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Case report

Conservative management of emphysematous pyelonephritis in a horseshoe kidney



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Abstract

Emphysematous pyelonephritis (EPN) is an acute infection of the kidney, characterized by the presence of gas in the renal parenchyma and collecting system. Conservative management is rarely effective to treat this severe infection and the accepted treatment consists of early nephrectomy. Herein, we report a case of EPN in a horseshoe kidney, presented in a 67-year-old, diabetic woman. A percutaneous drainage of the kidney, under computed tomography control, was realized in emergency to manage her sepsis. A pelvic ureteral calculus was found to be responsible for the urinary obstruction and the infection. It was extracted endoscopically, three weeks later and the evolution was uneventful.

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Introduction

Emphysematous pyelonephritis (EPN) is a severe, acute necrotizing infection of the kidney, characterized by necrosis of parenchyma

and its surrounding tissues [1]. It is a life-threatening infection with a high mortality rate despite early treatment. Recent reports from literature assert that per-cutaneous drainage (PCD) can be effective to treat EPN and nephrectomy could be avoided in some cases [2,3]. Herein, we report a case of EPN in a horseshoe kidney, presented in a diabetic woman, which was managed by a conservative treatment.

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Case report

A 67-year-old, diabetic woman was admitted to our department for hyperthermia, abdominal pain and nausea lasting for four days. On physical examination, she had a 39°C temperature, a greyish face and her blood pressure was 120/60 mmHg. Abdomen palpation showed tenderness in the left flank pain and her urine was cloudy. The biological panel revealed a creatinine blood level of 2.8 mg/dL, glucose of 28 mmol/L. White blood cell count was 17,000/mm³,



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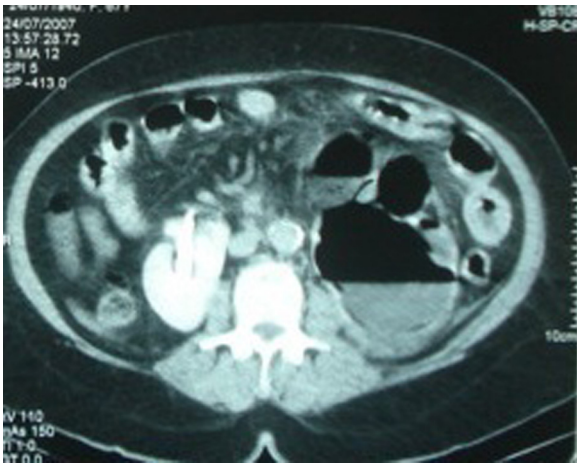


Figure 1 CT showing horseshoe kidney with an enlargement of the left side of the kidney and the presence of gas in parenchyma mainly in the collecting system with fluid collection.

with 80% neutrophils, platelet count was $80,000/\text{mm}^3$ and C reactive protein was 332 mg/L. Due to severe sepsis an abdominal computed tomography (CT) was realized immediately. It showed horseshoe kidney with an enlargement of the left side of the kidney and the presence of gas in parenchyma and mainly in the collecting system with fluid collection (Fig. 1). CT revealed also parenchymal atrophy and a pelvic ureteral calculus responsible for the urinary obstruction.

The diagnosis of EPN in a horseshoe kidney was considered and intravenous empiric antibiotic treatment was started just after urinalysis sampling and blood cultures. She received ciprofloxacin, cefotaxime and metronidazole. We decided to manage conservatively the case, so a PCD of the kidney, under CT control, was realized. It drained initially gas and infected urine then urine became clear. Thereafter, the nephrostomy tube drained 500 cm^3 of urine per day. As urine culture grew *Candida albicans*, fluconazole was administered for 14 days, whereas ciprofloxacin and metronidazole were stopped, but cefotaxime was continued. Blood cultures realized on admission were negative.

