Bangladesh Crit Care J March 2014; 2 (1): 46-47

Case Report

An Unusual Presentation of Type 2 Diabetes Mellitus

Mukut Roy[1], Pranab Kumar Sahana[2], Nilanjan Sengupta[3], Chanchal Das[4], Prashant Somani[5], Ranen Dasgupta[6]

Abstract:

In this part of world, the mode of presentation of type 2 diabetes is enormously varied and infections may be the first presenting feature of previously unknown diabetes. In this case, we report an initial way of presentation of type 2 diabetes mellitus as emphysematous pyelonephritis. He was treated successfully by antibiotics and percutaneous drainage. Emphysematous pyelonephritis is a rare life-threatening gas-producing, necrotizing infection of the renal parenchyma and surrounding areas which can be focal or diffuse and may spread to the collecting system or perinephric tissues. It is rapidly progressive and fatal if untreated. Prompt recognition and aggressive treatment helps in complete recovery of patients.

Key words: *Diabetes mellitus, Emphysematous pyelonephritis, Percutaneous drainage, Nephrectomy.*

Introduction:

Emphysematous pyelonephritis (EPN) is a life-threatening, necrotizing infection of renal parenchyma and peri-renal tissues caused by gas-forming organisms.[1] It predominantly affects female diabetics.[1,2] Though, this entity remains a distinctive complication of diabetes mellitus patients, case reports of EPN as initial way of presentation of diabetes mellitus is rare. Here, we report an interesting mode of presentation of type 2 diabetes mellitus as EPN.

Case Report:

A 60 year old gentleman presented with fever, right flank pain and vomiting since last 5 days. He did not contribute other significant present, past or personal history. On admission, he was toxic and confused. Examination revealed body temperature of 39°C, pulse rate of 112/min, respiratory rate of 32/min and blood pressure of 80/50 mmHg. He had severe tenderness and a bimanually palpable mass in the right lumbar region. No costovertebral angle tenderness or flank crepitus was noted. His random plasma glucose was 574 mg/dl. On complete hemogram, there was leukocytosis [Total count (TC): 20,900/mm^3] (ref. range: 4000-11000) with neutrophilia and toxic granules in the blood film. Serum urea: 42 mg/dl (ref. range: 7- 20) and creatinine: 1.6 mg/dl (ref. range: 0.6 – 1.2 mg/dL in males) were respectively.

1 Mukut Roy, M.B.B.S, MD (Medicine), Post Doctoral Trainee (Endocrinology)

2 Pranab Kumar Sahana, MD (Medicine), DM (Endocrinology), Associate Professor

3 Chanchal, Das, M.B.B.S (Cal), DCH (Cal), MD (Medicine), Post Doctoral Trainee (Endocrinology)

4 Nilanjan Sengupta, MD (Medicine), DM (Endocrinology), Associate Professor & Head

5 Prashant Somani, M.B.B.S, MD (Medicine), Post Doctoral Trainee (Endocrinology)

6 Ranen Dasgupta, MD (Medicine), DM (Endocrinology), Professor & Ex-Head Department of Endocrinology, N.R.S. Medical College & Hospital, Kolkata-700014, West Bengal, India.

Corresponding Author:
Mukut Roy
Department of Endocrinology,
Nilratan Sircar Medical College, Kolkata,
West Bengal, India,
Email: mukutdoc@gmail.com

Electrolytes values were: serum sodium: 134 meq/l (ref. range: 136-146) and potassium: 3.9 meq/l (ref. range: 3.5-5). Urine for ketone bodies was negative. After transferring the patient to intensive care unit, he was managed with volume repletion, insulin infusion and supportive conservative measures along with central venous pressure (CVP) monitoring. Empirically intravenous piperacillin-tazobactam and linezolid were initiated.

Next day, fasting plasma glucose (FPG) was 286 mg/dl (ref. range:<100) and ultrasound (USG) abdomen revealed an enlarged right kidney. On the 3rd day, computed tomography (CT) scan abdomen (Fig.1) confirmed multiple air pockets in the right renal parenchyma and extension to perinephric space with heterogeneous contrast enhancement.

