Killer picket in carpenter: A rare case of Acute Pyelonephritis

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Abstract

A 16-year-old young male presented with severe shortness of breath, fever with chills, decreased urine output since 4 days. On examination, oxygen saturation was 84% on room air, BP was 140/90 mmHg, heart rate of 114/min. Respiratory system examination revealed B/L coarse crepitations.Investigations revealed blood urea 256 mg/dl, creatinine 13.56 mg/dl, pH 7.27, bicarbonate levels of 12.2 mmol/l. Imaging showed B/L swollen kidneys on USG. NCCT KUB suggested acute pyelonephritis.The patient was managed with intravenous antibiotics and haemodialysis.The patient was discharged on the 8th day with a working diagnosis of acute pyelonephritis leading to acute kidney injury.

Introduction

People with diabetes have an increased propensity to develop infections. Infections are more common, more severe, and often harder to treat. Some of the causes include hyperglycaemia, which impairs neutrophil function, poor glycaemic control, and glycosuria, creating an ideal environment for microbial growth and promoting bacterial growth in the urinary tract. Additionally, autonomic neuropathy may lead to bladder dysfunction, further increasing the risk of UTI.[1]

UTI in diabetes can be asymptomatic or symptomatic, such as acute cystitis or acute pyelonephritis. Although several epidemiologic studies have shown that people with diabetes receive treatment for infection more often than those without, the magnitude of diabetes' effect on infection risk remains an active research question. Understanding the interplay

between diabetes and infection susceptibility is crucial for timely diagnosis and effective management.[2–4]

CASE REPORT

A 16-year-old male with no known co-morbidities presented to ED with complaints of burning micturition, fever with chills since 7 days and decreased urine output since 4 days. The fever was intermittent high-grade with chills and rigor with no diurnal variation. Patient started experiencing shortness of breath in the last two days before admission. There was no history of vomiting, loose stools, chest pain, abdominal pain, altered sensorium, no recent intravenous or intramuscular drug intake.On examination, patient was obese (BMI 30), was dyspnoeic, maintaining oxygen saturation of 97% on 2-3 L/min, with generalised body swelling. BP was 140/90 mm Hg, HR of 114/min, RBS was 171 mg/dl. On chest auscultation bilateral diffuse crepitations were present. Routine blood investigations are depicted in Table 1.

Table 1: Routine blood investigations

Parameters/Date	***Day 0***	***Day 1***	***Day 6***	***Day 14***	***Day 21***
Hb (gm/dl)	11.3	11.7	11.4	11.9	12.2
TLC (/uL)	22k	16k	11k	9.4k	8k
Platelets (lakh/uL)	1.14	1.46	1.78	2.04	1.79
Urea (mg/dl)	256	180	98.8	82	64
Creatinine (mg/dl)	13.6	11.8	9.2	5.4	2.12

Sodium (mEq/L)	127	129.3	133	135	134
Potassium (mEq/L)	5.09	5.1	4.28	4.11	3.86
Calcium (mg/dl)	7.9	7.8	8.8	8.6	8.5
Phosphorus (mg/dl)	6.8	6.4	5.9	5.6	5.1
Bilirubin Total	0.9	0.8	0.6	0.6	0.5
Bilirubin Direct	0.3	0.2	0.3	0.2	0.3
SGOT	32	28	29.4	33	26
SGPT	19	24	18	22	16
Total protein	6.4	6.8	7	7.2	7.4
Albumin	3.1	3.5	3.7	3.6	3.8

Keeping a possibility of UTI, further investigations were proceeded, USG KUB was done which was suggestive of bilateral bulky kidneys (Figure 1A). A NCCT KUB was performed which confirmed USG findings and were suggestive of acute pyelonephritis. (Figure 1B, 1C).

Even though there was no history of diabetes mellitus on presentation, but due to raised persistent blood sugar readings, an HbA1c was done, which tuned out to be 8.0%. Patient tested negative for viral markers.

