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증 례

Vertebral Osteomyelitis due to *Salmonella enterica* serovar Othmarschen in an Immunocompetent Patient

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건강한 사람에게 발생한 *Salmonella enterica* serovar Othmarschen 척추염

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최병관[1] · 김석호[2] · 허희진[3] · 김의석[1] · 이상민[4] · 채석래[3]

Salmonellae have been recognized as uncommon etiological organisms causing osteomyelitis in patients with sickle cell anemia and other immunocompromised conditions. A 34-year old man who had no underlying illness except for congenital block vertebrae at T10-11 vertebrae was admitted to the hospital due to lower back pain and fever for a week. Vertebral osteomyelitis was diagnosed and surgical drainage was performed. *Salmonella enterica* serovar Othmarschen was isolated from the drained pus. Therapy with ciprofloxacin for 8 weeks was successful without relapse. We describe here a case of vertebral osteomyelitis which was caused by *S.* Othmarschen in an immunocompetent patient.

Key Words : *Salmonella enterica* serovar Othmarschen, Vertebral osteomyelitis

Introduction

Salmonellae have been recognized as rare etiological organisms causing osteomyelitis for one hundred years, accounting for 0.5% of all cases (1). It is known that *Salmonella* osteomyelitis usually develop in patients with sickle cell anemia or other immunocompromised conditions, such as connective tissue disorders or hematological malignancies (2). *Salmonella enterica* serovar Othmarshcen is a relatively rare serovar which has been isolated from humans in Korea and rarely cause illness in human. Outbreaks caused by *S.* Othmarschen were reported in both hospital setting and community (3, 4).

We describe here the first case of vertebral osteomyelitis which was caused by *S.* Othmarschen in a patient with no underlying conditions.

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Case report

A 34-year old man presented to the hospital with a 1-week history of left lower back pain and pleuritic chest pain accompanied by fever and chills. No clinically evident systemic or gastrointestinal illnesses were shown preceding the onset of the symptom. His past medical history was not significant except for congenital block vertebrae on the T10-11 vertebrae which had previously been found in a routine radiological examination. He took antipyretics

and analgesics for 2 days due to pain and chills. He didn't have any hematological or immune disorders.

On physical examination, he appeared acutely ill and had slight tenderness in his left costovertebral angle and lower back. On auscultation, the sound of his breath was weak in the left lung field. Other physical findings were negative. The blood pressure was 140/68 mmHg, pulse rate 115/minute, respiratory rate 24/minute and body temperature 39.7℃. The white blood cell count was 13,410/mm^3, with 86.3% neutrophils, 6.5% lymphocytes, and 7.1% monocytes. A urinalysis was normal. The level of aspartate aminotransferase and alanine aminotransferase were 34 IU/L and 58 IU/L, respectively. The antibody for human immunodeficiency virus was negative. A Widal test was negative. His hemoglobin electrophoresis showed a normal pattern. The erythrocyte sedimentation rate was 44 mm/h and C-reactive protein was 19.5 mg/dL. Plain roentgenograms and magnetic resonance image of the chest and thoracolumbar spine revealed congenital block vertebrae in T10-11 with paravertebral abscesses and left pleural effusion (Fig. 1). Thoracentesis was performed and pleural fluid analysis revealed the white blood cell count of 4,480/mm^3, with 55% neutrophils and 25% lymphocytes. The levels of lactate dehydrogenase, protein, and adenosine deaminase levels of pleural fluid were 1,374 U/L, 4.6 g/dL, and 92 IU/L, respectively. No bacteria, including acid fast bacilli, was isolated in cultures. A transthoracic echocardiogram showed no valvular vegetations.

Costotransversectomy and pus drainage were performed on the third day of hospitalization and *S.* Othmarschen (Group C) was isolated from the drained pus. The serotypes of the O and H antigen were determined by the method of slide agglutination and the Kaufman-White scheme, respectively (5, 6). The organism was susceptible to ampicillin, cefotaxime, and ciprofloxacin. No organisms were isolated in blood, urine or stool cultures. Stain and culture for acid fast bacilli and the polymerase chain reaction for *Mycobacterium tuberculosis* were also negative.

Intravenous ciprofloxacin (200 mg every 12 hours) was given and continued for 4 weeks. The fever disappeared on the seventh day. He was prescribed a 4 week course of oral ciprofloxacin after discharge. The patient's condition improved and there were no evidence of relapse for 1 year after 8 weeks of antibiotic therapy.

