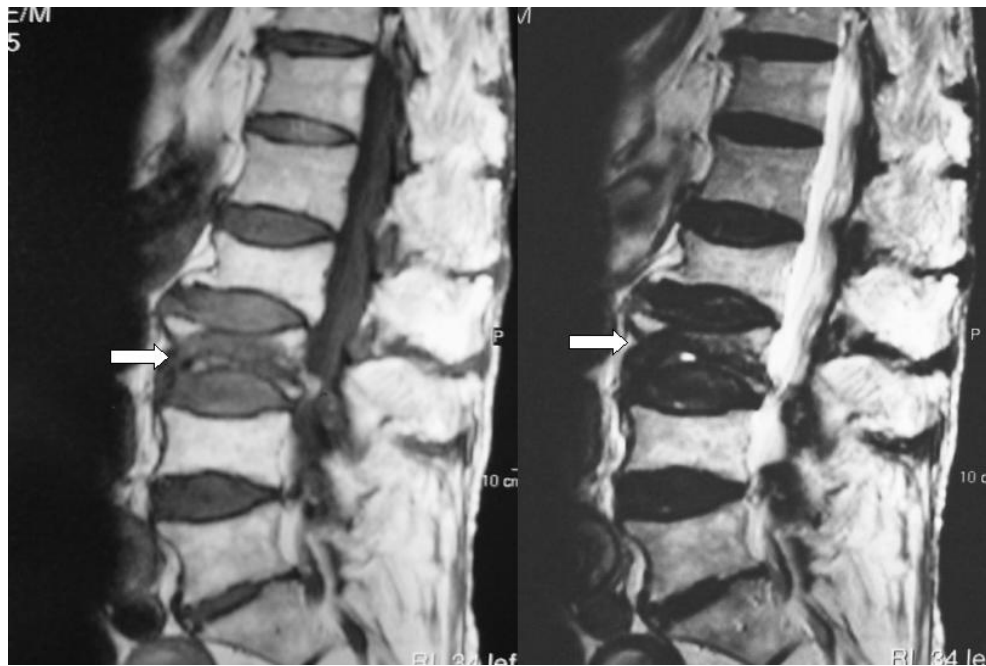


Figure 1. Initial MRI of the lumbar spine revealed reduction of the height of L-2~L-4 and a homogenous decreased signal lesion (arrows) in the vertebrae body of L-3 on both T1-weighted (left panel) and T2-weighted images (right panel).

