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Visual Diagnosis Pearl

A Liver Abscess Leading to Embolic Lung Showering

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A 55-year-old man presented to the emergency department (ED) with right upper quadrant abdominal and upper back pain. He reported 2 months of anorexia, 40-pound unintentional weight loss, mid-back pain with inspiration, nonproductive cough, subjective fevers, chills, and malaise. His history includes type 2 diabetes, 30 pack-year smoking, gout, Guillain-Barré syndrome on Intravenous Immunoglobulin (IVIG), and a prior pancreatic duct stricture requiring a biliary stent, with removal complicated by chronic pancreatitis.

Presenting vital signs were notable for fever to 103° Fahrenheit and tachycardia to 110 bpm. On exam, he had marked right upper quadrant and epigastric tenderness. Labs showed leukocytosis (14,700/μL) with neutrophil predominance (89.6%) and anemia (hemoglobin 9.2 g/dL). CMP was notable for hyponatremia (131 mmol/L), normal adjusted calcium (10.6 mg/dL), elevated AST 59 IU/L and ALT 81 IU/L, mildly elevated alkaline phosphatase (202 IU/L), and low albumin (2.1 g/dL). He was found to have multiple bilateral cavitory lung lesions, seen in the computed tomography (CT) chest with intravenous (IV) contrast image (See Figure 1 B,C.), with the largest mass measuring 4 cm. One year previously a CT chest with IV contrast was performed and no lesions were seen.

He was immediately placed on broad spectrum IV antibiotics and fluconazole. He was also found to have multiple liver abscesses, as seen in the magnetic resonance image (MRI) (Figure 1. A), that eventually required interventional radiology (IR) guided drain placement. The drainage from the liver grew *Klebsiella pneumoniae* (*K. pneumoniae*). He was continued on long-term IV antibiotics due to the severity of his liver and lung abscesses. Given the high likelihood that the lung lesions represented septic emboli—seen on CT chest as peripheral, thick-walled cavitory lesions—it is presumed he had *K. pneumoniae* bacteremia despite negative blood cultures. A decision was made to defer lung biopsy to exclude malignancy, opting instead for short-interval follow-up CT of the chest at six weeks while continuing antibiotic therapy.

DISCUSSION

Hypervirulent strains of *K. pneumoniae* accounts for most liver abscesses (~80%) complicated by septic emboli and is associated with significant morbidity and mortality.¹ Other potential pathogens include *Escherichia coli*, *Streptococcus viridans*, *Staphylococcus aureus*, and anaerobes. Polymicrobial infections occur in up to 79% of cases and may emerge

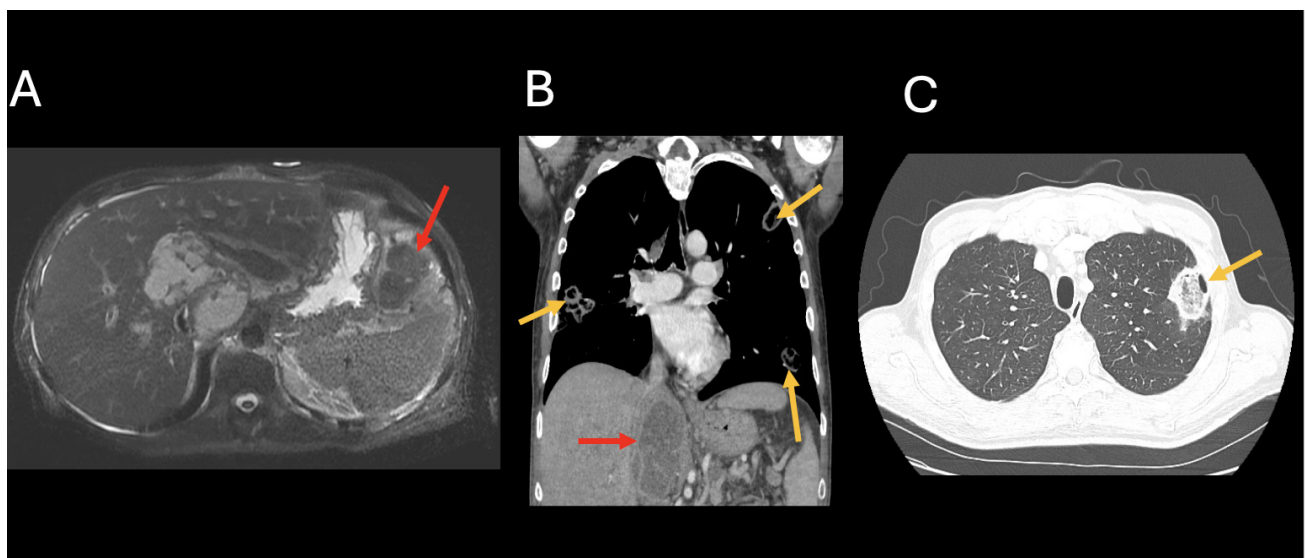


Figure 1. A: MRI with and without contrast showing a large multiloculated abscess in the caudate lobe of the liver (red arrow). B: CT Coronal view of chest revealing multiple cavitory pulmonary lesions (yellow arrows) and a large multiloculated abscess in the caudate lobe of the liver (red arrow). C: CT chest with IV contrast showing a left upper lobe cavitory pulmonary lesion abutting the pleura (yellow arrows).

secondary to invasive procedures which potentially may have been an inciting event as our patient had a biliary stent placed previously for a pancreatic stricture. Septic emboli to the lung, which can lead to cavitary lung lesions, is the most frequent metastatic end organ manifestation; however, involvement of the eyes (endophthalmitis), the central nervous system, and the musculoskeletal system can be seen as well. Patients typically present with fever, chills, abdominal pain, shortness of breath and cough.² Our patient had uncontrolled diabetes mellitus type II leading to further immune compromise and contributed to the showering of the bacterial emboli. Typical abnormal laboratory findings include leukocytosis, thrombocytopenia, elevated inflammatory markers, and elevated liver function tests. Septic pulmonary emboli, seen on CT, can reveal

characteristic findings including feeding vessel signs (79%), nodules with or without cavities (79%), pleural effusions (71%), peripheral wedge-shaped opacities (64%), and patchy ground-glass opacities (50%).³ Patients presenting with invasive *K. pneumoniae* liver abscess syndrome (IKLAS) require dual approach source control and antimicrobial therapy. Percutaneous catheter drainage is preferred for abscesses > 5 cm in size. Strict glycemic control can potentially prevent metastatic complications including septic pulmonary emboli leading to cavitary lesions. It is crucial to assess for metastatic infection when there is little to no clinical response. Overall, mortality in IKLAS ranges from 2-12%, with higher rates when complicated by septic shock and metastatic infections.



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