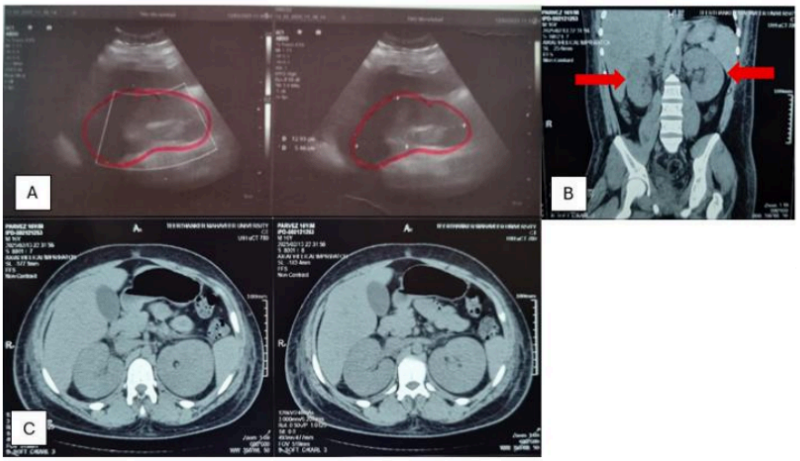

Figure 1. USG image suggestive of bilateral swollen kidneys **(A)**, image of coronal section of the CT KUB scan showing bilateral bulky kidneys marked with red arrow **(B)**, image of the axial section of the CT KUB scan showing bilateral bulky and swollen kidneys **(C)**.

Patient was managed conservatively and started on intravenous antibiotics (Piperacillin and tazobactam, Levofloxacin) and 3 sessions of haemodialysis were givenin view of severe acidosis, uraemia and volume overload. (Figure 2), and other supportive treatment. Patient responded well to the treatment. Urine culture and antibiotic sensitivity, which was sent on first day of admission, showed *E. coli* sensitive to the ongoing antibiotics as shown in TABLE 2.

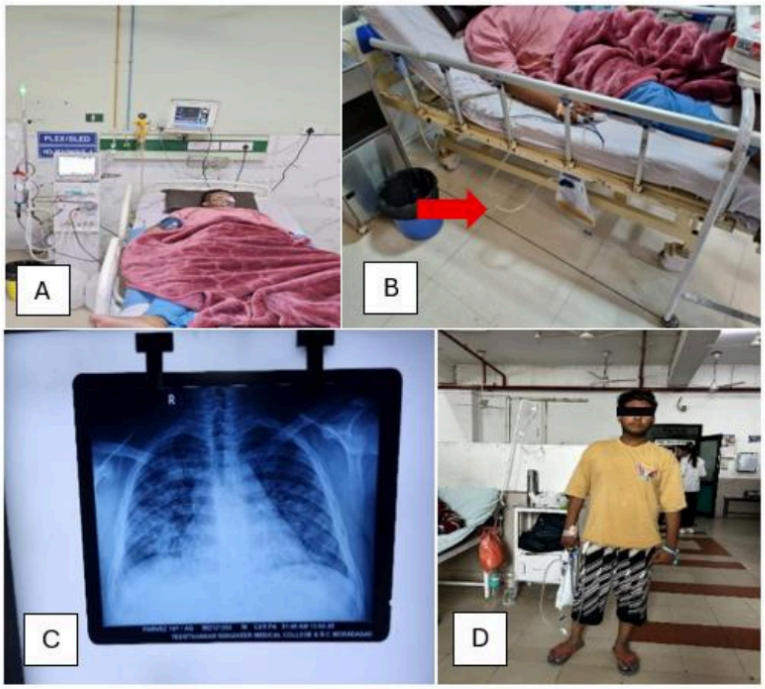

Figure 2. Image of patient undergoing haemodialysis **(A)**, collection of pus in foley's catheter (marked with red arrow) suggestive of pyuria **(B)**, X Ray chest of the patient suggestive of pulmonary oedema **(C)**, patient on discharge **(D)**.

