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EMPHYSEMATOUS CYSTITIS: A RARE CAUSE OF HEMATURIA

Urology

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ABSTRACT

Emphysematous cystitis (EC) is a rare and serious clinical problem that can be potentially life-threatening and is characterized by gas formation within the urinary bladder wall due to bacterial infection. This article presents a case study of emphysematous cystitis in a 69-year-old male patient who presented with hematuria, urinary tract infection, sepsis due to uncontrolled diabetes mellitus, and a history of recurrent urinary tract infections. Imaging studies revealed gas bubbles in the bladder wall. Early diagnosis and aggressive management in an intensive care setup with broad-spectrum antimicrobial therapy were initiated. After a 5-day prompt treatment, the patient's condition improved leading to discharge on day 10. This case emphasizes prompt recognition and aggressive treatment protocol for a better prognosis.

KEYWORDS

Emphysematous cystitis, Recurrent urinary tract infections, Hematuria, Gas formation, Uncontrolled diabetes mellitus.

INTRODUCTION

Emphysematous cystitis (EC) is a rare and severe clinical problem which can be potentially life-threatening. It was first discovered on autopsy in the late 1800s by Eisenlohr [1] which was later defined as —cystitis emphysematosa by Bailey in 1961. It is characterized by air within the bladder wall. Risk Factors for developing EC are Diabetes Mellitus, Neurogenic Bladder, and Urinary tract Abnormalities Like urinary obstruction. Microbes like Escherichia coli and Klebsiella pneumoniae are common organisms usually isolated from urine cultures. Usual presentation is similar to patients of UTI like fever, dysuria, irritative voiding symptoms like frequency, urgency with abdominal discomfort, and rarely pneumaturia and hematuria.

This article tries to encapsulate the clinical features, diagnostic methods, and management strategies for emphysematous cystitis, exemplified by a case involving a 69-year-old male patient with multiple comorbidities. Early recognition with prompt and aggressive management is crucial for good treatment outcomes and prevention of complications.

Case Presentation

A 69-year-old male patient presented to Urology department with a 2-day history of high-grade fever, dysuria, hematuria, pain in the lower abdomen, and signs of infection, accompanied by a deterioration in his general health. His comorbidities included hypertension, uncontrolled diabetes mellitus, and diabetic foot ulcer. The patient has a history of recurrent UTI and was on a alpha-blocker (Silodosin) for his lower urinary tract symptoms.

On examination, the patient had lower abdominal tenderness with palpable bladder and was febrile on touch. Blood investigations showed hyperglycemia (3.5 g/L), elevated TLC 18650 cells/ cubic mm, and elevated C-reactive protein (200 mg/L). The Urine sample was sent for culture and sensitivity test. Initial management included intravenous fluid, empirical antibiotics (Ceftriaxone), and endocrinology referral for controlling blood sugars.

Computed Tomography (CT) revealed air bubbles within urinary bladder wall as shown in the given images. (Fig. 1, Fig. 2, Fig. 3, Fig. 4)

CT findings suggested the diagnosis of emphysematous cystitis. The patient was initiated on broad-spectrum antimicrobial therapy, including ceftriaxone (2 g, once daily), metronidazole (500 mg, three times daily), amikacin (500 mg, twice daily). A urinary catheter (3-way Foleys catheter) was inserted, resulting in the drainage of 700 ml of red color urine containing a significant amount of gas and clots. Bladder irrigation was started but the patient went into clot retention for which cystoscopy and clot evacuation were performed. Subsequent urine culture showed positive bacteriological growth of Klebsiella pneumoniae which was sensitive to meropenem. So the patient was started on Inj. Meropenem 1 gm iv TID.

The patient was transferred to the intensive care unit for round-the-clock clinical and biochemical monitoring. The patient was transferred to general ward after 5 days. The patient did not develop any complications related to EC. The patient was discharged on oral medication on day 10. On follow-up, the patient was doing well with negative urine culture reports and normal blood parameters.

