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Case Report

Emphysematous pyelonephritis: A Life-threatening but treatable condition with high suspicion in Diabetic patients: A Case Report

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Abstract

Background: Emphysematous pyelonephritis (EP) is a rare necrotizing infection of the kidney with high morbidity and mortality. Susceptivity to infection, impaired tissue perfusion and high tissue glucose levels in uncontrolled diabetic patient and obstruction of urinary tract are main etiological factors. And emphysematous UTIs are usually due to *Escherichia coli* or *Klebsiella pneumoniae* among 65% of the affected individuals.
Case Report: We herein report a case of 51-year-old woman with uncontrolled diabetes mellitus who was admitted to casualty surgical ward with septic shock and acute abdominal pain with AKI. On admission ultra sound scan findings were suggestive of right sided pyelonephritis but repeated CECT abdomen after five days found right sided swollen kidney with large air collection around kidney. The diagnosis of emphysematous pyelonephritis was made and right sided JJ stent inserted. Despite of ten days of IV antibiotic and stenting clinical improvement was poor and repeated scan revealed in addition to EP, air conditioning collection extends into perinephric region with rising inflammatory markers. Urgent open surgical drainage of perinephric abscess done and drain inserted. The postoperative course was successful with reduction of inflammatory markers and patient clinically got better.
Conclusion: Emphysematous pyelonephritis though is an rare condition but always better to suspect in an uncontrolled diabetic or immunocompromised patient who poorly respond to pyelonephritis with IV antibiotic and attention must be paid to the selection of non-medical management when not responding to adequate IV antibiotic such percutaneous drainage or open drainage of abscess.

1. Introduction

Emphysematous pyelonephritis (EPN) is an acute severe necrotizing infection of renal parenchyma and its surrounding tissues and leads to gas production in the renal parenchyma, collecting system or perirenal tissue [1]. *Escheria* coli or *Klebsiella* pneumoniae infection in patient with diabetes mellitus and/ or urinary tract obstruction is the foundation for the development of EPN. Specially in diabetes mellitus high level of blood glucose, impaired tissue perfusion may provide nidus for gas forming microorganisms [2, 3]. Until late 1970s, mortality rate was up to 78%. But over couple of decades, it has come down to 21% due to early detection by advanced imaging techniques as well as management techniques [4]. CT remains the investigation of choice due to its high sensitivity and finds have also been used for prognostic classification [2]. Mortality of EPN was significantly associated with initial presentations of thrombocytopenia, disturbance of consciousness, and shock [2]. The treatment strategies include combination of fluid resuscitation, aggressive antibiotic therapy, correction of reversible precipitating factors and early percutaneous drainage followed by elective nephrectomy where indicated [5].

In this article we report a case of a fulminant urosepsis due to EPN in a middle-aged woman.

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2. Case description

A 51-year-old female diagnosed patient with diabetes, hypertension and dyslipidaemia transferred from a local hospital to the emergency department complaining acute abdominal pain and vomiting for four times with reduced urine output for one day duration. On admission she showed positive shock index with a heart rate of 125/min and blood pressure 88/54mmHg. She was afebrile but respiratory rate was around 30/min. The abdomen was soft but tenderness noted in epigastric region. The blood test indicated a leukocyte count 6620 cu/mm with neutrophil predominance of 91%, C- reactive protein (CRP) of 283.6 with platelets of $156x10^3$ Figure 1,2. Creatinine level of 252μmol/L indicated an acute kidney injury with abnormal coagulation profile PT/INR 1.3, APTT 38.33 suggestive of multiorgan dysfunction Figure 3. Blood gas analysis showed a compensated metabolic acidosis (pH 7.414, bicarbonate 19, Carbon diaoxide 29.5mmHg) and lactate was 4.9mmol/L.