Table 2: Investigations

2D ECHO	No LV RWMA, Normal LV systolic function (EF = 55-60%)
Blood C/S	Sterile after 5 days of incubation period

Urine Routine/microscopy (Day 1)	Albumin= absent Sugar = absent RBC = Nil Pus cell = 20-25/hpf Epithelial Cells = 0-1/hpf
Urine C/S	*E. coli* Sensitive to: Amikacin Cefoperazone Gentamycin Levofloxacin Meropenem Piperacillin
Thyroid profile	TSH=3.33mIU/L T3=0.96ng/dL T4=9.58ug/dL
HbA1c	8.0%
Procalcitonin	0.5ng/ml
NCCT Head	No obvious significant abnormalities detected in the present scan.

Considering the autoimmune aetiology for renal dysfunction, ANA, C3/C4, ANCA all investigations were sent which all came out to be negative. 2DEcho was performed in view of volume overload features like pulmonary oedema, but 2DEcho findings were within normal limits. Over a period of next 6 days, the patient started improving, urine output normalised, patient became symptom free, dialysis catheter removed, and patient was discharged in vitally stable conditions on oral antibiotics and follow up advice.

Discussion

Complicated urinary tract infection is a common presentation in diabetes patients due to their increased susceptibility to infections. Sometimes, such infections can be the first presentation of diabetes.In complicated UTI, the 30-day mortality rate can be up to 40%, with a higher rate in diabetics. UTI can present in multiple ways, one of which is "picket fence fever".[5]

"Picket fence fever," or quotidian fever, is a type of intermittent fever characterized by temperature spikes in the afternoon or evening, followed by a return to normal. It can occur in several infectious conditions, such as acute pyelonephritis or complicated UTI.Acute pyelonephritis can be complicated by renal corticomedullary abscess, perinephric abscess, emphysematous pyelonephritis, or papillary necrosis.[6]

In severe cases with obstructive uropathy, ureteric or indwelling stents may be needed. These stents help restore patency, aid urine flow, and facilitate the passage of debris.Complicated UTIs are associated with significant morbidity and mortality, with up to 40% mortality in some cases.Renal dysfunction is a major concern and can lead to rapid decline in kidney function. One study reported AKI development in 14% of hospitalized UTI patients.

Diabetes mellitus is a known risk factor for a wide range of infections, including urinary tract infections (UTIs), which occur more frequently and present more severely in diabetic

patients. Hyperglycaemia impairs neutrophil function and reduces host immunity, contributing to increased infection susceptibility. Glycosuria further promotes bacterial growth in the urinary tract, compounding the risk.[7–8]

The incidence of UTI is significantly higher in individuals with type 2 diabetes compared to the general population. Hirji et al. reported a substantially increased risk of UTI in diabetic individuals, highlighting the need for heightened clinical vigilance. Foxman also emphasized the public health burden posed by UTIs, particularly in populations with predisposing conditions such as diabetes.[2]

Renal dysfunction can be life-threatening if not promptly managed. This case demonstrates the importance of recognizing varied presentations of diabetes, even in young patients with no prior history.Early diagnosis, prompt antibiotic therapy, and supportive management including renal replacement therapy are critical for optimal outcomes in patients presenting with complicated UTI and renal dysfunction. Recognition of diabetes in undiagnosed individuals based on such infectious presentations remains an essential component of clinical care.[9,10]

Conclusion

This case highlights that complicated UTI can be the first manifestation of undiagnosed diabetes mellitus, even in adolescents with no known comorbidities. Acute pyelonephritis can rapidly progress to acute kidney injury if not promptly diagnosed and managed. It reinforces the importance of early recognition, comprehensive metabolic evaluation, and aggressive treatment—including antibiotics and dialysis when indicated—to ensure favourable outcomes. Clinicians should maintain a high index of suspicion for diabetes in young patients

presenting with severe infections and metabolic disturbances. Early intervention is key to reducing morbidity, preventing permanent renal damage, and saving lives.[10]

Conflict of interest - Nil

Ethical committee clearance- Proper ethical committee clearance obtained

Informed consent-Written and informed consent was taken from the patient.

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