Case Report

Fatal spontaneous bacterial peritonitis and necrotizing fasciitis with bacteraemia caused by 
Bacillus cereus in a patient with cirrhosis

Ya-Ling Lee,¹ Sheng-Dong Shih,² Yu-Jong Weng,³ Changhua Chen¹ and Chun-Eng Liu¹

¹Division of Infectious Diseases, Department of Internal Medicine, Changhua Christian Hospital, Changhua, Taiwan, ROC
²Department of Laboratory Medicine, Chiayi Veterans Hospital, Chia-Yi City, Taiwan, ROC
³Division of Gastroenterology and Hepatology, Department of Internal Medicine, Chia-Yi Veterans Hospital, Chia-Yi City, Taiwan, ROC

We report a case of spontaneous bacterial peritonitis and necrotizing fasciitis caused by Bacillus cereus in a cirrhotic patient without preceding disruption of skin or symptoms of gastroenteritis. This rapidly fatal infection due to B. cereus adds to the long list of aetiologies of infectious complications among patients with cirrhosis of the liver.

Introduction

Bacillus cereus is a ubiquitous Gram-positive or Gram-variable rod-like bacterium, and the widespread distribution of Bacillus species in nature explains its frequent isolation in the laboratory (Thomas, 2005; Vilas-Boas et al., 2007). The clinical isolate of B. cereus is usually regarded as a contaminant, but it can sometimes cause gastroenteritis, bacteraemia, pneumonia and, more rarely, necrotizing fasciitis, meningitis, endocarditis, endophthalmitis and peritoneal dialysis-related peritonitis (Miller et al., 1997; Gaur et al., 2001; Ruiz et al., 2006). Severe cases of B. cereus infections mainly occur in immunocompromised patients with leukaemia or other haematological malignancies, infants or intravenous drug users (Gaur et al., 2001; Hernaiz et al., 2003) and these infections are usually preceded by food intoxication, catheter insertion such as a ventriculoperitoneal shunt, trauma or surgical procedures (Tuaizono et al., 1979; Hernaiz et al., 2003; Vilas-Boas et al., 2007; Shimoni et al., 2008). Spontaneous bacterial peritonitis (SBP) and necrotizing fasciitis due to B. cereus are rare, however. We report herein a case of SBP and necrotizing fasciitis in a patient with cirrhosis of the liver.

Case report

A 47-year-old man was admitted to the hospital with presentations of progressive abdominal distension, leg oedema and jaundice that evolved together for more than 1 week. The patient had had a history of cirrhosis of the liver related to chronic hepatitis B virus infection for 3 years, which was complicated with oesophageal varices. He had led an otherwise uneventful life without episodes of variceal bleeding, SBP or hepatic encephalopathy over the past 3 years of follow-up at an outside hospital. He reported no diarrhoea, constipation, fever or altered consciousness, and could manage daily activities rather well during the first 4 days of hospitalization. His temperature and blood pressure were normal. Physical examination was remarkable for jaundice and icteric sclera; distended abdomen with shifting dullness; and no abdominal tenderness or rebound tenderness was found while pitting oedema was noted up to the mid-tibial region without skin lesions. The results of the blood tests on admission are shown in Table 1. Ultrasonography of the abdomen showed cirrhosis of the liver with splenomegaly, massive ascites and gall bladder wall thickening, but the common bile duct and intrahepatic duct were normal.

Based on the findings of physical and laboratory examinations, his stage of cirrhosis was classified as Child–Pugh class C on admission. Paracentesis was not performed initially. The patient was prescribed diuretics and intravenous albumin, and the ascites and oedema remitted gradually. In the early morning of the 5th hospital day, he experienced progressive disturbance of consciousness and fell over, causing ecchymosis on the right thigh, followed by hypotension, metabolic acidosis and acute renal failure, and the patient was admitted to the intensive care unit. Paracentesis was performed and analysis of the ascites specimen revealed a white-cell count of 8500 cells mm⁻³ with 95 % neutrophils and a red blood cell count of 4500 cells mm⁻³; the protein level was 1.8 g dl⁻¹ and the glucose level was 18 mg dl⁻¹ (serum glucose at the time of paracentesis, 172 mg dl⁻¹). The three sets of blood and ascites specimens were cultured in aerobic and anaerobic
blood culture bottles. The patient was started on intravenous ceftriaxone 2 g daily based on a presumptive diagnosis of SBP, pending the culture results. Progressive haemorrhagic bullae developed that extended from both thighs to the lower legs on the 6th hospital day. The bullae fluid was aspirated in a sterile syringe, which was transferred to the microbiology laboratory for aerobic and anaerobic cultures immediately. Gram staining of the aspirated bullae fluid revealed a few Gram-positive rods with endospores and no variability in staining. Ceftriaxone was switched to meropenem and metronidazole. Debridement was not performed because of the extremely unstable condition of the patient. Despite use of antibiotic therapy, inotropic agents and fluid resuscitation, he expired in the night of the 6th day of hospitalization due to septic shock. Progressive intravenous ceftriaxone 2 g daily based on a presumptive diagnosis of SBP, pending the culture results. "Progressive intravenous ceftriaxone 2 g daily based on a presumptive diagnosis of SBP, pending the culture results."

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minaemia, B. cereus entered the body through ingestion, followed by translocation through the intestinal mucosa, resulting in bacteraemia and peritonitis due to impaired phagocytosis resulting from the cirrhosis that failed to contain and eradicate the infection. The scenario is similar to that observed in two other much more common invasive diseases due to Aeromonas species and Vibrio species in Taiwan. Both species have the propensity to cause SBP, bacteraemia and necrotizing fasciitis in patients with cirrhosis of the liver (Ko et al., 1998; Lee et al., 2008).

Previous reports have suggested that B. cereus also has the potential to cause fulminant soft tissue infections that are indistinguishable from those due to clostridia, the majority of which have occurred in immunocompromised patients with neoplasms without antecedent trauma (Meredith et al., 1997; Mori et al., 2002). In one case of necrotizing fasciitis and brain abscess caused by B. cereus in a patient with myelodysplastic syndrome, B. cereus was isolated only from blood culture (Mori et al., 2002). The necrotizing fasciitis progressed within 1 week, without bullae formation; the brain abscess and necrotizing fasciitis were cured by a prolonged combination of antibiotics without surgery. In our patient, despite normal white-cell counts, the necrotizing fasciitis progressed to a lethal stage within 2 days. The fulminant presentation was similar to that of clostridial soft tissue infection.

Because invasive infections due to B. cereus are rare and guidelines are not available for the antibiotic susceptibility testing of Bacillus species by routine disk susceptibility tests, appropriate antibiotic therapy for such infections remains to be studied, though use of carbapenem or gentamicin plus clindamycin has been suggested (Hernaiz et al., 2003). B. cereus is often resistant to all β-lactams (except carbapenems) and imipenem seems to be active against almost all Bacillus species (Thomas, 2005). In this case, the patient received ceftriaxone as an empiric therapy, which is active against most of the intestinal pathogens causing SBP but is not active against B. cereus. The fatal outcome for this patient is likely due to the delay in timely initiation of effective antibiotic therapy and the advanced stage of cirrhosis of the liver.

In conclusion, B. cereus should be included in the list of aetiologies of SBP and necrotizing fasciitis in patients with cirrhosis of the liver when Gram-positive rods are identified in the clinical specimens.

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References


