

# Successful Medical Treatment of Emphysematous Pyelonephritis

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**KEY WORDS:** emphysematous pyelonephritis, percutaneous nephrostomy, nephrectomy, medical treatment

## Introduction

Emphysematous pyelonephritis (EPN) is a rare life threatening condition. It usually happens in diabetic patients. Its mortality is as high as 75% and urgent nephrectomy has been highly recommended.<sup>(1)</sup>

However, recent advancements in imaging techniques and new stronger antibiotics can make medical treatment an acceptable alternative for radical surgery. We report a diabetic patient with EPN, who was managed successfully with medical treatments.

## Case Report

A 45-year-old woman with a history of fever for 10 days, persistent left flank pain, nausea, vomiting, and loss of appetite was referred to our medical center. She was also complaining of irritative urinary symptoms. Hematuria or pneumaturia was not present. She had non-insulin dependent diabetes mellitus for 12 years, which was under control with glibenclamide and metformine. She had also a history of myocardial infarction 3 months earlier. On admission, she was cachectic and ill.

The conjunctiva was pale and the other vital signs were as follows: blood pressure: 130/85 mmHg, pulse rate = 90/min, and Temp = 38.1°C.

On physical examination, the left flank was tender and a moderately mobile and soft mass was palpable.

The right kidney was also palpable, but without tenderness. Laboratory studies revealed leukocytosis, anemia, serum creatinine 2.5 mg/dl, pyuria, and microscopic hematuria. Left kidney

calyces were outlined in KUB.

On intravenous pyelography that had been taken in another center, the left kidney was not visible, but there was air in the collecting system and the resultant air pyelogram and ureterogram were apparent (fig. 1). Ultrasonography revealed diffuse echogenic foci in the left kidney, together with hydronephrosis and dirty shadow. In addition, there was a 17-mm echogenic focus behind the bladder in the left side (suggestive of stone).

Due to the history of myocardial infarction 3 months earlier, the risk of surgery was high, and we decided to attempt medical treatment. CT scan without contrast enhancement revealed an enlarged left kidney with air density in collecting system (fig. 2).

Under intravenous sedation with neuroleptic agents and antibiotic coverage, cystoscopy and ureteroscopy were done. There was not any obstruction in the left ureter, but after lifting a mucosal fold, a purulent discharge was seen. Left percutaneous nephrostomy was performed and a ureteral stent was placed in the left ureter. After



**FIG. 1.** Air pyelogram and ureterogram in the collecting system was detected by intravenous pyelography.

*Received February 2003*

*Accepted May 2004*

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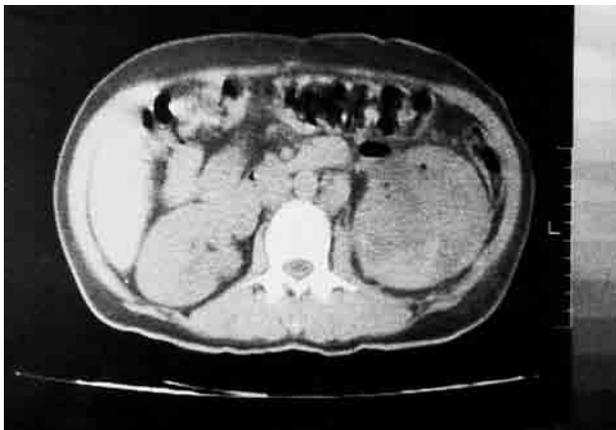


FIG. 2. Enlarged edematous left kidney with air density in the collecting system was observed in CT scan without contrast enhancement.

24 hours, nephrostomy tube was removed due to cessation of discharge. Antibiotic therapy consisted of metronidazole 500 mg, IV, TID, ceftriaxone 1 gr, IV, BD. After seven days of medical treatment, the patient's fever was alleviated and serum creatinine level decreased to normal level. The patient was discharged in the tenth day of admission with a good general condition and oral antibiotic (ciprofloxacin 500mg, PO, BD) for additional five days was prescribed.

### Discussion

Emphysematous pyelonephritis was first described in 1898 as an acute perirenal necrotizing parenchymal infection that is produced by gas forming uropathogen. Patients with EPN are very ill and septic and some have associated liver insufficiency.<sup>(1)</sup> Mostly it is unilateral, but in 10% of cases, both kidneys are involved. Four factors have been proposed to have a role in the development of EPN: gas producing bacteria, high blood glucose level, damaged tissue perfusion, and impaired immune response. In a report of 48 patients with EPN, 96% were diabetics and 22% had urinary obstruction.

The most common causative microorganisms are: *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Aerobacter aerogenes*, *Citrobacters*, and rarely fungi.<sup>(2)</sup> Emphysematous pyelonephritis can be

fatal if left untreated. Traditionally the consensus is that mere medical treatment is ineffective and prompt nephrectomy is necessary. Mortality rate in patients who are treated only with antibiotics is 40%. Treatment is successful in 66% of patients who are treated with percutaneous nephrostomy and antibiotics, and in 90% of those with nephrectomy.

Man et al have divided the EPN into two types.<sup>(3)</sup> In type one that is a classic form of EPN, the gas is disseminated throughout the kidney in the form of streaky or mottled pattern and there is associated tissue destruction and little or nil fluid.<sup>(4)</sup> In type two, there is fluid collection in renal or perirenal tissues with gas accumulation in collecting system (fig. 1). In type one, due to severe tissue destruction, the prognosis is poor and it is recommended that nephrectomy must be done. In type two, like our patient, prognosis is better and one can expect appropriate response to medical therapy.<sup>(5,6)</sup>

Based on our findings, it seems that nephrectomy is not a preferred treatment for all of the EPN cases. Nowadays, there are growing reports of successful medical treatment of EPN.

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