A Case of Emphysematous Pyelonephritis

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Background

EPN is a rare necrotising infection of the urinary tract characterised by the presence of gas in the renal parenchyma and surrounding tissues. EPN can progress to sepsis and multi organ failure without appropriate management. It is therefore an important diagnosis to consider, particularly in those with suspected pyelonephritis, who fail to respond to conventional treatment.

EPN is heavily associated with poorly controlled diabetes mellitus. High concentrations of glucose within the renal tissues, and the ischaemic environment created in the context of an associated microvascular nephropathy, aid in potentiating the growth of gas producing microorganisms. Over 90% of EPN cases are caused by the glucose fermenting Escherichia coli. Other responsible microorganisms include Proteus mirabilis, Klebsiella pneumonia, Bacteroides fragilis and Pseudomonas aeruginosa [1].

Case Presentation

A 59 year old lady with no known medical history presented with a short illness characterised by fevers and left sided flank pain.

She was hypotensive requiring a noradrenaline infusion. Her abdomen was distended and tender in the left upper and lower quadrants. Laboratory analysis revealed a WCC of 11.1(109/L), CRP in excess of 700mg/L, urea of 25.8mmol/L and creatinine of 216umol/L. Her blood glucose was 38 and met criteria for diabetic ketoacidosis. She was commenced empirically on intravenous meropenem and gentamicin for sepsis.

Chest X-ray showed retroperitoneal free gas in the left upper quadrant of her abdomen (Image 1). Computed Tomography (CT) imaging identified destruction of over 75% of the left renal parenchyma with gas fluid levels in the perinephric space (Image 2). A diagnosis of emphysematous pyelonephritis (EPN) was made, and a left sided nephrostomy was placed.

A pure growth of Escherichia coli was isolated from blood and urine cultures and she received ongoing management with intravenous ciprofloxacin for planned treatment duration of 4 weeks based on antimicrobial sensitivities.

She responded well clinically to treatment and biochemically with a reduction in CRP and improvement in renal indices. Her HBA1C was 160 mmol/L and a new diagnosis of diabetes mellitus was made.

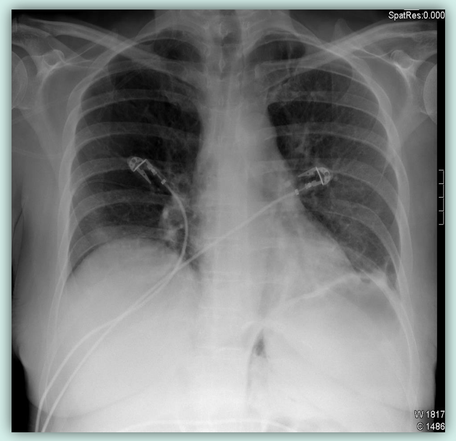

Image 1

Discussion

With non-specific symptoms such as fever, flank pain and nausea, recognition of EPN represents a significant diagnostic challenge.

Furthermore, while standard practice recommend renal ultrasound as first line in evaluating suspected pyelonephritis, this modality has poor sensitivity in the identification of gas pathognomonic of EPN. CT remains the gold standard, with an ability to identity the presence and distribution of gas and evaluating the extent of damage to the renal parenchyma [1].

At present there is no consensus for the management of EPN. As demonstrated in this case, medical management with appropriate antimicrobials and aggressive fluid resuscitation, with percutaneous drainage of retroperitoneal collections is often first line.

While nephrectomy may be considered in those whom conservative management has failed, it is often avoided due to it's deleterious effect on renal function.

Huang and Tseng suggested classification of radiological findings with the identification of poor prognostic indicators (thrombocytopaenia, acute renal failure, sepsis and altered mental status) to identify those in whom early nephrectomy may be beneficial [2].

While outcomes have improved with advancements in percutaneous catheters and reduced reliance on surgical management, mortality for EPN remains at approximately 13.5% [3]. Further evidence is needed to establish clinical practice guidelines for its treatment.

Image 2

References

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3. Somani BK, Nabi G, Thorpe P et al. Is percutaneous drainage the new gold standard in the management of emphysematous pyelonephritis? Evidence from a systematic review. J Urol 2008; 179: 1844–9