ABSTRACT

Title: A prospective study of role of minimally invasive approaches for renal salvagibility in management of emphysematous pyelonephritis

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Introduction & Aim and Objective

Emphysematous pyelonephritis (EPN) is a rare but potentially life-threatening necrotizing renal parenchymal infection characterized by the production of intra-parenchymal gas. We present our experience of 40 cases of EPN in the year 2012 to 2014.

The situation of standard treatment of nephrectomy of affected kidney for emphysematous pyelonephritis has improved in the last two decades with computed tomography (CT) scan based diagnosis and advances in multidisciplinary intensive care of sepsis syndrome aiming at renal conservation by minimal invasive approaches.

Materials and Methods
We analyzed 40 consecutive cases of emphysematous pyelonephritis admitted between Dec 2012 and Nov 2014

**Inclusion criteria**

1) Patients with features of acute pyelonephritis with gas in the renal parenchyma and perinephric and paranephric tissues. The symptoms were Fever, chills, loin pain, altered sensorium and vomiting.

**Exclusion criteria**

1) Patients with clinical features suggestive of acute pyelonephritis without gas in the renal parenchyma.

2) Presence of history of recent endoscopic or open interventions in the urinary tract

**Prospective study**:

The presence and duration of diabetes mellitus (DM) and the level of glycaemic control were noted. The hemodynamic status and the level of consciousness at initial presentation, renal function, platelet and total count and other biochemical parameters were recorded. The diagnosis of EPN was initially suspected on abdominal X-ray and ultrasonography of the abdomen which was later confirmed by computed tomography (CT) scan of abdomen. We analysed the differences in clinical features, management, and outcome among the different classes of EPN.
All patients were treated by the intensive resuscitative measures. All patients required aggressive fluid resuscitation, hemodynamic support, and insulin infusion for glycaemic control. Empirical antibiotics with third-generation cephalosporin or piperacillin + tazobactum along with aminoglycoside dose modified for renal dysfunction were started in all patients and subsequent changes made as required based on urine culture sensitivity results. Surgical approach involved stenting drainage, percutaneous drainage and percutaneous nephrostomy drainage with DJ stenting. Treated patients analysed with repeat blood parameters like platelet count, Total count, Hb level, serum electrolytes in 2-3 days. Clinical improvement also analysed. Radiological improvement assessed. Patients with failure of minimal invasive treatment subjected to open drainage and renal conservation and lost renal function individuals subjected for nephrectomy. Risk factors involved in treatment failure analysed. Dialysis was instituted based on clinical and biochemical indications (S creatinine >5 mg%). Clinical and laboratory details of these cases managed medically and surgically have been tabulated. Relevant tests of significance for comparison of means between groups were applied (t-test/Chi-square test) and P value < 0.05 was considered significant.

**Statistical analysis**

Univariate analysis was performed using 11 possible predictors to identify risk factors for mortality namely: Age, sex (male vs. female), diabetes,
presentation categories (urosepsis, abdominal distension, mass, renal angle
tenderness), CT Grade (I/II/III A,B/IV), urine & blood culture positive vs.
negative, serum creatinine (peak value), altered sensorium (absent vs. present),
shock (absent vs. present), platelets (normal vs. thrombocytopenia less than
1.2 lakh/ml), and treatment (medical vs. surgical).

Results

A total of forty cases of EPN were diagnosed during the study period
(30 females and 10 males). Thirty two patients had pre-existing diabetes
mellitus and three was diagnosed at presentation to have DM. five were Non
diabetic with obstructive features The median duration of DM was 10 years
range (0-20 years). Glycemic control was poor in all the cases with pre-existing
DM. EPN was left sided in 21 patients, right sided in 17, and bilateral in 2.

Two patients presented with acute pyelonephritis (APN), abscess
managed by open drainage and percutaneous drainage, all patients recovered
except of two who was taken for nephrectomy and twenty six with APN and
urosepsis, were managed by stent drainage and antibiotic coverage six
individuals with PCN/PCD with DJ stenting. Patients were classified according
to CT scan findings. EPN class I (two case) presented with APN and
pneumaturia, whereas EPN class II (19 cases), five cases presented as APN,
fourteen with urosepsis. In EPN class III (16 cases), two patients presented
with MODS others with APN, whereas in EPN class IV (three cases: Bilateral in three case)

**Conclusion**

The clinical scenario of EPN has changed over the years, which is reflected in our study. Earlier EPN used to be synonymous with perilous presentations with extensive disease. Owing to widespread availability of better investigative radiological tools, early detection (even small pockets of air in kidney in patients of urosepsis) has become possible. With more effective newer antibiotics and better intensive care including dialysis support services, and better drainage modalities the outcome in these patients has improved remarkably. Patients went for nephrectomy had class IV, poorly controlled DM, thrombocytopenia and raised renal parameters.

**References:**