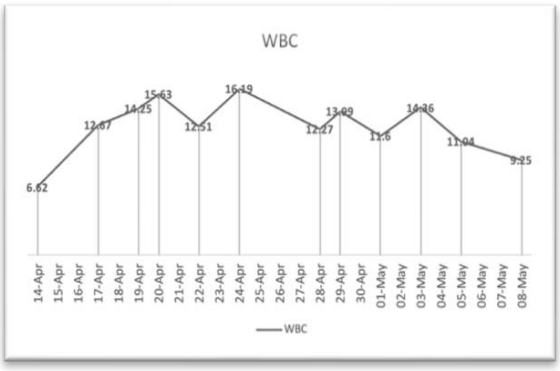

Figure 1: Graph 1

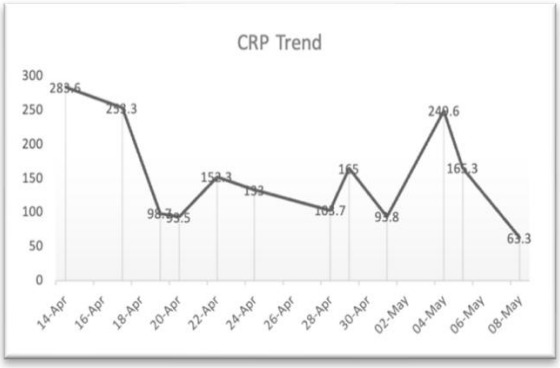

Figure 2: Graph 2

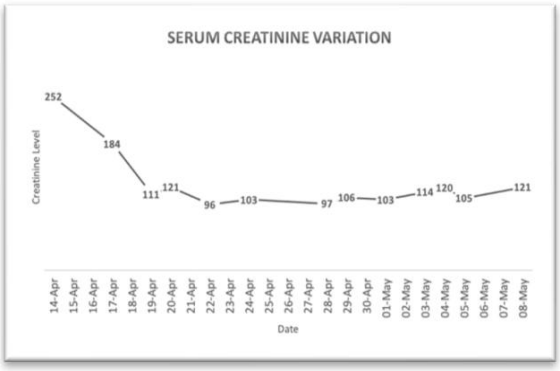

Figure 3: Graph 3

Initial ultrasound abdomen on admission showed features of right sided pyelonephritis and started on empirically intravenous cefuroxime. Even with IV antibiotic patient didn't show clinical improvement and urine culture became positive to *Klebseilla species* and changed to IV meropenem Figure 4. And CT showed an image with a right sided swollen kidney with evidence of large air collection around kidney favours emphysematous pyelonephritis with hydroureter and hydronephrosis without a calculus. Urgent urology referral done and emergency right sided JJ stenting done by uro-surgical team. Despite of ten days of IV meropenem and JJ stenting clinical improvement was poor and ultrasound scan repeated which showed in addition to EPN, air containing collection extends into perinephric region up to ascending colon.

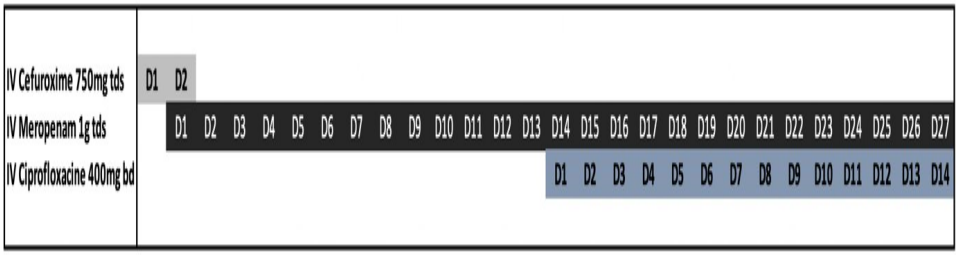

Figure 4: Timeline of Antibiotic therapy given over the hospital stay

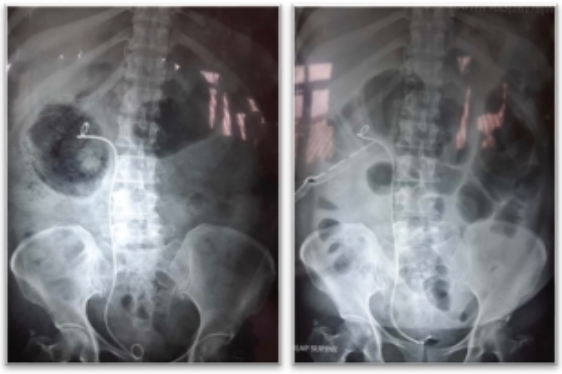

Figure 5: a) image showing perinephric collection around the right sided kidney b)Xray KUB after drainage of perinephric collection and after drain inserted

The patient underwent retroperitoneal drainage of perinephric abscess and pus send for culture and drain inserted. Pus culture revealed the growth of *Klebseilla species* sensitive to existing antibiotic therapy and led to a reduction of infectious parameters. The kidney function recovered and coagulation factors stabilized. Initial drain on post operative day one was 165ml and reduced day by day and it was 18ml on day six.

Reassessment ultrasound scan and Xray KUB on post operative day six shows no collection in right sided kidney which was previously noted Figure 5. Finally, the patient recovered well, mobilized and drain removed. The antibiotic therapy was oralized to co-amoxiclav. Finally, patient has been discharged in freedom of symptoms.

3. Discussion

Factors associated with pathogenesis of EPN are a high level of tissue glucose, glucose fermenting bacteria, impaired host immunity, decreased tissue perfusion and urinary tract obstruction in nondiabetics [2]. It's a life-threatening condition and should be promptly treated.

The clinical features of EPN and pyelonephritis are indistinguishable. Most complains fever, chills, flank or abdominal pain. Severe EPN may present with septic shock which is associated with high mortality rate [6]. EPN can be reliably diagnosed by non-contrast CT abdominal imaging. And it remains as a gold standard in diagnosis and Huang and Tseng Classification is the most-commonly used tool [2]. Which classify EPN into Class I, II, IIIa, IIIb and IV. Patients in class I and class II comprise the majority of patients, and respond well to medical treatment with excellent outcome [7].

4. Conclusion

Patients who are immunocompromised (specially diabetes) while being treated for acute pyelonephritis, if condition doesn't respond to broad spectrum antibiotic therapy EPN needs to be excluded. Especially early recognition and operative drainage may be required selective patients who are not responding to medical therapy depends on complications such as perinephric abscess.

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