

## CASE REPORTS

# EMPHYSEMATOUS PYELONEPHRITIS: SUCCESSFULLY MANAGED WITH CONVENTIONAL APPROACH

TABASSUM SAMAD, WASIM MD. MOHOSIN UL HAQUE<sup>2</sup>, MUHAMMAD ABDUR RAHIM<sup>3</sup>, RAHIM MA<sup>4</sup>, SARWAR IQBAL<sup>E</sup>

### Abstract:

*Emphysematous pyelonephritis is a rare necrotizing renal parenchymal infection characterized by gas accumulation in kidneys with or without involving surrounding structures. Patients with diabetes mellitus are the usual sufferers. Here we depict a case of a young Bangladeshi diabetic lady who presented with abdominal pain and dysuria. Investigations confirmed left sided emphysematous pyelonephritis. She responded well to open drainage along with antibiotic coverage.*

*Key-words: Diabetes mellitus; emphysematous pyelonephritis; management*

*Received: 03 December 2015*

*Accepted: 09 June 2016*

### Introduction:

Emphysematous pyelonephritis (EPN), a severe form of acute pyelonephritis, occurs especially in patients with diabetes mellitus (DM).<sup>1</sup> EPN was first described in 1898 and the term “Emphysematous pyelonephritis” was adopted in 1962.<sup>2,3</sup> Since the first reported case, only around 200 cases have been published in the literature.<sup>4</sup> As it carries a grave prognosis with mortality up to 80%, high index of suspicion and prompt management of the disease is of paramount importance.<sup>5</sup>

This case highlights the importance of open drainage as an alternative to percutaneous drainage in poor setting which also may avoid nephrectomy.

### Case History:

A 30-year old diabetic lady with poor glyceamic status had five day history of left sided, localized, aching type of loin pain. She was alert, oriented, afebrile and hemodynamically stable but dehydrated. There was tenderness over left flank and suprapubic region and breath sound was reduced in left lower chest. Bed side urine examination showed glucose 3+ and 1+ proteinuria and microscopic examination revealed plenty of pus cells but no red blood cells. There was neutrophilic leucocytosis, thrombocytopenia and high erythrocyte sedimentation rate (ESR) on routine blood test. Blood urea, serum creatinine and HbA1C were also raised (Table 1). Urine culture revealed growth

- 
1. Registrar, Nephrology, Ibrahim Medical College and BIRDEM general Hospital, Shahbag, Dhaka 1000, Bangladesh
  2. Associate Professor, Nephrology, Ibrahim Medical College and BIRDEM general Hospital, Shahbag, Dhaka 1000, Bangladesh
  3. Assistant Professor, Nephrology, Ibrahim Medical College and BIRDEM general Hospital, Shahbag, Dhaka 1000, Bangladesh
  4. Associate Professor, Nephrology, Ibrahim Medical College and BIRDEM General Hospital, Shahbag, Dhaka 1000, Bangladesh

**Address of Correspondence:** Dr. Tabassum Samad, FCPS(medicine), Registrar, Nephrology, Ibrahim Medical College and BIRDEM general Hospital, Shahbag, Dhaka 1000, Bangladesh. Mobile:01711282434, Email: samadtabassum@yahoo.co

