



## Case report

*Clostridium subterminale* septicemia in an immunocompetent patient

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## ABSTRACT

*Clostridium subterminale* is a *Clostridium* species that has been rarely isolated in the blood of immunocompromised patients. We report a case of *C. subterminale* septicemia in an immunocompetent patient who presented with acute mediastinitis following spontaneous esophageal rupture.

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## Introduction

Organisms of the genus *Clostridium* are ubiquitously found in the soil, sewage, marine sediments and decaying vegetation. They can also be part of the indigenous microbiota of the gastrointestinal and female genital tract [1]. Human infections with Clostridia range from localized wound contamination to overwhelming, toxin-mediated systemic disease, such as food poisoning, gas gangrene (caused by *C. perfringens*), antimicrobial associated colitis (caused by *C. difficile*), tetanus and botulism (caused by *C. tetani* and *C. botulinum*, respectively). *Clostridium* spp. are the second most common cause of anaerobic bacteremia after *Bacteroides* spp with *C. perfringens* being the most commonly isolated species in the blood, followed by *C. septicum* [2]. To our knowledge, *C. subterminale* bacteremia has been previously reported only in three immunocompromised adult patients [3–5].

We present a case of *C. subterminale* septicemia in an immunocompetent patient who developed acute mediastinitis following spontaneous esophageal rupture.

## Case report

A 50 year-old man presented to the emergency department with acute retrosternal pain and dyspnea after choking during

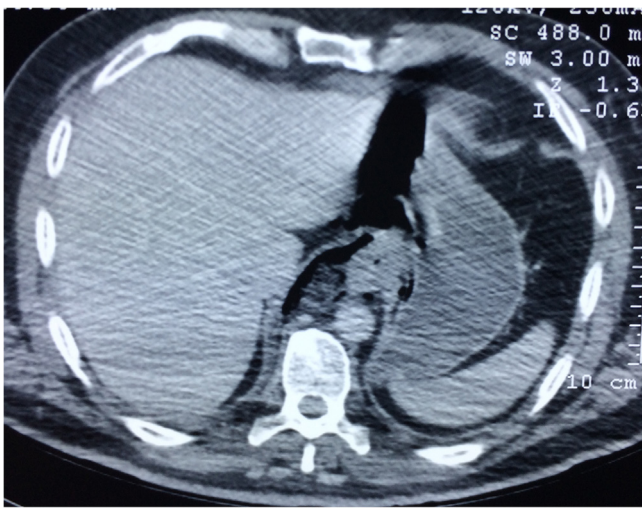
ingestion of a meal of greens, followed by a forceful vomiting. He developed subcutaneous emphysema of the neck and chest with severe airway compromise and was intubated emergently. A CT scan revealed pneumomediastinum and a paraesophageal fluid collection above the esophagogastric junction (Fig. 1). He was transferred to the operating room where through a left posterolateral thoracotomy the esophagus was inspected but a rupture was not detected. Exploration of the subdiaphragmatic esophagus through a midline laparoscopy was also unremarkable. A small amount of purulent pleural effusion was drained and revealed high amylase levels (Table 1). Pleural fluid culture did not grow any microorganisms.

After surgery, the patient was transferred to the ICU with signs of septic shock (fever, leukocytosis, tachycardia and hemodynamic instability). Although he was started on iv imipenem, vancomycin and metronidazole he remained febrile and hemodynamically unstable. On postoperative day 14 *Clostridium subterminale* was isolated from a blood culture and identified by Vitek 2 automated system (Biomérieux). A new CT scan of the chest showed a nonhomogeneous paraesophageal effusion (Fig. 2). Under CT guidance a diagnostic puncture of this effusion was performed and yielded purulent material but without any growth of microorganisms.

The patient underwent a right thoracotomy and a collection of pus and food residuals was drained from the lower mediastinum. During the next two days he significantly improved and was awakened with good muscle strength and Glasgow Coma Scale of 15. After a successful spontaneous breathing trial he was extubated but shortly after he developed a dramatic clinical picture with signs of bulbar dysfunction i.e. weak cough, disordered swallowing

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**Fig. 1.** Lung CT scan showing pneumomediastinum and a paraesophageal fluid collection above the esophagogastric junction.

