

## Aeromonas Hydrophila Bacteremia Presenting as Non-Traumatic Acute Osteomyelitis in a Cirrhotic Patient

Chern-Horng Lee, MD; Maw-Sen Liu, MD; Sheng-Hwu Hsieh<sup>1</sup>, MD

*Aeromonas hydrophila* is a low-virulence gram-negative bacillus. It has never been reported as a pathogen of non-traumatic acute osteomyelitis in a cirrhotic patient. Herein, we reported on a case of decompensated liver cirrhosis with *Aeromonas hydrophila* infection presenting as acute gastroenteritis and non-traumatic acute osteomyelitis. It has been shown that *Aeromonas* bacteremia usually affects immunocompromised subjects, such as those with liver cirrhosis. Non-traumatic acute osteomyelitis should be highly suggested when a cirrhotic patient with *Aeromonas* bacteremia presents with severe low back pain and no associated trauma. (*Chang Gung Med J* 2003;26:520-4)

**Key words:** *Aeromonas hydrophila*, non-traumatic acute osteomyelitis, liver cirrhosis.

**A**eromonas hydrophila, a species of the family Vibrionaceae,<sup>(1)</sup> is a low-virulence gram-negative bacillus typically resident in aquatic environments and distributed worldwide.<sup>(2)</sup> *Aeromonas hydrophila* is the most common human pathogenic species of the *Aeromonas* genus (68%), followed by *A. sobia* (17%) and *A. caviae* (10%), according to a previous epidemiological report.<sup>(2)</sup> *Aeromonas hydrophila* infection usually occurs among immunocompromised adults, such as those with cirrhosis or certain malignancies,<sup>(1,2)</sup> and it is associated with wounds, infections, and bacteremia. This raises the specter that once *Aeromonas* is found to be the cause of bacteremia or sepsis, an exhaustive search for underlying cirrhosis or malignancy should be required. To the best of our knowledge, *A. hydrophila* has never been reported as a pathogen of non-traumatic acute osteomyelitis. The pathophysiology of an *A. hydrophila* infection in acute osteomyelitis is discussed.

### CASE REPORT

A 63-year-old patient with chronic alcoholism and hepatitis B-related decompensated liver cirrhosis was transferred to our hospital on August 20, 2000 due to sepsis. He had suffered from mild back pain for a long time. One day prior to this admission, he began to experience diarrhea, fever, shaking chills, and severe low back pain. Diarrhea rapidly subsided within 4 days.

On physical examination, his temperature was 39.9 °C, blood pressure was 118/68 mmHg, and a spider angiomas was found on the upper chest wall. The lower leg showed no pitting edema, and only focal low back tenderness with knocking pain was found in the lower lumbar and sacral area. A peripheral hemogram revealed a leukocyte count of  $2.7 \times 10^9/L$  with 0.94 polymorphonuclear cells, a hemoglobin (Hb) level of 6.73 mmol/L, a mean corpuscular volume of 116.5 fl, a platelet count of  $28 \times 10^9/L$ ,

