

Diagnostic Challenge

Answer

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The answer is “c.” The CT image on page 527 shows air in the bladder and the bladder wall; in adjacent images the air extended to the penis. Emphysematous cystitis, described for the first time by Keyes in 1882, is an uncommon but severe form of lower urinary tract infection classically occurring in patients with diabetes. It occurs most often in women 55 years or older.¹ Beyond age and poor control of diabetes, other predisposing factors include chronic retention, neoplasm, renal transplant, cyclophosphamide therapy, recent instrumentation and immunosuppression.²⁻⁶

Aerobic and anaerobic microorganisms (e.g., *Escherichia coli*, *Enterobacter aerogenes*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Staphylococcus aureus*, streptococci and *Clostridium perfringens*) are usually implicated.^{2,3} Cases due to *Candida albicans* have also been reported.^{1,4} Carbon dioxide is the gas found in the vesical wall and results from the anaerobic fermentation of glucose present in the urine. The clinical findings include a tender hypogastrium, crepitus and pneumaturia in approximately one-third of cases. On cystoscopy, an inflammatory or necrotic bladder with gas bubbles under the mucous membrane has been likened to the appearance of champagne.⁴

The diagnosis of emphysematous cystitis is usually radiographic. Plain radiography can show a radiopaque ring in the pelvis area, a pneumobladder (edge clearly conforming to the detrusor and dissecting the vesical wall) and an air–fluid level in the pelvis.^{5,7} CT is more sensitive for these findings. Pneumaturia accompanied by fecaluria indicates a vesico–digestive fistula. Complications include necrotizing cystitis, emphysematous pyelonephritis and septic shock.⁴⁻⁶

Treatment involves goal-directed resuscitation, drainage of the bladder, broad-spectrum antibiotic guided by blood and urine cultures, and control of the glycosuria.

Our patient was taken to the operating room before

CT was done, with a provisional diagnosis of acalculous cholecystitis. A swollen gallbladder and an enlarged liver attributed to septic shock were identified, and cholecystectomy was performed. Postoperatively, fever and abdominal tenderness persisted, and crepitus at the base of the penis led to CT and definitive diagnosis. Aerobic urine and blood cultures remained negative. The patient was given imipenem and metronidazole, the diabetes stabilized and his condition improved. On day 15, repeat CT showed a healthy bladder free from the features of emphysematous cystitis.

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