

A case of back pain caused by *Salmonella* spondylitis

-A case report-

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Salmonella spondylitis is a rare illness, and it generally occurs in patients who have already had sickle cell anemia, and it is even rarer in patients who are without sickle cell anemia. A 61-year-old male patient was hospitalized for the evaluation of his renal function and then treatment was started for his back pain. His back pain had developed about 2 months previously without any specific trauma. Only a bulging disc was detected on the initial lumbar MRI. Regarding his fever, it was diagnosed as possible atypical pneumonia, scrub typhus, etc., and multiple antibiotic therapy was administered. At the time of transfer, the leucocytes and hs-CRP were normal and the ESR was elevated. A diagnostic epidural block was performed for his back pain, but his symptoms were not improved. Lumbar MRI was performed again and it showed findings of infective spondylitis. *Salmonella* D was identified on the abscess culture and so he was diagnosed as suffering from *Salmonella* spondylitis. After antibiotic treatment, his back pain was improved and the patient was able to walk. (Korean J Anesthesiol 2010; 59: S233-S237)

Key Words: Back pain, *Salmonella*, Spondylitis.

The incidence of salmonella infectious diseases in Korea has noticeably decreased, yet salmonella infection still regularly occurs. It can manifest as five clinical patterns: gastrointestinal tract infection, enteric fever, bacteremia, local infection and the chronic reservoir state. The initial symptoms are non-specific fever, weakness, myalgia, etc. In the bacteremia state, it can spread to any parts of the body and this induces localized infection or it forms abscesses [1]. The forms of localized salmonella infections are arthritis, urinary tract infection, infection of the central nervous system, bone infection, soft tissue infection, etc.

The most common pattern of salmonella infection is gastrointestinal infection, and this spontaneously improves after 1–4 days. Paget et al. in 1876 first showed that salmonella causes osteomyelitis. Among the different forms of salmonella infection, the incidence of osteomyelitis has been reported to be very low at approximately 0.8% [2]. Our patient had severe back pain for 2 months, and this was ultimately diagnosed as salmonella spondylitis and the correct diagnosis was not made early on. We report on this case and we review the relevant literature.

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Case Report

A male patient (165 cm in height, 61 kg and 62-year-old) was transferred to our hospital because of the chief complaint of back pain. The back pain had developed approximately 2 months previously without specific trauma, and the area around the left buttock was most painful. The pain worsened while standing up and turning around, and it was improved while lying down. The pain score by the VNRS was 9–10/10 points. There were no findings of radicular pain, costovertebral tenderness or spinal tenderness, and the muscle strength of both low extremities was grade 5, which was normal. The patient was hospitalized for the evaluation of renal function and treatments because of the elevated CPR. The patient had been hospitalized at the A hospital for back pain 2 months previously and bulging discs (L3/4, L4/5) were detected by lumbar magnetic resonance imaging (Fig. 1). Hypoxia and fever had developed during the hospitalization; atypical pneumonia was suspected and he had received treatment. Nonetheless,

the pain and other symptoms had not improved and so he was transferred to the B hospital. He was diagnosed with possible scrub typhus, doxycycline was prescribed and the fever subsided and he was discharged after one week.

At that hospital, he was diagnosed as suffering from chronic renal failure caused by glomerulonephritis. The back pain was diagnosed as L4-5 facet pain and so a lumbar median branch block was performed. After he initially improved 10–20% for 3 days, the back pain recurred and persisted until the time of transfer to our hospital. For his past medical history, he had undergone surgery for a ruptured infrarenal aorta aneurism 10 months previously. The vital signs of the patient at the time of transfer were a blood pressure of 115/90 mmHg, a pulse rate of 68 beats/min, a respiratory rate of 18 breaths/min and the body temperature was 36.4°C. The blood test of the patient showed that the number of leucocytes and the CRP level were normal, and the ESR was elevated to 49 mm/hr. First, a diagnostic epidural block was performed using a C letter type image intensifier (OEC® 9800 Plus, GE medical system, USA). Epidural



Fig. 1. The lumbar-spine MRI taken before admission shows bulging discs at L 3/4 and L 4/5. (A) The T2 sagittal image (B) and the T2 coronal image.

