

Research Article

EMPHYSEMATOUS CYSTITIS IN MALE PATIENT- A RARE FORM OF COMPLICATED URINARY TRACT INFECTION (UTI) CASE REPORT :-

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Abstract: **Introduction:** Emphysematous cystitis (EC) is a rare, potentially life-threatening complicated urinary tract infection characterized by gas within the urinary bladder lumen and walls. It predominantly affects females and is most commonly associated with diabetes mellitus. Here, we present an unusual case of EC in a male patient. **Case Presentation:** A 75-year-old male with a 20-year history of inadequately controlled diabetes mellitus presented with lower abdominal pain, high-grade fever with chills, and the passage of air bubbles in his urine for 15 days. Clinical examination revealed a palpable bladder and suprapubic tenderness. Ultrasonography demonstrated significant post-void residual urine, while computed tomography (CT) urography confirmed a pneumo-bladder featuring irregular mucosal wall thickening and an air-fluid level. Urine culture isolated *Klebsiella pneumoniae*, which was sensitive to multiple drugs. The patient was managed purely medically without the need for surgical intervention. Treatment included bladder drainage via a 14 Fr. Foley catheter and a 7-day course of oral Faropenem (300 mg twice daily). He responded well and was discharged on day 10 of admission. **Conclusion:** Although EC is exceptionally rare in males, clinicians must remain vigilant for symptoms like abdominal pain, fever, and pneumaturia, particularly in diabetic patients. Prompt medical intervention, including antibiotic therapy, strict glycemic control, and bladder drainage, can ensure early recovery and prevent severe complications.

Keywords: Emphysematous cystitis, *Klebsiella pneumoniae*, pneumaturia, diabetes mellitus

INTRODUCTION

Emphysematous cystitis is a rare disease.¹ It is identified by the presence of gas in the urinary bladder lumen due to infection by gas-forming organisms. It may also involve the urinary bladder walls.² It is also considered to be potentially life threatening.¹ Diabetes Mellitus is considered to be the most common pre-disposing factor, prevalent in more than half of the population affected with emphysematous cystitis.² Other risk factors include urinary tract obstruction, neurogenic bladder dysfunction, and immunosuppression.³ The most common offending organisms are *E. coli* and *Enterobacter aerogenes*, other agents include *Candida albicans*, *Streptococci*, and *Nocardia*.² Treatment with antibiotics, bladder drainage, and proper glycaemic

control are adequate treatment for most cases of emphysematous cystitis.³

Here, we present a rare case of Emphysematous cystitis (EC) as a presentation of complicated UTI in men. EC is even rare as far as male gender is concerned. It is more commonly seen in females, comparatively. The patient here presented with complaints of lower abdominal pain, high grade fever with chills and rigors for the last 15 days, along with passage of bubbles in urine. Subsequent admission to the hospital, hemodynamic stabilization, investigations, which revealed Emphysematous cystitis, and *Klebsiella pneumoniae* as the cause. And how prompt treatment led to early recovery and prevention of serious complications.

CASE REPORT-

A 75 year male patient presented to us with the complaints of lower abdominal pain, high grade fever with chills and rigors for the last 15 days. He also complained of passage of air bubbles in urine for the same duration. He also complained of burning micturition, pain during micturition, urgency, sense of incomplete urinary evacuation for the same duration. He had been diabetic for the last 20 years, currently on insulin, and is not adequately under control as evident by

his blood reports mentioned below. No history of hypertension or other major medical ailments in the past. He also did not give any history of any surgeries in the past.

On Examination, he was febrile (102 degree Fahrenheit), tachycardic (Pulse- 110 beats per minutes). Suprapubic tenderness was present, and bladder was palpable. Genital examination was essentially normal. Digital rectal examination revealed a non-tender, non-nodular grade 2 prostatomegaly. Other systemic examinations did not reveal any abnormality.

He was admitted in ward, was catheterized with 14 Fr. Foley's catheter, stabilized. Relevant investigations were done.

