

Emphysematous pyelonephritis in a non-diabetic patient associated with nephrolithiasis: A rare case report

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ABSTRACT

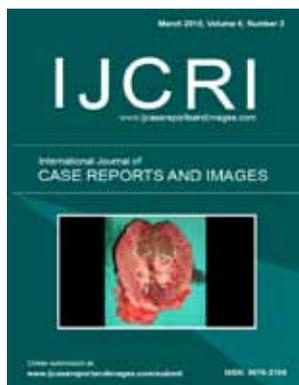
Introduction: Emphysematous pyelonephritis (EP) is an acute renal infection, potentially fatal, with high mortality, which is more frequent in women at fifth decade of life. Herein, we describe a case of EP successfully treated with surgery.

Case Report: A 50-year-old female was admitted with complaints of lumbar pain, irradiating to ipsilateral lower limb, associated with nausea and fever (38.9°C), with chills. Abdominal computed tomography (CT) scan showed amorphous echogenic image, with gaseous component, inside the right kidney, and pyelogram showing lithiasis in the right renal pelvis and filling defect. Urine culture was positive for *Escherichia coli*. Antibiotic therapy was initiated with piperacillin-tazobactam and opioids. On 15th day of hospital stay, she underwent a right nephrectomy. The histopathological analysis evidenced numerous sclerosed glomeruli, tubules with atrophy, inflammatory infiltrate in the interstitium. She was discharged with complete resolution of the infection, asymptomatic and with normal renal function.

Conclusion: Emphysematous pyelonephritis is a rare, atypical, and severe form of renal parenchyma infection. Early nephrectomy (<1 week) is associated with increased mortality in comparison to conservative treatment. In this case, the patient underwent an elective nephrectomy due to the chronicity of the disease, with successful recovery.



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CASE REPORT

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pyelonephritis is a rare, atypical, and severe form of renal parenchyma infection. Early nephrectomy (<1 week) is associated with increased mortality in comparison to conservative treatment. In this case, the patient underwent an elective nephrectomy due to the chronicity of the disease, with successful recovery.

Keywords: Emphysematous pyelonephritis, Infection, Nephrolithiasis, Non-diabetic patient, Renal failure, Urinary infection

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INTRODUCTION

The first case of emphysematous pyelonephritis (EP) was described in 1898 by Kelly and MacCallum, and it was called 'pneumaturia'. This term was then replaced by EP in 1962 by Schultz and Klorfein [1].

Emphysematous pyelonephritis is an acute renal infection, potentially fatal, with mortality around 70–80% [2, 3], and there are approximately 200 cases reported in literature. The disease is more frequent in women at fifth decade of life, in the proportion 5.9:1 [1]. The main risk factors are diabetes mellitus (80–90%) and urinary tract obstruction (40%).

Its pathophysiology is not completely understood, but it is related to bacterial infection by gram negative and anaerobes, such as *Escherichia coli*, *Klebsiella*

pneumoniae, *Proteus mirabilis* and *Pseudomonas aeruginosa*. The production of carbon dioxide and hydrogen from the glucose fermentation by these bacteria causes inflammation and necrosis of renal parenchyma with progressive renal function loss.

The clinical manifestations are similar to an acute pyelonephritis, characterized by the triad: lumbar pain, fever and vomiting. However, a more severe evolution can be seen, mainly associated with thrombocytopenia, renal failure, sepsis and shock.

The gold-standard complimentary test for the diagnosis of EP is abdominal computed tomography (CT) scan without contrast with the finding of gas in the genitourinary tract. It is unilateral in 90% of cases. Approximately, half of the cases present is extra-renal involvement.

There is still no consensus about the best treatment for this infection, since the prevalence of this disorder is low and there are a few data in literature. Treatment can be conservative, with endovenous antibiotics and percutaneous drainage, or surgical, with nephrectomy [4].

CASE REPORT

A 50-years-old female was admitted with complaints of lumbar pain, irradiating to ipsilateral lower limb, associated with nausea and fever (38.9°C), with chills, since 12 days ago. She referred an episode of pyelonephritis 18 years before, which has been successfully treated with antibiotics. She had also two other episodes of lumbar pain with hospitalization to treat pyelonephritis, and the last was three months before, when a hydronephrosis has been diagnosed, through ultrasound (Figure 1). Abdominal computed tomography (CT) scan revealed amorphous echogenic image, with gaseous component, inside the right kidney (Figure 2).

