End-Stage Renal Failure in a Solitary Kidney from Emphysematous Pyelonephritis

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Dear Sir,

Seriously ill patients, unable to give a comprehensive history, remain a diagnostic challenge. Radiological investigations, and correct interpretation of the radiographs, are paramount in the investigation of such a patient. Every patient presenting with severe renal failure requires renal tract ultrasonography in the first instance. Other renal investigations may be subsequently indicated. Serious urinary tract sepsis is an uncommon and elusive cause of the acute abdomen. We illustrate these points with the case of a patient with an acute abdomen where the radiograph was misinterpreted, ultrasound was not performed at the initial stage, and the patient underwent a laparotomy that otherwise would have been avoided.

A 76-year-old man was acutely admitted in the late afternoon with a 2-week history of constant generalized abdominal pain. He had not vomited. There was no bowel upset. Further history was limited due to the patient's marked confusional state. Previous history included 4 years of non-insulin-dependent diabetes mellitus, managed with glipizide (10 mg t.i.d.) and metformin (500 mg b.i.d.). A left nephrectomy had been performed 28 months previously because of a large perinephric abscess. He had a residual right hemianopia from an occipital infarct 5 years before, and a mild hemiparesis following a left cardiovascular accident 1 year before the current admission. Other medications on admission were temazepam (10 mg nocte), and Co-proxamol (paracetamol and dextropropoxyphene) as required for abdominal pain.

Examination findings on admission revealed an obese, unwell man in severe abdominal pain.

Supine blood pressure was

130/80 mm Hg and his pulse rate of 100/min was regular. He was afebrile and in severe distress, with marked signs of generalized peritonism and absent bowel sounds. The working diagnosis was perforation of an in-tra-abdominal viscus, and the patient was prepared for laparotomy. Abnormal blood results on admission are depicted table 1. A supine abdominal radiograph taken at this time is depicted in figure 1. This was interpreted as showing a possibly inflamed gall bladder.

He proceeded to laparotomy, the findings of which were normal bowel, mild 'staining' of the gall bladder, and an inflamed right kidney. A cholecystectomy was performed, and considerable bleeding ensued. This bleeding was eventually surgically controlled, and the patient transferred directly from theatre to the Intensive Therapy Unit. The next day, postoperatively, an abdominal ultrasound was performed. Visualization of the right kidney was poor. Ante-grade nephrostogram was attempted with a view to percutaneous nephrostomy, but fine-needle

puncture of the renal collecting system proved impossible. An abdominal computed tomography scan showed near complete destruction of the right kidney and distension of the renal capsule by gas. Gas was also noted in the perirenal spaces and psoas sheath. The appearances were those of emphysematous pyelonephritis (fig. 2).

His condition rapidly deteriorated, and he died 30 h after admission to hospital.

This case demonstrates three important points. An extremely unwell patient with generalized peritonitis may not have a perforated viscus. In such situations the cause may well be non-surgical, and renal causes of

Fig. 1. Abdominal radiograph depicting a large oval gas shadow in the right flank, not related to the overlying normal bowel gas. There are also curvilinear streaks of retro-peritoneal gas. abdominal pain, including severe urinary tract sepsis, pyelonephritis, or pyonephrosis, are not infrequent diagnoses and must be considered. Secondly, the supine abdominal radiograph in this case 'had the answer', but was misinterpreted. It is imperative that on-call medical staff faced with bizarre radiographs seek radiological help, whether during normal work hours or not. Had the ultra-

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Table 1. Admission blood results

Fig. 2. Abdominal CT scan depicting destruction of the right kidney and distension of the renal capsule by gas. Gas is also present in the perirenal tissues and psoas sheath. Some contrast is noted in the tissues following attempted antegrade nephrostogram. The left kidney is absent.

sound and computed tomography been performed earlier, a laparotomy with the complication of considerable intraoperative bleeding secondary to the uremia and thrombocytopenia would have been avoided. Thirdly, urasonography of the renal tract is imperative in any patient presenting with a solitary kidney and renal failure.

Emphysematous pyelonephritis is an uncommon, serious, life-threatening kidney infection. Most commonly seen in patients with diabetes mellitus. Management of such cases includes aggressive intravenous fluid, correction of the acid base and electrolyte imbalances, and antibiotic therapy. Nephrectomy is often required for successful

management of the infection and, indeed, survival of the patient. Nephrectomy, however, may not be always required, and a case of successful medical management, with preservation of renal function, has been reported [1]. Patients with a history of diabetes mellitus, presenting with an acute abdomen, should be investigated for an underlying renal cause, including urinary tract sepsis and uremic crisis. A supine abdominal film, correctly interpreted by a radiologist, and an ultrasound of the urinary tract should be performed as the initial radiological investigations.

Further radiological investigations may then be appropriately indicated [2].

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