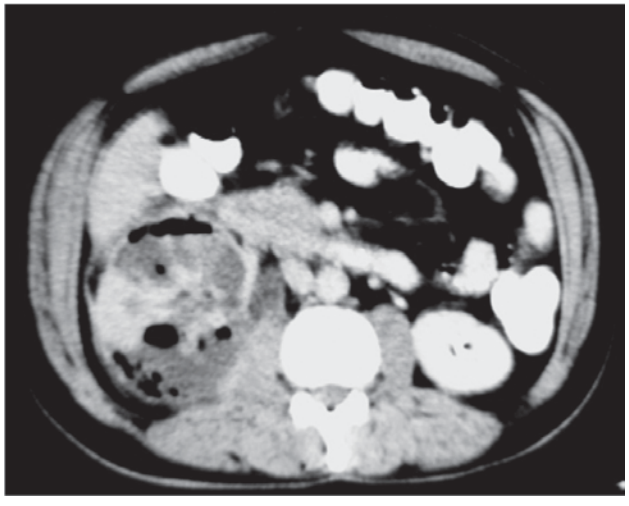

Fig. 1 : *CT abdomen with contrast showing evidence of pyelonephritis involving right kidney with enlargement, multiple air pockets and heterogeneous contrast enhancement.*

On this basis, percutaneous drainage (PCD) of approximately 200 ml of pus was performed, in two sittings, on the third & fifth day. His urine culture and sensitivity (C/S) picked up growth of *Escherichia coli* (>10^5 CFU/ml of urine); sensitive to imipenem-cilastatin and full dose was commenced (1gm i.v thrice daily). Glycated hemoglobin (HbA_{1c}) was 11.2% (ref. range: <6.5). As he started taking orally, insulin infusion was changed to subcutaneous (s.c.) basal-bolus insulin regimen which he tolerated well.

On 14th Day, he was hemodynamically stable and his abdominal mass was not palpable. TC was 10,600/mm³ with creatinine: 1.2 mg/dl. FPG was 116mg/dl with post-prandial plasma glucose (PPPG) of 170mg/dl (ref. range: <140). He was receiving regular insulin s.c. 6-6-4 units before each meal and neutral protamine hagedron (NPH) Insulin s.c 6 units at bedtime. Imipenem-cilastatin was continued till 21st day. On 22nd day, he was asymptomatic, afebrile with BP of 130/80mmHg. Repeat investigations revealed TC: 6,400/mm³, creatinine: 0.7 mg/dl, FPG: 98mg/dl and PPPG: 152mg/dl. Basal bolus regimen was changed to glimepiride 1mg and metformin 500mg. He was discharged and advised to follow up after 7 days with repeat CT abdomen report.

On follow up, on the 30th day, in endocrine outpatient department, he was asymptomatic.

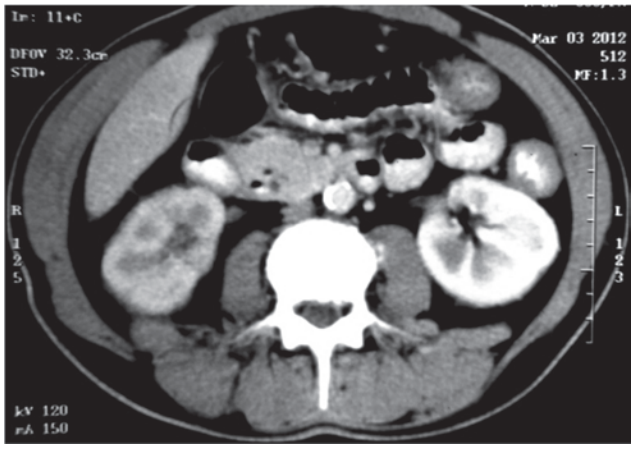

Fig. 2 : *CT abdomen (on 30th day) showing improved findings of the right kidney.*

His FPG was 92mg% with PPPG of 148mg%. His repeat urine C/S was sterile. Follow up CT abdomen (Fig.2) also showed improved findings.