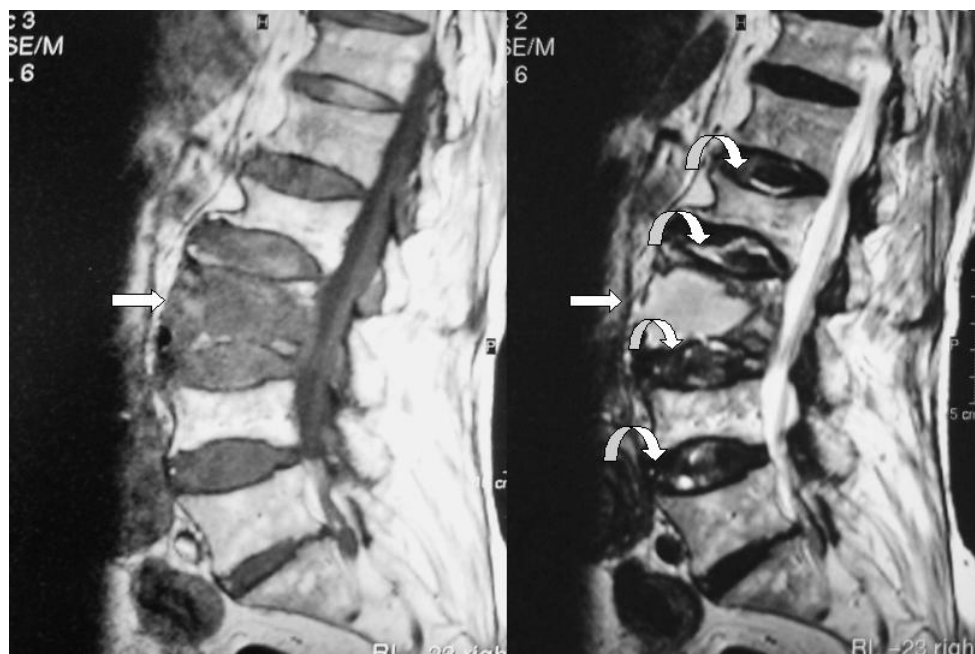


Figure 2. In contrast to the initial MRI, repeated MRI on the tenth day of admission revealed a heterogeneous decreased signal lesion in the vertebrae of L-3 on T1-weighted image (arrow, left panel). On T2-weighted image (right panel), an irregular hyperintensity lesion in L-3 (arrow), and linear dot-like hyperintensities (curved arrows) are noted within L1/2~L4/5 intervertebral discs. Osteomyelitis of L-3 and discitis in L1/2~L4/5 intervertebral discs are highly suspected.

In the literature,^[6] the median duration of symptoms before diagnosis has been reported to be about 8 weeks, with the shortest being 10 days. As far as our patient was concerned, the duration of symptoms before diagnosis was about 2 weeks. As *Salmonella* osteomyelitis has a strong propensity for chronicity if antimicrobial treatment is delayed, inappropriate, and/or inadequate; invasive tests to establish the microbiological diagnosis and to guide antimicrobial therapy are strongly suggested.^[8,9] In our patient, the initial clinical presentations and imaging studies favored a diagnosis of compression fracture. However, the response to standard treatment was poor. We thus performed a repeat MRI that supported a diagnosis of osteomyelitis. This diagnostic approach suggests that a repeat imaging study, particularly MRI, in patients with uncertain diagnosis should be considered. Also, the pathogen involved in *Salmonella* osteomyelitis was confirmed by blood and abscess cultures.

The standard treatment for salmonella infection is ampicillin and trimethoprim-sulfamethoxazole. However, Le^[5] reported failure in treating SVO with standard antibiotics. Tsui et al.^[4] reported successful treatment of SVO with quinolone group antibiotics (ciprofloxacin), the same antibiotics we used in our patient. Our literature review showed that most SVO patients recovered with conservative antibiotics treatment. Because SVO with abscess formation was highly suspected in our patient, we preferred surgical intervention in addition to an adequate antibiotic course of treatment. The combined result was excellent. We therefore strongly recommend surgical debridement along with antibiotics in patients with marked infectious signs and abscess formation.

Salmonella infection with aorta mycotic aneurysm has been frequently described in the literature.^[10] Brooks et al.^[11] reported on a patient who experienced recurrent *Salmonella* septicemia with mycotic aortic aneurysm, lumbar osteomyelitis, and psoas muscle abscess. The authors emphasized the importance of thorough investigation of patients with low back pain and *Salmonella* septicemia. Our patient had a history of abdominal aortic aneurysm and underwent an operation eight years earlier. This may have been related to *Salmonella* infection but the pathology at that time did not establish mycotic aneurysm. Nonetheless, we performed a thorough diagnostic evaluation of this patient and no other abnormality

was found.

CONCLUSION

SVO is a rare disease that may be misdiagnosed as an osteoporosis-related compression fracture, a particularly common condition in the elderly. A repeat imaging study in patients with a doubtful diagnosis is therefore of great value in identifying vertebral osteomyelitis. Establishing the specific microbiological pathogen to guide the use of antimicrobial agents is vital to proper treatment. SVO should be taken into consideration in patients with refractory low back pain and fever.

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沙門氏菌骨髓炎造成腰椎病理性骨折以壓迫性骨折表現

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我們報告一個以嚴重下背痛為表現的脊椎沙門氏菌骨髓炎(*Salmonella vertebrae osteomyelitis*)病患，根據臨床症狀和影像學檢查，最初的診斷是腰椎壓迫性骨折。然而患者在住院期間出現發燒症狀，第二次的核磁共振檢查、血液的細菌培養和手術中取得的膿瘍的細菌培養證實是沙門氏菌骨髓炎。脊椎沙門氏菌骨髓炎十分罕見，臨床症狀可和其他常見的疾病相似—例如壓迫性骨折。根據這個病例，我們建議病患如有快速進行的下背痛合併發燒的症狀且對治療反應不佳時，脊椎骨髓炎必須納入鑑別診斷。手術清瘡並給予適當的抗生素可獲得良好療效。(台灣復健醫誌 2004; 32(4): 203 - 208)

關鍵詞：沙門氏菌骨髓炎(*Salmonella osteomyelitis*)，壓迫性骨折(*compression fracture*)，腰椎(*lumbar spine*)