

**Emphysematous Pyelonephritis presenting as acute abdomen with
pneumoperitoneum: A rare presentation**

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pneumoperitoneum: A rare presentation**

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ABSTRACT

Background

Emphysematous pyelonephritis (EPN) is a severe necrotising infection of renal parenchyma and has been defined for more than a century. More than 200 cases have been reported in the indexed literature comprising mainly of diabetic (90%) and immunocompromised patients. EPN is extremely rare in adults without any comorbidities. EPN is considered a very fatal disease with mortality rates as high as 50-80% without proper management. Most common presentation include fever, flank pain and pyuria, but atypical presentation has been described in a couple of cases only. We report a case who presented as acute abdomen with pneumoperitoneum.

Case

A 22 year old non diabetic male presented as acute abdomen with pneumoperitoneum and underwent laparotomy with drainage of pyoperitoneum. He had a DJ stent in situ on left side from a long period which had likely led to emphysematous pyelonephritis with perinephric collection. The DJ stent was removed and collection was drained percutaneously and patient recovered over 1 week. Patient was discharged after 2 weeks and now is planned for right percutaneous nephrolithotripsy.

Conclusions

Pneumoperitoneum can be one of the uncommon presentation of EPN. Atypical presentation of EPN such as pnemopertitoneum may be confused with bowel perforation and can lead to surgery in such cases. A delay in proper diagnosis and management may increase the morbidity & mortality rates. Computed Tomography(CT) is considered investigation of choice for diagnosis of EPN and should be considered early in doubtful cases.

Key words: Emphysematous Pyelonephritis, Peritonitis, Retained double J (DJ) stent

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Conflict of interest: No

Case report is Original: YES

Whether case report publishes any where? NO

INTRODUCTION

Emphysematous pyelonephritis (EPN) is a rare, life threatening, severe necrotising infection of the kidney with gas formation in collecting system and renal parenchyma both. Around 200 cases are reported in indexed literature so far, although real number may be much more. It most commonly occurs in diabetics (90%) and other immunosuppressed patients. EPN has also been associated with some cases of urinary obstruction.² Most common presentations include fever, vomiting, flank pain, pyuria and renal angle tenderness³, but atypical presentation of pneumoperitoneum has been reported in handful of cases. Here we present a case of EPN likely due to retained DJ stent who presented as acute abdomen with pneumoperitoneum. EPN is a fatal disease with high mortality rates (40-50%) and most of the time nephrectomy is indicated.

CASE REPORT

A 22 year old non diabetic male presented to surgery emergency with complaints of pain over left flank region for 2 days which became generalised to whole abdomen with obstipation. There was no history of associated fever. Patient had a scar of left pyelolithotomy which was done in an outside hospital 2 years back. On examination patient was dehydrated with pulse rate of 120 beats/min and blood pressure 90/60 mmHg. Abdomen was tense and distended. There was generalised tenderness and guarding all over abdomen with absent bowel sounds.

Laboratory parameters showed Hg 6 gm/dl, total leukocyte counts 47000 cells/cumm and platelet counts 3.30 lacs/cumm. Blood urea was 247 mg/dl and serum creatinine was 6.7 mg/dl and normal serum electrolytes. Abdominal X-ray was suggestive of free intra-peritoneal air. X-ray also showed a DJ stent in left kidney and renal calculus in right renal pelvis.

Patient was taken for urgent exploratory laparotomy. Intra-operatively, around 200 ml of pus was drained from left paracolic gutter and pelvis; there was no bowel abnormality or perforation. Patient received injection meropenem and clindamycin intra-venously in a dose adjusted to creatinine clearance. Patient was shifted to intensive care unit in view of poor general condition. Patient made substantial recovery over next 48 hours.

Computed Tomography of KUB region was obtained which showed left perinephric collection and irregular hypodense areas with air foci in left kidney and perinephric collection. Also noted were right renal and upper ureteric calculi. DJ stent was removed. Ultrasonography guided percutaneous drainage of perinephric collection was done and 1.2 litres of frank pus was drained over 10 days and catheter removed. Culture revealed klebsiella

Emphysematous Pyelonephritis presenting as acute abdomen with pneumoperitoneum: A rare presentation

pneumoniae species which was sensitive to meropenem and patient continued on same antibiotic.

His urea and creatinine came down slowly to near normal levels over 2 weeks. Patient was discharged after 2 weeks and is now planned for right percutaneous nephrolithotripsy.

Abdomen xray erect view showing free air under diaphragm with retained DJ stent, right renal calculus and free air at left renal fossa



NCCT abdomen showing collection in left renal fossa around kidney with free air



NCCT abdomen showing emphysematous changes in left kidney with collection and free air.



