

URINARY INFECTION

Case Report

Emphysematous pyelonephritis caused by *Candida* species: first case in the English literature*Candida* türlerinin sebep olduğu amfizematöz piyelonefrit: İngilizce literatürdeki ilk vaka

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ABSTRACT

Emphysematous pyelonephritis (EPN) is an acute severe necrotizing infection of the renal parenchyma and its surrounding tissues that results in the presence of gas in the renal parenchyma, collecting system or perinephric tissue. Our case was a 46-year-old diabetic woman who was referred to us from the emergency department. This is the first case of emphysematous pyelonephritis caused by *Candida* species in the English literature.

Key words: *Candida*; Emphysematous pyelonephritis; mortality

ÖZET

Amfizematöz piyelonefrit renal parankim ve çevre dokularının akut, şiddetli, nekrotizan enfeksiyonudur, renal parankim, toplayıcı sistem ve çevre dokularda gaz birimiyle sonuçlanır. Kliniğimize Acil Servisten 46 yaşında diabetik bir hasta konsulte edildi, yapılan incelemeler sonucunda Amfizematöz piyelonefrit saptandı. Bu vaka İngiliz literatürüne geçen, *Candida* türlerinin sebep olduğu ilk Amfizematöz piyelonefrit vakasıdır.

Anahtar sözcükler: Amfizematöz piyelonefrit; *Candida*; mortalite

Introduction

Emphysematous pyelonephritis (EPN) is an acute severe necrotizing infection of the renal parenchyma and its surrounding tissues that results in the presence of gas in the renal parenchyma, collecting system or perinephric tissue.^[1,2] The first case of gas-forming renal infection was reported by Kelly and MacCullum in 1898.^[3] Since then, terms such as 'renal emphysema', 'pneumonephritis' and 'emphysematous pyelonephritis' have been used to describe the gas-forming infection. In 1962, Schultz and Klorfein suggested the use of 'emphysematous pyelonephritis' as the preferred term, as it emphasizes the relationship between infective pathology and gas formation.^[4]

Different microorganisms can cause emphysematous pyelonephritis. *Escherichia coli*, *Klebsiella pneumoniae*, *Aerobacter aerogenes* and *Proteus mirabilis* are the most common microorganisms that cause emphysematous pyelonephritis. There is only one reported

case of emphysematous pyelonephritis caused by *Candida* in the French literature.^[5] To the best of our knowledge, this is the first case of emphysematous pyelonephritis caused by *Candida* species in the English literature.

Case report

A 46-year-old diabetic woman presented with high fever for ten days, abdominal pain, and vomiting. She was febrile, tachypneic, tachycardic, and hypotensive. Her laboratory findings revealed white blood cell 13700/mL, platelets 170000 μ L, creatinine 1.43 mg/dL and blood glucose level 463 mg/dL. We found pyuria and microscopic hematuria in urinalysis. Urine cultures were positive for *Candida* species. The arterial blood gas revealed metabolic acidosis. A plain CT scan showed that the right kidney was enlarged. Air was noted in the pelvicalyceal system and the renal parenchyma (Figure 1). Over the next 24 hours, the patient's condition deteriorated further, showing signs of severe sepsis with a compen-

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sated metabolic acidosis (pH 7.38, CO₂ 3.3 kPa, HCO₃⁻ 18 mmol/L, base excess (-) 10 mmol/L, and lactate 8.6 mmol/L).

Based on these findings, we decided to perform an open exploration and possible nephrectomy for this gas-forming infection. During the operation, severe necrotizing infection and retroperitoneal gas were observed. Extensive debridement was performed, and a suction drain was left in the retroperitoneal space. After the operation, the patient was admitted to the intensive care unit for invasive monitoring, cardiovascular and respiratory support, and blood glucose control. Appropriate antifungal and antibiotic therapy was given. Unfortunately, she died on the third postoperative day due to respiratory distress and multiorgan dysfunction.

Discussion

Some authors have emphasized that emphysematous pyelonephritis is defined as gas within the renal parenchyma or perinephric space, but several other investigators define it as gas within the collecting system, parenchyma, perirenal space, or all sites.^[6-9]

Gas in the collecting system is defined as 'emphysematous pyelitis' and is a separate condition that could be secondary to instrumentation of the urinary tract. If a patient is diagnosed with emphysematous pyelitis, he/she has an excellent prognosis with medical management (MM). However, EPN deserves special attention because of its life-threatening potential with both MM and surgical management. The mortality from EPN is primarily attributable to septic complications. EPN was associated with a mortality rate of up to 78% until the late 1970s, but over the last two decades, improvements in management techniques have reduced the mortality rate to 21%.^[8,10]

The Maladia Infection Services in Tunisia reported the first case of bilateral emphysematous pyelonephritis due to *Candida glabrata*, which occurred in a 64-year-old diabetic woman. The clinical presentation began with fever and abdominal pain, without signs of urinary tract infection. Within six hours, the patient had developed septic shock with renal failure and ketoacidosis. The diagnosis was confirmed by CT scan, and the pathogen was isolated in the urine. Despite antibiotic and antifungal therapy, she died from septic shock.^[5]

Our case was a 46-year-old diabetic woman who was referred to us from the emergency department. She had a high fever for ten days, abdominal pain, and vomiting. She was febrile, tachypneic, tachycardic, and hypotensive. The arterial blood gas revealed metabolic acidosis. A plain CT scan showed that the right kidney was enlarged. Air was noted in the pelvicalyceal system and the renal parenchyma. Despite extensive debridement and appropriate antifungal and antibiotic therapy, she could not be extubated post-operatively. She died on the third postoperative day due to septic complications.

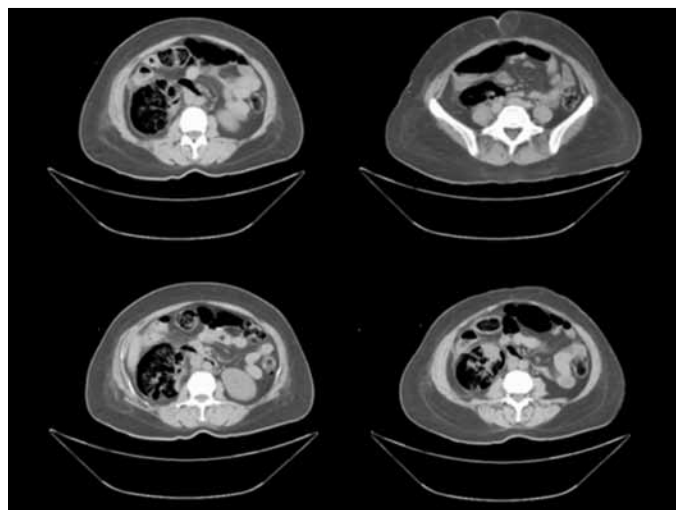


Figure 1. CT images show gas in the renal parenchyma (arrows)

Escherichia coli, *Klebsiella pneumoniae*, *Aerobacter aerogenes* and *Proteus mirabilis* are the most common microorganisms to cause emphysematous pyelonephritis. This is the first case of emphysematous pyelonephritis caused by *Candida* species in the English literature. As the other reported case of emphysematous pyelonephritis caused by *Candida* resulted in death, we believe that this condition most likely has a high mortality risk.

Conflict of interest

No conflict of interest was declared by the authors.

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