**Table-I**  
*Abnormal laboratory findings of the patient with emphysematous pyelonephritis*

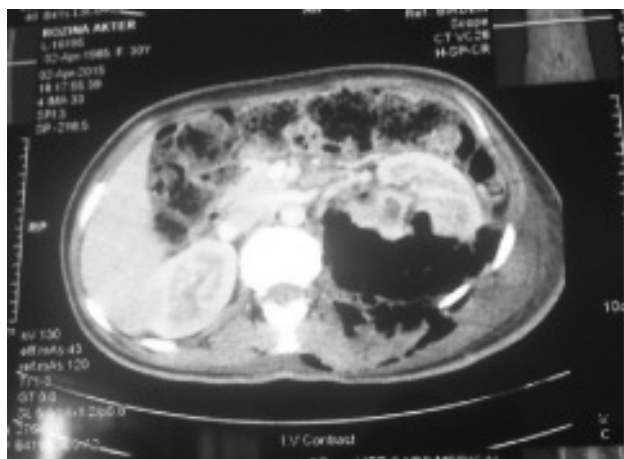
Laboratory Test	Patient's value	Reference range
Hb(gm/dl)	10	11.5-16
Total leucocyte count/cmm of blood	20,500	4000-11,000
Neutrophil (%)	86	40-70
Platelets /cmm of blood	95,000	1,50,000-4,50,000
ESR (mm in 1 <sup>st</sup> hr)	100	<20
Urea (mg/dl)	140	20-40
Serum creatinine (mg/dl)	4	0.67-1.2
Random Blood glucose (mmol/L)	23	<11.1
HbA1C (%)	13.5	<7
Urine		
Glucose	+++	
Protein	+	
Pus Cell / HPF	Plenty	
RBC / HPF	Nil	
Culture	Growth of <i>Escherichia Coli</i> Colony count > 1 × 10 <sup>5</sup> CFU/ml	

**Table-II**  
*Classification of emphysematous pyelonephritis by Huang and Tseng<sup>11</sup>*

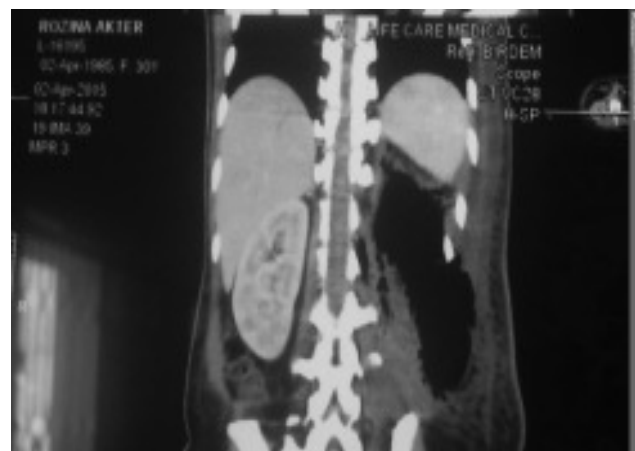
Classification	Radiological findings
1	Gas in collecting system only
2	Gas in renal parenchyma without extension to extra renal space
3A3B	Extension of gas or abscess to perinephric space Extension of gas or abscess to pararenal space
4	Bilateral EPN or solitary kidney with EPN

of *E.coli* but blood culture showed no organism. Focal hypo echoic area in parenchyma and pelvis of left kidney suggesting of left sided EPN was abdominal ultra sonographic findings. CT scan also revealed left sided EPN (Fig 1:A,B).Chest radiograph showed

elevated left hemidiaphragm. (Fig 2).She was put on meropenam according to our hospital guideline which was further continued after getting culture sensitivity report of urine. Intravenous fluid for correction of dehydration and insulin for uncontrolled blood glucose was also given. Patient was diagnosed as



**Fig1(A)** CT scan axial view showing heterogenous area of air in left kidney and air in psoas muscle



**Fig 1(B)** CT scan of KUB region (coronal view) showing a heterogeneous area of air displacing the left sided EPN



**Fig 2** CXR (PA view) showing elevated left diaphragm

having Class 3B EPN (Table-II) and underwent left sided open drainage of small amount of pus and air.

Her condition was improving afterwards and serum creatinine level came to normal. She was then switched to oral antibiotics according to culture sensitivity report and advised to continue it for total 6 weeks and come for follow up at nephrology out-patient- department with isotope renogram report.

