

Case report

Botulism-like symptoms in an immunocompetent patient with *Clostridium subterminale* bacteremiaMarytere Carrasquillo^a, Lisa L. Dever^{a,*}, Alexandra Sonyey^b^a Division of Infectious Diseases, Department of Medicine Rutgers New Jersey Medical School Newark, NJ, United States^b Department of Medicine and Infectious Diseases, VA New Jersey Health Care System East Orange, NJ, United States

A B S T R A C T

Clostridium subterminale is a low virulence species of *Clostridium* that is an infrequent cause of human infections. We report a case of *C. subterminale* bacteremia in an immunocompetent patient who developed botulism-like symptoms.

Introduction

Clostridium subterminale are ubiquitous in nature, commonly isolated from soil and the gastrointestinal tract of animals, including humans. The bacteria are of low pathogenicity but have been linked to skin and soft tissue infections, primarily as a result of direct inoculation from the environment [1–3], mediastinitis [4], and bacteremia [4–6]. A potential link between botulism-like disease and *C. subterminale* infection was suggested in one report in a patient with *C. subterminale* bacteremia and mediastinitis [4], but not in other reported cases. We present an immunocompetent patient with bacteremia due to *C. subterminale* who developed bulbar symptoms.

Case report

A 58-year old homeless man with a history of chronic untreated hepatitis C and injection drug use presented to the medical center with complaints of diffuse abdominal pain, fatigue, excessive sleepiness, and lower extremities weakness for two days. Physical examination revealed a temperature of 97.7 °F, blood pressure of 133/104 mmHg, heart rate of 84 beats per minute, respiratory rate of 20 breaths per minute, and oxygen saturation of 98% on room air. Our patient was awake, oriented to person only and appeared frail and in moderate distress. He had diffuse abdominal tenderness to palpation without rebound or guarding. Bowel sounds were diminished, but present in all quadrants. Neurological examination was limited due to the patient's inability to cooperate. There were no cranial nerve deficits and his speech was fluent. He moved bilateral upper and lower extremities spontaneously, but motor and sensory function could not be fully assessed. His reflexes were normal except for diminished Achilles reflexes

bilaterally. The remaining of his physical examination was unremarkable.

Laboratory data was significant for ammonia of 122 mmol/L, lactic acid of 3.36 mmol/L, BUN of 226 mg/dL, creatinine of 5.7 mg/L (baseline 1.0 mg/dL), mild elevations in aspartate aminotransferase and alanine aminotransferase, and metabolic acidosis with an anion gap of 28. Left pneumoperitoneum was present on his chest radiograph (Fig. 1). CT of the abdomen (Fig. 2) confirmed extensive free intraperitoneal air, likely due to bowel infarction, and a cirrhotic liver with probable hepatic carcinoma. CT of the head demonstrated ill-defined low-attenuation changes within both posterior inferior cerebellar hemispheres of uncertain etiology (possibly subacute ischemic changes), vague area of low attenuation in the left occipital pole and patchy areas of low attenuation scattered about the subcortical white matter. The patient was treated with empiric intravenous vancomycin 750 mg every 12 h and piperacillin-tazobactam 3.375 every 6 h.

He underwent exploratory laparotomy that failed to reveal signs of gross perforation. His postoperative course was complicated by failure to wean from the ventilator, and flaccid paralysis. He was extubated four days post-operatively, but had ongoing signs of bulbar dysfunction including dysarthria, dysphagia, poor clearance of oropharyngeal secretions, and hypotonic muscles in both upper and lower extremities. Admission blood cultures grew *C. subterminale* in one of four bottles. Intravenous clindamycin 600 mg every 6 h was added for potential mediation of toxin production. Within 24 h, his symptoms improved with decrease in dysarthria and improvement in muscular strength. Repeat blood cultures were negative. Peritoneal fluid culture grew a susceptible *Escherichia coli* and antibacterials were changed to a combination of intravenous levofloxacin 500 mg every 24 h with metronidazole 500 mg every 8 h. The patient had complete resolution of

