



CASE REPORT

Emphysematous Cystitis: An Unusual Imaging-based Diagnosis

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Introduction

Emphysematous cystitis (EC) is defined by an acute gas-production bacterial infection, affecting the urinary bladder.^{1,2} In this rare situation, gas is identified within the bladder walls, with or without associated with free gas in the lumen of this organ. However, there are other causes for the presence of air inside the urinary tract, such as instrumentation, fistulae, and abscesses. Early diagnosis and treatment are crucial to avoid urinary sepsis, which could be fatal.

We describe a case of an elderly woman who developed EC during her admission for treating a small bowel obstruction. The imaging findings on the abdominal x-rays and multidetector computed tomography (MDCT) of the abdomen are described and illustrated.

Case Report

An 86-year-old female patient was admitted with complaints of nausea, anorexia, lethargy, and weight loss. The past medical history was otherwise irrelevant, except for an uneventful cholecystectomy, performed ten years earlier. She was found to have a small bowel obstruction, which was caused by an adenocarcinoma of the proximal ileum. The patient was submitted to ileostomy and resection of the tumor.

The patient presented symptoms of major depression after the intervention and

was kept institutionalized awaiting clinical improvement. In the course of her post-operative period, an abdominal x-ray demonstrated the presence of gas in the walls of the urinary bladder (Figure 1). The patient was neither diabetic nor immunosuppressed. She had no significant urinary symptoms, except for occasional episodes of urinary incontinence.



Figure 1. The frontal radiograph of the pelvis shows the presence of air within the urinary bladder walls, outlining its anatomy.

MDCT assessment (Figure 2) confirmed the emphysematous cystitis and showed no ureteral or renal involvement. The urine samples analysis and culture indicated the presence of *Escherichia coli* as the infective agent. A transurethral urinary bladder catheter was inserted to reduce the urinary

bladder pressure and the treatment with broad-spectrum antibiotics was prescribed.

The patient evolved well from the EC perspective, with no signs of urinary sepsis or local complications. The patient remained depressed, despite the resolution of the infectious process.

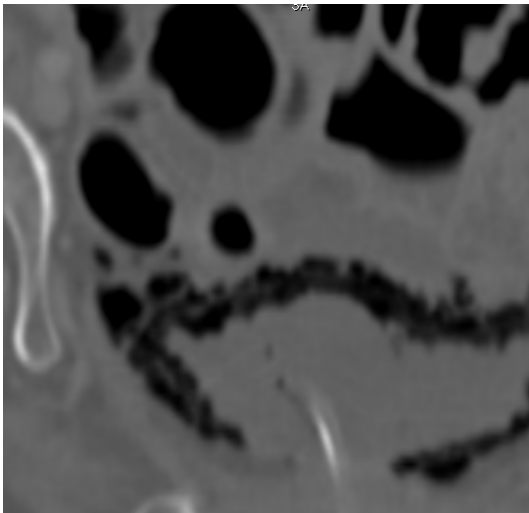


Figure 2. MDCT coronal reformat shows the presence of gas within the urinary bladder walls. No other signs of complication are noted. The transurethral catheter also can be identified inside the bladder.

Discussion

Patients with EC generally present with a predisposing underlying disease. Diabetes and immunosuppressive disorders are the most commonly reported associations.^{1,3} Other conditions, such as recurrent urinary tract infection (UTI), neurogenic bladder, and long-term urinary catheterization also are considered as risk factors.^{2,4} Similar to other types of UTI, EC is more prevalent in female patients. In the case reported, the catheterization during the gastro-intestinal operation and the advanced age of the patient were believed to be the precipitating factors for the EC.

The precise pathophysiology of EC has not been elucidated. In diabetic patients, most authors suggest that the exceeding

urine glucose, which is present in the majority of patients, would be fermented, resulting in an abnormal production of CO₂.⁵ The gas progressively would lead to higher intramural and intraluminal pressures, causing tissue ischemia and necrosis. *Escherichia coli* is the causative agent of EC in approximately 60% of cases, followed by *Klebsiella pneumonia*, *Proteus mirabilis*, *Candida albicans* and other microorganisms.⁶ Symptoms often include abdominal pain, dysuria, but might vary between asymptomatic and septic scenarios. The diagnosis is based on the demonstration of emphysematous walls of the urinary bladder on imaging studies, and the infection generally is confirmed on urinary tests. MDCT is also important for ruling out other complications, such as intra-abdominal collections and fistulae.

The abdominal x-ray frequently is diagnostic showing hyperlucent dots aligned on the shape of the bladder walls.² However, MDCT is more sensitive and can detect earlier cases, also showing gas within the bladder walls. Moreover, MDCT also provides relevant information for establishing differential diagnosis, especially fistulae and pelvic abscesses.

The isolation of the causal organism should not delay the treatment, and broad-spectrum antibiotics should be initiated as soon as the diagnosis of EC is suspected radiographically, especially in patients with predisposing conditions. Association of antifungal therapy also should be considered in severely immunosuppressed patients.⁷ The insertion of a transurethral catheter usually provides an improvement of tissue perfusion, by reducing the pressure on the bladder walls. Finally, an appropriate control of the glycemia is crucial, and may have significant prognostic implications. Surgery may be required in patients with necrosis of the bladder walls due to delayed diagnosis and in cases that have not

responded to a conservative treatment.⁸ Even with the appropriate management, the mortality rate is high, reaching 7-10% of all cases.³

References

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