Images of the month 5: Emphysematous pyelonephritis: not your garden-variety pyelonephritis

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Case presentation

A 62-year-old Indian woman with poorly-controlled diabetes mellitus presented with a recent admission for septic shock secondary to *Escherichia coli* bacteraemia and urosepsis for which she was treated with 10 days of intravenous piperacillin-tazobactam. She re-presented to the emergency department 1 week later with a 2-day history of fever and chills and left flank pain. Clinical examination showed that she was hypotensive, septic-looking and had a positive left renal punch. Investigations revealed leukocytosis, hyperlactataemia and acute kidney injury. Computed tomography (CT) showed features of advanced left emphysematous pyelonephritis with a large perinephric collection (Fig 1). Urine culture grew extended-spectrum beta-lactamase *E coli* and blood cultures were negative. She was treated with intravenous meropenem which was then de-escalated to piperacillin-tazobactam to complete a 14-day course. She underwent a percutaneous nephrostomy (PCN) yielding frank pus and was discharged well.

Emphysematous pyelonephritis (EPN) is a rare acute necrotising infection of the renal parenchyma, collecting system or perirenal tissue, characterised by gas formation. It is a life-threatening condition which warrants urgent medical and/or surgical attention. The most common risk factor is diabetes mellitus. Purported explanations for pathogenesis of EPN in diabetics include hyperglycaemia providing a favourable milieu for gas-forming microbes, impaired vascular supply, and impaired immunity.[1] Obstructive uropathy is the most common risk factor in non-diabetics. The most common organisms are *E coli*, *Klebsiella pneumoniae*, *Proteus*, *Enterococcus*, *Pseudomonas*, *Clostridium* and, rarely, *Candida*. Clinical manifestations are similar to pyelonephritis, but patients are often sicker and respond poorer to medical treatment. CT is the recommended imaging modality. EPN can be classified into two types based on CT findings: type 1 is characterised by renal parenchymal necrosis, and type 2 by renal or perirenal fluid and gas in the collecting system.[2] Treatment should follow early goal-directed therapy guidelines – with intravenous antibiotics, fluids, electrolyte and glucose management. PCN should be considered in patients other than those with mild disease with no abscess formation.[3] Nephrectomy is considered for patients in whom PCN is

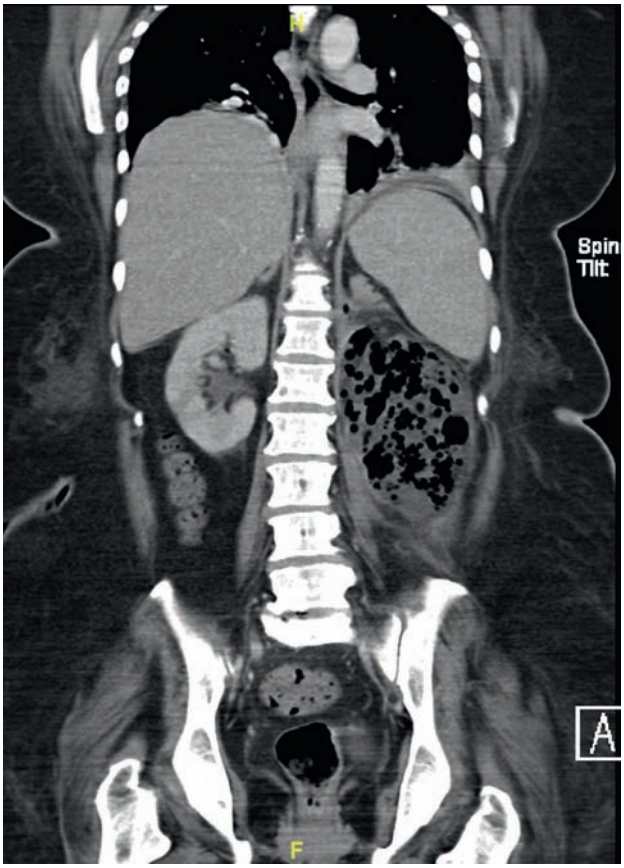

Fig 1. Computed tomography showing features of advanced left emphysematous pyelonephritis with a large perinephric collection.

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unsuccessful in controlling the disease.[4] Risk factors for adverse outcomes include type 1 disease, requirement for PCN, and thrombocytopenia.[5] ■

References

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