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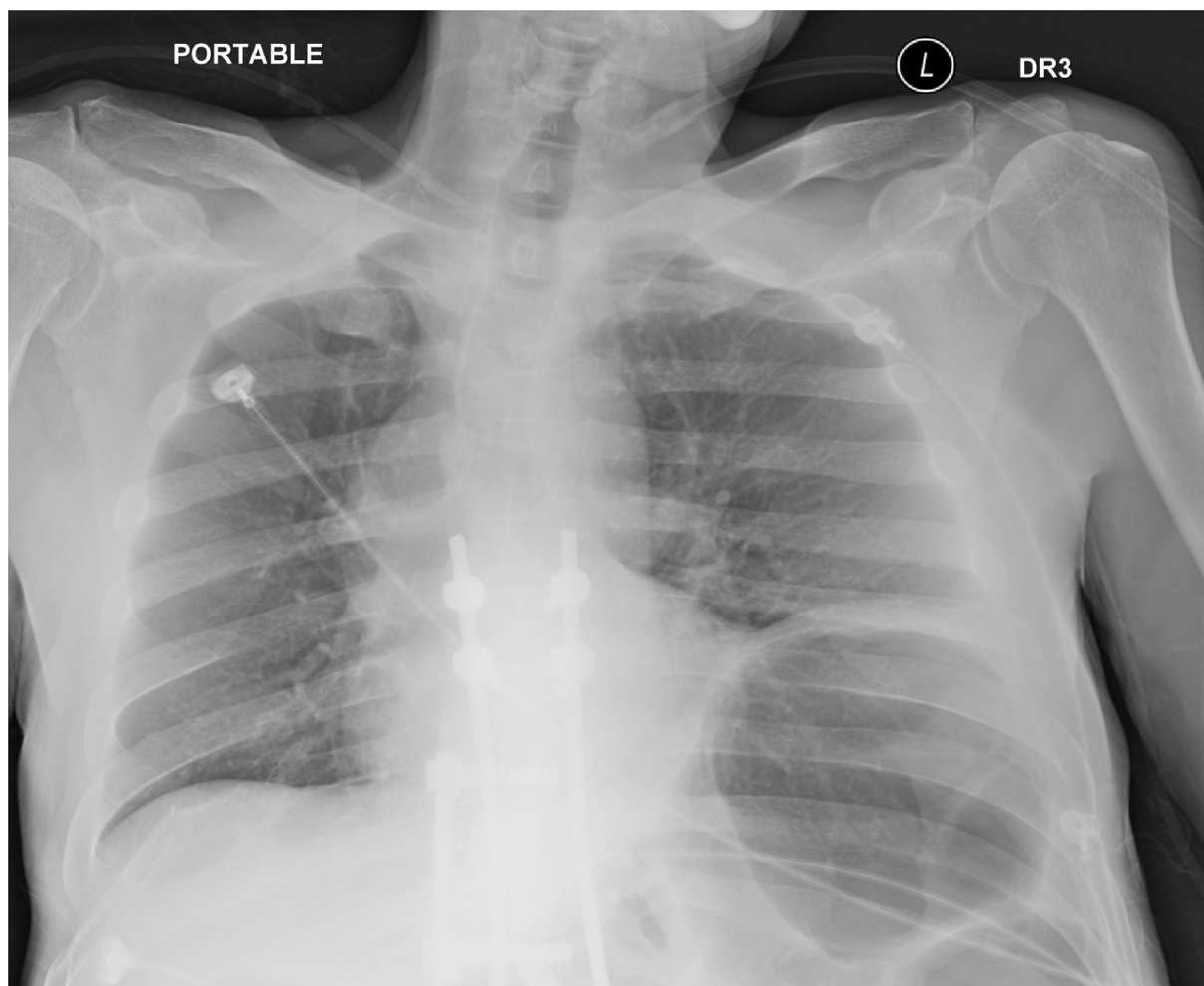


Fig. 1. Chest radiograph demonstrating a left-sided pneumoperitoneum.

bulbar symptoms and flaccid paralysis by day ten of hospitalization, but on day 18 he developed new onset seizures attributed to hepatic encephalopathy. He sustained hypoxic brain injury with persistent myoclonus. Comfort measures were instituted and the patient expired five days later.

Discussion

Clostridium species are ubiquitous in the environment and can be part of the normal gastrointestinal and female genital tract flora. *C. subterminale* is most frequently isolated from the soil and rarely associated with human infections. Most of the reported cases were skin and soft tissue-associated with direct inoculation of the bacteria from intravenous illicit drug injection [1], severe frost bite [2], or open fracture [3]. Review of the English literature yielded only four reported cases of *C. subterminale* bacteremia; three in immunocompromised patients and only one in an immunocompetent host. There is a notable association between the disruption of mucosal barriers and invasive *C. subterminale* infection. Examples from the literature include a patient with chronic myelogenous leukemia with severe mucositis following allogeneic cord blood transplantation [5], a neutropenic patient with T-cell acute lymphoblastic leukemia and perianal ulceration [6], a patient with adenocarcinoma of the esophagus and possible mucosal damage during stent migration [7], an immunocompetent patient with bacteremia after spontaneous esophageal rupture [4], and a patient with bowel perforation. Interestingly, both our patient and the patient with bacteremia following esophageal rupture [4], developed botulism-like symptoms. Although we cannot confirm that our patient's bulbar

symptoms were related to *C. subterminale* infection, the organism shares characteristics of *C. botulinum*. Both have subterminal endospores, the ability to produce botulinum toxin G [8], and type B neurotoxin genes may be present in some strains of *C. subterminale* [9].

The *C. subterminale* isolate from our patient was not tested for botulinum toxin production, but clinical and radiological studies failed to reveal any other conditions that would explain acute onset bulbar dysfunction (such as infarction of the medulla, or malignancy of the brainstem). The significant cranial nerve involvement made critical illness polyneuropathy and myopathy unlikely. Guillain-Barre is also unlikely given the absence of infection preceding the onset of muscular weakness and cranial nerves dysfunction.

In summary, *C. subterminale* is a rare cause of bacteremia in patients with disrupted mucosal barriers. Although most cases occur in immunocompromised patients, the infection can occur in immunocompetent patients as well. Clinicians should be alerted to the association of botulism-like symptoms whenever *C. subterminale* infection is diagnosed.

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Conflicts of interest

The authors report no conflicts of interest.



Fig. 2. CT of the abdomen showing pneumoperitoneum, liver cirrhosis, dilated air-filled loops of large bowel and ascites.

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