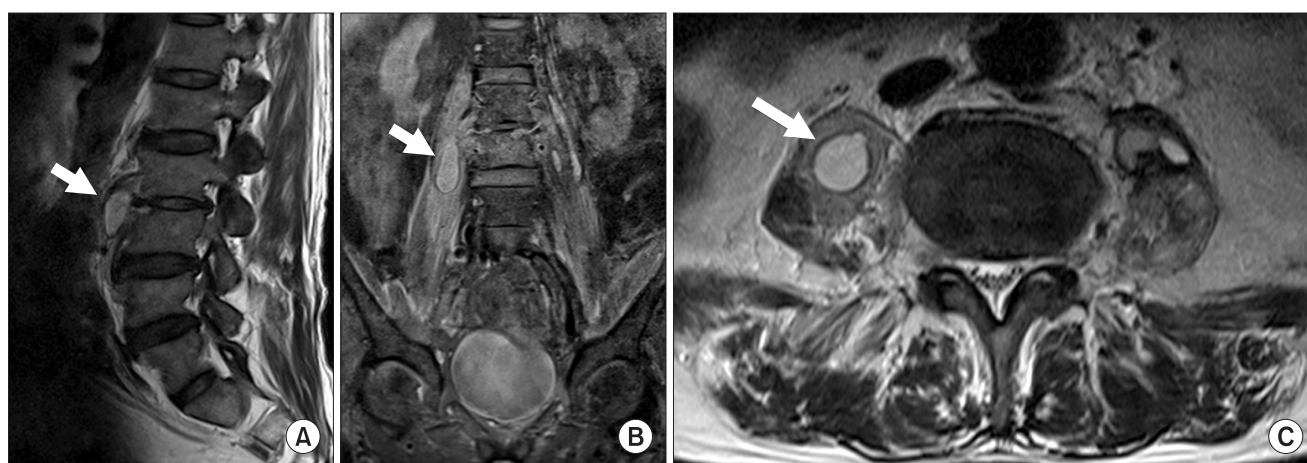


Fig. 2. The lumbar spine MRI taken in December 2009. The psoas paravertebral abscess and infiltration with edema of the L3 vertebral body are seen. (A) The T2 sagittal image (B), the T2 Transverse image (C) and the T2 coronal image.

block in the left L 4-5 interlaminar space was performed and 10cc of 0.125% ropivacaine and 20 mg tamcetone were injected. The next day after the epidural block, the patient showed approximately 20% improvement for 1–2 hours. After this, the pain recurred and sitting was difficult and painful. Since the symptoms of the patient and the findings of the previously performed lumbar MRI did not concur, magnetic resonance imaging was performed again after 2 days. A paravertebral abscess and findings of infective spondylitis were detected on the lumbar magnetic resonance imaging (Fig. 2). An aspiration culture test was performed for the abscess and salmonella group D was cultured. The patient was finally diagnosed with salmonella spondylitis, and ceftriaxone was administered according to the results of the antibiotic sensitivity test. The symptoms of the patient and the results of the hs-CRP then showed a tendency to improve. During the administration of antibiotics, there was persistent deterioration of the kidney function and uremia symptoms developed, and so hemodialysis was performed. Despite the administration of appropriate antibiotics, the patient showed intermittent fever and a trend for increased pain. MRI follow-up was performed 4 weeks after the administration of antibiotics, and the abscess was shown to have increased in size. Even though we performed drainage, this failed because of septation of the abscess. The patient was then transferred to another hospital according to his wishes. Afterward, at that hospital, the patient was treated with a combination of ciprofloxacin and ceftriaxone without surgery for 4 weeks, and then he was again transferred to our hospital because it is located in his hometown. Thirteen weeks after the administration of antibiotics, his back pain was much improved (VNRS: 1/10) and he was able to walk. On the blood test, the hs-CRP level was 0.34 mg/dl. On the lumbar MRI, the abscess showed improvement and so the antibiotics were terminated.

The patient is currently under follow-up observation at our outpatient clinic (Fig. 3).

Discussion

When a patient is transferred from another department for pain, the patient is examined during the mid course of disease, and so it is difficult to understand the overall problems of the patient. For our patient, his severe back pain had persisted for longer than 2 months. Nonetheless, his fever was diagnosed as possible atypical pneumonia and scrub typhus. After taking various antibiotics and anti-inflammatory agents, the blood culture test was negative and so the diagnosis of back pain was delayed.