Discussion:

Emphysematous pyelonephritis (EPN) is an uncommon, life-threatening suppurative infection of the renal parenchyma and surrounding areas leading to gas formation in the collecting tubules, renal parenchyma or perinephric tissues.[1] More than 90% of cases of EPN occur in patients with diabetes.[2,3,4] EPN also may occur in immunocompromised patients, alcoholic individuals, ureteral obstruction, urinary tract infection and hydronephrosis.[1] This is thought to be due to high levels of glucose in the tissues of diabetic patients which certain bacteria use for aerobic and anaerobic metabolism; decreased tissue perfusion and defective immune response.[2,5] Most infections are due to *Escherichia coli* (approximately 70%), *Klebsiella pneumoniae* (29%), *Proteus*, *Streptococci* or mixed organisms (10%).[2,5] For indefinite explanations, the left kidney involved more frequently than the right (67% vs. 25%).[2] In our case, we found EPN involving the right kidney only.

Presentations of EPN consists of fever, pyuria and flank or back pain usually; however, nausea, vomiting, shock and crepitus overlying the affected kidney are also common signs and symptoms. Younger patients with EPN have symptoms of acute pyelonephritis, whereas older patients may appear less critically ill.[1,2] Pontin et al reviewed 22 diabetic patients with EPN and found most of them had poor control of their diabetes in which 16 of them presented with ketoacidosis.[6] Our patient presented with fever, vomiting, right flank pain and a bimanually palpable mass in the right lumbar region but without any previous history of diabetes mellitus or any evidence of ketoacidosis. Subsequently, he was diagnosed as diabetes mellitus and managed accordingly.

The prognosis depends on the underlying disease, clinical status and treatment modalities.[2] CT has played an important role in improving EPN outcomes due to earlier diagnosis. CT scan is highly sensitive and specific for detecting air in the renal tract and clear depiction of renal and perirenal anatomy.[7] Based on CT, EPN can be classified into four classes; Class-1: Gas in the collecting system only; Class-2: Gas in the renal parenchyma without extension into the extra renal space; Class-3a: Extension of gas/abscess to perinephric space; Class-3b: Extension of gas/abscess into pararenal space; and Class-4: Bilateral EPN or solitary kidney with EPN.[2] Class-1 and 2 EPN are usually managed with antibiotics with or without PCD. Class-3 and 4 are usually managed surgically.[2] Our patient although presented as class 3 EPN but considering all the factors, a trial of PCD with antibiotic therapy was given which he tolerated well. Also, Chen MT et al established that PCD was a suitable means of treating EPN, including patients who were too ill to undergo nephrectomy.[8]

To conclude, emphysematous pyelonephritis, though unusual, could be an initial presentation of type 2 diabetes mellitus patients. Therefore, prompt recognition and appropriate treatment are needed to improve clinical outcome of this unusual and grave amalgamation.

References:

1. Michaeli J, Mogle P, Perlberg S et al. Emphysematous Pyelonephritis. *J Urol* 1984; 131: 203–208.
2. Huang JJ, Tseng CC. Emphysematous Pyelonephritis: Clinicoradiological Classification, Management, Prognosis and Pathogenesis. *Arch Intern Med* 2000; 160:797–805.
3. Smitherman KO, Peacock JE Jr. Infectious Emergencies in Patients with Diabetes Mellitus. *Med Clin North Am* 1995;79:53–77.
4. Cook DJ, Achong MR, Dobranowski J. Emphysematous Pyelonephritis: Complicated Urinary Tract Infection in Diabetes. *Diabetes Care* 1989;12: 229–232.
5. Huang JJ, Chen KW, Ruaan MK. Mixed Acid Fermentation of Glucose as a Mechanism of Emphysematous Urinary Tract Infection. *J Urol* 1991;146:148–151.
6. Pontin AR, Barnes RD, Joffe J, Kahn D. Emphysematous Pyelonephritis in Diabetic Patients. *Br J Urol* 1995;75(1):71-74.
7. Craig WD, Wagner BJ, Travis MD. Pyelonephritis: Radiologic-Pathologic Review. *Radiographics* 2008;28:255-277.
8. Chen MT, Huang CN, Chou YH et al. Percutaneous Drainage in the Treatment of Emphysematous Pyelonephritis: 10-year Experience. *J Urol* 1997; 157:1569–1573.