RESIDENT'S CORNER

A case of emphysematous cystitis caused by Klebsiella pneumoniae

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Emphysematous cystitis is a rare type of urinary tract infection that is characterized by air pockets within the bladder wall and lumen, which come from gas that is mainly produced by gram-negative bacteria, notably Escherichia coli. This infection is more common in older women with poorly controlled diabetes. An abdominal computerized tomography (CT) scan is the gold standard method to make the diagnosis. The infection can be life-threatening, so prompt treatment is essential.

We present a case of a 39-year-old woman with poorly controlled type 2 diabetes who developed emphysematous cystitis after a bilateral adrenalectomy. The infection was diagnosed by a CT scan that revealed gas in the bladder wall. A urine culture revealed 106 colonies/mL of Klebsiella pneumoniae. After a month of treatment with intravenous antibiotics (vancomycin plus meropenem plus colistin), bladder drainage, and strict glycemic control, the patient had a good outcome.

Key Words: emphysematous cystitis, urinary tract infection, Klebsiella pneumonia

Introduction

Emphysematous cystitis was first identified in 1882 by Keyes.[1] In this uncommon but potentially fatal condition, the lower urinary tract is infected with gas-producing pathogens. This infection is more common in older women with type 2 diabetes. The diagnosis requires an imaging test, preferably a CT scan.[2] Because it is rare, physicians may not suspect that a patient has emphysematous cystitis, yet early diagnosis and management are essential for a good prognosis.[3]

We present a case of a patient who was diagnosed with emphysematous cystitis caused by Klebsiella pneumoniae.

Case report

A 39-year-old woman with type 2 diabetes who had a bilateral adrenalectomy to treat ectopic Cushing syndrome was admitted to hospital with upper gastrointestinal bleeding with hemodynamic decompensation.

When she was admitted, she was confused and had a fever (temperature 38ºC), a fast pulse (125 beats/minute), a normal blood pressure (130/80 mm Hg), and a respiratory rate of 22 breaths/min and O2 saturation of 96% on room air. She also had lower abdominal pain without peritoneal signs or dysuria.

Her laboratory tests values were: white blood cell (WBC) count 6534 cells/mL with 81% neutrophils; serum glucose 36 mg/dL; urea 50 mg/dL; creatinine 0.12 mg/dL; and lactic acid 3.44 mmol/L. An earlier serum glucose had been 254 mg/dL. Blood cultures were negative. A urine culture revealed > 100,000 Klebsiella pneumoniae/mL, and the patient was given vancomycin plus meropenem plus colistin.

An abdominal CT scan revealed intramural gas in the bladder with thickening of the bladder wall, Figures 1 and 2, confirming the diagnosis of emphysematous cystitis. As a first step, an indwelling urinary catheter was inserted.

After a month of treatment with intravenous antibiotics, bladder drainage, and strict glycemic control, a second CT scan was performed that showed that the gas pockets were no longer present, Figure 3. A urine culture was negative and glycemic values were normal, and the patient was discharged home.

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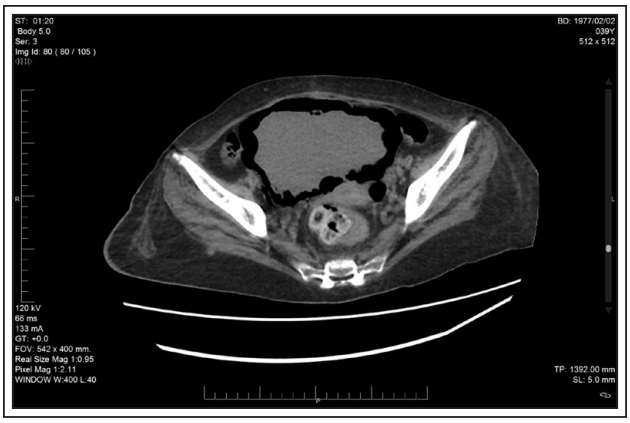

Figure 1. Abdominal CT scan shows gas within the bladder wall and lumen.

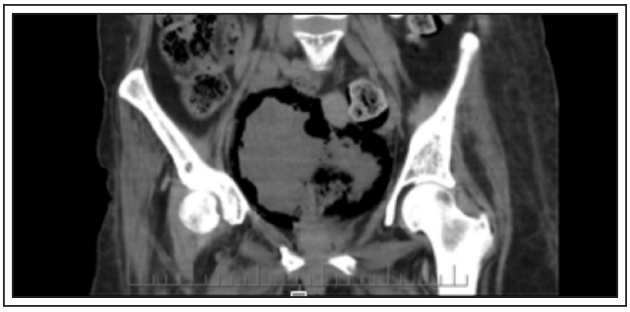

Figure 2. Coronal plane showing multiple air bubbles around the bladder wall.

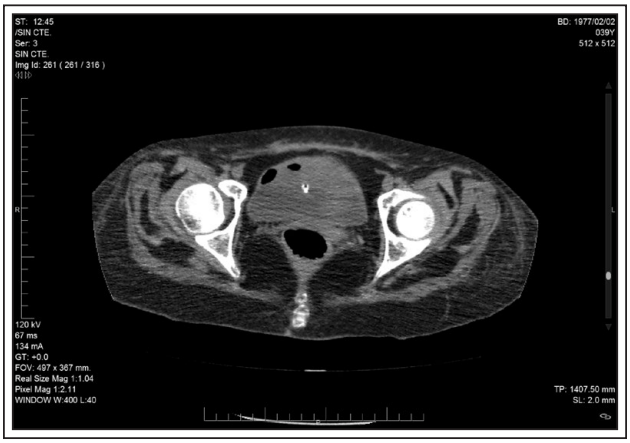

Figure 3. CT scan with vesical probe demonstrates the disappearance of the gas pockets.

Discussion

Although emphysematous cystitis is rare, it should be considered in a differential diagnosis of an infection in an older woman with poorly controlled diabetes. It is typically caused by E. coli, but it may be caused by Enterobacter, Staphylococcus aureus, Streptococcus, K. pneumoniae, Proteus mirabilis, Clostridium perfringens or Candida.[3,4]

An abdominal CT scan is the most sensitive, specific test to make the diagnosis.[2] The presence of air within the bladder wall is the hallmark finding. A CT scan shows the severity and extent of the disease and can rule out another differential diagnosis for air in the urinary tract such as a fistula with hollow organs.[5,6] Conservative management is generally the treatment of choice, but patients who do not respond to medical management or have necrotizing infections will require surgery.[7]

Conservative management includes intravenous antibiotics, bladder drainage, and improved glycemic control.[8] The patient should be given intravenous antibiotics that target the specific pathogens and should also receive an indwelling catheter for bladder drainage and medications for better glycemic control.

A delay in diagnosing emphysematous cystitis could potentially be fatal,[7] so early diagnosis and treatment are essential for a good patient prognosis.

Conclusion

Clinicians should be aware that although emphysematous cystitis is rare, this type of urinary tract infection can be life-threatening, and they might suspect it in certain older women with poorly controlled diabetes. To screen for emphysematous cystitis requires imaging such as an abdominal x-ray or preferably an abdominal CT scan. □

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