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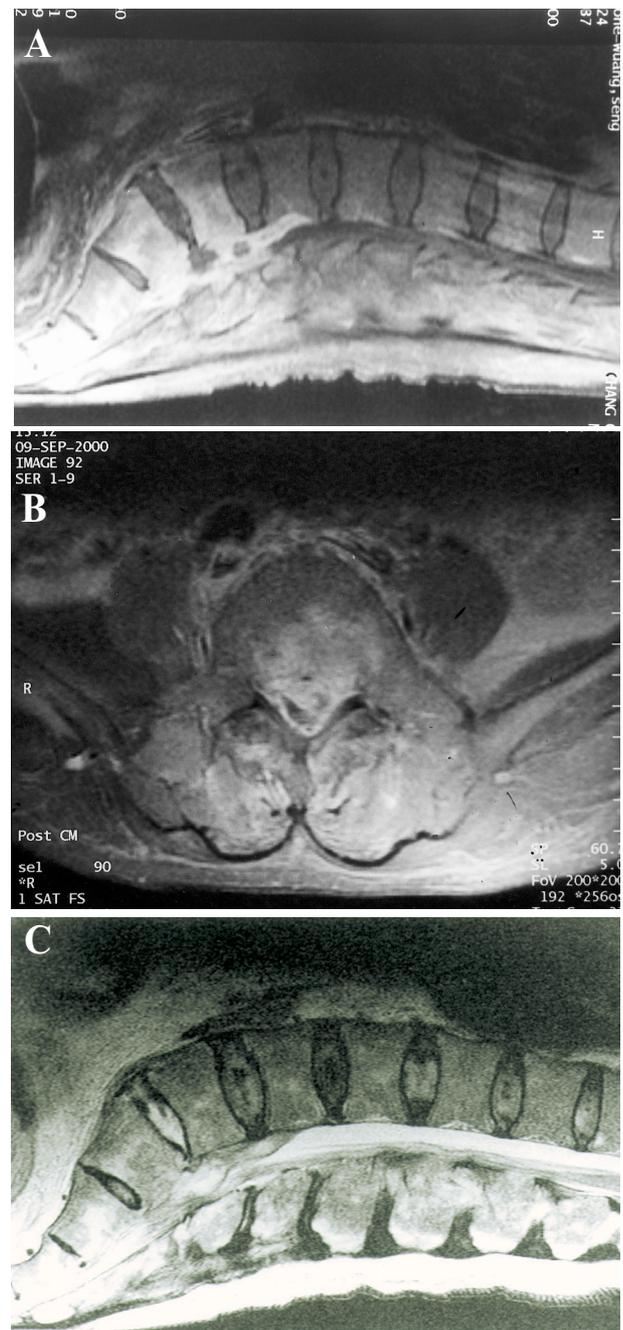
From the Division of General Medicine, <sup>1</sup>Division of Endocrinology and Metabolism, Department of Internal Medicine, Chang Gung Memorial Hospital, Taipei.

Received: Mar. 6, 2002; Accepted: Dec. 21, 2002

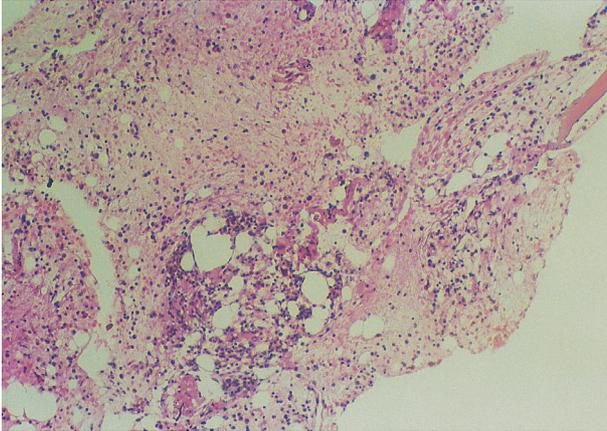
Address for reprints: Dr. Sheng-Hwu Hsieh, Division of Endocrinology and Metabolism, Department of Internal Medicine, Chang Gung Memorial Hospital, 5, Fushing Street, Gueishan Shiang, Taoyuan, Taiwan 333, R.O.C. Tel.: 886-3-3281200 ext. 8450; Fax: 886-3-3289410; E-mail: lee4570@cgmh.org.tw

and a prolonged prothrombin time measured at 18.3 s (normal control, 11.7 s). Serum biochemistry tests revealed elevated levels of aspartate aminotransferase (1.70  $\mu$ kat/L; normal, < 0.563  $\mu$ kat/L), alanine aminotransferase (0.779  $\mu$ kat/L; normal, < 0.597  $\mu$ kat/L), total bilirubin (132.6  $\mu$ mol/L; normal, < 23.8  $\mu$ mol/L), normal alkaline phosphatase (1.55  $\mu$ kat/L; normal, 0.467-1.57  $\mu$ kat/L), and globulin (29 g/L). In addition, the patient had a reduced albumin level (27 g/L). The serum C-reactive protein level was high (44.1 mg/L; normal, < 5 mg/L). Liver cirrhosis with mild ascites was detected using abdominal ultrasound. Although no *Aeromonas* was found in a stool culture, *A. hydrophila* grew in two sets of blood cultures 2 days after admission. Empirical antibiotic treatment with ceftizoxime began at admission, due to fever and underlying decompensated cirrhosis (Pugh-Child's C).<sup>(3)</sup> The plain radiology studies for the lumbar spine revealed only mild degenerative joint changes at admission and again 2 weeks after admission.

