

Concurrent emphysematous pyelonephritis (EPN) and emphysematous cystitis (EC) presenting with septic shock

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DESCRIPTION

A 51-year-old woman with uncontrolled type-1 diabetes mellitus (DM) presented to our emergency department (ED) with complaints of nausea, vomiting and abdominal pain that started the day before. The pain was described as diffuse and cramping with radiation to the back. She denied having any changes in her urinary habits. In the ED, her vital signs were blood pressure of 143/77 mm Hg, heart rate of 111 beats/min, respiratory rate of 18 respirations/min and oxygen saturation was 100% breathing ambient air. On physical examination, the patient was ill-appearing, she had dry mucous membranes and diffuse abdominal tenderness. Laboratory workup revealed a serum creatinine level of 2.23 mg/dL (previously normal), blood urea nitrogen 51 mg/dL, normal white blood cell count of 10.5 k/mm³; however, band neutrophils constituted 12% of the differential. Lactic acid was elevated at 5.8 mmol/L. A urinalysis showed hazy appearing urine, glycosuria with >500 mg/dL of glucose, trace leukocytes and a moderate number of bacteria. Urine cultures and blood cultures were collected as an infectious aetiology was considered. A scout view of the abdomen prior to CT showed

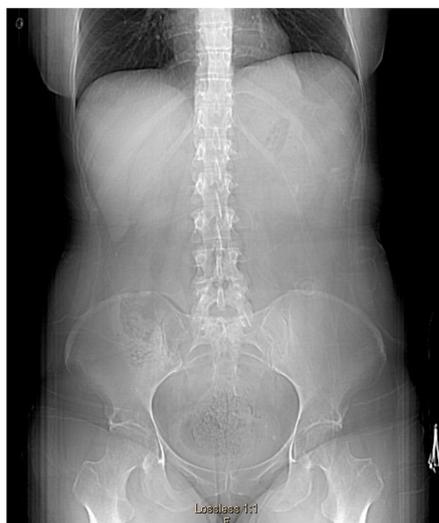


Figure 1 Scout view of the abdomen and pelvis showing non-specific gas pattern.



Figure 2 CT of the abdomen and pelvis showing significant perinephric inflammation and gas within the renal calyces (arrow).

a non-specific abdominal gas pattern (figure 1). CT of the abdomen and pelvis was done, intravenous contrast was withheld given the patient's acute kidney injury. The CT scan revealed significant perinephric inflammation and gas within the renal calyces and proximal left ureter consistent with emphysematous pyelonephritis (EPN) (figures 2 and 3), and concurrent intraluminal and urinary bladder wall gas that is highly suggestive of emphysematous cystitis (EC) (figure 4). A multidisciplinary team was consulted including infectious disease, urology, general surgery and critical care medicine. The patient was admitted to the medical intensive care unit, she was started on intravenous piperacillin/tazobactam for coverage of Gram-negative bacteria. Shortly thereafter she became hypotensive and required placement of a central venous catheter through which vasopressor support was provided. Blood cultures grew *Escherichia coli*. Lactic acid did not improve despite several boluses of intravenous fluids and pressure support. Given the overall worsening of the patient's clinical status, antibiotics were escalated to intravenous meropenem to cover possible extended-spectrum



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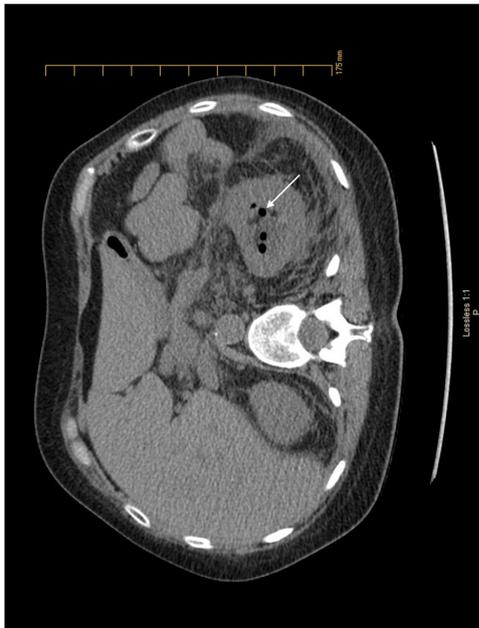


Figure 3 CT scan of the abdomen and pelvis showing air in the proximal left ureter (arrow).



Figure 4 CT scan of the abdomen and pelvis showing significant intraluminal and bladder wall air (arrows).

Learning points

- ▶ Concurrent emphysematous pyelonephritis (EPN) and emphysematous cystitis (EC) has been rarely reported in the medical literature, these necrotising infections most commonly affect patients with underlying diabetes mellitus (DM).
- ▶ Our case is unique in that the infection progressed leading to septic shock and was successfully managed with systemic antibiotics and percutaneous catheter drainage, a multidisciplinary approach involving several specialties might be necessary to manage EPN and EC.
- ▶ Ultimately, this case presents one of the acutely life-threatening complications of uncontrolled DM, and emphasises the importance of having a good control of DM.

beta-lactamase producing bacteria. Ultimately, interventional radiology (IR) was consulted and the patient underwent IR-guided placement of a left-sided nephrostomy tube for the purpose of decompression. Antibiotic susceptibility on blood cultures showed pan-sensitive *E coli*, and antibiotics were deescalated to intravenous ceftriaxone. The patient's blood pressure improved, and vasopressor medications were discontinued. Her renal function slowly improved. The patient was discharged to a skilled nursing facility where she underwent physical therapy.

Concurrent EPN and EC is a rare occurrence. These infections result from infection with gas-forming bacteria, most commonly in patients with uncontrolled DM.¹ These infections have a high-mortality rate if left untreated.² CT scan is the most sensitive modality for diagnosis emphysematous urinary tract infections.³ Treatment approach includes systemic antibiotics, percutaneous catheter drainage and nephrectomy.¹ Early recognition of this infection is prudent for early management, which can improve patient outcomes and potentially prevent more invasive interventions.

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