Case report

Clostridium bacteremia and its implications: A case report

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A R T I C L E   I N F O

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A B S T R A C T

Background: The Clostridium species is a gram positive, anaerobic, rod-shaped microbe that is known to produce many toxins. Most infections by the Clostridium species involve C. botulinum, C. difficile, and C. perfringens. However, other types of Clostridium species are also clinically relevant, such as C. septicum and C. tertium.

Case summary: We discuss a case of a 79-year-old patient with a past medical history of prostate cancer and alcohol abuse who presented to the hospital after being found down. They were admitted to the ICU for septic shock, and initial blood cultures grew C. septicum, C. tertium, and E. coli. A CT of the abdomen and pelvis with IV contrast showed pneumoperitoneum and a loculated pericolic fluid collection concerning for colon perforation. Initially the patient had a benign abdominal exam, but later developed significant distention and tenderness that required an emergent exploratory laparotomy and total abdominal colectomy. The patient was found to have three separate colon perforations, and no malignancy on histopathology.

Discussion: C. septicum is a highly virulent pathogen, and there are several cases reporting C. septicum-associated endocarditis, aortitis, and endophthalmitis. It is also associated with colon and hematologic malignancies and neutropenia. Common risk factors for C. tertium include immunocompromised status, neutropenia, hematologic malignancy, exposure to beta-lactam antibiotics, cirrhosis, and intestinal mucosal damage. It seems to have low virulence and low mortality when treated correctly. It is important that any patient found to have Clostridium bacteremia be evaluated for a gastrointestinal source and treated promptly and appropriately.

Introduction

The Clostridium species is a gram positive, anaerobic, rod-shaped microbe. It is known to produce a large number of toxins compared to other bacteria [1]. It is usually found in the natural environment, the gastrointestinal tract, and female genital tract [2]. Most infections by the Clostridium species involve C. botulinum, C. difficile, and C. perfringens. However, other types of Clostridium species are also clinically relevant, such as C. septicum and C. tertium.

In the following report, we present a rare case of a patient who initially presented with C. septicum, C. tertium, and E. coli bacteremia with benign abdominal findings. While blood cultures during the hospital course persistently grew only E. coli with resolved C. septicum and C. tertium, the patient developed an increasingly distended and tender abdomen. Further evaluation revealed multiple perforations of the intestinal tract that required emergent surgery.

Case

A 79-year-old patient with a past medical history of prostate cancer and alcohol abuse presented to the hospital after being found down by a family member. Further history revealed that they suffered a mechanical fall five days prior to being found. They were admitted to the ICU for septic shock. Initial blood cultures grew C. septicum, C. tertium, and E. coli, and the patient was started on ceftriaxone 2 g IV. Repeat blood cultures three days later were negative, and one week later the patient was able to be weaned off vasopressors and downgraded from the ICU.

Another set of blood cultures were drawn due to persistent fevers and grew Bacteroides ovatus. At this time, the Infectious Disease team was consulted who switched the patient to Zosyn 3.375 g IV. A CT of the abdomen and pelvis with IV contrast was obtained due to mild abdominal distension in the setting of recent C. septicum and C. tertium bacteremia. The imaging showed pneumoperitoneum and a loculated pericolic fluid collection concerning for colon perforation, as seen in Fig. 1. The location raised suspicion for cecal versus ascending colon

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neoplasm. General surgery was consulted for further evaluation, and initially no surgical interventions were performed due to a relatively benign abdominal exam. That same evening, however, the patient developed significant abdominal distention with diffuse tenderness requiring an emergent exploratory laparotomy, total abdominal colectomy, and end ileostomy.

