

CLINICAL VIGNETTE

Case Study: An Unusual Cause of Sepsis

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A 98-year-old male with multiple chronic medical problems, including ischemic cardiomyopathy, was brought to the Emergency Room (ER) for chest pain that lasted 25 minutes. By the time he arrived in the ER, his chest pain had improved with the aspirin 325mg and nitroglycerin that he received in the ambulance. His caregiver also reported that he had been having melena for the prior 4-5 days with 1-2 loose stools a day. His past history includes hypertension, chronic kidney disease, and chronic gastrointestinal bleeding with transfusion dependent anemia. His medications include daily low dose aspirin with lansoprazole and naproxyn 1-2 tablets per week. He was admitted for evaluation of his chest pain in the setting of chronic gastrointestinal bleeding with hemoglobin 5.8 gm/dL on admission.

The patient lived in his own home with 24-hour caregiver support. He was dependent on his caregiver for transfers, bathing, dressing, and toileting.

On admission, he was afebrile with blood pressure between 91-137/40-72 mmHg and pulse between 76-102 beats per minute. His general examination was unremarkable except for left eye ptosis with possible erythema around the lids. He had a benign abdominal exam but was noted to have blood and stool in the rectal vault.

Within the first 24 hours of admission, his white blood cell count increased from 15 x 10E3/uL to 43 x 10E3/uL. Hemoglobin improved to 8.3 gm/dL after transfusion of two units of packed red blood cells but then dropped again to 6.9 gm/dL. His troponin I peaked at 0.10 ng/mL. Lactate increased from 7 mg/dL to 31 mg/dL.

Cardiology felt his troponin elevation was likely due to demand ischemia. Ophthalmology did not think his left peri-orbital findings were evidence of an active infection. Gastroenterology was following but deferred procedures due to his medical instability.

The patient was persistently hypotensive and started empirically on vancomycin and piperacillin-tazobactam for sepsis and transferred to the Intensive Care Unit (ICU). He remained hypotensive with systolic blood pressures of 70-80s despite intravenous fluid and blood products and started on pressors.

He developed abdominal pain after his transfer to the ICU. An abdomen and pelvis CT showed pancolitis and ileus of his small bowel. Blood cultures from admission returned with gram-positive rods suggestive of *Clostridium*.

He continued to deteriorate in the ICU and was switched to comfort care and expired on hospital day four.

Final blood cultures showed the speciation of *Clostridium* to be *Clostridium septicum*.

Discussion

Clostridium septicum is a gram-positive anaerobe. It is very rare relative to other *Clostridium* species. It is the primary causative agent of nontraumatic or spontaneous gas gangrene in humans and causes necrotizing enterocolitis. Spores disseminate from intestine to cause infection. The alpha-toxin forms pores in cells and induces rapid cell necrosis.^{1,2} The infection progresses rapidly and is frequently fatal.

All *Clostridium septicum* infections can be classified into seven anatomically based phenotypes.³ The most common (52%) is nontraumatic infection of the skin and soft tissue, which manifests as progressive cutaneous and myonecrosis with associated systemic illness. The second most common (23%) presentation was classified as "bacteremia" in which the diagnosis was initially made based solely upon blood culture. The clinical presentation often consists of diffuse abdominal pain and fever. For patients that undergo surgery, a portion of the bowel is noted to be grossly necrotic and neutropenic. The five remaining phenotypes (vascular, intraperitoneal, central nervous, musculoskeletal, and head/neck) comprise of the remaining 25% of cases. Surgical treatment, if possible, is the only treatment shown to improve survival.

Clostridium septicum is associated with colorectal cancer and hematological diseases.⁴ More than 70% of patients with incidence of *Clostridium septicum* infection also have concomitant cancer.³ The infection is more frequently fatal in patients with hematologic versus gastrointestinal malignancies. There is also a temporal relationship with chemotherapy and hormonal therapy, which suggests immunosuppression lowers the threshold for acquiring the infection.

Although rare, it is important to maintain a high clinical suspicion for *Clostridium septicum*, especially in those with concomitant cancer or have had immunosuppression. Early surgical treatment, if possible, is the only treatment to improve survival in an otherwise frequently fatal disease.

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