DISCUSSION

Emphysematous cystitis (EC) is a rare and severe clinical problem that can be potentially life-threatening. In this type of infection, there is the presence of gas within the bladder wall and its lumen. It is a relatively uncommon condition as it accounts for approximately 1–2% of all cases of infections of the urinary tract. Uncontrolled diabetes mellitus is the most common predisposing factor, accounting for approximately 70–90% of cases. Other predisposing factors are obstruction of the urinary tract, neurogenic bladder dysfunction, and immunocompromised states.[2]

EC has two distinct phases of progression. The initial phase is similar to uncomplicated cystitis in which there are mild symptoms due to bacterial colonization. During this phase, the gas-forming bacteria such as Escherichia coli and Klebsiella pneumoniae, increase in number within the bladder, leading to the production of gas. There is no progression beyond this phase in 30-50 % of patients.[3]

However, more pronounced clinical features and complications can be seen if there is progression to next phase. This advanced stage is seen in about 50–70% of cases and is associated with a higher risk of complications. The passage of gas in urine, Pneumaturia, is seen in this second phase. The exact mechanisms that cause the production of gas are unclear. One such theory in diabetic patients suggests acid fermentation of excess tissue glucose by the microbes, resulting in the production of hydrogen and carbon dioxide gas. In non-diabetic individuals, the gas comes from the fermentation of proteins in exceptional circumstances.[4]

The second-stage disease needs a prompt and aggressive management

strategy without which EC can be complicated by bladder wall necrosis, abscess formation, or even bladder wall perforation. Mortality risk increases in the patient with sepsis, which occurs in 10-20 % of cases. Therefore, early recognition with a prompt diagnosis and management are crucial for improving the patient's prognosis.[5]

Imaging modalities are the mainstay for diagnosis of emphysematous cystitis. Computed tomography (CT) is the gold standard as it provides detailed visualization of the bladder and surrounding structures. Characteristic findings in approximately 80–90% of cases are bladder wall thickening and the presence of gas bubbles within the bladder wall.[3]

Prompt diagnosis is important for the initiation of appropriate treatment strategies. Early bladder decompression, performed in about 70–80% of cases, helps relieve bladder distension and helps in the resolution of symptoms. Broad-spectrum antibiotics against gas-forming bacteria, such as Escherichia coli and Klebsiella pneumoniae, are administered to effectively control the infection. Commonly used empirical antibiotics include fluoroquinolones (e.g., ciprofloxacin, levofloxacin), third-generation cephalosporins (e.g., ceftriaxone, cefotaxime), aminoglycosides (e.g., gentamicin), and metronidazole. The local sensitivity patterns are important to control infection. The duration of antibiotic therapy typically ranges from 10 to 14 days but may require longer administration in severe or complicated cases.[5]

The overall mortality rate is 7 to 20 % though in patients with advanced age, sepsis, and delayed diagnosis, the mortality rates are higher. Multiple factors determine the prognosis of EC, namely the promptness of diagnosis, the severity of infection, the presence of comorbidities, and the development of complications.[6]

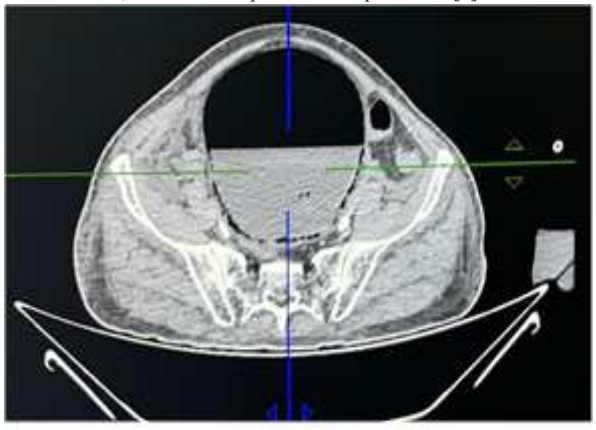

Fig.1. CT scan showing intraparenchymal air bubbles in the bladder wall and intraluminal gas in the bladder