At physical examination she had blood pressure 110/80 mmHg, temperature 36°C, heart rate 80 bpm, and painful lumbar percussion at right flank. Her laboratory tests showed: hemoglobin 11.5 g/dL, hematocrit 35.9%, leukocytes 4420/mm³, platelets 2.52x10⁵/mm³, urea 39 mg/dL, creatinine 0.8 mg/dL, fast glucose 122 mg/dL, sodium 138 mEq/L, potassium 4.0 mEq/L, calcium 8.6 mg/dL, albumin 4.2 g/dL, VHS 34 mm, PCR 0.7. Urinalysis: Ph 5.0, protein traces, hemoglobin +++, leukocytes +++ (30/high power field), erythrocytes 25/high power field, moderate bacteriuria. Urine culture was positive for *Escherichia coli*, resistant to ciprofloxacin, amikacin and ceftriaxone. Antibiotic therapy was initiated with piperacillin-tazobactam and opioids. Despite antibiotic use, the patient persisted with dysuria, lumbar pain and purulent collection in the kidney. She had no signs of systemic inflammatory response syndrome, but the persistent pain and absence of regression of the collection with gas suggestive of emphysematous pyelonephritis (EP) refractory to clinical treatment. On

15th day of hospital stay, the patient underwent a right nephrectomy (Figure 3). The histopathological analysis evidenced numerous sclerosed glomeruli, tubules with atrophy, inflammatory infiltrate in the interstitium (Figure 4). Pyelocaliceal system was dilated and re-vested with squamous metaplasia, containing partially calcified material. These findings were compatible with chronic pyelonephritis, acute tubular necrosis and hydronephrosis. She was discharged with complete resolution of the infection, asymptomatic and with normal renal function.

DISCUSSION

Emphysematous pyelonephritis is a rare, atypical, and severe form of renal parenchyma infection [5]. This is an acute infection, potentially fatal, with mortality around 70–80%. Emphysematous pyelonephritis is a necrotizing infection of the renal parenchyma characterized by the production of gas in the intra- and perirenal tissues [6, 7]. It is believed that high levels of glucose, in association with

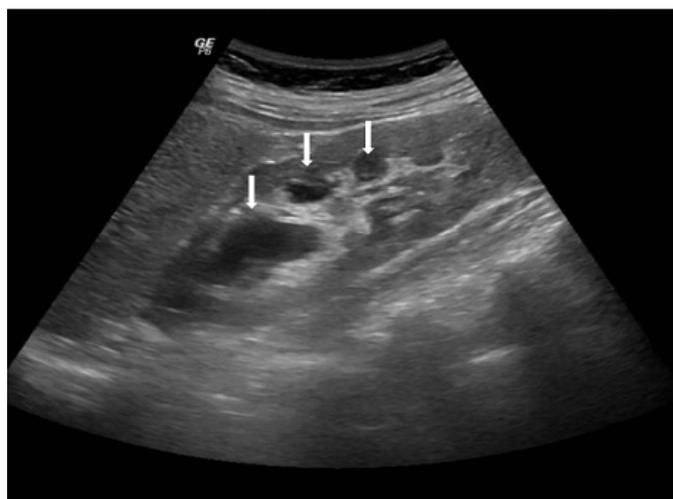


Figure 1: Ultrasound showing increased right kidney, with pyelocaliceal dilation (arrows).



Figure 2: Computed tomography scan image showing increased right kidney, with heterogeneous lesion with gaseous component (left arrow) and calcified image (right arrow).



Figure 3: Macroscopic image of right kidney after nephrectomy showing purulent secretion and thickening of the renal parenchyma.

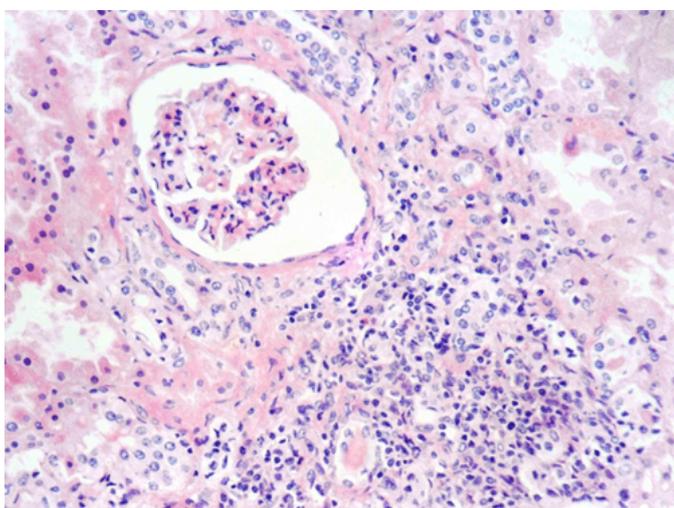


Figure 4: Histopathological analysis evidencing sclerosed glomerulus, tubules with atrophy and inflammatory infiltrate in the interstitium.

inadequate perfusion, lead to a favorable environment for the growth of anaerobic organisms. This disease affects individuals of all ages, but women are six times more likely to be affected [6, 7].

