

A Case of Emphysematous Cystitis Presenting with Acute Urine Retention in an Immunocompetent Host

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Abstract

Emphysematous cystitis is a very rare form of lower urinary tract infection with gas formation. It commonly presents with suprapubic pain associated with lower urinary tract symptoms (LUTS). Predisposing factors are old age, diabetes mellitus, female gender, urinary tract obstruction and neurogenic bladder. Most frequent causative pathogens are *Escherichia coli* and *Klebsiella pneumoniae*. Imaging is essential to confirm the diagnosis. Prompt treatment marks in improved outcome and better prognosis. It should be considered as one of the differentials of acute urinary retention with UTI. Here we present a case of emphysematous cystitis in an immunocompetent host presenting as acute urinary retention.

Keywords: Emphysematous cystitis; Immunocompetent; Diabetes; Urinary retention

Key Messages

Our index case highlights the fact that emphysematous cystitis should be kept as a rare possibility in the differential diagnosis of an elderly male patient presenting with UTI and acute urinary retention. It also reemphasizes that emphysematous cystitis can even occur in patients without any immunosuppressive state.

Introduction

Emphysematous cystitis (EC) is a rare but severe clinical problem defined by the presence of air within the bladder wall and/or the bladder lumen. Etiology is multifactorial, and disease is potentially fatal if not treated properly. Most cases diagnosed are elderly diabetic females. The exact mechanism is unclear and poorly understood, however, in diabetic patients; carbon may be produced through fermentation by the pathogens when glucose concentrations are high leading to gas formation. It presents as irritative voiding symptoms, abdominal discomfort and pneumaturia. Clinical presentation varies individually and may not correlate with severity of inflammation. As there is no typical clinical sign, diagnosis can be made by imaging studies in absence of clinical findings. Since the disease is very rare and commonly presents in immune compromised patients, here we present an uncommon form of presentation of a case of emphysematous cystitis as acute urinary retention in an immune-competent host and discuss its management. Prompt diagnosis and treatment is essential to prevent serious complication like bladder necrosis, perforation and urosepsis.

Case Presentation

A 54-year-old chronic smoker presented to emergency department with complaints of painful acute urinary retention. He complained of low grade fever in the past few days and dull aching supra-pubic pain. Fever was not associated with chills or rigors and subsided on taking anti pyretic. He had no history of lower urine tract symptoms and previous urinary tract instrumentation. On examination, his body temperature-38.7°C, pulse rate-108/min, respiratory rate-20/min and blood pressure was 142/88 mm Hg. General physical examination showed non-healing left leg ulcer with atrophic calf muscles. On systemic examination, lower abdomen was tensed, and urinary bladder was palpable up to umbilicus. A 16 Fr Foleys catheter was placed and 800 ml of cloudy appearing foul smelling urine was drained immediately. Investigation showed anemia (hemoglobin-8 gm/dl), leukocytosis (total leukocyte count-18000/mm³)

with neutrophils predominance. His serum glucose was 94 mg/dl. Serum electrolytes and renal function tests were normal. Urine analysis reported 14-16 white blood cells (suggestive of infection) and albumin (++) while culture showed growth of *E. coli* which was sensitive to aminoglycosides and all generation cephalosporins. Broad-spectrum antibiotics (meropenem 500 mg IV, three times a day and amikacin 1 gm IV, once a day) were empirically started in view of severity of infection and standard protocol followed in our institute. An abdominal ultrasound showed multiple air foci in bladder wall with debris in the bladder lumen suggestive of emphysematous cystitis. In addition, a contrast enhanced computed tomography scan was performed which showed emphysematous changes in the bladder wall confirming EC (Figure 1). Patient showed improvement in the follow up period with increased appetite, normalized leukocyte count and clear urine output. A computed tomography scan of the abdomen repeated after 10 days of admission showed decreased air foci in the bladder wall (Figure 2). A repeat urine culture was sterile and Foleys catheter was removed on day 14. At 6 weeks follow up, there is complete resolution of EC and patient is under regular follow up (Figure 3).

Discussion and Conclusion

Emphysematous cystitis is severe form of lower urinary tract infection characterized by presence of gas in the bladder wall with or without intraluminal gas. It usually occurs in immunocompromised hosts and elderly diabetic females as they are prone to recurrent urinary tract infection. Emphysematous cystitis was first reported by Hueper et al. [1]. Thomas et al. identified that two-thirds of all reported cases were diabetic and 64% were women, with a median patient age of 66 years [2]. However, the index case is an elderly non-diabetic male without any immunosuppressive state. The organisms most commonly responsible are *Escherichia coli* and *Enterobacter*. Less commonly, *Proteus*,

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Received March 03, 2018; Accepted March 19, 2018; Published March 26, 2018

Citation: Parmar K, Gupta M, Attri V, Khanna A. A Case of Emphysematous Cystitis Presenting with Acute Urine Retention in an Immunocompetent Host. Journal of Surgery [Jurnalul de chirurgie]. 2018; 14(1): 49-51 DOI: [10.7438/1584-9341-14-1-8](https://doi.org/10.7438/1584-9341-14-1-8)