Clinical and biological conditions of the patient improved after one week and glucose blood level was easier to control. Repeat CT, performed 2 weeks later, showed a functioning left side kidney with dilated cavities. A technetium-99m-labelled dimercaptosuccinic acid (99m-Tc-DMSA) scintigraphy was also performed and revealed a left side kidney functioning at 28%.

Three weeks after initial diagnosis, an ureteroscopy plus ballistic lithotripsy of ureteral calculus was realized. A double J stent was inserted and the nephrostomy tube was taken out. The stent was removed after four weeks and the patient had uneventful evolution.

Discussion

Emphysematous pyelonephritis (EPN) is a severe, acute necrotizing infection of the kidney. It is characterized by necrosis of parenchyma and its surrounding tissues which results in the presence of gas in the renal parenchyma, collecting system or perinephric tissue [1].

It is a life-threatening infection with a mortality rate of 20%. Factors found to worsen prognosis are diabetes, thrombocytopenia, acute renal failure, the need of haemodialysis, bilateral infection and septic shock at presentation [2–4].

EPN occurs predominantly in female patients with a ratio rate of 6:1 [2]. Diabetes mellitus is reported in 80% of the patients [4] and a urinary tract obstruction is noted in 25–60% of the cases [1,5]. Urinary obstruction is mainly due to ureteral stones. Causative organisms are those usually found in urinary tract infection [5]. *Escherichia coli* is the most isolated germ (70% of cases) followed by *Klebsiella* (10%), whereas anaerobic microorganism has been rarely reported [3]. As our patient's urine culture grew *C. albicans* fluconazole therapy was added, but we did not stop all antibiotics as we believe that other germ could be present.

Physiopathology of EPN had been largely discussed in literature. The presence of gas-producing organisms, a high tissue glucose concentration and impaired tissue perfusion are all risk factors for the development of emphysematous infections of the urinary tract [5]. A high glucose concentration within the tissues acts as a favourable factor for production of carbon dioxide through natural fermentation processes [6–9]. In fact, diabetic patients represent more than 60% of all cases [5,7,8]. However, for non-diabetic patients fermentation of urinary albumin might be the cause of gas production [3]. Others suggested factor of gas production is an impaired host response, involving vascular compromise and impaired catabolism within the tissues [9].

Clinical presentation of EPN varies widely and ranges from asymptomatic patients or having minimal low urinary tract symptoms to severe sepsis.

Diagnosis of EPN is radiological. KUB can show abnormal gas shadow in the renal region and typical ultrasonographic image is a high amplitude echoes with low level dirty acoustic shadow.

However, CT is the most effective radiological examination to confirm diagnosis; it shows intra-renal gas with or without peri-renal region and parenchymal destruction [4]. It is also useful to determine possible cause of urinary obstruction. Two classifications of EPN had been reported in literature; both of them are based on CT findings [4,6]. Wan et al. [4] classification is more used and is better related to prognosis. Our patient had according to Wan's classification a type II EPN, which is characterized by the presence of fluid within the parenchyma and/or its surrounding tissues. This type II of EPN has a better prognosis.

EPN should be differentiated from emphysematous pyelitis which is characterized by gas within the upper urinary tract system in the absence of endourological manoeuvres. The later infection has a good prognosis when treated with effective antibiotics and urinary drainage. As EPN is a severe infection, the accepted treatment consisted of early nephrectomy after short reanimation with antibiotics [1,4]. However, recent reports from literature assert that PCD can be effective to treat EPN and nephrectomy could be avoided in some cases [2,3]. In a review of the literature, it has been shown that after PCD of EPN only 13% of patients required differed elective nephrectomy for non-functioning kidneys [2]. To our knowledge, this is the fourth published case of EPN in horseshoe kidney and as the other cases; a conservative management was realized [10–12].

In conclusion, EPN in a horseshoe kidney is a rare situation, an early diagnosis and urgent management are the guaranties to a favourable outcome.

Conflict of interest

We have no conflict of interest to declare.

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