At the time of transfer, his back pain was severe, but any fever was not detected. On the blood test results, the leukocyte count and hs-CRP level showed normal findings and this made it difficult to suspect infection. Furthermore, bulging discs were detected on the lumbar MRI that was previously performed and a diagnostic epidural block was then done. An epidural block can suppress selective pain pathways; hence, it is frequently used for the diagnosis and treatment of acute and chronic pain [3]. However, the symptoms were not improved after the lumbar epidural block; lumbar MRI was performed again and infective spondylitis as well as a psoas abscess were shown. An aspiration test was performed on the paravertebral abscess, Salmonella group D was cultured, and the man was diagnosed with salmonella spondylitis.

It has been reported that salmonella bacteria is the causative bacteria in less than 1% of the cases of hematogenous spondylitis and it rarely causes spondylitis in humans [4]. Salmonella spondylitis primarily invades the ilium and vertebrae. It develops in the spine in the order of the lumbar

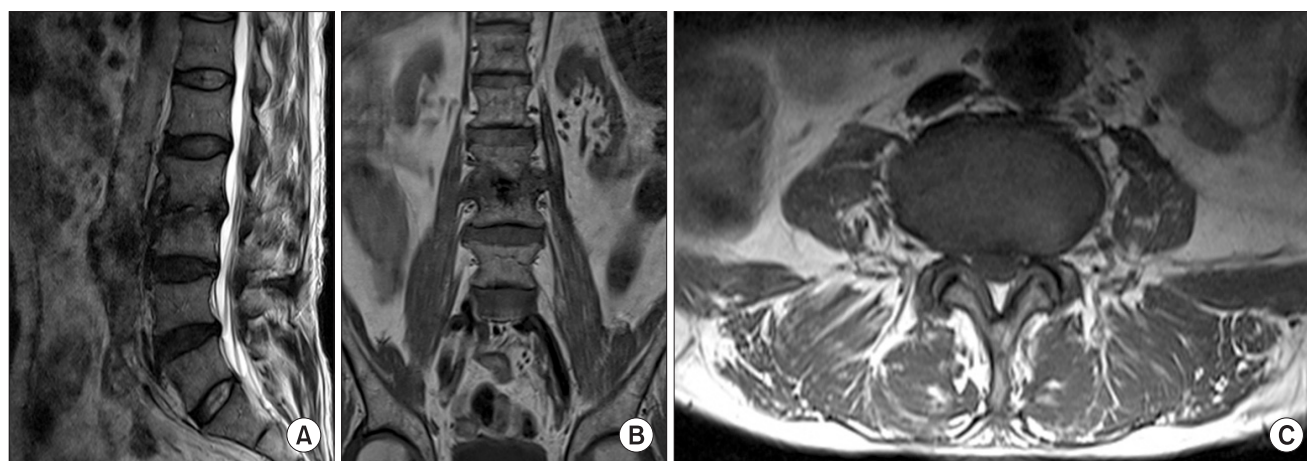


Fig. 3. The lumbar spine MRI taken in March 2010. (A) The sagittal plane, T₂-weighted MRI, (B) the coronal plane, T₁-weighted MRI and (C) the transverse plane T₁-weighted MRI.

vertebras and the thoracic vertebrae. The risk factors are sickle cell anemia, hemoglobinopathies, underlying bone diseases, chronic liver diseases, connective tissue diseases, malignant tumors, the use of steroids, old age, diabetes, etc. [1]. It has been reported that in sickle cell anemia patients, more than 70% of the spondylitis is caused by salmonella, and it has rarely reported in patients without sickle cell anemia [5-7]. In patients with normal immune function, the major symptoms of *Salmonella* spondylitis are back pain (100%), fever (75%), elevation of the ESR and elevated C-reactive protein levels (CRP). An elevation of the leukocyte count has not been consistently reported and the blood culture was positive in approximately 75% of patients [5-7]. This patient also initially had back pain and a high fever. Nonetheless, the diagnosis of fever varied and several antibiotics were administered resulting in the alteration of the typical findings, and so the diagnosis became difficult. In patients with salmonellosis, the symptomatic period has widely varied from 10 days to 12 years, and it is on average 8 weeks. It has been reported that after the first infection with *Salmonella*, the infection may remain as the latent form for a long time, and when the function of reticular endothelial cells is deteriorated, it may become activated and consequently, it may secondarily induce metastatic infection in the bone several months or several years after acute salmonellosis [1,8].

