Case Report

Emphysematous pyelonephritis: A rare case report from Syria

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ABSTRACT

Introduction: Emphysematous pyelonephritis is a rare necrotizing infection of the kidney. It should be diagnosed early because it has a bad prognosis. Treatments range from intravenous antibiotics to nephrectomy in severe cases.

Presentation of case: A 67 years old female with uncontrolled diabetes mellitus presented with fever, right flank pain, and dysuria. Computed tomography for abdominal and pelvis showed gas inside the right kidney. After administration of intravenous antibiotics, she underwent right nephrectomy. Next, she was admitted to intensive care unit for monitoring. After three days, she was discharged with no complains. Follow-up for three months showed full recovery.

Clinical discussion: Emphysematous pyelonephritis is an emergent condition. A history of uncontrolled diabetes mellitus with current flank pain with fever raises the suspicion. Computed tomography could be performed to confirm the diagnosis.

Conclusion: Severe cases of emphysematous pyelonephritis are an emergent condition that needs nephrectomy.

1. Introduction

Emphysematous pyelonephritis (EPN) is an acute severe necrotizing infection of the renal parenchyma and its surrounding tissue and leads to gas production in the renal parenchyma, collecting system, or perirenal tissue [1].

The triad of symptoms of fever, flank pain and pyuria especially in diabetic patients who do not respond to conventional antibiotics must raise the possibility of EPN [2].

Emphysematous pyelonephritis is a radiological diagnosis which requires imaging, since most of the clinical and the laboratory findings will only indicate sepsis of renal origin [3].

It is best managed with intravenous broad-spectrum antibiotics and hydration, and if necessary, minor surgical procedures such as percutaneous drainage of the abscess. In rare cases, nephrectomy may be required as a life-saving procedure after stabilization [4].

We had a patient with diabetes mellitus diagnosed with emphysematous pyelonephritis. Intravenous antibiotics with simple nephrectomy were the choice to gain full recovery of our patient. This case report examines one such presentation in line with the SCARE guidelines [5].

2. Case presentation

A 67 years old female with uncontrolled diabetes mellitus type 2 presented to our emergency department with high fever, malaise, nausea, right flank pain, and dysuria three days ago. She was diagnosed with diabetes mellitus 15 years ago with noncompliance with medications. Physical examination revealed a generalized ill patient with abdominal tenderness mostly in the right flank. Her blood pressure was 90/60 mm/Hg, pulse 138 bp/m, and temperature 39.2 °C. Laboratory tests were: white blood cells 19 × 10^5/ml, Hgb 10 mg/dl, Glucose 418 mg/dl, creatinine 3.1 mg/dl, urea 187 mg/dl, and PH 7.1, Na 140 mEq/L, and K 5.3 mEq/L. Urinalysis showed pyuria. Two large bores cannulas were inserted and we started resuscitation with normal saline.

Computed tomography (CT) scan for the abdominal and pelvis was obtained. CT scan showed gas in the right kidney (Fig. 1). The diagnosis was emphysematous pyelonephritis (EPN). Based on the clinical status of our patient, we decided to perform the right simple nephrectomy (Fig. 2) after taking patient consent. Intravenous antibiotics with the third generation of cephalosporin were given to our patient. Through the subcostal approach, we resected the kidney. During surgery, we transferred one unit of blood.

The surgery was successful. Postoperative, we admitted the patient...
to the intensive care unit (ICU) for monitoring. The patient spent two days in the ICU. Daily blood tests are shown in Table 1. We changed the antibiotic to meropenem and levofloxacin according to culture sensitivity. Then, we could extubate the patient. Next, we transferred the patient to the ward. She needed just one night and the next day she was sent home to go back later on regular clinic visits. Follow-up for three months with laboratory and radiology work-up demonstrated full recovery.

3. Discussion

EPN is a life-threatening, necrotizing infection of the renal parenchyma, characterized by the presence of air within the kidney, collecting system, and perinephric tissue [6].

Uncontrolled DM is the leading cause in almost 95% of cases like in the index case presented. Other causes include impaired renal blood flow, ureteric obstruction and immunosuppression among others [4].

Emphysematous pyelonephritis is a radiological diagnosis which requires imaging, since most of the clinical and the laboratory findings will only indicate sepsis of renal origin. A plain radiograph shows an abnormal gas shadow in the renal bed raising suspicion, whereas an ultrasonography or CT will confirm the presence of intrarenal gas which supports the diagnosis of EPN. CT is preferred as it is more sensitive and it also defines the extent of EPN by identifying features of parenchymal destruction [3].

Until the late 1970s, mortality rate was up to 78%. Over the last two decades, a reduction of the mortality rate to 21% could be achieved by improved management techniques [1].

Definitive surgical management includes percutaneous drainage or nephrectomy for overwhelming sepsis with extensive gas and renal destruction [6].

Our patient was a female with long-standing diabetes mellitus that was uncontrolled with medications. She presented with abdominal pain and septicemia symptoms. CT scan of the abdomen and pelvis showed right emphysematous pyelonephritis. Based on clinical and radiological findings, we performed the right simple nephrectomy. The postoperative course was unremarkable. Later, we discharged our patient after we maintained clinical symptoms and laboratory values. Three months of follow-up showed full recovery.

4. Conclusion

Emphysematous pyelonephritis is an emergency condition. Physicians should suspect patients with sepsis, uncontrolled diabetes mellitus, and abdominal pain. Full work up should be in performed to reach the diagnosis. Simple nephrectomy is considered for severe cases.

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Fig. 1. CT scan showing gas inside the right kidney.

Fig. 2. The kidney after nephrectomy.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images, in line with local ethical approval requirements. No other requirements were stipulated.

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Author contribution

MA contributed in study concept and design, data collection, and writing the paper.
MT contributed in data interpretation and writing the paper.

Registration of research studies

N/A.

Guarantor

The corresponding author is the guarantor of this manuscript.
Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Declaration of competing interest

There was no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.103281.

Table 1

| Laboratory values during intensive care unit admission. |
|--------------------------------------------------------|
| In ICU | WBC | Hgb | PLT | Cr  | Urea | Glu | PH  | Na  | K   |
|--------|-----|-----|-----|-----|------|-----|-----|-----|-----|
| Day 1  | 14 × 10^5/ml | 10.9 × 10^9/gr/dl | 300 × 10^3/mcl | 1.7 mg/dl | 85 mg/dl | 164 mg/dl | 7.30 | 142 mEq/L | 4.3 mEq/L |
| Day 2  | 11 × 10^5/ml | 10.4 × 10^9/gr/dl | 320 × 10^3/mcl | 1 mm/dl | 43 mg/dl | 150 mg/dl | 7.38 | 139 mEq/L | 4 mEq/L |

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