Emphysematous Pyelonephritis in the Setting of Diabetes Mellitus

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Abstract

Introduction: Emphysematous pyelonephritis (EPN) is a rare, life-threatening, upper urinary tract infection with high mortality rate.

Case Report: We report a type-2 diabetes mellitus patient presenting with persistent fever, vomiting and pyuria despite appropriate treatment, diagnosed as a case of EPN, recovered without any surgical intervention.

Conclusion: Suspicion of EPN should be entertained in diabetes mellitus patient with persistent pyuria and deteriorating condition despite adequate treatment with antibiotics.

Introduction

Emphysematous pyelonephritis (EPN) is a very rare, life-threatening, fulminant, necrotizing upper urinary tract infection with gas within the kidney and/or perinephric space. EPN is most commonly seen in diabetic patients with bilateral renal involvement in long-standing uncontrolled diabetes. Very few cases of EPN have been previously described to our knowledge and almost all of them required aggressive antibiotic treatment and nephrectomy.

Here we present a case report of a patient of type-2 diabetes mellitus presenting with EPN, who recovered fully and uneventfully after conservative treatment even though literature cites mortality of EPN being 60-75% with antibiotics alone and 21 to 29% with antibiotics and nephrectomy.

Case Presentation

Sixty-one years old north Indian female, a known case of type-2 diabetes mellitus on oral hypoglycaemic agents with fairly controlled blood glucose levels presented to department of accident and emergency with five days history of high grade fever associated with chills and rigors, burning micturition, vomiting, pain right mid abdomen. She denied any history of loose motions, jaundice or travel to outside. At the time of presentation, patient was febrile, dehydrated with tenderness in right lower abdomen. Her baseline investigations revealed neutrophilic leucocytosis (16000/mm³, N 90), deranged KFT (serum urea 102mg/dl, serum creatinine 2.8mg/dl), urine examination showed full field of pus cells and was sent for culture sensitivity. Aside from these investigations, she was subjected to ultrasonography of abdomen which showed features of emphysematous pyelonephritis of right kidney which was confirmed by computed tomography of abdomen (Fig. 1). Patient was managed with normal saline infusion, subcutaneous short acting insulin injections and empirical broad spectrum third generation cephalosporin (ceftriaxone was started). Surgical consultation was sought for possible nephrectomy as patient did not show any improvement with above mentioned treatment. Meanwhile, urine culture showed growth of E. coli, sensitive to meropenem. She was started on meropenem injections in modified dosage along with metronidazole injections for 10 days, she showed improvement in all her parameters. She was discharged on short acting insulin and oral fluoroquinolone antibiotics without any nephrectomy. Follow-up CT scan abdomen, done after four weeks, was normal (Fig. 2).

Discussion

Emphysematous pyelonephritis is an acute and chronic necrotizing pyelonephritis with multiple renal abscesses. Mixed acid fermentation of glucose by Enterobacteriaceae bacteria is the major pathway of gas formation. Patients usually present with chills, fever, flank pain, lethargy and confusion. Septicemia may occur. A crepitant mass may be present. Often bacteruria, positive blood culture results and leukocytosis are present. Obstructive uropathy, urinary calculi, calycetal stenosis, neoplasms, poorly controlled diabetes, acidosis, dehydration and electrolyte imbalance are other significant predisposing conditions. Infecting organisms usually consist of mixed flora including E. coli, Klebsiella, Proteus, Pseudomonas, Enterobacter and Candida.

Serum creatinine levels ≤ 1.4 mg/dl and platelet counts > 60,000/mm³ are good prognostic criteria. Routinely sonography is initially preferred but plain abdominal radiography is initial examination of choice as it is more specific than ultrasonography in depicting air in renal collecting system. Computed tomography findings are diagnostic and give information regarding spread of infection to perinephric tissues.
Conclusion

Possibility of EPN should be considered in a diabetic patient with pyuria, pain in the lumbar region, high grade fever and vomiting not improving with appropriate antibiotics. Computed tomography scan is confirmatory and the patient needs aggressive antibiotic therapy, drainage procedure and even nephrectomy in life threatening situations. However, as in our case, early simultaneous and aggressive management of both hyperglycaemia as well as the infection can bring about uneventful recovery without surgery or any complications.

Competing Interests

The authors declare that they have no competing interests.

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the consent is available for review by the Editor-in-Chief of this journal.