

Case Report

A case of emphysematous pyelonephritis presenting as leg pain- a multi disciplinary approach

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ABSTRACT

Emphysematous pyelonephritis is a rare and severe infection of the kidney, which is characterized by necrotising changes in the renal parenchyma and accumulation of gas in the peri-renal tissue. The causative organism is usually a gas forming gram negative bacteria. We present a case of 65 years old gentleman presenting with leg pain, little lower urinary tract symptoms of fever, referred to our hospital with a renal mass requiring nephrectomy. He was subsequently diagnosed as EPN, requiring aggressive antibiotic therapy, haemodialysis, fasciotomy and surgical debridement. This case highlights the timely interventions required by multiple specialities and aggressive management including surgical intervention essential for an acceptable recovery. We have also tried to understand the pathophysiology of the disease and why it responds poorly to treatment.

Keywords: Bacterialinfection, Disease control, Diagnosis, Treatment, Urologic

INTRODUCTION

Emphysematous pyelonephritis is a life threatening suppurative infection of the renal parenchyma and peripheral tissues. It usually presents with fever, nausea, vomiting, abdominal pain, shock, lethargy, and confusion.¹ It has a preponderance for females and diabetics. It has a life-threatening course with high mortality and no effective treatment guidelines.² Until the rise of CT scan-based diagnosis and advances in multi-disciplinary intensive care of sepsis, the standard treatment was nephrectomy of the affected kidney. But this method had high mortality rates.³ The situation has improved dramatically in the last two decades with early CT scans-based diagnosis and aggressive multi-organ dysfunction management.⁴ Currently there are no clear-cut guidelines or protocols for its management. Early initiation of antibiotics, aggressive intensive care and surgical intervention still remains the mainstay of

treatment. Here we discuss a case of emphysematous pyelonephritis (EPN) with an unusual presentation, how it required multi-disciplinary intervention for acceptable recovery.

CASE REPORT

An elderly male diabetic, post penectomy for carcinoma of penis, presented to the emergency department with a two week history of severe pain radiating into the right leg. He was initially evaluated in an outside hospital with normal blood counts; urine routine examination was suggestive of an ongoing urinary tract infection. An MRI of the lumbo-sacral spine showed a large heterogeneous mass in right renal fossa causing compression of the right exiting nerve root at L1-L2 level, disc desiccation and diffuse bulge at L4-L5 level causing anterior thecal sac indentation. He was referred to our hospital for further evaluation and nephrectomy for the renal mass.

On admission to the emergency department, he was conscious, oriented, tachycardic with high blood sugars. His initial blood investigation showed a total count of 22,000, CRP of 259 mg/dl, haemoglobin of 6.1 mg/dl, serum sodium of 123 mg/dl, serum potassium of 5.2 mg/dl and serum creatinine of 2.53 mg/dl. He was empirically started on broad spectrum antibiotics in view of the high white cell count and CRP and transfused one pint Packed red blood cell in view of low hemoglobin. Blood sugars were optimised with insulin infusion. He was shifted to medical intensive care unit (MICU) for further management. Six hours into admission, he became anuric and developed severe hyperkalemia despite ongoing antihyperkalaemic measures and was initiated on haemodialysis through a right femoral access after consulting with the nephrologist. His blood cultures grew *Klebsiella pneumoniae* and his antibiotics were hiked to meropenam. The renal mass, anuria, sepsis were all favouring the diagnosis of an emphysematous pyelonephritis which prompted for a CT abdomen. The CT abdomen showed that the right kidney had significant architectural distortion and multiple air fluid level with extensions into the perirenal fascia, posterior abdominal wall, retrocecal region, right psoas and caudal extension into the iliacus muscle, thigh muscles and into the perineum (Figure 1a-1b). Since he was clinically stable and on IV antibiotics, procedures like DJ stenting/nephrostomy were initially considered to salvage the infected kidney. A bedside USG guided aspiration done the following day yielded frank pus. However the drain was not effective in obtaining a significant collection. Subsequently, he became hypotensive with a gradual decline in his GCS score. He was intubated and started on inotropes.