**Table 1**  
Pleural fluid characteristics.

Hct	7%
Cells	>75,000/mm <sup>3</sup>
PMN	100%
Glucose	7 mg/dl
LDH	1134 U/L
Protein	4,24 g/dl
Amylase	23,830 U/L



**Fig. 2.** Lung CT scan showing a large paraesophageal fluid collection with areas of hypodensity.

and dysphonia. Although he did not develop hypoxemia or hypercapnia he had to be reintubated for airway protection. A tracheostomy was subsequently performed. A barium swallow test revealed microaspiration during swallowing. Brain CT scan was normal. Anti-acetylcholine receptor (AChR) antibody test was negative. The patient remained awake, afebrile and hemodynamically stable on spontaneous breathing through the tracheostomy tube and was transferred to the ward. His bulbar function was

gradually restored and the tracheostomy tube was removed ten days later.

## Discussion

*C. subterminale* is a *Clostridium* species closely related to *C. botulinum* group IV, which has rarely been associated with human disease [6]. It has been occasionally isolated from soft tissue and pleuropulmonary infections [7–10].

To our knowledge, only three cases of *C. subterminale* bacteremia have been reported in adults in the English literature. All three of them occurred in immunosuppressed hosts. The first patient had a history of chronic myelogenous leukemia and had undergone allogeneic cord blood transplantation after total body irradiation and chemotherapy. She became neutropenic, developed severe mucositis and during a febrile episode two weeks post-transplant *C. subterminale* was isolated from the blood [3]. The second patient was on chemotherapy for T-cell acute lymphoblastic leukemia and presented with neutropenia, sepsis and hemorrhoidal pain due to ulceration near the anal verge with erythema and induration of the perianal area. *C. subterminale* was identified in the blood [4]. The third patient had adenocarcinoma of the esophagus with lung and thoracic spine metastases. He had undergone endoscopic placement of an esophageal stent and underwent repeat endoscopy one week later because of suspected stent migration. A few days after the last endoscopy he was admitted with signs of infection and a blood culture grew *C. subterminale* [5]. In all the above cases there was evidence of mucosal damage which may have facilitated entry of *C. subterminale* into the bloodstream from the patients' gut microflora. Indeed, mucositis was an independent predictor of bacteremia in a study of 23 bone marrow transplant recipients with anaerobic bloodstream infections [11].

This is the first reported case of *C. subterminale* septicemia in a previously healthy, immunocompetent host. The patient presented with spontaneous esophageal rupture after forceful vomiting (Boerhaave syndrome). The episode followed ingestion of a meal consisting of greens. Although a tear of the esophagus was not detected during the first thoracotomy, high amylase levels in the pleural fluid were suggestive of esophageal rupture and this was confirmed by the subsequent thoracotomy which revealed a pus collection with food residuals in the mediastinum. Bacteremia was likely secondary to acute mediastinitis caused by greens contaminated with *C. subterminale*. Failure to isolate the bacterium from the mediastinal pus could be due to its stringent transport and growth requirements. Alternatively, the microorganism might comprised part of the patient's gastrointestinal microbiota and have spread into the mediastinum through an esophageal defect.

Antimicrobial susceptibility of the isolate was not tested at our laboratory. However, although variable resistance to cephalosporins, tetracyclines, aminoglycosides and quinolones has been reported, most *Clostridium* species are sensitive to carbapenems, glycopeptides and metronidazole [1]. Lack of response of our patient to treatment with these agents was not due to resistance but rather to the presence of a mediastinal abscess since surgical debridement of the mediastinum led to rapid clinical improvement.

An intriguing question arising from this case is whether the transient bulbar dysfunction that was noted after extubation could have represented a manifestation of a mild form of botulism. Other causes of bulbar dysfunction were excluded by the clinical signs, brain imaging and autoantibody testing. Furthermore, lack of limb muscle and diaphragmatic weakness argue against critical illness polyneuropathy. *Clostridium subterminale* is known to produce botulinum toxin G, that has occasionally been isolated from

autopsy specimens, although it has not been clearly implicated as a cause of paralytic illness [6]. As the presence of botulinum toxin was not tested at our institution, the possibility of a botulism-like disease with cranial nerve involvement in our patient can only be speculative.

In conclusion, detection of *C. subterminale* in the blood of an immunocompetent patient should prompt investigation for a potential source of infection which may need surgical debridement in addition to antimicrobial therapy.

#### Conflict of interest

Authors declare no conflict of interest.

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