Blood report showed Hb- 13.5 gm%; WBC- 15900 with Neutrophil of 86% and platelet- 430000. Urine routine examination showed Proteinuria; Abundant pus cells; Leucocyte esterase 1+; and Bacteria+. USG (Ultrasonography) Abdomen and pelvis was done and reported as changes of chronic cystitis in urinary bladder with significant post void residue(290/370 cc) as shown in Figure 1. Computed Tomography (CT) Urography was done and was reported as having overdistended urinary bladder with irregular mucosal wall thickening and air fluid level s/o pneumo-bladder, as shown in Figure 2. Due to underlying diagnostic dilemma, Colonoscopy was advised and was reported only as colonic diverticulosis with no colo-vesical fistula reported, as shown in Figure 3.

Meanwhile, his urine culture and sensitivity revealed *Klebsiella pneumoniae* sensitive to multiple drugs.

He was started on Tablet Faropenem 300 mg twice daily for 7 days, changing it from the broad spectrum antibiotics. He responded well. He was treated with medical management. No surgical intervention was required. He was discharged on day 10 of admission. No complications were noted on follow up, and the urine culture and sensitivity report also showed no bacterial growth after 48 hours of incubation.

FIGURES:-

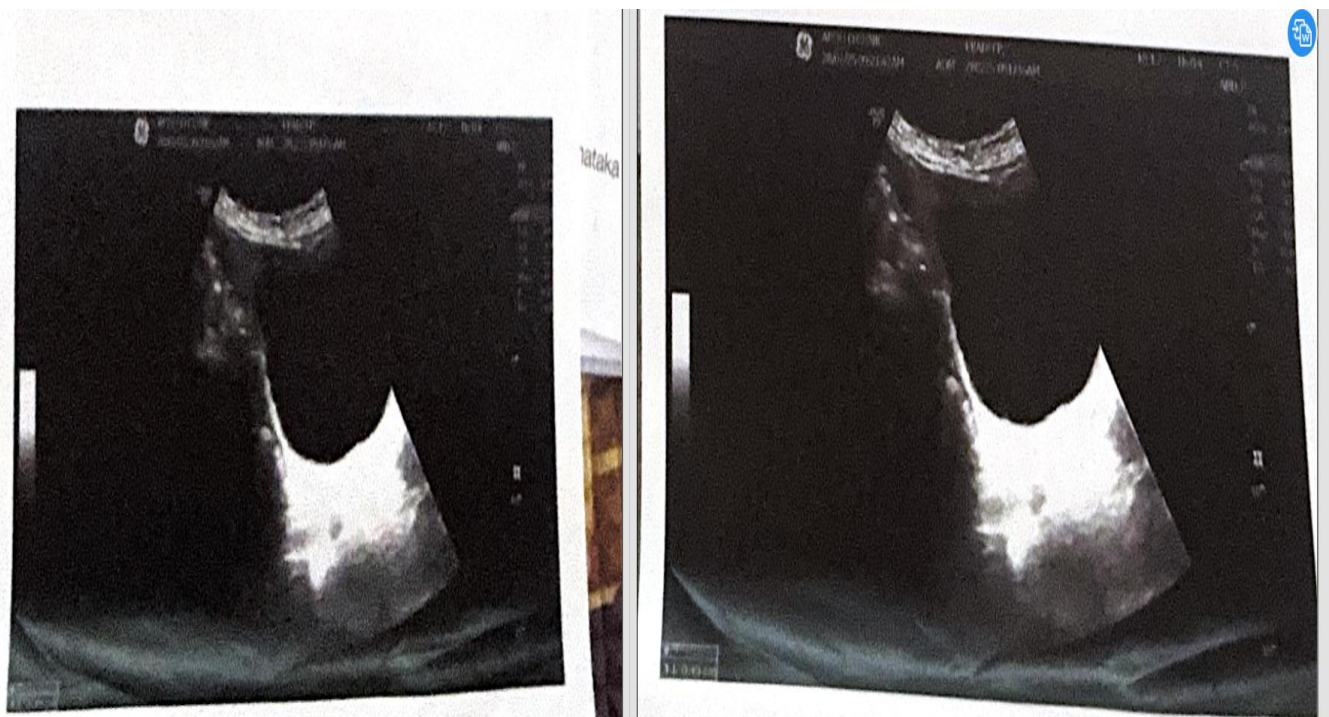


FIGURE 1- PRE AND POST VOID RESIDUAL URINE IN URINARY BLADDER ON ULTRASONOGRAPHY

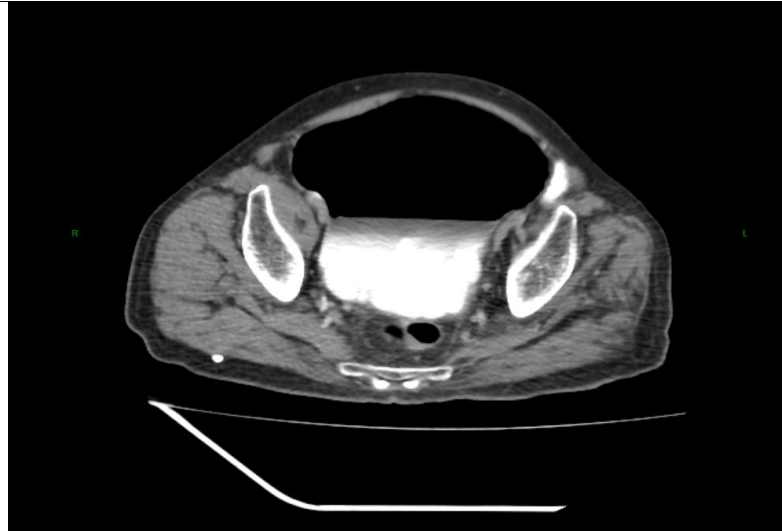


FIGURE 2- DELAYED AXIAL CUT OF CONTRAST ENHANCED CT SCAN SHOWING PNEUMOBLADDER

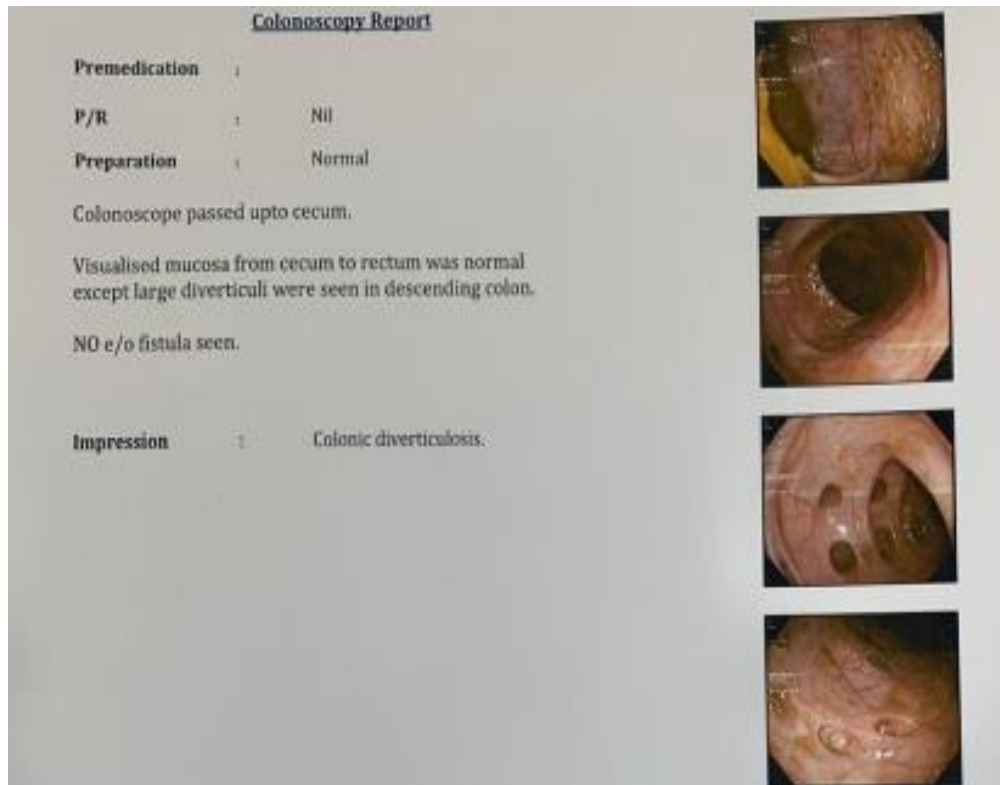


FIGURE 3- COLONOSCOPY DONE WHICH REVEALED COLONIC DIVERTICULOSIS.