In view of the sudden clinical deterioration, he was taken up for emergency renal debridement and drainage of the abscess. Post-surgery, his GCS improved, inotropes were stopped, renal parameter improved with dialysis, hemoglobin stabilized after multiple blood product transfusions and was shifted out of MICU. On post-operative day 3, he developed a right thigh swelling and blebs on the skin with necrotic patches. On examination, he had right thigh edema, erythema and an active pus discharge from a small incised wound. He was taken up for an emergency fasciotomy with a working diagnosis of necrotising fascitis. Large pockets of pus were seen on incising the lateral thigh. The posterior thigh muscles had necrosed with deep pockets of pus, starting from the gluteal region, extending into the mid leg region. All pockets were drained and extensive fasciotomy was done. Large amount of muscle was removed from the gluteal, posterior and lateral thigh. The pus had extended to just below the popliteal fossa.

He improved subsequently with IV antibiotics, haemodialysis, multiple blood transfusions and good post-operative management. A CT abdomen done post fasciotomy showed remarkable resolution (Figure 1c-1d).

He was discharged to a local hospital to continue with the regular dressing of the wound.

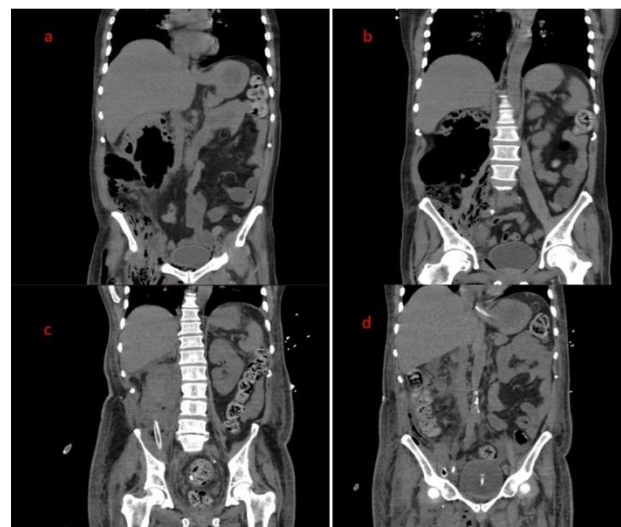


Figure1: a, b) Huge right renal mass with air fluid level suggestive of EPN; c, d) post surgical resolution.

DISCUSSION

Favourable conditions needed for the pathogenesis of EPN include; an organism capable of mixed acid fermentation, high concentration of glucose in the tissue and impaired tissue perfusion amongst others (Table 1). Collectively these factors result in a rapid progression of EPN. The pathophysiology of gas production can be attributed to change in bacterial metabolism. Certain bacteria can produce carbon dioxide and hydrogen from the glucose fermentation in optimal conditions like glucosuria and low renal perfusion.⁵

Table 1: Factors favouring progression to EPN.²

Factors
Diabetes mellitus
Alcoholism
Impaired immune mechanisms
Neurogenic bladder
Obstructive uropathy
Renal stones
Developmental defects in urinary system

The rapid progression to septic shock, multiple organ failure and death can be explained by poor efficacy of antibiotics due to poor renal blood flow.^{6,10} This case is unique as it had an unusual presentation with minimal lower urinary symptoms, diffuse leg pain and renal mass. He was referred to our centre for nephrectomy and he was clinically stable on presentation. His clinical deterioration was sudden and required multiple interventions including hemodialysis, blood transfusions,

percutaneous drainage, renal debridement and fasciotomy to stabilize him and have an acceptable recovery.

A prompt institution of antibiotics and supportive care can bring down mortality. The usual duration of treatment is around 2 to 4 weeks in EPN without associated risk factors. However, in extensive or fulminant disease, surgical management, including percutaneous drainage or immediate nephrectomy should not be delayed.^{7,8} In patient with risk factors, early surgical approach remains the gold standard in treatment.^{9,12}

EPN has no clear guidelines or studies on which modality of treatment gives better outcome. Both medical and surgical management has been tried with varying success rates.¹¹ EPN presenting as a limb pain due to severe extension into thigh and leg has been rarely reported in a stable patient. This case required evaluation from multiple specialties with extensive intervention and excellent ICU and post-operative care for an acceptable recovery.

CONCLUSION

EPN is still a rare and uncommon disease that has no universal guidelines for diagnosis or management. In diabetics, an early suspicion of EPN is required when met with a poor clinical response to treatment. Early imaging including CT abdomen, good glycaemic control and prompt use of sensitive antibiotics reduce the mortality in EPN. However, in high risk patients, aggressive early surgical approach in addition to medical management is warranted. Thus EPN requires immediate and extensive intervention from a multidisciplinary team for a favourable outcome.

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