CASE REPORT

NON-O1/NON-O139 *VIBRIO CHOLERAE* SEPTICEMIA WITH PERITONITIS

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Abstract. A 67-year-old Thai female with alcoholic cirrhosis presented with fever and abdominal pain for 5 days. On examination, there was marked ascites with generalized abdominal tenderness. The result of ascitic fluid analysis showed yellow turbid fluid, a WBC count of 6,100 cells/mm^3 with polymorphonucleocytes predominant. Blood cultures yielded non-O1/non-O139 *Vibrio cholerae*. The patient improved gradually and recovered fully after 1 week of parenteral antibiotic.

INTRODUCTION

Vibrio cholerae O-1 is generally regarded as a noninvasive enterotoxigenic organism causing gastroenteritis of various severity. Non-O1/non-O139 *V. cholerae*, although biochemically indistinguishable from *V. cholerae* O1, has often been associated with extraintestinal infection (Morris and Black, 1985). We report here a case of bacteremia with spontaneous bacterial peritonitis caused by non-O1/non-O139 *V. cholerae* in a patient with underlying liver disease.

CASE REPORT

A 67-year-old Thai woman with a history of alcoholic cirrhosis was admitted to Maharat Nakhon Ratchasima Hospital on October 1, 2007 with fever and abdominal pain for 5 days. On examination the patient was alert and cooperative but appeared sick looking. Her temperature was 39.5ºC, pulse 100 beats/minute, blood pressure 100/60 mmHg and respiratory rate 24 respirations per minute. She had mild pallor and icteric sclerae. She had signs of chronic liver disease, namely spider nevi and palmar erythema. She had marked ascites with generalized abdominal tenderness. There was no hepatosplenomegaly. Her lower extremities had marked edema. She had no focal neurological deficits or nuchal rigidity, but asterixis was observed. A complete blood count showed a hematocrit of 29.2%, WBC count of 7,000 cells/mm^3 with 94% polymorphonuclear cells, 3% lymphocytes and 3% monocytes and a platelet count of 77,000 cells/mm^3. The result of liver function tests were as follows: total bilirubin 4.0 mg/dl, direct bilirubin 1.6 mg/dl; alkaline phosphatase 146 U/dl, aspartate transaminase 48 U/dl; alanine transaminase 29 U/dl; albumin 2.6 g/dl and total protein 7.0 g/dl. A coaggulogram showed a prothrombin time of 19.5 seconds, partial thromboplastin time 46.6 seconds and thrombin time 25.8 seconds, International Normalize Ratio was 1.63. At the time of admission, 2 blood samples were drawn for culture before administration of the first dose of intravenous cefotaxime was given

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Table 1
Recommended antimicrobial therapy for non-O1/non-O139 *V. cholerae* infections.

Non-O1/non-O139 *V. cholerae* infection	Recommended antimicrobial therapy
Mild gastroenteritis	No antimicrobial therapy Oral rehydration only
Moderate to severe gastroenteritis	Ciprofloxacin, 500 mg PO bid for 3 days, or Doxycycline 100 mg PO bid for 3 days, or Norfloxacin, 400 mg bid for 3 days
Wound infection or cellulitis	Ceftazidime, 2 g IV tid, or Cefotaxime, 2 g IV tid, and/or Doxycycline, 100 mg IV bid, or Ciprofloxacin, 400 mg IV bid for 7-14 days
Septicemia	Ceftazidime, 2 g IV tid, or Cefotaxime, 2 g IV tid, and/or Doxycycline, 100 mg IV bid, or Ciprofloxacin, 400 mg IV bid for 7-14 days

at 1 g q8h. Abdominal paracentesis was performed after the antibiobic was given and the ascites fluid was sent for culture. The result of the ascitic fluid was as follows: yellow turbid ascitic fluid, WBC count of 6,100 cells/mm^3 (with 95% polymorphonuclear cells, and 5% lymphocytes), protein 1.7 g/dl, albumin 1.2 g/dl and no organisms were seen on Gram's stain or on culture. By the next morning the patient's abdominal complaints had resolved, her temperature decreased to 37.8ºC but asterixis was still present. Lactulose 30 cc was given orally for hepatic encephalopathy. Three days after admission, 2 blood cultures yielded non-O1/non-O139 *V. cholerae,* which was found to be susceptible to ampicillin, Co-trimoxazole, third-generation cephalosporins, gentamicin and fluoroquinolones. No organisms were detected in the ascitic fluid. The patient gradually improved. She fully recovered after 1 week of parenteral antibiotic therapy, then the treatment was switched to oral ciprofloxacin.

DISCUSSION

The vibrios are a group of gram-negative, curved or straight motile rods that normally inhabit the aquatic environment. Currenly, the genus consists of 51 species, of which at least 12 species are known to be associated with human diseases (Nair and Sack, 2003).

Strains of *V. cholerae* that do not agglutinate with O1 or O139 antiserum are known as non-O1/non-O139 *V. cholerae* (formerly called nonagglutinating vibrios). The non-O1/non-O139 *V. cholerae* serogroups comprise a heterogenous group, which give the same reactions on microbiological tests. Few laboratories perform serotyping of these strains since knowing the specific serogroup is not important clinically (Nair and Sack, 2003).

