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CASE REPORT | LIVER

# *Clostridium tertium:* An Unusual Cause of Pyogenic Liver Abscess

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## ABSTRACT

Pyogenic liver abscess (PLA) is the result of portal vein pyemia, which usually originates from the hepatobiliary system or the gastrointestinal tract. Gram-negative organisms are the most common causative pathogens in PLA. *Clostridium tertium* is an anaerobic gram-positive, low-virulence organism that most commonly affects neutropenic patients with hematological malignancy and has not been reported to cause PLA. We report an unusual presentation of a *C. tertium* infection as a PLA in a previously healthy, immunocompetent patient with no identifiable source of portal pyemia.

## INTRODUCTION

Pyogenic liver abscess (PLA) accounts for nearly 48% of visceral abscesses.[1] Risk factors include diabetes mellitus, hepatobiliary disease such as gallstones, and malignant strictures and inflammation of the gastrointestinal (GI) tract.[2] PLA are usually polymicrobial, and single organisms should raise suspicion for systemic seeding and bacteremia. Pathogens that most commonly cause PLA are gram-negative organisms such as *Klebsiella pneumoniae* and *Eschirechia coli*, and gram-positive organisms such as *Streptococcus* species and anaerobes, most commonly *Bacteroides*.[3] *Clostridium tertium* is a low-virulence gram-positive anaerobe that lives in the GI tract. Infections typically occur in immunocompromised individuals, especially in those with hematological malignancies and neutropenia.

## CASE REPORT

A 70-year-old man was admitted for low blood pressure discovered during a routine clinic visit for depression. Past medical history was significant for chronic obstructive lung disease, hypertension, depression, and dilated cardiomyopathy with congestive heart failure. History revealed a weight loss of 18 kg, attributed to poor appetite over a period of 6 months, as well as light-headedness and fatigue. Review of systems was insignificant. Social history was significant for a 50-pack-year history of cigarette smoking but no alcohol consumption or recreational drug use. Vital signs on admission revealed blood pressure 74/48 mm Hg, regular heart rate of 76 beats/min, temperature 97.9°F, and respiratory rate 14 breaths/min. Physical exam was significant for dehydration and cachexia, and mild right upper quadrant (RUQ) tenderness was noted. Laboratory tests showed an elevated total leukocyte count of 11,400/$\mu$L but no bands, hemoglobin 11.4 g/dL, hematocrit 34.9%, mean corpuscular value 91 fL, and ferritin 378. Basic metabolic panel revealed an elevated blood urea nitrogen of 41 mg/dL and serum creatinine of 1.82 mg/dL, whereas electrolytes and liver enzymes were within normal limits. Non-contrast computed tomography (CT) of the abdomen and pelvis was insignificant. Blood cultures and urine culture were negative for any organisms. After medical stabilization, the patient was transferred to an inpatient psychiatry unit for suicidal ideation.

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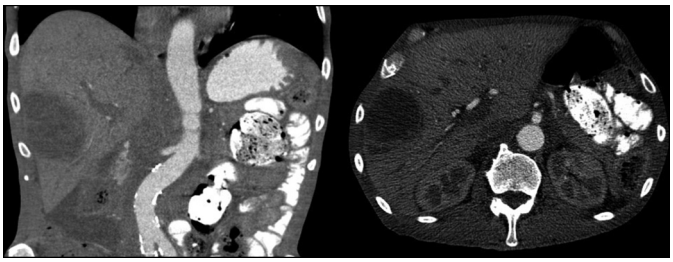

**Figure 1.** Abdominal computed tomography scan showing a 4.6 × 4.5 × 5.7 cm multi-loculated complex cystic mass in the right lobe of the liver.

Two weeks later, the patient complained of recurrent RUQ pain. Vital signs were within normal limits and physical exam revealed RUQ tenderness. Abdominal ultrasound revealed a complex mass measuring 56 × 51 mm in the right lobe of the liver, and triphasic CT showed a 4.6 × 4.5 × 5.7 cm multi-loculated complex cystic mass in the right lobe of the liver, which was not visible on the initial imaging study (Figure 1). Repeat blood cultures were negative. Abscess drainage was performed by interventional radiology, draining 150 mL of pus; the drain was left in place. Piperacillin-tazobactam was started. Abscess aspirate culture grew gram-positive rods, later identified as *Clostridium tertium* sensitive to amoxicillin/clavulanate, metronidazole, vancomycin, cefotetan, and imipenem. Antibiotics were switched to metronidazole. Colonoscopy to rule out occult sources of portal pyemia and malignancy was significant for sigmoid and descending colon diverticulosis. The patient received a total of 6 weeks of antibiotics; when the drain was removed after 4 weeks, repeat abdominal CT showed nearly complete resolution of the PLA (Figure 2).

**Figure 2.** Abdominal computed tomography scan showing a 1.8 × 1.1 cm low-density lesion in the right lobe of the liver, indicating nearly complete resolution of the pyogenic liver abscess.

## DISCUSSION

The incidence of liver abscess is 3.6/100,000 people in the United States, and it is the most common visceral abscess in the country.[4] Liver abscess most commonly involves the right lobe, most likely due to its larger size and greater blood supply compared to the left and caudate lobes. The presentation of PLA is variable, and the classic triad of RUQ pain, fever, and jaundice only occurs in approximately 10% of patients.[5] Other presenting symptoms may be anorexia, nausea, vomiting, or a single sign of the classic triad, as in this case. Proper history to evaluate for risk factors, clinical examination, and a high index of suspicion is required for timely diagnosis and management. Laboratory investigations may reveal leukocytosis and elevated inflammatory markers such as erythrocyte sedimentation rate, ferritin, or C-reactive protein. CT and ultrasound imaging are the preferred modalities for diagnosis, with sensitivities of 93–97% and 83–95%, respectively.[6-8] Typical findings on CT are peripherally enhancing, centrally hypo-attenuating lesions. Solid mass-like lesions have also been described.[9]

Management of PLA is essentially CT-guided percutaneous drainage and targeted antimicrobials based on sensitivities when available.[10] Criteria for percutaneous drainage are lesions >5 cm in size, failure of medical therapy, or impending signs of PLA rupture.[11] There are no guidelines as to the duration of antimicrobials; however, it is reasonable to start with parenteral antimicrobials and to switch the route to oral after at least 2 weeks when a clinical response is evident. Oral antimicrobials may be given for up to 6 weeks. Surgery is seldom needed, but may be required due to failure of percutaneous drainage and ruptured abscess.[12] Mortality from PLA is reported to be 2–14%, which has significantly decreased over the past few decades in light of advanced technology and improved antimicrobials.[13]

Despite the lack of risk factors, this patient developed a PLA secondary to an unusual pathogen in the absence of a hematological malignancy or neutropenia. Local liver inflammatory response likely explains the RUQ pain during his initial presentation in the absence of a visible PLA on the initial imaging study. However, within 2 weeks the PLA had grown to a significant size, possibly due to the low virulence of the organism. *C. tertium* has been implicated in abdominal infections, but this is the first reported case of PLA cause by this pathogen.[14-16] Although more common in neutropenic patients, there are reports of fatal infections in immunocompetent patients.[17] PLA should be identified promptly and treated aggressively with a prolonged course of antimicrobials, and serial imaging studies are necessary to confirm adequate response and resolution.

## DISCLOSURES

Author contributions: M. Barakat, S. Hernandez, J. Benoit, and S. Pourshahid wrote the manuscript. Y. Mamoon and GT Martin supervised and edited the manuscript. M. Barakat is the article guarantor.

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