

Case Report

A rare case of emphysematous pyelonephritis: a case report

Kanajariya Tushar Ishwarbhai*, Kamlesh A. Bhadreshwara, Mohini Parmar

Department of General Surgery, SVP Hospital, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

Received: 08 April 2024

Revised: 13 May 2024

Accepted: 21 May 2024

*Correspondence:

Dr. Kanajariya Tushar Ishwarbhai,

E-mail: tusharkanajariya@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Emphysematous pyelonephritis is a rare, severe, acute necrotizing renal parenchymal and perirenal infection with formation of gas. Emphysematous pyelonephritis predominantly affects females with uncontrolled diabetes and obstruction of the urinary tract are the main predisposing factors and *Escherichia coli* is the most frequent causative pathogen. We reported a case of a 66 year old female patient who presented with diarrhoea, fever and breathlessness for 5 days. Patient was a known case of type-2 diabetes mellitus. On per abdominal examination, guarding and rigidity were not present. Urine examination shows plenty of pus cells. Patient was underwent for CECT, which was suggestive of changes of emphysematous pyelonephritis with pneumoretroperitoneum. Patient was taken for bilateral D-J stenting and right PCN diversion. Approximately 1500 ml toxic fluid was drained from right kidney and was sent for culture and sensitivity examination. Culture of fluid shows moderate growth of *Escherichia coli*.

Keywords: Emphysematous, Pyelonephritis, Diabetes mellitus, Kidney

INTRODUCTION

Emphysematous pyelonephritis (EPN) is an emergency urological condition in which acute necrotizing infection leads to formation of gas in the collecting system, renal parenchyma, and perirenal tissues. It is considered a life-threatening condition with a high mortality rate. It predominantly affects females with Type I and Type II diabetes. Rare cases have been reported in non-diabetics, who are immunocompromised with urinary tract obstruction secondary to stones, tumors, or sloughed papilla.¹ *E. coli* is the most frequent causative pathogen.² Rarely, it is seen in patients with autosomal dominant polycystic kidney disease. The factors that predispose to EPN in diabetics may include uncontrolled diabetes mellitus, high levels of glycosylated hemoglobin, and impaired host immune mechanism.³

EPN is often observed in individuals experiencing flank pain and fever, particularly those with a history of diabetes mellitus and kidney stones. While renal or perirenal gas can be detected via plain KUB film and ultrasound, a CT scan is preferred for diagnosing and

staging the condition. CT scan is also useful for ruling out obstruction and urinary tract stones. Typically, a plain CT scan suffices, but contrast study is recommended unless contraindicated, as it can more accurately pinpoint gas in the renal parenchyma, aiding in disease classification.

Wan et al and Huang et al have categorized patients with EPN according to CT scan results.^{4,5} Patients classified as Huang et al class 1 and class 2 generally have a favorable prognosis and can be managed with percutaneous procedures and medical therapy. However, those in class 3 and class 4 may require surgical intervention if antibiotic treatment, percutaneous drainage (PCD), and obstruction relief are ineffective.

CASE REPORT

A case of a 66-year-old female patient who presented with diarrhea, fever and breathlessness for 5 days. The patient was a known case of type-2 diabetes mellitus. On physical examination, the patient was conscious and oriented with a pulse rate of 102 /min, blood pressure of

122/68 mm/Hg maintaining 98% SpO₂ with 2 liter O₂ support by nasal prong. No significant findings were present on general examination.



Figure 1: X-ray abdomen.



Figure 2: X-ray chest.

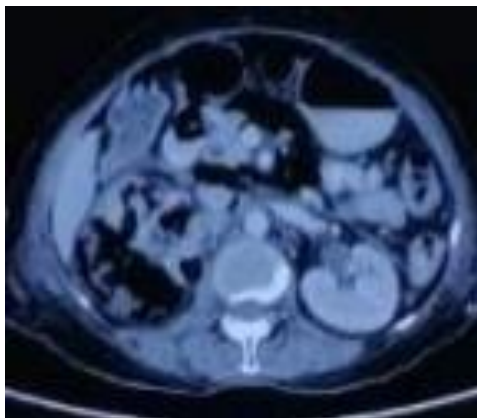


Figure 3: CECT abdomen.

No guarding and rigidity were elicited on per abdominal examination.

