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# Rapidly developing, large pyogenic liver abscesses in the setting of pancreatic cancer

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## ABSTRACT

We report a case of multiple, giant, polymicrobial pyogenic liver abscesses that developed within 3 months in a patient with a recent pancreatic cancer diagnosis. He presented with fatigue, abdominal distension, abdominal pain, dyspnea, and lower extremity edema and was treated with intravenous antibiotics and percutaneous hepatic abscess catheter placement. Abscess fluid cultures were polymicrobial. Unfortunately, he developed septic shock with bacteremia and multiorgan failure and died after 6 days of hospitalization. Pyogenic liver abscesses are increasingly common in the United States, especially those associated with malignancy.

**KEYWORDS** Hepatic abscess; infectious disease; oncology; pancreatic cancer

Pyogenic liver abscess (PLA) is a potentially life-threatening condition associated with significant morbidity and mortality. In the past several decades, the overall incidence of PLA has been slowly increasing,<sup>1</sup> with an increasing incidence of PLAs associated with cancer. Treatment of patients with PLAs has also changed rapidly with the introduction of interventional procedures such as percutaneous drainage.<sup>2</sup> In this report, we describe a case of a patient who developed multiple, giant, polymicrobial pyogenic liver abscesses within a span of 3 months in the setting of a recent pancreatic cancer diagnosis.

## CASE PRESENTATION

A 70-year old man presented to the emergency department with complaints of fatigue, abdominal distension, dyspnea, and increased lower extremity edema over 1 week. Three months earlier, he was diagnosed with stage IV pancreatic cancer via endoscopic ultrasound and fine-needle aspiration. At that time, a staging computed tomography (CT) of the abdomen revealed a 4.4 × 3.7 cm mass within the pancreatic head. Dilation of the pancreatic duct to 9 mm was seen without intrahepatic or extrahepatic biliary ductal dilation. Heterogenous enhancement of the liver was noted

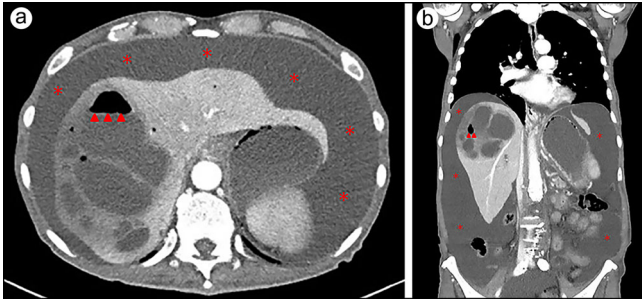
without masses. His history was also notable for metal biliary stent placement for recurrent pancreatitis and biliary stricture via endoscopic retrograde cholangiopancreatography 6 months prior to his cancer diagnosis.

He had been directed to the emergency department after a strikingly abnormal repeat CT of the abdomen that showed numerous new air-containing and rim-enhancing fluid collections with surrounding parenchymal edema essentially replacing most of the right hepatic lobe (*Figure 1*). These findings were most consistent with abscesses, the largest of which measured 8 × 6 × 10 cm. On further review of systems, the patient denied any fevers, chills, nausea, vomiting, diarrhea, confusion, or recent travel. Vital signs revealed a temperature of 36.4°C, pulse of 105 beats/min, blood pressure of 70/49 mm Hg, respiratory rate of 16 breaths/min, and oxygen saturation of 90% on 2 L of oxygen via nasal cannula. The patient's abdomen was distended with a fluid wave but there was no tenderness on palpation. Pitting edema was present in the lower extremities. Laboratory evaluations revealed hemoglobin of 9.0 g/dL, white blood cell count of 18.9 × 10<sup>9</sup>/L, platelet count of 334 × 10<sup>9</sup>/L, international normalized ratio of 1.8, sodium level of 122 mmol/L, bicarbonate of 21 mmol/L, total bilirubin of 0.9 mg/dL, alanine aminotransferase of 51 U/L, aspartate aminotransferase of 41 U/L, alkaline phosphatase of 190 U/L, and lactate

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**Figure 1.** (a) Axial and (b) coronal CT scans of the abdomen at the time of admission showing multiple liver abscesses with air-fluid levels (arrowheads) essentially replacing most of the right hepatic lobe. The largest abscess measured 8 × 6 × 10 cm. Large volume ascites (asterisks) are also noted.

of 2.7 mmol/L. The patient was started empirically on piperacillin/tazobactam, given 2 L of normal saline, and admitted to the hospital. His blood pressure improved somewhat to 111/61 mm Hg after these measures.

