

Conservative Management of Emphysematous Pyelonephritis with Obstructive Renal Calculus in a Diabetic Female: A Case Report

Dr. Raviraj S Vasaiya¹, Dr. J. G. Vagadia²

¹ 3rd Year Resident, Department of General Surgery, PDU Government Medical College and Hospital, Rajkot, Gujarat, India

² Associate Professor, Department of General Surgery, PDU Government Medical College and Hospital, Rajkot, Gujarat, India

Abstract: *Emphysematous pyelonephritis (EPN) is a rare, life-threatening necrotising renal infection characterised by gas formation within the renal parenchyma, collecting system, or perinephric tissues. It commonly occurs in patients with diabetes mellitus and urinary tract obstruction. Early diagnosis and timely management are critical to reduce morbidity and mortality. We report the case of a 45-year-old diabetic female who presented with left flank pain, fever, and dysuria of 7-10 days duration. Imaging revealed obstructive left renal pelvic calculus with features of emphysematous pyelonephritis. She was managed initially with broad-spectrum intravenous antibiotics followed by left-sided DJ stenting. Significant clinical, biochemical, and radiological improvement was seen, avoiding emergency nephrectomy.*

Keywords: Emphysematous pyelonephritis; Obstructive uropathy; Diabetes mellitus; DJ stenting; Conservative management

1. Introduction

Emphysematous pyelonephritis (EPN) is a severe necrotizing infection of the kidney characterized by gas formation within the renal parenchyma, collecting system, or surrounding tissues. It affects patients with diabetes mellitus and urinary tract obstruction. Historically, EPN carried a high mortality rate, often necessitating emergency nephrectomy. However, advances in imaging, antibiotics, and minimally invasive urinary drainage techniques have shifted management toward kidney-preserving approaches in hemodynamically stable patients. We present a case of emphysematous pyelonephritis with obstructive renal calculus in a diabetic female, successfully managed with antibiotics and DJ stenting without the need for percutaneous nephrostomy or nephrectomy.

2. Case Presentation

A 45-year-old female presented with complaints of left flank pain, fever, and burning micturition for 7–10 days. She was a known case of type 2 diabetes mellitus diagnosed three months prior and was on medical management. Her past surgical history included left percutaneous nephrolithotomy (PCNL) performed 13 years back

3. Clinical Examination

On admission, the patient was hemodynamically stable. Systemic Examination:

- Cardiovascular and respiratory systems: Normal
- Abdominal examination: Mild tenderness in the left lumbar region

4. Investigations

Laboratory Findings

- Haemoglobin: 9.4 g/dL
- Total leukocyte count: 20,600 /mm³

- Platelet count: 4.2×10^5 /mm³
- Serum creatinine: 1.68 mg/dL
- Random blood sugar: 88 mg/dL
- Urine routine microscopy: 5–6 pus cells/hpf
- Urine culture: No growth

5. Radiological Findings

Plain CT KUB (Outside):

- Obstructive calculus in left renal pelvis
- Emphysematous changes in left kidney

CECT Abdomen and Pelvis:

- Bulky oedematous left kidney with multiple hypo-dense cortical areas
- Multiple air foci within renal parenchyma and pelvicalyceal system with Obstructing renal pelvic calculus (21 × 18 mm) causing proximal dilatation of pelvi-calyceal system
- Mild cortical thinning
- Diagnosis: Emphysematous pyelonephritis with obstructive uropathy

Management

The patient was started on broad-spectrum intravenous antibiotics (Inj. Meropenem 1 g IV every 8 hours). Glycemic control and supportive care were optimized.

After one week of stabilisation, left-sided DJ stenting was performed under local anesthesia to relieve obstruction.

Post-Procedure Outcome

- Urine output: 2.5 L/day, clear
- Clinical improvement with resolution of fever and pain

Post-procedure laboratory values:

- Haemoglobin: 10.1 g/dL
- TLC: 13,600 /mm³
- Serum creatinine: 1.22 mg/dL



Follow-Up Imaging (CT Urography)

- Reduction in renal size and intrarenal air
- DJ stent in situ
- Persistent calculi but improved perinephric inflammation
- Delayed and reduced contrast enhancement in left kidney
- Minimal opacification of left pelvicalyceal system on delayed images
- Right kidney showed normal contrast excretion

Urosurgical opinion was sought regarding percutaneous nephrostomy; however, given the patient's clinical and biochemical improvement, conservative management was continued.

Outcome and Follow-Up

The patient showed sustained clinical improvement and was discharged on postoperative day 9 with:

- Stable renal function
- Adequate urine output
- Tolerating full oral diet
- Normal bowel and bladder habits

6. Discussion

EPN is commonly associated with diabetes mellitus and urinary tract obstruction. Gas-forming organisms such as *Escherichia coli* and *Klebsiella pneumoniae* are most frequently implicated. CT imaging remains the gold standard for diagnosis and classification.

Recent evidence supports conservative management with antibiotics and drainage (DJ stenting or PCN) in stable patients. Nephrectomy is now reserved for patients with extensive disease, hemodynamic instability, or failure of conservative therapy. This case reinforces the evolving paradigm toward kidney-preserving management even in advanced radiological disease.

7. Conclusion

This case highlights that selected patients with emphysematous pyelonephritis and obstructive uropathy can be successfully managed conservatively with prompt

antibiotic therapy and internal urinary drainage, even in the presence of extensive radiological disease.

Take-Home Message

- Early diagnosis of emphysematous pyelonephritis is crucial.
- Diabetes and urinary obstruction are major risk factors.
- Hemodynamically stable patients can be managed conservatively.
- DJ stenting is an effective internal drainage option.
- Nephrectomy should be reserved for non-responders.

References

- [1] Huang JJ, Tseng CC. Emphysematous pyelonephritis: Clinicoradiological classification, management, prognosis, and pathogenesis. *Arch Intern Med.* 2000;160(6):797–805.
- [2] Pontin AR, Barnes RD. Current management of emphysematous pyelonephritis. *Nat Rev Urol.* 2009;6(5):272–279.
- [3] Kapoor R, et al. Management of emphysematous pyelonephritis: A series of 15 cases. *BJU Int.* 1998;82(3):343–347.
- [4] Somani BK, et al. Is percutaneous drainage the new gold standard in the management of emphysematous pyelonephritis? *J Urol.* 2008;179(5):1844–1849.