



PERCUTANEOUS NEPHROSTOMY DRAINAGE IN EMPHYSEMATOUS PYELONEPHRITIS

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ABSTRACT

Emphysematous pyelonephritis is a gas-producing acute necrotizing infection affecting the renal parenchyma and the perirenal area. The prognosis and treatment approach has changed over the last few years with a shift from surgical to aggressive medical and minimally invasive approach.

INTRODUCTION

Emphysematous pyelonephritis (EPN) is defined as an acute, severe necrotizing infection of the renal parenchyma and perirenal tissue. It is caused by gas-forming uropathogens.^[1] It results in the presence of gas within the renal parenchyma, collecting system or perinephric location. Emphysematous pyelonephritis occurs almost exclusively in setting of diabetes but occasionally seen in patients of renoureteral unit obstruction. Gas-forming organisms, such as, *Escherichia coli*, *Klebsiella* spp. and *Proteus* spp. are the main pathogens. The conventional treatment of EPN has historically been open surgical and or emergency nephrectomy drainage along with antibiotic therapy with a reported mortality rate of 40% to 50%. Advances in catheter technology have made percutaneous drainage feasible in the treatment of EPN.^[2] However, there is no definitive rule for the choice of a conservative and or aggressive surgical approach.

MATERIALS AND METHODS

Aim of our study was to look for the role of percutaneous nephrostomy (PCN) in patients with emphysematous pyelonephritis and was carried out on patients referred to the Department of Radio-diagnosis, Indira Gandhi Medical College and Hospital, Shimla. We retrospectively evaluated 5 cases with emphysematous pyelonephritis.

Out of these, 3 involved Right Kidney (60%) and 2(40%) involved Left Kidney. Four patients (80%) had diabetes with one having (20%) urinary tract obstruction. Patients were evaluated with ultrasonography (USG) and Computerized Tomography (CT) imaging for confirmation of diagnosis and severity of disease. Pre procedure work up includes complete haemogram, renal function test, bleeding time, clotting time, PT, INR.

Percutaneous Nephrostomy (PCN) was performed under CT and Ultrasound guidance. Percutaneous 10 F pigtail catheter of 'Uresil' was used. Daily catheter output was recorded and catheter was flushed daily with normal saline to maintain patency. Post procedural complications and general condition of patients were also looked for. Pus was sent for culture and sensitivity.

RESULTS

Pus and gas was aspirated with PCN in all the 5 patients. Pus was sent for culture and sensitivity. Percutaneous drainage was continued for 10 days and evaluated. In 3 patients the culture came out positive for *E.coli* and in 2 patients for *klebsiella*. Monitoring was done via blood counts and general condition of the patients. No nephrectomy was performed. There was significant improvement in all 5 patients.

DISCUSSION

CT is the most reliable diagnostic tool with highest accuracy in EPN. Ultrasound and plain radiography has low accuracy however may give initial clue to the diagnosis. The plain radiograph of abdomen can show mottled gas in the renal and peri-renal space, but this may occur only in one third of patients.^[3] Ultrasound is an excellent means of diagnosis. It will show the presence of gas and urinary tract obstruction. CT being the gold standard confirms the diagnosis and show the extent of destruction of the renal parenchyma.

EPN has been classified into 2 types on the CT basis by Wan et al.^[4] Type 1 refers to renal necrosis with absence of fluid or mottled gas pattern. Type 2 refers to renal or perirenal fluid collection in association with associated loculated gas. The prognosis is much worse in type 1, with mortality of 70% versus 20% in type 2. Altered mental status, acute renal failure, thrombocytopenia and

sepsis at presentation are reported to be poor prognostic factors.