Non-O1/non-O139 *V. cholerae* organisms are distributed worldwide and are ubiquitous in a variety of water sources from fresh water rivers to oceans (Morris, 1990). They are concentrated in fish and shellfish and contaminate undercooked seafood.

Non-O1/non-O139 *V. cholerae* strains occasionally cause wound infections and sepsis, especially in patients with predisposing illnesses, such as chronic liver disease (cirrhosis), chronic kidney disease needing dialysis (chronic ambulatory peritoneal dialysis, hemodialysis, kidney transplantation), immunosup-

pressed patients (cytotoxic chemotherapy, steroid abuse), hematologic disease (leukemia, aplastic anemia, thalassemia), diabetes mellitus and postsplenectomy (Siegel and Rogers, 1982; Mc Cleskey *et al*,1986; Safrin *et al*, 1988; Dhar *et al*, 1989; Shelton *et al*, 1993; Lin *et al*, 1996; Ko *et al*, 1998; Berghmans *et al*, 2002; Youmbissi *et al*, 2003; El-Hiday *et al*, 2006).

Clinical features of patients with non-O1/non-O139 *V. cholerae* bacteremia consist of fever (100%), abdominal pain (70%), diarrhea (50%), skin lesions (45%), peritonitis (35%), hypotension (30%), encephalopathy (25%) and gastrointestinal bleeding (15%).The mortality rate is 50%. Most cases expire within 24 hours of admission (Thamlikitkul, 1990).

Spontaneous bacterial peritonitis is characterized by the spontaneous infection of ascitic fluid in the absence of an intraabdominal source of infection. The presence of at least 250 polymorphonuclear cells per cubic millimeter of ascitic fluid is diagnostic of this condition (Rimola *et al*,2000). Spontaneous bacterial peritonitis involves the translocation of bacteria from the intestinal lumen to the lymph nodes, with subsequent bacteremia and infection of ascitic fluid (Ginés *et al*, 2004). Thus, when non-O1/non-O139 *V. cholerae* bacteremia occurs in cirrhotic patients with ascites, vibrios may infect ascitic fluid and cause spontaneous bacterial peritonitis.

Numerous broard-spectrum antibiotics have been used to treat severe non-O1/non-O139 *V. cholerae* infections. Information to guide agent selection and dosing is limited, but most strains are sensitive *in vitro* to tetracycline, ciprofloxacin, and 3rd generation cephalosporins (Matthew and Gerald, 2005). Recommendations for treatment of patients with O-1/non-O139 *V. cholerae* infection are found in Table 1 (Daniels and Shafaie, 2000).

Four reports of non-O1/non-O139 *V. cholerae* bacteremia have been published in Thailand, three reports have appeared in the English-language literature and one in the Thai-language literature.

The first report, from Siriraj Hospital (Bangkok, Thailand), described a study of the clinical features of 20 patients with bacteremia due to other *Vibrio* species (Thamlikitkul, 1990). Of these patients, 10 were infected with non-O1/non-O139 *V. cholerae* (3 were infected with *V. vulnificus,* and 7 were infected with other *Vibrio* species). Of the 20 patients with bacteremia, 7 had peritonitis. No details regarding underlying diseases or of the clinical features in those patients with O-1/non-O139 *V. cholerae* infection were described.

The second report was from the Department of Pediatrics, Chulalongkorn University Hospital, Bangkok, Thailand (Thisyakorn and Reinprayoon, 1990). The patient, a 15-year-old girl with β-thalassemia/hemoglobin E disease, had undergone splenectomy 3 years prior to admission to the hospital. She presented with primary peritonitis and bacteremia of 2-days duration. Exploratory laparotomy disclosed 50 ml of peritoneal fluid that yielded non-O1/non-O139 *V. cholerae.* The patient's postoperative course was uneventful and she became afebrile on the fifth day of hospitalization.

The third report was from the Department of Pediatrics, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, Thailand (Laosombat *et al*, 1996), described non-O1/non-O139 *V. cholerae* bacteremia in 2 thalassemic patients with previous splenectomy. The diagnosis of peritonitis was made in one patient and exploratory laparotomy was done.

The fourth report was from Sappasitprasong Hospital, Ubon Ratchathani,Thailand (Weera, 2005), described 3 patients with bacteremia due to non-O1/non-O139 *V. cholerae*. All patients denied a history of diarrhea. One patient had underlying liver cirrhosis. Two patients denied any underlying disease, however cirrhosis was diagnosed after

the patient was admitted. There were no patients with peritonitis in this study.

Our patient's blood cultures yielded non-O1/non-O139 *V. cholerae* but no growth from the ascitic fluid, probably due to a delay in the time from paracentesis until the fluid was cultured.

In conclusion, non-O1/non-O139 *V. cholerae* extraintestinal infections are uncommon but have a high mortality rate. Clinicians should consider this diagnosis in cases of peritonitis and bacteremia in compromised patients.

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