*Aeromonas* was showing increased resistant to ceftizoxime and ciprofloxacin by 10 days after admission in the blood culture report of August 31, 2000. The antibiotic regimen was changed to imipenem-cilastatin according to the results of an antibiotic sensitivity test. Since severe low back pain and fever were refractory to antibiotic treatment for 1 week, an inflammatory gallium-67 citrate scan was performed on September 1, 2000. Active lesions over the fourth and fifth lumbar vertebrae and the sacral spine were noted. A lumbar spinal magnetic resonance image (MRI) with and without gadolinium-labeled diethylenetriamine pentaacetic acid (Gd-DTPA) demonstrated a heterogeneous hyperintensity on T1W1 with homogeneous enhancement (Fig. 1A, B), while heterogeneous hyperintensity on T2W1 (Fig. 1C) was also noted, which is compatible with a diagnosis of acute osteomyelitis in L4-S1. The diagnosis was further confirmed by a biopsy from the region of L5-S1 (Fig. 2). Surgical debridement and drainage were performed on September 22, 2000. *Aeromonas hydrophila* was also found to be resistant to imipenem-cilastatin from culture of the abscess and drainage. The antibiotic regimen was again changed to gentamicin. Subsequently, a 45-day course of antibiotic treatment was completed, and the patient was discharged while still taking oral cotrimoxazole



**Fig. 1** (A) Magnetic resonance image (sagittal plane) indicating heterogeneous hyperintensity on T1W1 from L4-5 to the sacral spine resulting from *Aeromonas hydrophila* infection in a cirrhotic patient. (B) Magnetic resonance image (axial view) with Gd-DTPA enhancement revealing non-traumatic acute osteomyelitis with spinal nerve root compression in the fifth lumbar vertebra. (C) Magnetic resonance image (sagittal plane) demonstrating heterogeneous hyperintensity on T2W1 with compression of the thecal sac.



**Fig. 2** Histological examination with H&E stain ( $\times 100$ ) demonstrating acute and chronic inflammation from the biopsy of L4-5 to the sacral spine on February 1, 2002.

on October 4, 2000 with minimal symptoms of low back pain and leg weakness. He was regularly followed-up for liver cirrhosis and hepatitis B at our OPD until August 15, 2002. Liver cirrhosis and a nodule were detected using repeat abdominal ultrasound examination, but a recent CT scan was negative for malignancy. He had completely recovered from the initial symptoms and signs except for mild back pain.

## DISCUSSION

It has been proposed that soft tissue acts as a nidus for systemic contamination from *Aeromonas*, presumably through a break in the mucosa of either the gastrointestinal tract or the skin.<sup>(1,4-6)</sup> Since our patient exhibited no skin or surgical wound, the route of transmission of *Aeromonas hydrophila* was unclear. However, it was very likely that the infection was transmitted via the gastrointestinal tract.

*Aeromonas* infection as a well-recognized intestinal pathogen accounted for approximately 6% of all bacterial gastroenteritis cases reported by Munoz et al. in 1994.<sup>(7)</sup> In addition, *Aeromonas* infection has been reported to lead to severe opportunistic infections, such as diarrhea, perianal abscess, endocarditis, cellulitis, necrotizing fasciitis, cholangitis, peritonitis, traumatic osteomyelitis, and meningitis in children and immunocompromised adults.<sup>(2,5,6,8)</sup> To the best of our knowledge, *Aeromonas hydrophila* has never been reported to be

a pathogen for non-traumatic acute osteomyelitis in patients with liver cirrhosis, although one patient with acute myelogenous leukemia who contracted non-traumatic acute osteomyelitis following a complete course of chemotherapy was reported.<sup>(9)</sup> Herein, we report on a case of decompensated liver cirrhosis with *A. hydrophila* infection presenting as non-traumatic acute osteomyelitis.

