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Management of a Life-Threatening Urosepsis with Emphysematous Pyelonephritis, Presented with Diabetic Ketoacidosis, Using Combined Endourological and Percutaneous Approach

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Abstract

Emphysematous pyelonephritis (EPN) is a rare and potentially life-threatening condition that requires prompt and aggressive management. Here, we present a case of a 57-year-old male patient with EPN and urosepsis who presented to ER with diabetic ketoacidosis (DKA) and sepstic shock, and developed respiratory and cardiac arrest during his hospital stay. The patient was managed successfully with DKA and sepsis management and an endourological approach to drain the infection. The patient was also on a ventilator for 5 days in the ICU.

Keywords: Endourological; Emphysematous; Diabetic ketoacidosis

Introduction

Sepsis is a life-threatening organ dysfunction caused by dysregulation of the host's response to infection. Organ dysfunction is identified using the Sequential Organ Failure Assessment score (SOFA score). SOFA score equal to or more than 2 reflect a risk of death of around 10%. This requires prompt and appropriate intervention so that the condition does not get worse. Sepsis can lead to ketoacidosis in diabetes mellitus patients. More than 50% of KAD cases are thought to be triggered by infection. Diabetic ketoacidosis is an acute metabolic disorder characterized by increasing circulating ketone bodies which progresses to ketoacidosis with uncontrolled hyperglycemia due to insulin deficiency. Acidic ketone bodies are produced by lipolysis process. Acidosis occurs when ketone levels exceed the body's buffer capacity. During an infection there will be an increase in the secretion of cortisol and glucagon hence there is a significant increase in blood sugar levels

Case Presentation

A 57-year-old male diabetic presented to the emergency department with complaints of fatigue and shortness of breath. On further evaluation he was found to have severe diabetic ketoacidosis with sepsis. He was started on fluid and insulin management. He developed sudden respiratory arrest while in emergency department and was intubated and ventilated. He was shifted to ICU. Initial investigations could not identify the focus of infection. But empirical broad spectrum antibiotic-Piperacillin+Tazobactum was started. Urine examination and USG KUB were normal. His Blood pressure was not improving and acidosis were persisting. Inotropic support started. Patient developed sudden cardiac arrest. Advanced cardiac life support was initiated, and the patient was successfully resuscitated. On second day, his platelets dropped drastically. Renal function worsened. Acidosis persisted. Hemodialysis was done. HRCT chest and CT abdomen were done. CT abdomen showed evidence of Emphysematous pyelonephritis of left kidney. Antibiotic changed to Meropenam. Patient remained hemodynamically unstable despite treatment. He was taken up for emergency endourological management. A double-J stent was placed to drain the infected urine from the left kidney. Left sided Percutaneous nephrostomy drains placed after 2 days.

Investigations

Investigations revealed- Hb- 12.2 g/dl, platelet count-126000, CRP-351.2 mg/l, RBS-33.8mmol/lHbA1c16%, Urea12.7mmol/l, Creatinine190micromol/l, Sodium-119 mmol/l, Potassium-4.3 mmol/l, Chloride 78 mmol/Lpt-12.2 sec, PTT-31.2 sec, Lactate-3.9 mmol/l, Procalcitonin-100 microgram/l, pH-7.19 L, PCo2-26.6 mm hg, Bicarbonate 9.8 mmol/l Cxr and USG abdomen-was normal HRCT-chest was normal CT abdomen showed evidence of Emphysematous pyelonephritis of left kidney (Figure 1).

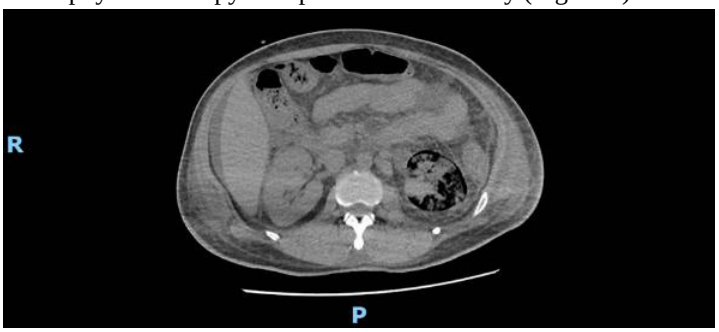

Figure 1: *Evidence of Emphysematous pyelonephritis of left kidney.*

Management

An urgent CT scan revealed the presence of gas in the left renal parenchyma and retroperitoneal space, indicating the progression of EPN. The patient was taken up for emergency endourological intervention, and a Left DJ stent placed under IV analgesia using minimum instrumentation. After 2 days percutaneous nephrostomy was placed to drain the left kidney. The patient's condition improved significantly following this intervention, and he was shifted to the ICU for further management. The patient was on a ventilator for 5 days in the ICU. He was gradually weaned off the ventilator and shifted to the general ward. The patient was discharged after a total hospital stay of 21 days. The patient remained asymptomatic on follow-up after 2 months.

Follow-Up

The patient was followed up after 1 week, 3 weeks, and 2 months postoperatively. Pt was consulted with Internal medicine and nephrologist for management of Blood sugars and kidney function. He is currently asymptomatic and planned for Left DJ stent removal. His sugars are also well controlled.

Discussion

The management of life-threatening urosepsis with emphysematous pyelonephritis (EPN) and associated complication of cardiac arrest is a complex and challenging task. The endourological approach for drainage of the infection is a minimally invasive technique with the potential to avoid more invasive surgical procedures and allow for renal sparing, as in our case. Our patient presented as a case of Diabetic ketoacidosis with sepsis and prompt search for source of infection identified the cause. Patient didn't have any urological symptoms on presentation and as he was on ventilator immediately after presentation, we couldn't gather a proper past history. Search of medical records identified a past h/o Prostatic abscess last year which prompted us to look for urosepsis. Initial USG abdomen was normal and EPN was diagnosed with CT abdomen.

In our patient, we successfully treated EPN using a combination of percutaneous nephrostomy and ureteric stenting. The patient had a remarkable recovery with complete resolution of sepsis and return of normal renal function. Moreover, the renal sparing approach adopted in our case allowed us to preserve the kidney, which is particularly important in cases of unilateral renal disease. Although the endourological approach has been described in literature as an effective management strategy for EPN, its use in cases of cardiac arrest is rare. In our case, prompt initiation of cardiopulmonary resuscitation (CPR) allowed the patient to survive the cardiac arrest and receive the necessary endourological treatment. The use of CPR in such cases has been associated with improved survival rates and neurological outcomes [1-7].

Conclusion

In conclusion, the management of life-threatening urosepsis with EPN and associated complication of cardiac arrest is challenging and requires a multidisciplinary approach. The endourological approach, with its potential for renal sparing, can be a viable treatment option. Prompt initiation of CPR in cases of cardiac arrest can be lifesaving and allow for successful management of the underlying infection. Identifying the source of infection and prompt treatment of infection helped in correction of DKA as well.

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