MRI is more sensitive than CT as an imaging modality for infective spondylitis. Low signal intensity on T1WI and high signal intensity on T2WI were shown as the typical pattern of MRI. Nevertheless, negative MRI findings during the initial period of disease have been reported. Hence, for cases that infective spondylitis is suspected clinically according to the blood tests, it is recommended to perform MRI at a minimum interval of 2 weeks [9]. Our patient also did not show special findings, except bulging discs, on the lumbar MRI during the initial period, and spondylitis was shown on the MRI performed again after 2 months. The infection was identified as salmonella by a tissue culture test. We can speculate that the incubation period for *Salmonella* is long, and so our patient was shown to be negative on the MRI taken during the early symptomatic period. So, if the symptoms of a patient persist or are vague, then a re-work up process may be required.

Salmonella spondylitis can be diagnosed by culture tests of blood, feces, bone, abscess, etc. [10]. Fifty-two percent of the reported cases were diagnosed by tissue culture of bone or abscess, 48% of the cases were diagnosed by blood culture and the fecal or urine culture tests were shown to be positive in 36% and 23% of the cases, respectively. For our case, the blood culture test was negative because the patient took antibiotics for an unknown fever. However, salmonella was identified on the abscess culture test and so the patient was

diagnosed. In regard to complications, paravertebral abscess is present in 39% of the cases, epidural abscess is present in 4%, abscess in the spleen is present in 2% and infective aortic aneurysm is present in 28% [1,10]. *Salmonella* is a common causative bacteria for inducing infectious aortic aneurysm and it induces spondylitis at the adjacent spine [1]. When the aorta or spine is infected first, the septic embolus is lodged in the vasa vasorum and the infection travels along the outside of the adjacent blood vessels to the adjacent organs; infectious aortic aneurysm and spondylitis occur simultaneously in many cases [4]. In our patient's case, surgery was performed for a ruptured aortic aneurysm 10 months prior to the diagnosis of *Salmonella* spondylitis. Considering the long incubation period of salmonella, the ruptured aortic aneurysm may have been due to salmonella. In addition, pneumonia and subacute renal failure may be complications of salmonella bacteremia. Spondylitis accompanied with abscess in the psoas muscle is a common complication of salmonella bacteremia, which was also observed in our case [1].

Salmonella is classified to subgroups according to the surface antigens, and particularly depending on the O antigen, it is classified into the A to E group. In the Korean reports, salmonella spondylitis was primarily caused by the D group, and this was also true for our patient [1].

The primary treatment is appropriate antibiotics based on the results of the culture test and also appropriate drainage of any abscess in the adjacent organs. Surgical treatments are required for the cases with osseous instability, neurological deficits, clinical unresponsiveness to antibiotics, refractory infection and the failure of biopsy to provide a firm diagnosis [4].

The length of the treatment period is still controversial, but more than a minimum of 4 weeks is required. Improvement of the clinical symptoms and reduction of the C-reactive protein values are the major indexes of the treatment response. The MRI findings do not concur with the improvement of clinical symptoms. Hence, MRI's usefulness is low for following the recovery. Yet if the infection is not improved after 4 weeks of treatment, then an epidural abscess should be suspected, and repeat imaging is useful for the patients who improve without drainage treatment despite the presence of a big abscess, and termination of antibiotic treatments should then be considered. *Salmonella* spondylitis responds well to the appropriate antibiotics and it is completely cured in 76% of the patients. On the other hand, in approximately 17%, the condition appears to progress to chronic spondylitis. The prognosis has been shown to be good for young patients who are without preceding factors [1,4]. This patient was also a patient without preceding factors and he improved with only antibiotic treatment.

In conclusion, our case was a patient with back pain that persisted for longer than 2 months. The lumbar MRI was nega-

tive in the initial period and since antibiotics were administered for fever, the diagnosis of Salmonella spondylitis was delayed. Assessing the comprehensive disease history and performing a diagnostic nerve block are necessary for the patients who are transferred from another department. If the treatment effects are atypical, then more comprehensive tests are required for making the diagnosis.

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