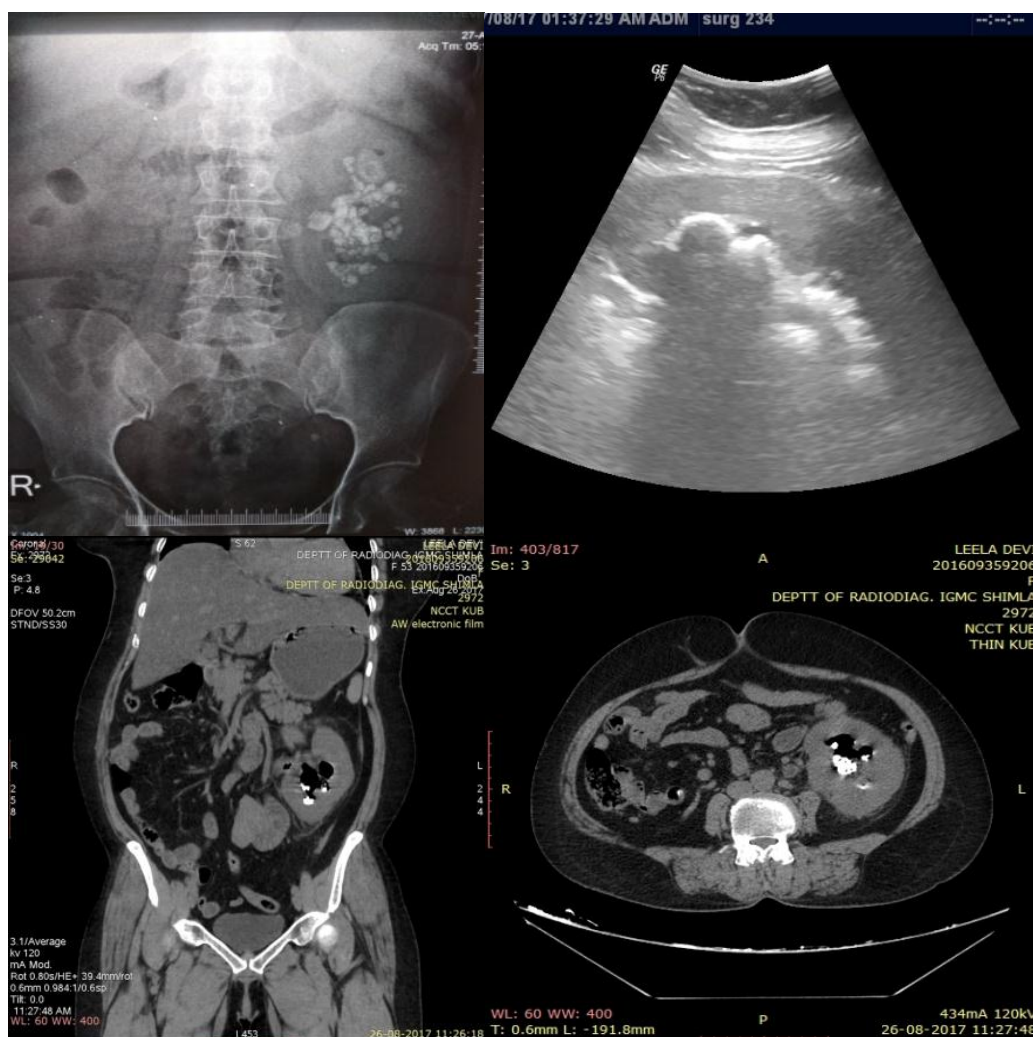


Figure 1: (a) Abdominal radiograph shows mottled gas within left renal fossa with multiple radio opaque shadows. (b) USG image shows enlarged kidney with coarse echoes within renal parenchyma/ collecting system with dirty shadow with echogenic foci (c) & (d) CT images showing stag horn calculus in left kidney with mild hydronephrosis with air in pelvicalyceal system. Right kidney was small and atrophic.

The therapeutic measures for the management of EPN consist of fluid resuscitation, antibiotics, prompt control of sugar, surgical or percutaneous drainage, and nephrectomy. Type and aggressiveness is guided by the degree of severity of presentation, predisposing factors, the progress of clinical situation.

Most experts advocate an aggressive medical and interventionist approach.^[5] Some authors have proposed nephrectomy for patients with EPN with antibiotic & fluid therapy. However, the mortality associated with is slightly high.^[6] Percutaneous drainage techniques enabled a minimally invasive strategy allowing maximum nephron sparing. Percutaneous drainage technique along with medical management has high success rate.^[7] It has an advantage over major surgery in severely ill patients who often has severe impairment of renal functions also in patients with bilateral emphysematous pyelonephritis and in patients having

solitary kidney. Successful medical management has been reported even in bilateral EPN.^[8]

The disadvantage is that it requires longer drainage time than surgical intervention which requires longer hospital stay. Also if kidney is non functioning than the role of percutaneous drainage is not much, as elective nephrectomy is required. When a conservative approach gives no or little benefit, an aggressive approach may be adapted which may include nephrectomy.



Figure 2(a): abdominal radiograph shows mottled gas within renal fossa. **(b)** USG shows coarse echoes within renal parenchyma/ collecting system with dirty shadowing **(c)** axial & **(d)** coronal CT images show enlarged, destroyed renal parenchyma. Small bubbly or linear streaks of gas in it with gross destruction with breach in its lateral wall with resultant pneumoperitoneum. **(e)** percutaneous drainage under USG guidance was done **(f)** USG image showing PCN tip in right kidney **(g)** CT images show PCN catheter in situ with decrease in air as well size of enlarged kidney.

CONCLUSION

Based on our experience we conclude that EPN requires early diagnosis and urgent treatment. Percutaneous drainage in conjunction with fluid and antibiotic therapy should be the first line therapy followed by elective nephrectomy where indicated.

Conflicts of interest

None.

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