DISCUSSION

Gas collection in the urinary bladder wall was first described by Eisenlohr in 1888.² It was first described radiologically, with the help of X-Ray, by Mulsow in 1934.⁵ Although gas-producing infections account for a very small percentage of all bacterial infections of the urinary tract, they are extremely important because of their life-threatening potential.² Gas formation requires

pathogenic bacteria capable of mixed acid fermentation, poor glycaemic control, and local tissue ischaemia. These factors exacerbates tissue destruction, encourages purulent infection, and inhibits the removal of locally produced gas.⁴

The progression of emphysematous cystitis occurs in two distinct stages. In the first stage, colonization by bacteria occurs.¹ Diabetic nephropathy, bladder dysfunction from diabetic neuropathy, presence of indwelling catheters, obstructive uropathy, neurogenic bladder, immunosuppression predisposes to the colonisation of the bacteria.⁶ In the second stage, pneumaturia- the passage of gas in the urine, becomes evident. Systemic complications, such as sepsis, can occur in approximately 10–20% of cases.¹

The most common organism to cause emphysematous cystitis is *E. coli*.^[6] Other organisms reported include *Klebsiella pneumoniae*, *Enterobacter aerogenes*, *Staphylococcus aureus*, streptococci, *Proteus mirabilis*, *Candida albicans* and *Clostridium perfringens*.² In our case, *Klebsiella pneumoniae* caused the emphysematous cystitis.

Clinical symptoms include abdominal pain (80%), hematuria(60%), ischuria(10%), and pneumaturia. ^{6,7} Other possible symptoms are fever, dysuria, urgency, and frequency.⁷ As the disease is considered to be potentially life threatening, prompt diagnosis and treatment is required to prevent the potential morbidity and mortality due to this condition.⁸

In diagnosing EC, apart from routine blood investigations, which are usually non-specific as far as EC is concerned, both urine and blood should be cultured, as it has been reported that 50% of patients with EC have bacteremia.⁷ In radiological investigation, computed tomography(CT) abdomen and pelvis is the primary imaging method and is the most sensitive modality for diagnosis of EC.^{2,6, 7,8}

CT allows early detection as well as differentiation of intraluminal or intramural gas and whether the infection has spread to involve pelvic/cecal systems and renal parenchyma.² Management of Emphysematous pyelonephritis is mainly surgical whereas management of EC is primarily medical.^{2,3}

In the treatment of EC, prolonged antibiotics for 3-6 weeks, glycaemic control, and bladder drainage are adequate treatment for most cases of emphysematous cystitis.^{2,3} Commonly used antibiotics include fluoroquinolones (e.g., ciprofloxacin, levofloxacin), third-generation cephalosporins (e.g., ceftriaxone, cefotaxime), aminoglycosides (e.g., gentamicin), and metronidazole.^{1,7}

Combined surgical and medical intervention is required in 10%, whereas death rate in EC is around 7%, mainly due to delay in diagnosis and treatment, emphasising on the importance of early detection and treatment.⁷

CONCLUSION

Emphysematous cystitis is a relatively rare form of complicated UTI.

It is characterized by the presence of gas within the bladder wall and lumen. The risk factors include an older age, female gender, which was not the case here, making it an even rarer case report, and uncontrolled diabetes mellitus.

This type of pre-disposing factors are non-specific for EC, or, in other words, no significant clinical features strongly suggestive of/or are specific of EC, have been reported to date, making it an even more difficult condition to diagnose. Therefore, urologists should be vigilant of even subtle symptoms indicating this condition (e.g., abdominal pain, fever and hematuria), as EC is a potentially life-threatening disease.

However, by being vigilant, and thus providing early medical intervention, which include prompt admission to the hospital, hemodynamic stabilization, antibiotic therapy, glycemic control, bladder drainage, one can expect to achieve positive response and favourable prognosis. It is also advisable to rule out any associated/extended spectrum of emphysematous pyelonephritis (EP), as the management of EC is primarily medical, where as for EP it is surgical. To conclude, delay in the management of EC can lead to worsening of the condition, surgical intervention, ICU stay and although very rare, but instances of death.

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