



Case Report

Emphysematous cystitis: A case report

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Abstract

Infection is a serious problem encountered in urology, especially when emergency or severe conditions fail to respond to medications or conservative treatment. Emphysematous cystitis is a rare condition, and thus rapid, correct management is important. In this report, we review our experience and the steps of treatment for this rare condition.

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Case report

We report the case of a 73-year-old man with hypertension. He came to our hospital due to ischemic stroke with right hemiparesis. He suffered from cerebral shock with urinary retention and was started with clean, intermittent catheterization every 8 hours. After one month of admission, he developed an acute fever of about 38.9°C, suprapubic pain, and gross hematuria.

Urinalysis showed: positive nitrite test, glucose 4+, white blood cells; 2-3/HPF, red blood cells; 100-200/HPF and complete blood count; white blood cells 14,300/mm³ with 93% neutrophils and band form 1%, hemoglobin 9.2 g/dL and platelet 158,000/mm³.

As a complementary test, a plain KUB X-ray was performed, which revealed the presence of abnormal air density in the area of the pelvis, probably in the urinary bladder wall, which is suggestive of emphysematous cystitis (Figure 1). Computerized tomography showed a large volume of air in the urinary bladder wall, which is suggestive of the diagnosis of emphysematous cystitis (Figure 2, 3 and 4).

One hour after a CT scan, the patient developed respiratory failure and needed intubation with

respiratory support, and was transferred to the intensive care unit. Initial treatment consisted of intravenous antibiotic therapy with piperacillin-tazobactam, large bore urinary bladder catheterization with continuous bladder irrigation for gross hematuria, and blood clot retention.

Four days after parenteral antibiotic therapy, urine culture showed more than 100,000 CFU/ml of *Klebsiella pneumoniae* sensitive to ceftriaxone, ceftazidime, piperacillin-tazobactam, gentamycin and trimethoprim-sulfamethoxazole. Additionally, we decided to switch from an intravenous antibiotic to ceftriaxone.

After 5 days of treatment, his condition was stable and we decided to perform extubation and stop continuous bladder irrigation. The next day, he was transferred from the intensive care unit to a general ward. Parenteral antibiotics were continued for 14 days. Urine culture was repeated at the 10th day of parenteral antibiotic; no organisms were reported. The urinary catheter was removed on the 17th day. The follow-up plain KUB X-ray can be seen in Figure 5. At 14 days after the cessation of antibiotics, no air in the urinary bladder could be seen.



Figure 1. Plain film of the abnormal air density around the urinary bladder in the mid area of the pelvis



Figure 2. Computerized tomography of the pelvis (axial view) revealing air in the bladder wall.

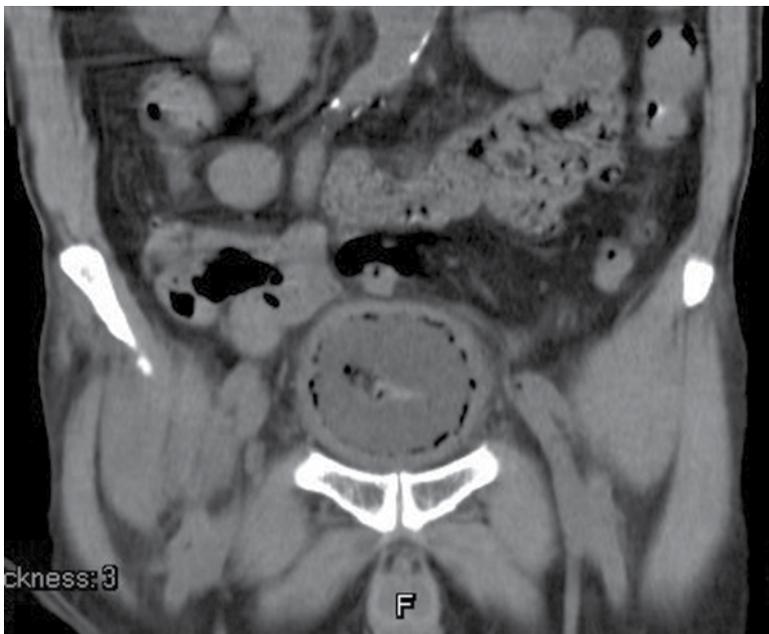


Figure 3. Coronal view of a CT scan showing air in the whole area of the urinary bladder wall with fat standing around this organ.



Figure 4. Emphysematous cystitis with enlarged prostate.



Figure 5. Plain film after the completed treatment with proper antibiotics and maximum urinary drainage.

Discussion

Emphysematous cystitis is a rare condition. It is defined as a collection of gas within the bladder wall that is secondary to an infectious cause. The first case was described by Einsenhör in 1888, and it was defined precisely by Bailey in 1961. There have been only 200 cases published in medical literature.^[1,2] The incidence has increased in recent years due to the development and routine use of diagnostic imaging methods.

It occurs more commonly in women (64%), especially in the 6th-7th decade of life. The risk factors consist of diabetes mellitus, recurrent urinary tract infection, neurogenic bladder, indwelling bladder catheter, bladder outlet obstruction, bladder diverticula, history of malignant hematological disease, and immunocompromised patients.^[3,4]

Gas-forming microorganisms, mainly *Escherichia coli* (58%), followed by *Klebsiella pneumoniae*, are responsible for the main causative organisms. The others, Enterococcus, fungus (*Candida*) and anaerobic organisms (*Clostridium perfringens*) have also been described.^[1,3] There are several theories concerning the pathogenesis but no clear consensus. High tissue glucose concentration and poor tissue perfusion favor its development and act as a substrate for the microorganism to produce CO₂. For non-diabetic patients, these pathogens use urinary lactose or tissue

protein for gas production.^[7]

The clinical presentation comprises abdominal pain (80%), lower urinary tract symptoms, gross hematuria, and septic shock in severe cases.^[1,3] Diagnostic methods: plain abdominal X-ray may be useful with the radiolucent curvilinear area, delineating the urinary bladder (with or without intraluminal air) and the ultrasonography may show the thickening of the urinary bladder wall with marked echogenicity (low sensitivity). The most effective method, abdomino-pelvic CT scan, may reveal early detection of the intraluminal gas in the urinary bladder, extension and severity of the disease, and differentiate the other conditions, such as enterovesical fistula, vesicovaginal fistula, and emphysematous vaginitis.^[3,4]

Management of this condition includes strict glycemic control, complete urinary bladder drainage, and broad-spectrum antibiotics. Once the acute phase has been resolved, antibiotics should be adjusted, according to the causative organisms from the urine culture. Although the duration of treatment is still unclear, short courses of treatment are not advised.^[5,6]

For the prognosis, only 10%-20% of cases with complications, emphysematous pyelonephritis and bladder perforation have been described.^[7] The death rate is low, only 7%, compared to emphysematous conditions in other organs.^[1]



Conclusion

1. Emphysematous cystitis is defined as the presence of gas within the bladder wall, secondary to an infectious cause that may or may not be associated with intraluminal gas.

2. Nonspecific clinical features range from asymptomatic, suprapubic pain, gross hematuria, and septic shock.

3. The most valuable diagnostic method is abdomino-pelvic CT scan.

4. Management consists of broad-spectrum antibiotics, adequate bladder drainage, and strict glycemic control.

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