

## A Case of Emphysematous Pyelonephritis With Septic Shock

Jeevan Malaiyan<sup>1,\*</sup>, Krishnaswamy B<sup>2</sup>, Sambandan Alandur Paramasivan<sup>3</sup>,  
Gokul Radhakrishnan<sup>3</sup>

<sup>1</sup>Department Of Microbiology, Sri Muthukumar Medical College Hospital And Research Institute,  
Chikkarayapuram, Chennai, India.

<sup>2</sup>Department Of Geriatrics, Sri Muthukumar Medical College Hospital And Research Institute,  
Chikkarayapuram, Chennai, India.

<sup>3</sup>Department Of ENT, Sri Muthukumar Medical College Hospital And Research Institute,  
Chikkarayapuram, Chennai, India.

<sup>4</sup>Managing Director And Department Of Medicine, Muthukumar Medical College Hospital And Research  
Institute, Chikkarayapuram, Chennai, India.

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**Abstract:** Emphysematous pyelonephritis is a severe, necrotizing renal parenchymal infection that is characterized by the production of intraparenchymal gas. In this case, patient was found to be diabetes mellitus, depressive illness, severely dehydrated with hyperglycemic and diagnosed as emphysematous pyelonephritis Class IIIa with early septic shock, as evidenced by bacterial growth in blood and urine culture and computerized tomography of abdomen. He was treated successfully by antibiotics and percutaneous drainage.

**Keyword:** CT scan, diabetes mellitus, emphysematous, pyelonephritis, septic shock.

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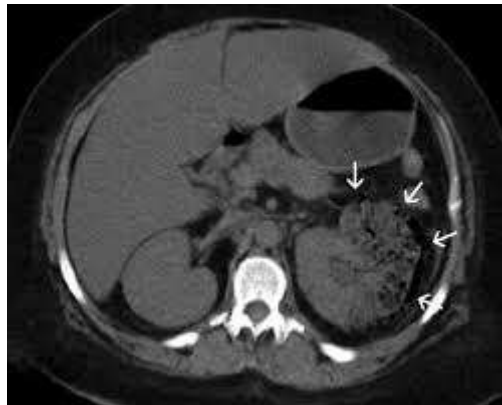
### I. Introduction

Emphysematous pyelonephritis (EPN) is a severe, acute necrotizing infection seen in patients with long-standing diabetes and is characterized by formation of gas in the collecting system, renal parenchyma and perirenal tissues [1]. Rare cases have been reported in non-diabetics who have contributing factors such as immunosuppression, urinary tract obstruction secondary to stones, tumor and rarely with autosomal dominant polycystic kidney disease [2]. Its most frequent clinical manifestations are fever, flank pain, and pyuria. In addition, non-specific abdominal pain, nausea, vomiting, loss of consciousness, shock, costovertebral angle tenderness, dysuria, local crepitation and pneumaturia are also seen [3]. The primary cause of EPN is urinary tract infection caused by either Gram-negative organisms or anaerobes in some cases. In patients with diabetes mellitus (DM), the high level of blood glucose provides gas-forming microorganisms with a more favorable environment for gas formation via mixed acid fermentation of glucose along with some hydrogen and nitrogen [4]. The diagnosis of EPN is confirmed by noncontrast computed tomography (CT) and treatment is usually based on the CT classification and here, we report a case of Class IIIa Emphysematous Pyelonephritis with septic shock.

### II. Case report

A 58 year old male who is a known case of diabetes mellitus for 10 years duration on oral hypoglycemic agents and depressive illness on oral fluoxetine has been admitted with history of dizziness, urinary incontinence, and poor oral intake and reduced activities of daily living for three days duration. He had history of head trauma five years before and recovered. There was no significant past history of fever, nausea, vomiting, back pain, hypertensive, coronary artery disease, bronchial asthma, and smoker/alcoholic. Vitals were stable and systemic examinations were found to be normal. On examination, the patient looked dull and apathetic dehydrated. Pallor was present but no icterus, cyanosis, clubbing pedal edema or generalized lymphadenopathy and patient was afebrile. Upon further investigation, patient was found to be severely dehydrated with hyperglycemic and emphysematous pyelonephritis with early septic shock, as evidenced by growth of *Staphylococcus aureus*, *Klebsiella pneumoniae* in blood and urine culture, increased cell counts with toxic granules, ultrasound and High resolution computerized tomography of abdomen [Figure - 1]. The patient was initially managed with fluid correction, appropriate intravenous antibiotics; one unit of packed cell volume and appropriate supportive care in the intensive care unit. Urology opinion was obtained and a DJ stent was placed under spinal anesthesia.

During the hospital stay, cardiologist, neurologist, psychiatrist opinion were obtained and was managed accordingly. The catheter was removed and patient voided clear urine, as evidence by negative urine culture report. Patient fully recovered at the time of discharge, was afebrile with adequate oral intake, good hydration status, alert, active and ambulant. Patient was advised to continue antibiotics, other supportive medications, asked to regularly monitor blood sugar and renal function.



### III. Discussion

Emphysematous pyelonephritis is a well-known condition which mainly affects the diabetic population (90%) and seen in patients with chronic diabetes. Patients with EPN show relatively vague symptoms initially, but frequently undergo a sudden deterioration in their condition, necessitating urgent medical attention [5]. Emphysematous pyelonephritis should be strongly suspected in patients with flank pain and fever who have history of diabetes mellitus and stone disease. [2], whereas in present case no significant history of fever, back pain were noticed. In 75% of the EPN cases, infection is caused by *Escherichia coli* (75%). In other cases, *Klebsiella pneumoniae*, *Enterobacter aerogenes*, *Proteus mirabilis*, *Pseudomonas* species, anaerobic streptococci, and *Candida* and other fungi have been isolated as the pathogenetic organisms [6] and in this case *Staphylococcus aureus*, *Klebsiella pneumoniae* were isolated in blood and urine culture. CT classification of EPN by Huang et al. divides patients into four classes based on the site of gas collection. It has been correlated with prognosis and management of the patients. [7]. Treatment of patients with EPN comprises resuscitation, correction of any electrolyte and administration of antibiotics targeting Gram-negative bacteria [5]. We observed extension of gas to the perinephric space, reported as class IIIa Emphysematous pyelonephritis and patient was managed with fluid correction, appropriate intravenous antibiotics and appropriate supportive care.

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### Figure legend

**Figure-1:** CT scan abdomen: Severe cystitis with enlarged kidney and raised renal parenchymal echoes. Compressed left renal sinus by cortical edema with mild associated perinephric inflammation which is suggestive of left emphysematous pyelonephritis.

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None