

Nephron-sparing surgery in case of emphysematous pyelonephritis

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Abstract

Emphysematous pyelonephritis is fatal necrotizing infection where life saving emergency nephrectomy is recommended for severe cases, but we performed nephron sparing surgery. Elderly diabetic female presented with left flank pain and fever for 15 days. On examination tender lump was palpable in left lumbar region. Investigations showed hyperglycemia, leucocytosis and creatinine 3.0 mg/dl. NCCT-KUB suggested class 3B-EPN. Following emergency pigtail, a repeat CT-scan suggested upper and lower pole destruction. In open drainage both poles debrided with sparing of middle pole. Follow-up CECT-KUB showed spared kidney with normal function. No literature for nephron sparing surgery in similar cases of EPN was found.

Key Words: Emphysematous pyelonephritis, nephron-sparing, percutaneous drainage

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INTRODUCTION

Emphysematous pyelonephritis (EPN) is severe, acute necrotizing infection of the kidney characterized by the presence of gas within the renal parenchyma, collecting system, and perirenal tissues.^[1] EPN is common in uncontrolled diabetics, especially in females.

Till mid-1980s, the standard treatment was nephrectomy of the affected kidney because efforts in preserving the kidney by nonsurgical treatment led to mortality of up to 60–80%.^[2] The situation has changed in the last 2 decades with diagnosis by computed tomography (CT) scan and advances in multi-disciplinary approach with the overall mortality estimated to be 20–25%.^[2] Though emergency nephrectomy

is recommended for higher CT-scan class of EPN, but we performed the nephron-sparing surgery with excellent outcome.

CASE REPORT

A 60-year-old female presented with complaints of progressively increasing left flank pain, high-grade fever, and associated burning micturition for the last 15 days. She also complained of weakness. Patient was a known case of diabetes mellitus and on hypoglycemic agents for the last 2 years. On examination, patient was febrile, pale looking, and had tachycardia of 100/min. Abdominal examination showed a large palpable lump in the left lumbar region with severe tenderness associated with inflammatory changes.

The routine investigations showed increased blood sugar level (250 mg/dl), serum creatinine (3 mg/dl), and increased leukocytes. Ultrasound abdomen showed mild dilation of the pelvicalyceal system of the left kidney. The noncontrast CT-kidneys, ureters, and bladder (KUB) suggested Class 3B EPN involving the left kidney with gross peri-renal collection [Figure 1a]. Emergency pigtail insertion was done. The discharge was purulent for the next 3–4 days which slowly turned to urinous. Patient's clinical condition improved and the investigations including the serum creatinine and total leukocyte

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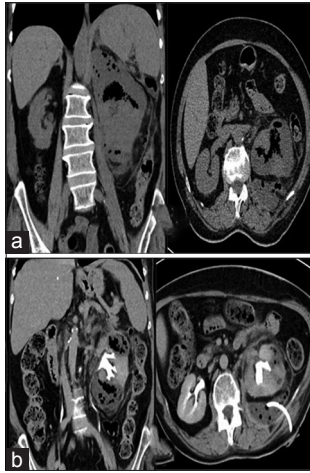


Figure 1: (a) Noncontrast computed tomography (CT)-kidneys, ureters, and bladder (KUB) suggesting Class 3B emphysematous pyelonephritis involving the left kidney with gross peri-renal collection. (b) Contrast-enhanced CT-KUB shows destruction of the upper and lower pole with spared middle pole

count returned to the base line. The culture report from the drain was negative. The pigtail showed clear urine around one liter. A repeat contrast-enhanced CT (CECT)-KUB was done after 1 week which showed destruction in the upper and lower pole with spared middle pole [Figure 1b]. Patient was taken up for open drainage through the left flank incision. Intraoperatively, multiple perinephric pus pockets with completely destroyed upper and lower pole of the kidney were noted [Figure 2a]. The middle pole of the kidney showed good parenchyma. Both the upper and lower pole were debrided and left open with a perinephric drain, as there was no intraoperative leakage of urine. Postoperatively, there was continuous urinous drain output around one liter, so a double J stent was placed. The drain output gradually decreased, and the patient was discharged with drain. In the follow-up period at 1-month, the drain output completely stopped and was removed. The stent was removed at 6 weeks postoperatively. The repeat CECT-KUB done at 2 months showed the spared kidney with good parenchyma and normal function [Figure 2b].

DISCUSSION

Emphysematous pyelonephritis characterized by the presence of gas in the renal system, most often in the parenchyma, but also extending to surrounding perinephric tissues. The term EPN was first used by Schultz and Klorfein. It is usually caused by *Escherichia coli* (70%). 95% of patients with EPN have uncontrolled diabetes mellitus.^[3]

High mortality is associated with factors such as blood pressure <90 mmHg, altered mental status, increase in serum creatinine, thrombocytopenia, bilateral disease, and patients managed conservatively with antibiotics. The patients of EPN

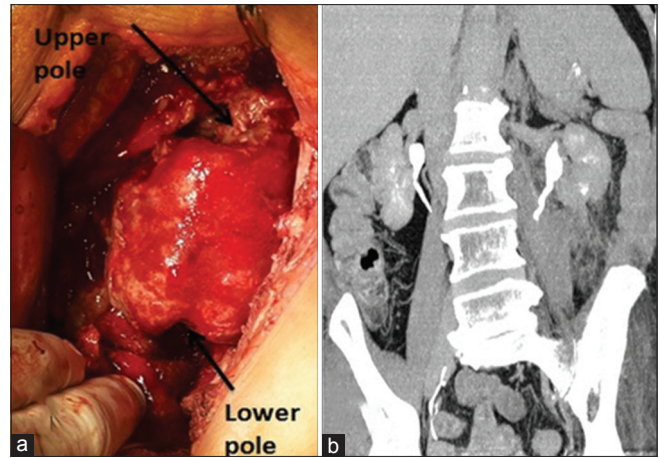


Figure 2: (a) Perinephric pus pockets with completely destroyed upper and lower pole of the kidney with spared middle lobe. (b) Contrast-enhanced computed tomography-kidneys, ureters, and bladder at 2 months showing the spared kidney with good parenchyma and normal function

have symptoms of a typical pyelonephritis. Patients in severe conditions may present in acute renal failure or septic shock. The CT-scan designates the amount of gas, the destruction of the renal parenchyma, the presence of fluid collections and fluid-gas levels as well as the underlying cause of urinary tract obstruction. EP is classified according to Huang and Tseng into five categories.^[4] In Type-1 gas is confined in the pyelocalyceal system only. In Type-2 gas is found in the renal parenchyma. In Type-3A gas extends into the perinephric space and in Type-3B into the pararenal space. Finally, in Type-4, EP affects a solitary kidney or the infection is bilateral. Our case was Type 3B according to this classification where the gas was extending into the pararenal space in which usually nephrectomy is recommended as life-saving procedure.

The approach in treating patients with EPN has changed over the years with advances in medical imaging, interventional radiology and newer more effective antibiotic therapy. The recent reviews of management of EPN propose that percutaneous drainage should be part of initial management strategy for EPN.^[5] Our patient was managed in accordance with the current evidence-based protocols where she was started initially with broad-spectrum antibiotics followed by percutaneous drainage. This initial medical management strategy improved the patient's condition clinically with blood investigations returning to baseline. The follow-up CT scans showed spared middle pole which deferred our plan to nephron-sparing surgery instead of nephrectomy.

CONCLUSION

Emergency nephrectomy is usually recommended in extensive EPN, but nephron-sparing surgery can be attempted in a

viable kidney with due risk as we did in our case with excellent outcome.

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