Plain radiography (at admission and 2 weeks after admission) showed no changes in the acute stage of osteomyelitis in this patient; a diagnosis of acute osteomyelitis was confirmed using MRI and a biopsy taken after the operation. The diagnosis of acute osteomyelitis has been shown to have 73% accuracy, 57%-81% specificity, and only 60%-82% sensitivity using plain radiography, while MRI studies have a higher diagnostic role, with 77%-96% sensitivity, 90%-94% accuracy, and 92%-100% specificity.<sup>(10,11)</sup>

The mortality rate for elective surgery was 83% in Child-Pugh C cirrhotic patients, even rising to nearly 100% for emergency surgery cases.<sup>(12,13)</sup> *Aeromonas* (gram-negative bacillus) has been found to be resistant to antibiotics, such as ceftizoxime, ciprofloxacin, and imipenem-cilastatin, during long-term use for osteomyelitis as occurred in our case. The *A. hydrophila* infection in the present case was finally successfully controlled using surgical debridement and drainage in addition to appropriate antibiotic therapy. Usually, surgical drainage should be performed as soon as possible once a diagnosis is determined.

*Aeromonas hydrophila* infection has been found to be frequently associated with malignancy and liver cirrhosis.<sup>(2)</sup> The association of *Aeromonas* infection with cirrhosis is not limited to *A. hydrophila* but also to other *Aeromonas* species as well. Data pertaining to the present case further support that once *A. hydrophila* bacteremia is found, prompt treatment with antibiotics and a thorough search for underlying malignant diseases or cirrhosis is critical,<sup>(1,2)</sup> because severe bacteremia usually leads to severe complications in patients with liver cirrhosis.<sup>(14)</sup> In a study reported by Ko et al, liver cirrhosis accounted for 36% (21/59) of the underlying diseases associated with *Aeromonas* bacteremia in Taiwan.<sup>(2)</sup> Their data further highlighted the significance of *Aeromonas* bacteremia for patients with decompensated liver cirrhosis. On the other hand,

empirical antibiotics should also be used to provide coverage for gram-negative microorganisms present among patients with decompensated cirrhotic, because such patients are also easily susceptible to these infectious agents.<sup>(15,16)</sup>

Although some *Aeromonas* bacteremic victims exhibited a history of direct exposure to contaminated water, fish, or infected wounds,<sup>(1,2,5)</sup> no transmission sources were identified for most patients with cirrhosis reported. The incubation period of *Aeromonas* infection typically lasts from about 8 to 48 hours according to studies on wound infection.<sup>(1)</sup> The present case exhibited obvious diarrhea both prior to and during the bacteremic episode, implying that the infection was transmitted via the gastrointestinal tract. The known factors leading to impaired immune function in decompensated liver cirrhosis are intrahepatic shunting, impairment of reticuloendothelial function, a decrease in serum complement, and deficient ascitic opsonism.<sup>(15-18)</sup> In 1998, Lin et al. proposed that the gastrointestinal system might be the source through which the organism reaches the circulatory system.<sup>(5)</sup> Bacterial translocation from the bowel is an important pathogenesis of infection in cirrhotic patients. Acute osteomyelitis may arise via subsequent hematogenous spread.<sup>(6,9,11)</sup>

This case showed that once *Aeromonas* bacteremia is identified in cirrhotic patients, a thorough search for an occult nidus of infection should be carried out. Non-traumatic acute osteomyelitis is highly suggested when a patient experiences severe back pain with no associated trauma.

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# 親水性單孢子菌菌血症以非創傷急性骨髓炎 表現於失代償性肝硬化病患

李承鴻 劉茂森 謝勝湖<sup>1</sup>

親水性單孢子菌是一低侵害性革蘭氏陰性菌，從未有親水性單孢子菌病原菌在肝硬化病患以非創傷急性骨髓炎表現。在此我們報告一位失代償性肝硬化病患合併親水性單孢子菌菌血症，以同時腹瀉及非創傷急性骨髓炎來表現。以往已知，一旦親水性單孢子菌菌血症產生，通常受感染的病人是免疫力受損的人，如肝硬化。肝硬化病患若出現嚴重下背痛，雖然未有外傷病史，應該想到有非創傷急性骨髓炎可能性，及早治療。(長庚醫誌 2003;26:520-4)

**關鍵字：**親水性單孢子菌，非創傷急性骨髓炎，肝硬化。

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長庚紀念醫院 台北院區 一般內科，<sup>1</sup>內分泌及新陳代謝科

受文日期：民國91年3月6日；接受刊載：民國91年12月31日。

索取抽印本處：謝勝湖醫師，長庚紀念醫院 內分泌及新陳代謝科。桃園縣333龜山鄉復興街5號。Tel.: (03)3281200轉8450; Fax: (03)3289410; E-mail: lee4570@cgmh.org.tw