Discussion

Salmonellae cause a broad spectrum of human illnesses, such as enteric fever, gastroenteritis, bacteremia, and local infections. *Salmonella* vertebral osteomyelitis has been uncommon. Osteomyelitis in nontyphoidal salmonellosis was reported in 0.75% of cases (59 of 7,779) and spine was the most frequently involved site (7). Among *Salmonella* osteomyelitis, 22.6% of cases (34 of 150) had vertebral involvement (8). Santos EM and Sapico FL reviewed 46 *Salmonella* vertebral osteomyelitis cases in the literature, including their 2 cases, and reported that most patients (54%) had underlying conditions, which included atherosclerosis (28%), sickle-cell disease (13%), diabetes (11%),

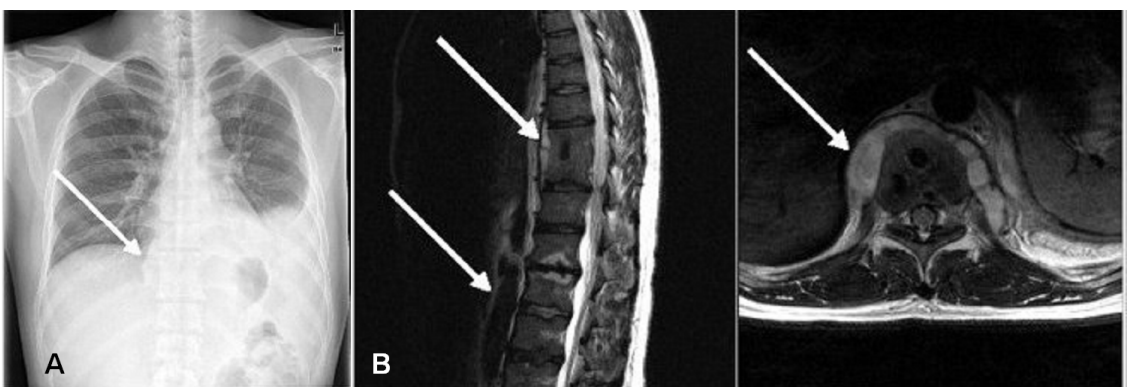

Figure 1. Chest PA (A) on admission shows a paravertebral mass and left pleural effusion (arrow). A magnetic resonance image (B) shows congenital block vertebrae in T10-T11, paravertebral abscesses and retroperitoneal fluid collection (arrows).

collagen diseases (6%), liver cirrhosis (6%), and achlorhydria (6%) (9). However, a significant number (46%) did not have any predisposition. Trauma and preexisting bone diseases have been mentioned as predisposing factors in some cases, but there was no convincing evidence of a strong association (10). The present patient had no underlying disorders except for congenital block vertebrae in the T10-11 vertebrae.

Salmonella enterica serovar Typhi, *Salmonella enterica* serovar Paratyphi, and diverse non-typhoidal salmonellae are known to cause vertebral osteomyelitis (9). Human diseases caused by *S.* Othmarschen were reported as outbreaks in a hospital and in community (3, 4). The *S.* Othmarschen outbreak in Korea was related to food poisoning and the main clinical feature was gastroenteritis (4). There were no preceding gastrointestinal symptoms or any epidemiological features implying association with an outbreak in the present case. Moreover, we could not find any cases of osteomyelitis caused by *S.* Othmarschen in the literature. To the best of our knowledge, this is the first case report in which *S.* Othmarschen caused vertebral osteomyelitis.

It has been reported that most patients with pyogenic vertebral osteomyelitis are admitted with an initial complaint of back or neck pain (11). Fever is usually low grade or absent but it is an important factor that may help in the early diagnosis of infection. A prompt and appropriate workup is needed. Diarrhea is an uncommon symptom but when it is present, it may be a clue to an enteric pathogen (9). Chest symptoms due to pleural effusion are unusual. Shimada T et al. reported a case of vertebral osteomyelitis caused by *Salmonella enterica* serovar Newport associated with a bilateral pleural effusion in a leprous patient (12). Similarly, Gupta SK et al. also reported a case of vertebral osteomyelitis due to *Salmonella* species that was associated with pleural effusion in an immunocompetent patient (13). In our case, the patient had pleuritic chest pain and a chest roentgenogram showed a paravertebral mass and pleural effusion. Pleural effusion and chest symptoms in thoracic vertebral osteomyelitis may be a result of a reactive pleuritis as the pleura is close to the thoracic vertebrae (13).

The choice of antibiotic therapy is guided by the results of *in vitro* sensitivity tests. It has been reported that *Salmonella* vertebral osteomyelitis can be cured by using single or various combinations of antibiotics (9). More recent reports on *Salmonella* vertebral osteomyelitis have described success with the use of fluoroquinolones. Fluoroquinolones have the advantage of requiring less frequent dosages and good oral absorption. Ciprofloxacin has the ability to penetrate macrophages, which is important in killing intracellular salmonellae (14). Also, the efficacy of oral ciprofloxacin for the treatment of bone infection has been well documented (15). The duration of antibiotic treatment is of paramount importance. Patients 50 years of age or older who have underlying predisposing conditions may need more than 8 weeks of therapy (9). Our patient was also treated with ciprofloxacin for 8 weeks and there was no evidence of relapse.

Here we report that osteomyelitis can be caused by *S.* Othmarschen. As it is known to be uncommon in immunocompetent patients, we should be aware of continuous fever, lower back pain and pleuritic chest pain in these patients, which will facilitate early diagnosis and treatment.

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