#### **Discussion:**

EPN is a rare necrotizing infection of upper urinary tract. DM is the commonest risk factor contributing in 90% cases.<sup>6</sup> EPN of left kidney in a female diabetic patient with uncontrolled blood glucose level is the commonly affected group like in our case.<sup>6</sup>

*E.coli* is the commonest isolated organism as in this reported case.<sup>7</sup>

Low oxygen tension within kidney enforces anaerobic metabolism by *E.coli*, which are facultative anaerobes.<sup>8</sup> Gas production is secondary to rapid tissue catabolism with fermentation of glucose to carbon dioxide. In patients without DM, urinary albumin is thought to substitute for glucose.<sup>9</sup>

As there are no definite sign and symptoms which are pathognomonic of EPN, imagings are essential for diagnosis. Although plain abdominal films and ultrasonography of abdomen can detect gas in kidneys, CT scan has higher sensitivity and specificity.<sup>10</sup> Huang and Tseng studied a collection of 48 EPN patients and classified them into four classes according to the CT scan findings (Table 2).<sup>11</sup> The higher the class, the worse the prognosis.<sup>12</sup> Huang and Tseng also identified thrombocytopenia, acute renal failure, altered mental status and sepsis as poor prognostic factor and proposed the following treatment guideline: (1) antibiotic and percutaneous

drainage (PCD) as initial treatment for all patients (2) bilateral PCD for class 4 patients (3) immediate nephrectomy for class 3 patients with more than 2 risk factors. (4) nephrectomy if PCD fails.<sup>11</sup> This classification of EPN and guideline has been used by others for therapy and prognosis.<sup>12</sup>

Our patient had class 3B EPN and had two risk factors for which medical management with PCD is proposed by Huang and Tseng. Our patient responded well to medical management with open drainage (OD). Chen MT et al and Aboumarzouk et al advocated OD as a management technique.<sup>9,13</sup> Aboumarzouk et al also found that mortality is significantly lower with OD or PCD with delayed nephrectomy than emergency nephrectomy.

Despite of having life threatening potential of EPN, favourable outcome is achievable with high degree of suspicion, early detection, prompt and appropriate management of the disease. Personalized invasive methods can be adopted depending on available facilities.

#### **References:**

1. Pontin AR, Barnes RD, Joffe J, Kahn D. Emphysematous pyelonephritis in diabetic patient. *BJ Urol* 1995;75:71-4
2. Kelly HA, Maccullum WG. Pneumatouria. *J Am Med Assoc* 1898;31:375-81
3. Schultz EH, Klofrein EH. Emphysematous pyelonephritis. *J Urol* 1962;87:762-6
4. Yao J, Gutierrez OM, Reiser J. Emphysematous Pyelonephritis. *Kidney International* 2007;71:462-5
5. Khira A, Gupta A, Rana DS, Gupta A, Bhalla A, Khullar D. Retrospective analysis of clinical profile, prognostic factor and outcome of 19 patients of Emphysematous pyelonephritis. *Int Urol Nephrol* 2009; 41:959-66
6. Ali M, Barlas NB. Emphysematous pyelonephritis: A case report. *Int J Diabetes mellitus* 2010;2:130-2
7. Simms R, Torpeng N, Kanagasundaram NS, Baines L, Sayer JA. Emphysematous pyelonephritis leading to end stage renal failure. *NDT plus* 2004;4:264-5
8. Blattner FR, Plunkett G, Bloch CA, Perna NT, Burland V, Riley M et al. The complete genome sequence of *Escherichia coli* K-12. *Science* 1997; 277:1453-73
9. Aboumarzouk OM, Hughes O, Narahari K et al. *Arab J Urol* 2014;12:106-15
10. Bamanikar A, Dhobale S. Fever with abdominal pain and diabetes – is it emphysematous pyelonephritis? *Malays J Med Sci* 2014; 21(3): 85–8.
11. Huang JJ, Tseng CC. Emphysematous pyelonephritis: Clinicoradiological classification, management and pathogenesis. *Arch Int Med* 2000;160:797-805
12. Yao J, Gutierrez OM, Reiser J. Emphysematous pyelonephritis. *Kidney International* 2007;1:462-5
13. Chen MT, Huang CN, Chou YH, Huang CH, Chiang CP, Liu GC. Percutaneous drainage in the treatment of Emphysematous pyelonephritis 10 year experience. *J Urol* 1997;157:1569-73.