A Case of Lumbar Vertebral Osteomyelitis Following Community-Acquired Serratia Marcescens Bacteremia with Enteritis

Yoshiro Imai, Ryo Iida, Masahiko Nitta and Akira Takasu
Department of Emergency Medicine, Osaka Medical College, Takatsuki, Japan

Keywords: Serratia marcescens; Enteritis; Vertebral osteomyelitis

Introduction

Lumbar vertebral osteomyelitis is usually caused by hematogenous bacterial infection. The majority of the patients have underlying medical conditions or risk factors, including diabetes, alcoholism, chronic hepatic disease, spinal surgery and steroid uses [1-3]. The major primary focus of infection is the urinary tract, skin, or soft tissue and common causative organism is Staphylococcus aureus followed by Escherichia coli [1,2,4,5]. Serratia marcescens as being causative organism is extremely rare [6]. We experienced such a rare case of the vertebral osteomyelitis associated with community acquired Serratia marcescens bacteremia due to enteritis.

Case Presentation

An 80-year-old man was urgently hospitalized by septic shock due to Serratia marcescens enteritis. The patient had recovered from shock state and been well by antibiotics therapies, but suddenly had a body temperature of 39°C and complained of a lower back pain on the 21st day of hospitalization. Again, Serratia marcescens was isolated from blood culture. A Computed tomography scan examination showed lumbar vertebral osteomyelitis between the levels of L2 and L4 and abscesses in bilateral iliopsoas muscles. He had treatments with intravenous antibiotics for 6 weeks until discharge and followed by 12 weeks of oral antibiotics as an outpatient. This is the first case report of lumbar vertebral osteomyelitis following community acquired Serratia marcescens bacteremia due to enteritis.
On the next day, the CT guided drainage for iliopsoas muscle abscesses were performed, but the amount of drained fluid was so small that the culture was not able to detect any bacteria. As expected, *Serratia marcescens* was again revealed from the blood cultures, having identical patterns of sensitivity to antibiotics at admission. A subsequent magnetic resonance imaging (MRI) scan demonstrated vertebral osteomyelitis between the levels L₂ and L₄ (Figure 4). He was treated with intravenous LVFX for one week followed by three weeks of intravenous cefepime (CFPM) (2 g/day), followed by two weeks of tazobactam/piperacillin (TAZ/PIP) (4.5 g/day). He had a satisfactory clinical condition and the following CT scan at 58th hospital day revealed the abscesses nearly disappearing, but osteolytic changes appearing in the lumbar vertebrae (Figure 5). After the 59th hospital day, he was outpatient and treated with oral fosfomycin (FOM) (2000 mg/day) and LVFX (500 mg/day), and those were taken in every 2 weeks rotation for 3 months, and then had been in free of symptoms and shown a normal CRP value.

### Table 1: Laboratory findings.

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CK</td>
<td>5317 IU/l</td>
</tr>
<tr>
<td>BE</td>
<td>-7.4 mmol/l</td>
</tr>
<tr>
<td>BUN</td>
<td>61 mg/dl</td>
</tr>
<tr>
<td>Lac</td>
<td>35.2 Torr</td>
</tr>
<tr>
<td>Cr</td>
<td>3.13 mg/dl</td>
</tr>
</tbody>
</table>

**Note:** WBC: White Blood Cells; RBC: Red Blood Cells; Hb: Hemoglobin; Ht: Hematocrit; PLT: Platelets; Neut: Neutrophils; TP: Total Protein; Alb: Albumin; T-Bil: Total Bilirubin; AST: Aspartate aminotransferase; ALT: Amino Alanine Transferase; ALP: Alkaline phosphatase; LDH: Lactate dehydrogenase; γGTP: Gamma-glutamyl transpeptidase; CK: Creatine Kinase; BUN: Blood Urea Nitrogen; Cr: Creatine; Na: Sodium; K: Potassium; Cl: Chloride; CRP: C-Reactive Protein; PT-%: Prothrombin time and pro time; PT-INR: Prothrombin time and pro time international normalized ratio; AT III: Antithrombin III; FDP: Fibrin degradation products; ABG: Arterial blood gas; pCO₂: Partial Pressure of Carbon Dioxide; pO₂: Partial Pressure of Oxygen

---

**Figure 1:** Plain computed tomography (CT) scan of his abdomen showed (a) the mirror surface image to transverse colon and (b) the slight thickening of the wall of the descending colon.

**Figure 2:** Course of treatment. The vertical axis shows a C-reactive protein (CRP) level. The horizontal axis shows the hospital day.

The relapsed diarrhea was gradually improved, but on the 21st hospital day, he suddenly developed fever of 39°C and complained lower back pain. CT scan showed abscesses in bilateral iliopsoas muscle and lumbar vertebral osteomyelitis at the levels L₂-L₄ (Figure 3). We regarded this as hematogenous infection due to *Serratia marcescens* bacteremia and treated with intravenous levofloxacin (LVFX) (500 mg/day), because *Serratia marcescens* in blood sample on admission showed susceptibility to LVFX (Table 2).
Levofloxacin  
S 0.25

Ciprofloxacin  
S ≤ 0.25

Fosfomycin  
S ≤ 16

Sulfamethoxazole Trimethoprim  
S ≤ 20

S: Susceptible; I: Intermediate; R: Resistant; MIC: Minimum Inhibitory Concentration

Table 2: Susceptibility of antibiotics for Serratia marcescens.

Discussion

*Serratia* species are aerobic Gram-negative bacillus, occupied 92% in *Serratia marcescens* [7] and prone to cause septic shock accompanying with endotoxin. It is important to know it as a pathogen of the nosocomial infection, associated with outbreaks of nosocomial infections [8]. The incident rate of nosocomial bacteremia of *Serratia* species is 1.2 to 1.4 % [9-12] and the incidence of the community acquired bacteremia was only 0.49 per a population 100,000 people [13]. Gastrointestinal as being the focus of infection of the community acquired *Serratia marcescens* bacteremia is extreme rare [5].

Vertebral osteomyelitis is usually caused by hematogenous infection [12,14] and also rare infection as indicated an annual incidence rate of 2.4 per a population of 100,000 people [12,15]. The common causal organism is *Staphylococcus aureus* followed by *Escherichia coli* [1,2,4,5]. *Serratia marcescens* as being causative organism is extremely rare [6]. Such a rare case of lumbar vertebral osteomyelitis following community acquired bacteremia caused by enteritis due to *Serratia marcescens* has been presented.

The vertebral osteomyelitis is a relatively uncommon disease, and physicians are unaccustomed to diagnose it [4,16]. In this case, CT and MRI examinations were timely performed because he had a sudden spike fever and complained of lower back pain. However, back pain is not specific symptom and fever is variably present as seen in the 35% to 60% cases [5,17], and therefore the diagnoses are sometimes overlooked.

The diagnosis of vertebral osteomyelitis is possible with positive results of blood cultures and of image findings of such as CT and MRI [5]. Infectious Diseases Society of America [17] recommends a total duration of 6 weeks of antibiotics therapy when the disease was identified. In this case, the patient had continued the antibacterial treatment for 18 weeks and did not show any side effects, although the incidence of adverse drug reactions due to long-term antibiotics treatment was reported to be high as 45.2 % in patients with vertebral osteomyelitis [18].

Conclusion

The vertebral osteomyelitis following community acquired *Serratia marcescens* bacteremia with enteritis is extremely rare, but exist, and the long-term antimicrobial treatment is needed once if it was given the diagnosis.

References