Intraoperatively, there were three separate perforations found in the large bowel at the cecum, splenic flexure, and proximal sigmoid colon. Pathology results showed that the colon had patchy areas of ischemic colitis and ulceration, focal transmural necrosis, serosal adhesions, and acute and chronic serositis, without any malignancy identified. Three days postoperatively, the patient developed a diffuse maculopapular rash that was concerning for a beta lactam reaction, so they were switched from Zosyn to meropenem 1 g every 8 h. They continued to spike fevers, so another CT abdomen and pelvis with oral and IV contrast showing right subhepatic fluid collection. The imaging showed a right subhepatic fluid collection.

Fig. 1. CT abdomen pelvis with IV contrast showing pericolic fluid collection.

Fig. 2. CT abdomen and pelvis with oral and IV contrast showing right subhepatic fluid collection.

As previously mentioned, both C. septicum and C. tertium infections are relatively uncommon. C. septicum only accounts for about 5% of total Clostridial infections, while C. tertium even less [1,3]. Nevertheless, the literature shows that these infections are clinically relevant since they can cause multiple complications and have a high morbidity. C. septicum is a highly virulent and aggressive pathogen, and there are several cases reporting C. septicum-associated endocarditis, aortitis, and endophthalmitis [4]. C. septicum is also strongly associated with colon and hematologic malignancies and neutropenia [5]. It is thought that colorectal tumors create an acidic environment in which C. septicum can survive due to its anaerobic and spore-forming properties [5]. Given this, all patients found to have C. septicum infection should be evaluated for any colon malignancy. Our patient interestingly did not have any findings concerning for malignancy on histopathology.

C. tertium is different from other Clostridium since it does not produce a toxin [6]. This infection is most common in immunocompromised hosts [7]. Other common risk factors include neutropenia as a result of hematologic malignancy, previous exposure to beta-lactam antibiotics, particularly third generation cephalosporins, cirrhosis, and intestinal mucosal damage [8,9]. Though our patient had a history of prostate cancer, they were not undergoing active treatment at the time of admission, nor did they have any known hematologic malignancies. They also did not have any recent antibiotic use. Many patients with C. tertium infection present with fever and generalized abdominal complaints, but there have also been cases in which patients are completely asymptomatic. It seems to have low virulence and low mortality when treated correctly, so effective treatment should not be delayed [7].

About 0.5–2% of positive blood cultures are due to Clostridium species [2]. Yamamoto et. al reviewed 40 cases of patients with Clostridium bacteremia and found that the most common species isolated was C. perfringens. Two of the patients had C. septicum, and one had C. tertium, which were the 4th and 5th most common species, respectively. Twenty-five of these patients had polymicrobial bacteremia, with E. coli being the most common species identified. Our patient was also found to have E. coli in the blood, likely from the same gastrointestinal source. There have not been many reported cases of patients like ours with initially asymptomatic colonic perforations causing Clostridium bacteremia. Symptoms such as nausea, vomiting, abdominal pain, hypotension, and acute hemolysis have been associated with an increased 7-day mortality [10].

Our patient initially had no abdominal symptoms. They were thought to have a relatively stable bacteremia but were later found to have multiple bowel perforations of unclear etiology. It is peculiar that they did not develop any abdominal symptoms until almost two weeks after their initial presentation. Though the gastrointestinal tract is a known source of Clostridium, it is not often considered in the differential for patients found to bacteremic secondary to such. Our patient unfortunately did not undergo a CT of the abdomen until almost halfway through the hospitalization, which likely delayed the overall recovery. This case also shows the importance of accurately identifying the causative microbe and providing timely and adequate treatment, since clostridium bacteremia has a high rate of almost 60% mortality [10].

Ethical approval

Not applicable.

Consent

Verbal informed consent was obtained from the patient for publication of this case report and accompanying images.

CRediT authorship contribution statement

Sruthi Bonda: Conceptualization, Writing – original draft, Writing – review & editing. Kevin Lee: Conceptualization, Writing – review & editing. John Rovig: Writing – review & editing. Shadaba Asad: Supervision.
Conflict of interest statement

The authors report there are no competing interests to declare.

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