Emphysematous pyelonephritis is more common in patients with diabetes [1]. Our patient did not have diagnosis of diabetes, but had altered fast glucose. An obstructive factor was found in the present case, nephrolithiasis, which is a known risk factor for chronic

kidney disease. She had history of recurrent urinary tract infections, with increased frequency in the last years. Emphysematous pyelonephritis was suspected after doing a CT scan, which showed a gaseous component in the right kidney.

Huang and Tseng [8] proposed a radiological classification for emphysematous pyelonephritis in four classes: (1) gas in the collecting system only, (2) gas in the renal parenchyma without extension to extrarenal space, (3A) extension of gas or abscess to perinephric space, (3B) extension of gas or abscess to paranephric space, and (4) bilateral EPN or solitary kidney with emphysematous pyelonephritis. According to this classification, the case presented here falls in class II, which is associated with a better prognosis. Some factors are associated with poor prognosis such as thrombocytopenia, renal failure, hyponatremia and sepsis. No one of these factors was present in our patient.

Based on the cases published by now, there is no consensus regarding the best treatment conservative management, with endovenous antibiotics and percutaneous drainage, or surgery, with nephrectomy of the involved kidney should be chosen according to each case. Early nephrectomy (<1 week) is associated with increased mortality in comparison to conservative treatment. In the present case, the patient underwent an elective nephrectomy due to the chronicity of the disease. Patients with chronic pyelonephritis and renal function <10% evidenced by scintigraphy benefits with nephrectomy.

CONCLUSION

In summary, we reported a rare case of emphysematous pyelonephritis in a non-diabetic patient. Renal lithiasis was evidenced in this case, and it represents a possible risk factor for pyelonephritis due to chronic urinary tract obstruction. Repeated history of pyelonephritis is another important factor for emphysematous pyelonephritis.

Author Contributions

Sônia M. H. A. Araújo – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Mateus P. M. Feitosa – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Priscila D. Evangelista – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Sarah F. Sá – Substantial contributions to conception and design, Drafting the article, Revising it critically

for important intellectual content, Final approval of the version to be published

Jarinne C. L. Nasseralla – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Yuri Nóbrega – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Pedro Miguel A. Pinheiro – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Nicole Almeida de Alencar Araújo – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Elizabeth F. Daher – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Geraldo B. Silva Junior – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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REFERENCES

1. Carvalho M, Goulão J, Monteiro C, et al. Pielonefrite enfisematosa: revisão da literatura a propósito de um caso clínico. *Acta Urol* 2006;23:75–80.
2. Junior M, Ferreira G, Lopes H, Amaral K. Pielonefrite enfisematosa: revisão e atualização da abordagem terapêutica. *HU Revista (Juiz de Fora)* 2010;36:161–5.
3. Cavalli AC, Tambara Filho R, Cavalli RC, Bressan F. Emphysematous pyelonephritis: importance of early diagnosis. *Rev Méd Paraná (Curitiba)* 2006;64:13–15.
4. Eloubeidi MA, Fowler VG Jr. Images in clinical medicine. Emphysematous pyelonephritis. *N Engl J Med* 1999 Sep 2;341(10):737.
5. Lim CS, Kim WB, Kim YS, et al. Bilateral emphysematous pyelonephritis with perirenal abscess cured by conservative therapy. *J Nephrol* 2000 Mar-Apr;13(2):155–8.
6. McGorry DM, Kroser J, Taylor LT, Howard Lewis H, Gabale D. Emphysematous Pyelonephritis Presenting as an Acute Abdomen. *Infect Urol* 1999;12:162–5.
7. Jain SK, Agarwal N, Chaturvedi SK. Emphysematous pyelonephritis: A rare presentation. *J Postgrad Med* 2000 Jan-Mar;46(1):31–2.
8. Huang JJ, Tseng CC. Emphysematous pyelonephritis: clinicoradiological classification, management, prognosis, and pathogenesis. *Arch Intern Med* 2000 Mar 27;160(6):797–805.

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