On admission, interventional radiology placed two abdominal pigtail catheters and a percutaneous hepatic abscess drain. Contrast injected through the hepatic abscess cavity did not show a clear communication to the biliary tree. However, an underlying biliary connection remained in the differential. Both blood cultures were positive for *Streptococcus constellatus*. Ascitic fluid drawn from the pigtail catheters revealed signs of secondary bacterial peritonitis with an absolute neutrophil count of 5577 cells/mm<sup>3</sup>, but subsequent cultures lacked growth. Cultures drawn from the hepatic abscesses showed polymicrobial growth of *S. constellatus*, *Escherichia coli*, *Prevotella buccae*, *Candida lusitanae*, and *Slackia exigua*. Infectious disease was consulted, and antibiotics were changed to cefepime and metronidazole.

The patient remained stable until hospital day 3, when he developed atrial fibrillation with rapid ventricular response. Despite aggressive resuscitative measures, he developed dyspnea and acute hypoxic respiratory failure requiring continuous positive airway pressure and was transferred to the intensive care unit. On hospital day 5, he had large-volume melena, became more unstable, and was intubated for mechanical ventilation while requiring norepinephrine and vasopressin drips for hemodynamic support. Nonbleeding grade 1 esophageal varices along with a previously placed biliary stent with internal debris were noted on emergent upper endoscopy. On hospital day 6, after extensive discussions with the patient's family, the decision was made to transition him to comfort measures with no further escalation of care given his poor prognosis. The patient expired shortly after extubation.

## DISCUSSION

We describe a case of a patient with pancreatic cancer who developed multiple, large pyogenic liver abscesses. Of notable importance in this case, the abscesses developed rapidly within the span of 3 months. In the last several decades, reports have shown an increase in prevalence of PLA in the United States from 2.7 to 4.1 per 100,000 population.<sup>1</sup> PLA

has also been reported to occur in roughly 1 in 7000 hospital admissions, depending on the region.<sup>3</sup>

The most common etiology of PLA is biliary tract disease,<sup>4-6</sup> but other risk factors include hepatobiliary or pancreatic malignancy, liver transplant, diabetes mellitus, and use of proton pump inhibitors.<sup>2,7-9</sup> Most PLAs are polymicrobial, with *Streptococcus*, enteric facultative species (e.g., *E. coli* and *K. pneumoniae*), and anaerobes (e.g., *Bacteroides* spp., *Fusobacterium* spp.) being the most common pathogens.<sup>1,10</sup> There has been an increasing incidence of fungal growth in PLA as well.<sup>2</sup> The cause of our patient's hepatic abscesses was likely multifactorial, including pancreatic cancer and biliary tract disease requiring a metal common bile duct stent. Although the biliary stent appeared patent on imaging, the presence of hardware and instrumentation via endoscopic retrograde cholangiopancreatography may have introduced polymicrobes into the biliary tract and liver. *S. constellatus* grew in blood and abscess cultures, suggesting a potential biliary source for our patient's bacteremia. It is also possible that the endoscopic ultrasound and biopsy during the patient's cancer diagnosis may have seeded infection, potentially leading to the liver abscesses.

Treatment for PLA includes intravenous antibiotics that provide coverage for gram-positive (particularly *Streptococcus*), gram-negative, and anaerobic pathogens. Often recommended is use of a third or later generation cephalosporin (e.g., ceftriaxone or cefepime) plus metronidazole. Metronidazole is typically added to most regimens to provide coverage for anaerobic organisms as well as *E. histolytica*.<sup>5</sup> PLA may also be treated with percutaneous drainage, which has been shown to be an effective and relatively safe procedure to treat both singular and multiple liver abscesses.<sup>11</sup> Some studies have shown that for particularly large abscesses (>5 cm) and multilocular abscesses, surgical drainage is an effective treatment.<sup>12</sup> Endoscopic ultrasound-guided drainage is an emerging and promising therapy for PLA, particularly for lesions not accessible by percutaneous drainage.<sup>13,14</sup> In our case, the patient received indwelling peritoneal drainage, which may have increased the risk of worsening infection and contributed to clinical decompensation. Abdominal pigtail catheters may be used, however, in a palliative setting.

In conclusion, PLAs are becoming more common in the United States, especially those associated with malignancy. Patients with hepatobiliary or pancreatic malignancies are at increased risk due to biliary obstruction and possible immunosuppression from chemotherapy. This case serves as an example of multiple, large hepatic abscesses that developed rapidly in the setting of pancreatic cancer, contributing to our patient's death.

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## Avocations



“Indian Paintbrush.” Photo copyright © Rolando M. Solis, MD. Dr. Solis is co-medical director of the Cardiopulmonary Rehabilitation Program at Baylor Scott & White The Heart Hospital Plano, Plano, Texas (e-mail: [rmsolis@mac.com](mailto:rmsolis@mac.com)).