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## Emphysematous Cystitis: A Case Complicated with Bilateral Hydroureteronephrosis

Umran Şumeyse Ertürk<sup>1</sup> , Kadir Yıldırım<sup>2</sup> 

### ABSTRACT

Emphysematous cystitis is a urinary tract infection with gas formation. Because of life-threatening complications, early diagnosis and treatment of emphysematous cystitis are essential. Many predisposing factors have been described, such as diabetes mellitus and neurogenic bladder. Hydroureteronephrosis without an obstructive lesion has been reported in some emphysematous cystitis cases. In this case report, a 74-year-old female patient was diagnosed with emphysematous cystitis and bilateral hydroureteronephrosis without any predisposing factor. We present the characteristics of the case in this report.

**Keywords:** Emphysematous cystitis, hydroureteronephrosis, bilateral hydroureteronephrosis

### INTRODUCTION

Emphysematous urinary tract infections belonging to the lower or upper urinary tract are associated with gas formation. Cystitis may occur with pyelitis or pyelonephritis (1). Diabetes mellitus and urinary tract obstruction are the most important risk factors. A significant proportion of the patients are women over 60 years of age (2). Abdominal pain, dysuria, pollakiuria, and urgency symptoms might be seen in patients with emphysematous cystitis. The diagnosis is made by imaging of the abdomen by direct radiography or computed tomography (CT) via detecting air in the bladder wall (3). *Escherichia coli* and *Klebsiella pneumoniae* are common isolated microorganisms (2). Bacteremia is generally observed in half of the cases. Most cases can be cured by medical treatment and rarely require bladder debridement or partial or total cystectomy (4). In this case, a rare clinical presentation of emphysematous cystitis was observed.

### CASE REPORT

A 74-year-old female was admitted to the emergency department because of fatigue, loss of appetite, and fever. She had no known chronic disease and no history of taking any medication. In the first evaluation, the patient had a high fever (38.2°C) and tachycardia. Blood pressure was 120/70 mmHg. The acute phase reactant levels were high (CRP: 244 mg/L, WBC: 11,300/mm<sup>3</sup>, and ESR: 68 mm/h), and acute kidney injury was detected (urea: 183 mg/dL and creatinine: 2.4 mg/dL). The patient was hospitalized in the infectious disease ward. Blood and urine samples were taken for culture tests. Pyuria was detected from the urinalysis. Ceftriaxone treatment was initiated empirically with the clinical diagnosis of sepsis. Grade 1-2 hydroureteronephrosis and trabecular bladder wall appearance were detected in urinary system ultrasonography. Abdominal CT was performed for detecting urinary stones without intravenous contrast. CT showed decrease in the size of the kidneys (right kidney: 8.5×6 cm, left kidney: 7×4 cm), grade 3 right hydroureteronephrosis, and grade 2 left hydroureteronephrosis. No stone was observed in the bilateral urinary tract. Air-fluid appearance was observed in the bladder lumen, and the air bubbles were also detected in the submucosal area in the bladder. The bladder wall was diffusely thickened. Radiological findings supported emphysematous cystitis (Fig. 1 and 2). Urinary catheter was inserted based on CT findings. There were no risk factors for immunosuppression (blood glucose level: 98 mg/dL, HbA1c: 5.6%, Anti-HIV: Negative). *E. coli* was isolated from blood and urine cultures. The isolate was susceptible to common antibiotics used for urinary system infections (Becton, Dickinson and Company 7 Loveton Circle Sparks, Maryland 21152, USA). The patient recovered gradually; acute phase laboratory test findings indicated return to normal values. Renal dysfunction also improved. Antibiotic regimen of 14 days was completed. Upon full recovery, the patient was discharged from the hospital.

### DISCUSSION

Emphysematous urinary tract infections are life-threatening diseases. Delay in diagnosis may result in sepsis and bladder rupture in patients (5). Rectovesical, colovesical, and enterovesical fistula should be considered in the dif-

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<sup>1</sup>Department of Infectious  
Disease, King Hamad  
University Hospital, Bahrain  
<sup>2</sup>Department of Urology, Elazığ  
Fethi Sekin City Hospital,  
Elazığ, Turkey

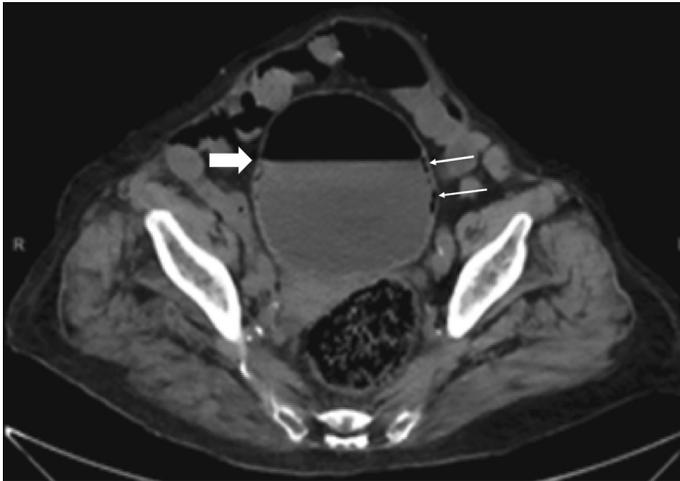
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**Correspondence**  
Umran Şumeyse Ertürk,  
Department of Infectious  
Disease, King Hamad  
University Hospital, Bahrain  
Phone: +973 3220 9581  
e-mail:  
drumran\_08@hotmail.com

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**Figure 1.** Computed tomography image showing distension of the urinary bladder with diffuse intramural gas (thin arrows) and intraluminal gas-fluid level (thick arrow)

ferential diagnosis if an air image is detected in the bladder lumen. As therapy, supportive treatment with intravenous parenteral antibiotic might be sufficient in most of the cases like in the presented case. Bladder irrigation may also be required in some cases (6).

Diabetes mellitus and neurogenic bladder have been described as the main risk factors for emphysematous cystitis. Although some of the patients with emphysematous cystitis did not have stenosis or hydronephrosis, these complications were observed in our patient (7). In the literature, hydronephrosis with emphysematous cystitis has been reported in one patient who was receiving chemotherapy for malignancy (8). Our patient did not have diabetes mellitus or any other immunocompetent, which is a rare situation. For this reason, physicians should consider the possibility of emphysematous cystitis in immunocompetent patients as well.

In conclusion, emphysematous cystitis and hydronephrosis can be seen in immunocompetent patients and may be treated with antibiotic and supportive therapy. The early diagnosis is life-saving. The revealing of gas shadow in the urinary bladder wall might be a clue of emphysematous cystitis, and the patients should be evaluated as soon as possible and appropriate therapy should be initiated promptly. It should be kept in mind that invasive procedures may be required in some cases.

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**Figure 2.** Computed tomography image showing diffuse intramural gas (thin arrows) and bilateral hydronephroretroperonephrosis (curved arrows)

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