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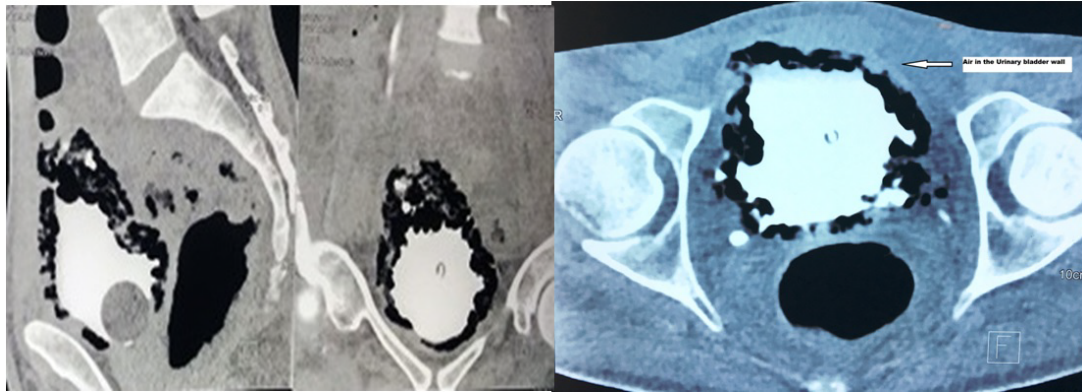


Figure 1: Coronal and axial image of computed tomography scan of the abdomen showing air in the bladder lumen and the bladder wall (necklace appearance).

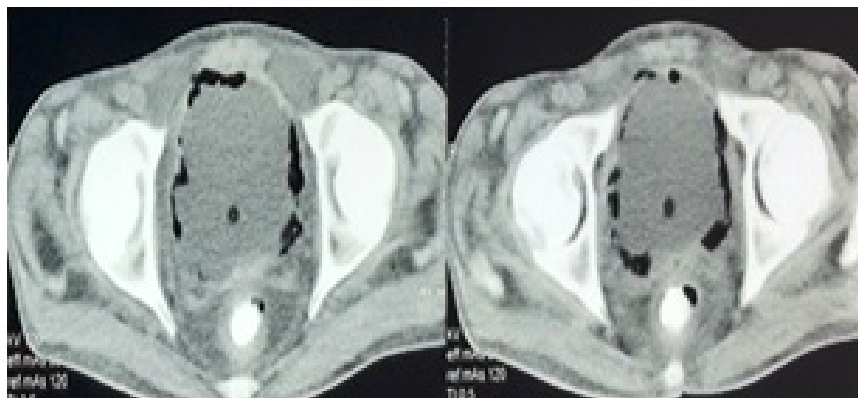


Figure 2: Computed tomography at 2 weeks showing drastically decreased air foci in bladder wall.

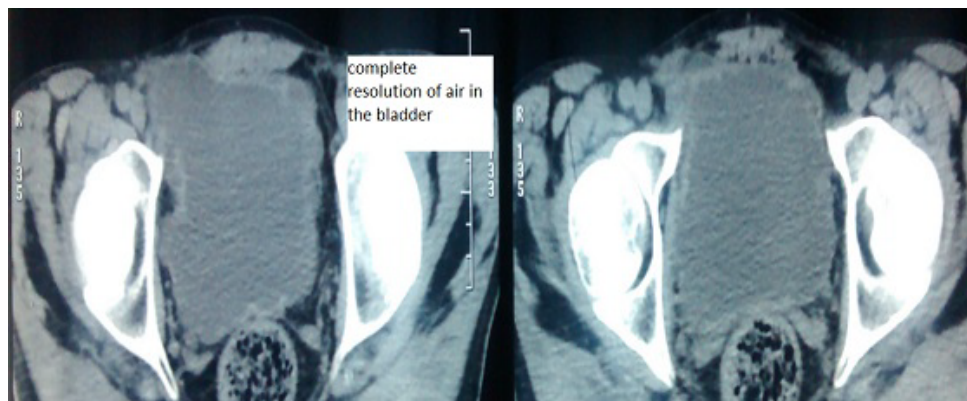


Figure 3: Axial image of computed tomography scan of the abdomen showing complete resolution of EC.

Klebsiella, Clostridium and Streptococci may be found. The etiology and pathogenesis of EC is poorly understood. In diabetic patients, elevated levels of urinary glucose are possible source of fermentation for gas forming bacteria. In non-diabetic patients, higher levels of urinary albumin, lactose or tissue proteins can result in formation of H_2 and CO_2 . Urinary obstruction and stasis are added risk factors. In the index case, we postulate severe UTI and high urinary albumin resulting in EC. The clinical presentation of EC is variable; approximately 53% of cases present with classical symptom of pneumaturia. Up to 7% of cases are asymptomatic and are diagnosed on the basis of an incidental finding on abdominal/pelvic imaging [3]. Acute urinary retention is a rare form of presentation of EC [4]. Acute urinary retention could be explained by the severity of UTI and presence of air in the bladder wall

causing bladder atonicity. Imaging plays important role in diagnosis of EC. Plain X-ray of abdomen can reveal air fluid levels and typical cobblestone appearance. A rim of gas shadow may be visible along the wall of bladder. Computed tomography of abdomen is more reliable, definitive and defines the extent and location of gas more precisely. It can clearly depict presence of air in the bladder lumen or wall [5]. Treatment varies with severity of infection and generally includes bladder drainage, hydration and broad spectrum antibiotics covering the most common offending microorganism [6]. The gas is reabsorbed once the infection is treated. Our index case responded well to bladder drainage, intravenous antibiotics and hydration. In severe cases infection may spread to renal parenchyma and may need more aggressive treatment and nephrostomy tube placement. In conjunction

with antibiotic and hydration, hyperbaric oxygen therapy has also shown to be an effective treatment for EC [7]. Surgery is rarely needed unless stone is the obstructing cause. Delayed treatment can lead to urosepsis and death.

Conflicting Interest

None.

Acknowledgement

We sincerely thank the patient for being cooperative during the treatment and investigation period.

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