X-ray abdomen showed free air under both domes of diaphragms, suggestive of pneumoperitoneum. Chest X-ray reported both CP angles obscured. Urine examination showed plenty of pus cells. The patient underwent for CECT, which was suggestive of changes in emphysematous pyelonephritis with pneumoretroperitoneum. Patient was taken for bilateral D-J stenting and right PCN diversion. Approximately 1500 ml of toxic fluid was drained from the right kidney and was sent for culture and sensitivity examination. Culture of fluid shows moderate growth of *E. coli*. Postoperatively the patient was discharged on 10th postoperative day after the removal of the drain. She resumed her routine activity one month after surgery and there were no recurrences after that.

DISCUSSION

EPN is an uncommon, necrotizing infection affecting the upper urinary tract, primarily affecting diabetic individuals, with 90% of cases occurring in this population. Women with diabetes and the left kidney are more frequently impacted, while bilateral involvement occurs in only 5% of patients. About 30% of patients experience obstruction. Gas within renal tissues is characteristic of EPN, warranting a CT scan when clinically suspected.⁶ Mortality rates do not significantly differ based on patient age, glycosylated hemoglobin levels, urinary tract obstruction, or duration from symptom onset to diagnosis.⁷ However, presenting with altered consciousness, thrombocytopenia, or shock signifies high risk. Huang et al CT classification system categorizes patients into four classes based on gas location, which correlates with prognosis and treatment. While clinical features are similar across the classes, mortality rates tend to rise, and percutaneous drainage efficacy decreases from class 1 to class 4.

In our instance, gas was confined to the pelvicalyceal system, categorizing it as class 4 according to Huang et al classification.⁴ So, the patient was taken for bilateral D-J stenting and right PCN diversion. Approximately 1500 ml of toxic fluid was drained from the right kidney and was sent for culture and sensitivity examination. Culture of fluid shows moderate growth of *E. coli*. Classes 1 and 2 typically have the most favorable prognosis, with a 100% survival rate and no instances of percutaneous drainage failure reported in the study.⁶ Conversely, for classes 3A, 3B, and 4, mortality rates increase to 29%, 19%, and 50%, respectively.⁶

CONCLUSION

EPN is a rare necrotizing infection with high mortality and morbidity. Uncontrolled diabetes and urinary tract obstruction play an important role in the development of EPN. CT is the modality of choice in the diagnosis and

classification of EPN. Treatment options are based on CT classification. Localized EPN (class 1 and 2) are treated by antibiotics, percutaneous drainage and relief of obstruction if present. Advanced EPN (class 3 and 4) are attempted with antibiotics and percutaneous drainage. However surgical intervention should not be delayed in patients who do not substantially improve on medical treatment or who have signs of organ failure.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Ali M, Barlas NB. Emphysematous pyelonephritis: A case report. Int J Diab Mell. 2010;2(2):130-2.
2. Townsend CM. Sabiston textbook of surgery. 21st ed. Elsevier; 2021: 2066-2067.
3. Rafailidis V, Karadimou V, Liouliakis C, Kougioumtzoglou D. Emphysematous pyelonephritis: a case report. Hippokratia. 2013;17(4):373-5.
4. Chawla A, Pillai SB, Taori R, Rosette JJMCH, Laguna P, Pandey AK, et al. Evaluation of early scoring predictors for expedited care in patients with emphysematous pyelonephritis. Therap Adv Urol. 2022;14:175628722210787.
5. Oh YK, Choi YH, Sung CK, Lim CS. Emphysematous pyelonephritis treated with percutaneous catheter drainage and antibiotics. Nephrol Dial Transplant. 2006;21(11):3331-2.
6. Pagnoux C, Cazaala JB, Méjean A, Haas C, Brochen J, Boitard C, et al. Emphysematous pyelonephritis in diabetics. Rev Med Interne. 1997;18(11):888-92.
7. Chen MT, Huang CN, Chou YH, Huang CH, Chiang CP, Liu GC. Percutaneous drainage in the treatment of emphysematous pyelonephritis: 10-year experience. J Urol. 1997;157:1569-73.

Cite this article as: Ishwarbhai KT, Bhadreshwara KA, Parmar M. A rare case of emphysematous pyelonephritis: a case report. Int Surg J 2024;11:1016-8.