Bullous cellulitis in cirrhotic patients – a rare but life-threatening infection caused by non-O1, non-O139 *Vibrio cholerae* bacteraemia

The article by Petsaris et al. (2010) regarding non-O1 *Vibrio cholerae* bacteraemia in a cirrhotic patient is interesting. Recently, we encountered a cirrhotic patient with small cell lung cancer who was admitted to our hospital because of superior vena cava syndrome and underwent concurrent radiotherapy and chemotherapy. However, he had sudden-onset septic shock on the seventh hospitalization day. No prominent infection focus was found except for bullae formation and red skin lesions on both the hands and forearms. The patient was suspected to have a nosocomial infection, therefore piperacillin/tazobactam (4.5 g every 6 h) was administered immediately, but he died 3 days later. The results of blood culture tests were obtained 3 days after his death, and two cultures tested positive for *V. cholerae*. *V. cholerae* infections are often associated with travel, seawater exposure or raw seafood ingestion. The O1 or O139 biotypes of *V. cholerae* may cause cholera and severe diarrhoea. However, non-O1, non-O139 *V. cholerae* causes not only diarrhoea but also extraintestinal infections such as cellulitis or bacteraemia, which often occur in immunocompromised patients, such as patients with cirrhosis (Cheng et al., 2004; Halabi et al., 1997; Ko et al., 1998; Lin et al., 1996; Petsaris et al., 2010), transplantation (Choi et al., 2003) and malignancy (Berghmans et al., 2002). *V. cholerae* bacteraemia is rare but critical because the mortality rates are extremely high, ranging from 23.8% to 47% (Jabeen et al., 2010; Ko et al., 1998; Lin et al., 1996). In cirrhotic patients, decreased phagocytic activity of the reticuloendothelial system and high intestinal permeability may facilitate the passage of bacteria to the regional lymph nodes and systemic circulation, thereby leading to the development of *V. cholerae* bacteraemia (Lin et al., 1996). Hepatitis B and C are endemic to Taiwan, a tropical island (Chen et al., 2007); further, liver cirrhosis is not uncommon here. The clinical characteristics and the prognosis predictor of such critical patients must be elucidated to ensure early detection and adequate treatment of this condition and to reduce the high mortality rate. Tetracycline and fluoroquinolone are the common antimicrobial agents used for treating *V. cholerae* infection (Swerdlow & Ries, 1992; Anderson et al., 2004). Alternatively, sulfamethoxazole/trimethoprim (SMZ/TMP) has also been used for treating these infections but there has been an increase in resistance to this. However, treatment guidelines in such patients have not been established because of the low number of cases.

Through a computer-assisted search of medical records, we retrospectively reviewed all patients with non-O1, non-O139 *V. cholerae* blood isolates at the Kaohsiung Medical University Hospital, Taiwan, between January 1990 and May 2010. Non-O1, non-O139 *V. cholerae* bacteraemia was identified in 16 patients (15 men and 1 woman). The demographics, systemic diseases, clinical presentations, treatment and prognosis of these patients were recorded using a case record form.

Fifteen of the 16 patients with *V. cholerae* bacteraemia were cirrhotic. Most patients (10 patients, 62.5%) experienced bacteraemia in the warmer months (March–September). Fourteen patients had community-acquired bacteraemia, and two patients developed *V. cholerae* bacteraemia more than 48 h after admission. Only one patient remembered consuming raw seafood before the onset of bacteraemia. Seafood soup and porridge are very popular in Taiwan, and the Taiwanese believe that fresh seafood is good for the unwell. Consumption of improperly cooked seafood may be fatal to cirrhotic patients. The retrospective design may result in a recall bias, where identifying the possible source of *V. cholerae* may not be possible.

Fever (12 patients, 75%) was the most common disease manifestation, followed by conscious disturbance (seven patients, 43%) and diarrhoea, abdominal fullness and abdominal pain (six patients, 37.5%). The other manifestations, including ascites, jaundice, pleural effusion, lower-leg pitting oedema, bullous cellulitis and acute renal failure, were relatively uncommon. The overall mortality rate was 37.5% (6/16). We found that bullous cellulitis was one of the uncommon manifestations (4/16, 25%), but the mortality rate of patients with this manifestation was up to 75% (3/4). However, the association of bullous cellulitis and mortality was not statistically significant ($P = 0.11$; Fisher’s exact test, two-tailed); this finding might be attributed to the rarity of this condition.

All our isolated strains of *V. cholerae* were sensitive to tetracycline; however, two strains were resistant to SMZ/TMP and two were resistant to ampicillin. All our patients who died of *V. cholerae* bacteraemia had been administered β-lactam derivatives, including piperacillin/tazobactam and ceftriaxone. The administration of inappropriate antibiotics for treating *V. cholerae* bacteraemia may have led to high mortality, but the diagnosis could only be made when the culture reports were obtained several days later. Therefore, early prescription of tetracycline or fluoroquinolone antibiotics may be performed if the development of bullous cellulitis is detected in cirrhotic patients who present signs of sepsis.

To conclude, we accumulated more clinical evidence suggesting that bullous cellulitis is a rare but life-threatening manifestation in cirrhotic patients and that...
it must be regarded as an important clinical clue for *V. cholerae* bacteraemia. Early detection of the disease and early administration of effective antibiotics may reduce the mortality.

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