DISCUSSION

Emphysematous pyelonephritis (EPN) is a rare, life threatening, severe necrotising infection of the kidney with gas formation in collecting system and renal parenchyma both. The first case of gas forming infection of kidney was reported more than a century ago in 1898 but the term Emphysematous Pyelonephritis was coined in 1962 by Schultz and Klorfein to focus over the relation between gas formation and acute renal infection.¹ Renal emphysema is one of the most fulminant form of upper urinary tract infection associated with necrosis and gas

Emphysematous Pyelonephritis presenting as acute abdomen with pneumoperitoneum: A rare presentation

formation. It is described that most of the cases have unilateral involvement and bilateral involvement has been reported in about 10-15 cases globally.¹⁵ EPN is associated with diabetes in 90% of cases and has been associated with obstructive uropathy (likely due to calculus, stricture or BPH) and renal transplants patients.² Female predominance is found in most of the studies and diabetic females have increased incidence of asymptomatic bacteriuria which predisposes them to higher chances of pyelonephritis.¹⁶ Common presentations include fever, vomiting, flank pain, pyuria, renal angle tenderness, severe dehydration and features of sepsis.^{5,6,12} Emphysematous pyelonephritis has also been documented to present as spontaneous subcapsular hematoma¹⁷ or palpable mass in renal fossa.⁶

Intra parenchymal gas production is hypothesised to be due to alcoholic fermentation of glucose in infected and necrotised tissue in diabetics but it could not explain the occurrence of EPN in non diabetic patients.⁴ Most common organisms are same of those involved in acute pyelonephritis. E.coli is implicated in 75% of cases followed by klebsiella pneumonia, proteus species, staphylococcus species, acinetobacter species and pseudomonas aureginosa.^{5,6}

EPN is usually suspected in patients with diabetes or obstructive uropathy with severe pyelonephritis having a prolonged course and poor response to therapy. Xray may find mottled air in region of renal fossae, loss of psoas outline, presence of bubbly pockets of gas and may show gas in perinephric region separate from bowel gases. USG findings include air foci in renal parenchyma and pelvis, dirty shadow and ring down artefact in EPN. Computed tomography will show presence, extent and position of air foci and necrosis of renal parenchyma as well as extent of collection. CT is regarded as best diagnostic modality for EPN.⁷

The choice of antibiotics should be appropriate for gram negative bacteria or should be according to culture and sensitivity. Usually aminoglycosides, β -lactamase inhibitors and cephalosporins are used along with Vigorous control of blood sugar.

IV antibiotics, percutaneous drainage and nephrectomy are the options for the management of EPN each having its own advantages and disadvantages. The conventional treatment has been nephrectomy as soon as the diagnosis is made; however of late patient have also been managed with conservative or percutaneous drainage. Medical management alone is associated with mortality rates of 60-80%.^{8,9}

In 1986, Hudson et al reported a case of EPN managed successfully with percutaneous drainage. Percutaneous drainage is ideally done under CT guidance and pigtail catheter are to be placed in collection and gas for proper drainage. After percutaneous drainage, some patients will still be requiring nephrectomy. In a study of 25 patients showed 80% success rate with antibiotics and percutaneous drainage.¹¹

During the period of 1970-1982, mortality rates for EPN who were managed with nephrectomy was 11% which made it treatment of choice for EPN. But nowadays, nephrectomy is recommended for only non-functional kidney or with gross renal

Emphysematous Pyelonephritis presenting as acute abdomen with pneumoperitoneum: A rare presentation

parenchymal damage. It should be considered only if medical management and drainage has failed.¹² The management may vary case to case depending upon general condition and progression or improvement of patient over 48-72 hours.

Higher mortality rates are observed in patients with adverse prognostic factors such as renal failure at presentation, thrombocytopenia and hyponatremia.¹³ Non-diabetic patients improve well with medical management and percutaneous drainage however nephrectomy is needed in patients with extensive disease.

Atypical presentations in some cases may result in confusion of diagnosis where free intra-peritoneal air in Xray point towards perforation peritonitis. In our case, retained DJ stent had most likely caused EPN. In our case patient presented with features of acute abdomen along with pneumoperitoneum and underwent laparotomy. A handful of cases has been reported where patient presented with pneumoperitoneum but were not associated with features of acute abdomen. The CT scan revealed diagnosis of EPN, which was further managed with IV antibiotics and percutaneous drainage. It therefore points towards the need for early CT scan if patient presents with flank pain and pyuria to avoid unnecessary laparotomy. Ideal treatment for EPN had been nephrectomy with lowest mortality rates (10%) but some isolated reports have shown improvement with medical management⁶ and percutaneous drainage.¹⁴ however no uniform consensus is made about management and it needs to be discussed to categorize patients for different managements and threshold to consider nephrectomy.

CONCLUSION

It is emphasized to consider emphysematous pyelonephritis as a possible diagnosis in patients harbouring renal stones or DJ stent even in non diabetics. A high index of suspicion is mandatory while managing patients with acute abdomen with burning micturition and fever and we should be aware about atypical presentations of emphysematous pyelonephritis before labelling pneumoperitoneum as bowel perforations. EPN can be suspected as one of the uncommon cause of pneumoperitoneum and CT scan should be considered early in centres where this facility is available in case of doubtful scenarios, to avoid unnecessary laparotomy. Early CT scan help in prompt diagnosis and may improve outcome in terms of mortality.

ETHICAL CLEARANCE

Ethical clearance was not required in this case report as it is a retrospective evaluation and overview of a particular case and study did not alter course of management for patient.

PATIENT CONSENT

A well informed consent was obtained from patient for study and publication of data obtained.

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FOOTNOTES

The author declare that there is no conflict of interest regarding the publication of the manuscript.

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