

## Altered Mental Status in an 81-Year-Old Man

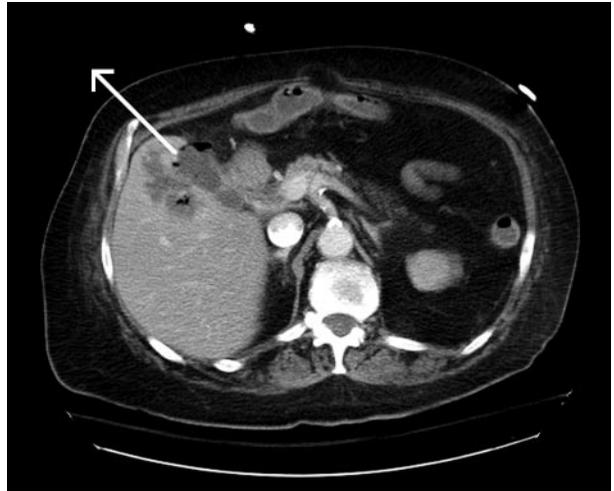
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### CASE PRESENTATION

An 81-year-old African-American man presented to the emergency department from a nursing home with acute mental status changes. His past medical history was significant for hypertension, end-stage renal disease requiring hemodialysis, and congestive heart failure with respiratory failure. His past surgical history was significant for a suprapubic catheter placement due to urethral stricture.

On physical examination, the patient was febrile and was on ventilatory support due to respiratory failure. He was arousable. Abdominal examination revealed suprapubic tenderness. Laboratory testing revealed a white blood cell count of  $23 \times 10^3/\mu\text{L}$  (normal,  $4.5\text{--}11.0 \times 10^3/\mu\text{L}$ ), and liver function panel results were as follows: total bilirubin, 2.0 mg/dL (normal, 0.3–1.1 mg/dL); direct bilirubin, 1.1 mg/dL (normal, 0.1–0.4 mg/dL); alkaline phosphatase, 262 U/L (normal, 35–150 U/L); aspartate aminotransferase, 291 U/L (normal, 1–36 U/L); and alanine aminotransferase, 65 U/L (normal, 1–45 U/L). Urinalysis was significant for 10 red blood cells/high-power field and was positive for leukocyte esterase. In the hospital, the patient required intubation and ventilation and aggressive resuscitative measures, including pressor support. The patient was treated with broad-spectrum antibiotics for presumed urosepsis-related septic shock. As his abdominal examination was unreliable, a computed tomography (CT) scan of the abdomen and pelvis was ordered (**Figure**).



**Figure.** Computed tomography scan of the abdomen of the case patient.

### WHAT IS YOUR DIAGNOSIS?

- (A) Acute cholecystitis
- (B) Amebic liver abscess
- (C) Chronic cholecystitis
- (D) Emphysematous cholecystitis with adjacent liver abscess

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**ANSWER**

The correct answer is (D), emphysematous cholecystitis with adjacent liver abscess.

**DISCUSSION**

This CT scan shows air collected intraluminally in the nondependent portion of the gallbladder. Air is seen in the anterior and posterior wall of the gallbladder body extending into the right lobe of the liver. Both emphysematous cholecystitis and acute cholecystitis present with gallbladder wall thickening, edema of the wall, and pericholecystic fluid; however, air in the wall and lumen of the gallbladder is pathognomonic of emphysematous cholecystitis. Acute cholecystitis and chronic cholecystitis are incorrect because they present without air in the gallbladder. In chronic cholecystitis, the gallbladder wall is thickened but there is no edema of the wall or pericholecystic fluid. A CT scan of amebic liver abscess would show a round, rim-enhancing, low-attenuation lesion, and the gallbladder would not be involved. Patients with amebic liver abscess would present more commonly with fever and right upper quadrant pain as well as weight loss, hepatomegaly, and jaundice.

**EMPHYSEMATOUS CHOLECYSTITIS**

Emphysematous cholecystitis, first described in 1901 by Stolz,<sup>1</sup> is an uncommon, rapidly progressing, life-threatening manifestation of acute cholecystitis, occurring in approximately 1% of all cases. Emphysematous cholecystitis may result in perforation of the gallbladder and death in up to 15% of cases.<sup>2,3</sup>

**Pathogenesis**

Similar to gangrenous cholecystitis, emphysematous cholecystitis is thought to occur as a result of primary vascular compromise.<sup>4</sup> This theory is supported by a higher incidence of endarteritis obliterans seen in pathology specimens.<sup>2</sup> Other causes of emphysematous cholecystitis are gallstone obstruction of the cystic duct (which leads to gallbladder wall edema and vascular compromise), diabetes, and infection with gas-producing organisms. The infecting bacteria are mainly *Clostridium* species as well as *Escherichia coli*, *Klebsiella* species, and anaerobic streptococci.<sup>2-4</sup>

**Evaluation**

The clinical presentation of emphysematous cholecystitis is much like that of acute cholecystitis. Symptoms include right upper quadrant pain, nausea, vomiting, and fever. Altered mental status can be a symptom of advanced disease. The diagnosis of emphysematous chole-

cystitis requires a high index of suspicion. The physician must consider the differences between emphysematous cholecystitis and acute cholecystitis (ie, predominance in males, higher incidence in patients with diabetes, higher incidence of gangrene and perforation, lower incidence of associated cholelithiasis) and the implications of a missed or delayed diagnosis, such as higher morbidity and mortality (15% mortality rate for emphysematous cholecystitis versus 4% for acute cholecystitis).<sup>2,4</sup> The physical examination usually reveals a tender, enlarged, tense gallbladder. Plain abdominal radiographs show gas in the least dependent portion of the gallbladder.<sup>3,5</sup> Gas is produced in the lumen and progresses first to the wall of the gallbladder and then into the surrounding pericholecystic tissue; this can be identified on the radiologic evaluation. CT or ultrasound are able to detect smaller amounts of gas in the beginning stages of disease before gas can be identified on plain radiograph.<sup>5</sup>

**Treatment**

Early cholecystectomy (open or laparoscopic) is the treatment of choice once emphysematous cholecystitis is diagnosed. Preoperatively and postoperatively patients should be given parenteral antibiotics targeted against *Clostridium* species, including broad-spectrum combinations such as a third-generation cephalosporin with metronidazole or clindamycin or piperacillin/tazobactam with metronidazole. If the patient cannot tolerate a general anesthetic, a percutaneous cholecystostomy tube can be placed for initial management with interval cholecystectomy.

**CLINICAL COURSE OF THE CASE PATIENT**

The patient was treated with intravenous antibiotics, and a percutaneous cholecystostomy tube was placed, as the family refused surgical intervention. The patient recuperated with conservative management and was discharged to the nursing home. **HP**

**REFERENCES**

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