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### RESEARCH ARTICLE

#### EMPHYSEMATOUS PYELONEPHRITIS: ABOUT ONE CASE WITH REVIEW OF LITERATURE.

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#### Abstract

Emphysematous pyelonephritis is a necrotic infection of the kidney and occasionally of the perinephretic areas. It's a rare affection, occurring essentially in the diabetic woman and associated with a heavy mortality. We report a case of emphysematous pyelonephritis in an 82 years old diabetic patient associated with factors of poor prognosis, which evolved towards death in a state of septic shock. The aim of this observation is to remind the different characteristics of this pathology.

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#### Introduction:

We report the observation of an 82-year-old patient, with no notable previous history, other than recent type 2 diabetes mellitus with hypoglycemic sulfonamides, who presents to the emergency room for abdominal pain with vomiting, in a context of fever and chills, evolving for a week. The clinical examination found a patient in poor general condition, confused, oliguric with gross hematuria, signs of severe sepsis, with fever at 40 ° C, blood pressure at 100/60 mmHg, polypnea at 36 cycles / min, tachycardia at 97 / min and a defense of the left flank. The biological assessment revealed kidney failure at 160 mg / l of creatinemia, hyperkalemia at 7.2 mEq / l, hyperglycemia at 3 g / l, CRP at 316 mg / l, leukocytosis at 24,000 / mm<sup>3</sup>, anemia at 7 g / dl and thrombocytopenia at 98,000 / mm<sup>3</sup>. The cyto-bacteriological examination of urine (CBEU) made in the city 48 hours before admission is positive to Escherichia Coli. An abdominal computed tomography without contrast injection shows a reduced size left kidney, seat of a coralliform pyelic lithiasis, and multiple calcitic calculi, with parenchyma and perirenal fat air bubbles. The right kidney is also home to a heterogeneous mass of the superior pole (Figures 1 & 2). The diagnosis of acute left pyelonephritis on a stone obstruction is retained and the patient is transferred to intensive care. Therapeutic management consisted of parenteral antibiotic therapy with ceftriaxone and metronidazole adapted to renal function, insulin therapy and a hemodialysis session in front of hyperkalemia and anuria. A urinary percutaneous drainage of both kidneys is performed, and brought back turbid urine of both kidneys. The evolution took place in 48 hours towards the death of the patient in a state of septic shock.

#### Discussion:

The EPN is described for the first time by Kelly and Mac Callum in 1898 [1]. It is more common in women, with a sex ratio of 1.8 women for a man. Note that our patient is male. Among the contributing factors, we find poorly balanced diabetes present in almost 70% of cases [2], and urinary tract obstruction in 19 to 40% of cases [2, 3]. These two contributing factors are found in our patient.

The clinical presentation is not specific, resulting a delay in diagnosis. Most often, there are signs of severe acute pyelonephritis, with fever, chills, and low back pain. The physical examination shows an impasto, sometimes a crepitation in the flank. Sometimes, the EPN is diagnosed during a complication type of septic shock (observed in

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16 to 29% of cases), or type of metabolic complication of diabetes [2, 4]. Biology shows an inflammatory syndrome with hyperleucocytosis and an increase in CRP and an accelerated sedimentation rate related to sepsis. It can also reveal visceral dysfunction related to severe sepsis, as in our patient:

- 1- Renal insufficiency (present in 67% of cases);
- 2- Consumption coagulopathy (thrombocytopenia, increased activated partial thromboplastin time and decreased prothrombin time) (50% of cases);
- 3- Metabolic acidosis;
- 4- Hepatic insufficiency (50% of cases).

On the bacteriological level, CBEU is positive in half of cases, blood cultures in 42% of cases and pus collected locally in 68% of cases [5]. The most frequently isolated organisms are *Escherichia coli* (69 to 93%), followed by *K. pneumoniae* (29%) [6-8]. These germs have the ability to produce hydrogen and carbon dioxide (CO<sub>2</sub>) by degrading excess glucose in an anaerobic environment. These germs have the ability to produce hydrogen and carbon dioxide (CO<sub>2</sub>) by degrading excess glucose in an anaerobic environment. They also promote the occurrence of venous thrombosis, tissue hypoperfusion and corticomedullary and papillary necrosis causing acute renal failure [6; 7].

Given the non-specificity of the clinical and biological signs, imaging is essential as an indispensable tool for diagnosis, and in particular for computed tomography, by showing airway images of the kidney and perirenal fat, and specifying the type of damage. Indeed, Wan et al. and through the largest series of EPNs, has established a classification into 2 types: type I where there is only intra- and / or perirenal air and type II where there is also an intra or perirenal purulent collection or presence of gas in the excretory tract. This classification has a prognostic significance because there is a correlation between radiological images and histological types. In type I, the kidney is strewn with necrosis and infarctions related to vascular thrombosis whereas in type II renal vascularization is not compromised. This disparity of histological lesions is related, with a more appropriate immune response in type II. [9]

In 2000, Huang and Tseng established a new CT classification with both a prognostic value and an impact on the therapeutic decision [2]:

**Stage 1:** Gas in the excretory lanes only;

**Stage 2:** Gas in the renal parenchyma without extension in the extrarenal space

**Stage 3A:** Extension of the gas or abscess of the renal lodge;

**Stage 3B:** Extension of the gas or abscess beyond the Gerota fascia;

**Stage 4:** Bilateral emphysematous pyelonephritis or single kidney.

The prognosis of the PNE is globally severe. The overall mortality rate, all therapies combined, is 19% [5]. Four significant prognostic factors were retained by Wan et al.:

1. A creatinine level greater than 120  $\mu\text{mol} / \text{ml}$ ,
2. Thrombocytopenia less than 60 000  $\text{elt} / \text{mm}^3$ ,
3. The radiological type I, and
4. The presence of macro- or microscopic hematuria, the importance of which would reflect the severity of renal destruction and the presence of venous thrombosis.

The mortality varies between 69 and 18% for type I and II respectively and increases to 92 and 53% when thrombocytopenia or renal failure is present [9]. In our observation, the patient had 3 factors of poor prognosis: renal insufficiency, gross hematuria and type I at CT according to the Wan classification.

The EPN is a therapeutic emergency. Its treatment is either conservative based on resuscitation with adapted antibiotherapy more or less associated with drainage of the renal pelvis or a collection; either non-conservative based on nephrectomy [2; 4; 6]. This must be proposed either immediately because of the presence of poor prognostic factors or after an attempt of conservative treatment [10]. Urine drainage is indicated in the absence of a poor prognostic factor, if the lesion is bilateral or on a single kidney and if there is a contraindication to surgery [3; 4; 6]. It is performed even in the absence of obvious urinary obstruction. Endoureteral drainage is preferred to nephrostomy [10]. The results of the conservative treatment vary according to the radiological class with a better prognosis for classes 1 and 2 of Huang and type 2 of Wan [2; 4; 7].

**Conclusion:-**

The EPN is a rare renal parenchymal infection that is rapidly life-threatening. CT plays an important role in positive diagnosis and therapeutic attitude. Antibiotic therapy is systematic. Urine drainage is the first therapeutic step in the majority of cases. However, it should not delay a rescue nephrectomy.



**Figures 1& 2:-** Abdominal CT scan showing left renal appearance of emphysematous pyelonephritis: increased renal volume and presence of air in excretory cavities and perirenal fat.

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