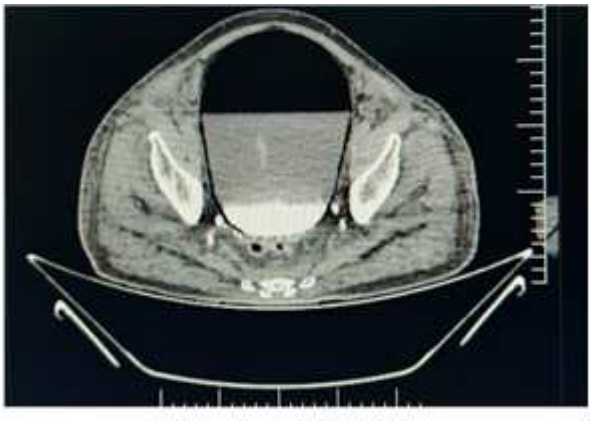

Fig.2.Delayed films showing contrast in bladder separated by air column from bladder wall

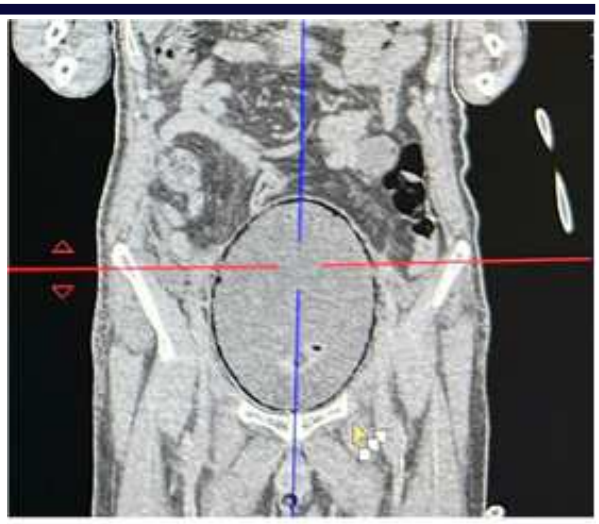

Fig. 3.CT scan showing a coronal view of the patient showing the bladder wall outlined by mottled air bubbles

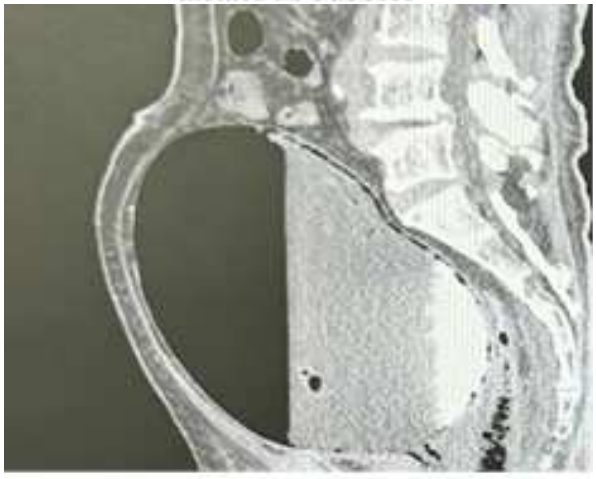

Fig. 4. CT scan: sagittal view showing air bubbles within the bladder wall and gas with contrast in the bladder cavity

CONCLUSION

In conclusion, emphysematous cystitis is a rare and complex disease that can lead to mortality if early and aggressive management is not undertaken by a team of specialists. It most commonly affects individuals with uncontrolled diabetes mellitus. Bladder decompression, antimicrobial therapy, and management of underlying comorbidities are the mainstay of treatment and are required for better treatment outcomes. Continued research is necessary to refine diagnostic approaches, optimize treatment strategies, and reduce morbidity and mortality associated with this challenging condition.

Conflict Of Interest: Non

Declaration:

In this case report, proper consent from the patient and his guardians regarding the use of investigations for scientific purposes and publication in scientific medical journals is taken. We have not disclosed the identity of the patient anywhere in the case report.

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