Emphysematous Cystitis: A Case Report

Amfizematóz Sistit: Olgu Sunumu

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Özet

Anahtar Kelimeler
Amfizematóz Sistit; Diabetes Mellitus; Uriner Enfeksiyon

Abstract
Emphysematous cystitis is an infectious disease, which is characterized by accumulation of air within the lumen and wall of the bladder. Diabetes mellitus, neurogenic bladder and advanced age are important risk factors for the development of the disease. In this case report, we present a young diabetic male patient with neurogenic bladder, who was treated with the diagnosis of emphysematous cystitis.

Keywords
Emphysematous Cystitis; Diabetes Mellitus; Urinary Tract Infection.
Introduction

Emphysematous cystitis is a severe lower urinary tract infection, which is characterized by accumulation of air within lumen and wall of the bladder. Diabetes mellitus, neurogenic bladder and advanced age are important risk factors for development of emphysematous cystitis [1]. Clinical findings show a wide distribution; just as asymptomatic cases, lethal cases may be encountered with. Early diagnosis and treatment of emphysematous cystitis is extremely important in order to prevent serious morbidity, such as bladder necrosis, emphysematous pyelonephritis, and sepsis. As there is no typical clinical sign, diagnosis can be made by imaging studies rather than clinical. In this report, we present a case who admitted to our clinic with the complaint of suprapubic pain and eventually diagnosed with emphysematous cystitis by computed tomography (CT), and discuss the diagnosis and treatment of the disease in light of current literature.

Case Report

Twenty-nine-year-old male was admitted with complaints of one month-long suprapubic pain, a sensation of burning during urination, air bubbles coming from urethra, a feeling of residual urine, frequent urination more than 10 times a day and 6-7 times a night. Histories of type 1 diabetes mellitus, hypothyroidism, asthma, pneumothorax, cirrhosis and variceal bleeding were present in patient's medical history. Suprapubic tenderness was detected on physical examination. Laboratory analysis revealed that blood glucose level was 255 mg/dL, creatinine was 0.96 mg/dL, and leukocytes were 4400/mm3. Abundant leukocytes and erythrocytes were present in urinalysis. More than 105 colony forming units/mL of Escherichia coli, sensitive to ceftriaxone, were detected in urine culture. Abdominopelvic CT showed accumulation of air within lumen and wall of the bladder and multiple round radiodense bladder stones, the largest measuring 1 cm in diameter (Figure 1). The patient was hospitalized, intravenous ceftriaxone (1000 mg bid.) treatment was initiated, and elevation of blood glucose level was regulated by insulin. Pneumaturia was observed when urethral foley catheter was administered. At the 5th day of antibiotic therapy, control urine culture was negative and a cystolithotripsy procedure was planned for bladder stones. Urethra, bladder neck and prostate were observed normal in cystourethroscopy. There were no necrotic tissues or increased trabeculation in the bladder. A pneumatic lithotripter was used for fragmentation of a total of 11 stones in the bladder. Urethral foley catheter was removed on the 1st postoperative day. Suprapubic pain did not relieve postoperatively. Clean intermittent catheterization (CIC) was offered to the patient when his residual urine volume was measured as 500 mL on ultrasonography. The patient was released from the hospital with a prescription of 14-day oral antibiotic therapy. At 1st month follow-up, urodynamic study revealed detrusor underactivity. Diabetic cystopathy was considered and continuation of CIC therapy was deemed appropriate for the patient.

Discussion

Emphysematous cystitis is a rare bladder infection associated with gas production. The presence of gas in urinary tract was first described in 1671, in a patient stating that air coming from the urethra. By the late 1800s, Eisenlohr first detected intramural gas in the bladder at an autopsy. In 1961, Bailey defined the disease as emphysematous cystitis [2]. Emphysematous cystitis is usually seen in older diabetic females. In their prevalence study of 153 cases, Toyota et al. have reported that 63.4% of patients with emphysematous cystitis is women and 66.7% is diabetic [3]. Apart from diabetes mellitus, neurogenic bladder, urethral catheterization, vesicorectal fistula, end-stage renal failure, bladder outlet obstruction and immunosuppressive conditions are present among the risk factors for emphysematous cystitis. Our patient had both diabetes mellitus and neurogenic bladder. Mechanism of gas formation in emphysematous cystitis is not yet fully understood. A generally accepted one is the accumulation of carbon dioxide and hydrogen in tissues as a result of fermentation formed by infective organisms. The primary factor for gas production is thought to be increased glucose in urine and tissues for diabetic patients, and albumin or lactose for non-diabetics [4]. Gas formation resulting from fermentation process increases local pressure and leads to the deterioration of tissue perfusion and infarct. Clinical signs of emphysematous cystitis are nonspecific. Clinical manifestations vary from asymptomatic or mildly symptomatic cases to cases with peritonitis or even with septic shock. Prevalent symptoms include dysuria, hematuria, increased frequency of urination, fever, suprapubic pain and pneumaturia. Although pneumaturia is a more specific symptom than others, it is quite rare [5]. Thomas et al. have reported that 7% of cases is asymptomatic and incidentally detected by abdominal imaging [2].

As in our case, the most common causative agent of emphysematous cystitis is Escherichia coli. In addition, Klebsiella pneumoniae, Enterobacter aerogenes, Proteus mirabilis, Staphylococcus aureus, Streptococci, Clostridium perfringens and Candida albicans are other isolated organisms [6]. Radiologically, the most appropriate option is CT. The appearance of small, multiple gas filled vesicles under the bladder mucosa is a characteristic finding. Grupper et al. have reported that air can be seen in the bladder wall and bladder lumen in 94.4% and 3.7% of the cases, respectively [7]. In our case, air was present in both the wall and lumen of the bladder. Computed tomography is also useful for differential diagnosis of other pathologies that could create gas in the bladder, such as colovesical and vesicovaginal fistula, trauma, gas gangrenes of uterus and the vagina [8]. Ultrasound has a lower sensitiv-

![Figure 1](image-url)
ity than CT, it helps determine bladder wall thickening and increased echogenicity. Cystoscopy is not sufficient by itself in the diagnosis of emphysematous cystitis, but can be used to evaluate a possible bladder outlet obstruction.

Treatment of emphysematous cystitis includes broad spectrum antibiotics, urinary bladder drainage, blood glucose level control and correction of the underlying predisposing disease. Antibiotic treatment should be performed intravenously. There is no common consensus on the duration of antibiotic therapy. Broad-spectrum antibiotics, such as ceftriaxone, fluoroquinolones, aminoglycosides or carbapenem should be given until the causative agent isolated [9]. Surgery including partial or total cystectomies is rarely required. In their case series of 135 patients with emphysematous cystitis or pyelonephritis, Thomas et al. reported that 90% was treated medically while the remaining 10% underwent cystectomy or nephrectomy [2]. If not treated, the infection can give rise to bladder rupture, spread to the kidneys or ureter, or may even cause death [10]. Although the mortality rate is about 7% for emphysematous cystitis, this ratio increases up to 14% if the upper urinary tract is affected. Although emphysematous cystitis is generally seen in diabetic females, our case reminds that it should always be kept in mind in the differential diagnosis of all patients including young males, who present with pneumaturia or suprapubic pain. Abdomen CT should be the preferred radiological diagnostic method. As in this case, results of timely and appropriate antibiotic therapy, and surgical interventions aiming to cure underlying pathology, are very successful.

Competing interests
The authors declare that they have no competing interests.

References

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