

PYONEPHROSIS: DIAGNOSIS AND TREATMENT: REPORT OF 65 CASES

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Abstract:

Pyonephrosis is one of the most severe pathologies caused by high urinary tract obstruction, which untreated may progress to serious complications that culminate with septic shock and death. The most common cause of pyonephrosis is represented by kidney stones. Currently eco-guided percutaneous nephrostomy provides a means to drain the pus from kidney cavity and determining residual kidney function. In this study have been included 65 cases which were observed for a period of 5 years. Lumbar pain was present in 84%, fever and chills are found in 46% of patients and irritative symptoms in 75% of cases. Cytobacteriological urine analysis shows *E. coli* urinary tract infections in 55%, *Enterococcus* in 9% of cases, *Klebsiella* in 3% of cases, *Pseudomonas* and *Proteus* in 1.5% cases each and 30% of patients had sterile urine cultures. In all cases the diagnosis was confirmed by imagistic means. The predominant etiologic factor was incriminated by urinary stones in 53 cases, followed by genital neoplasia with secondary ureteral obstruction in 6 cases. Treatment consisted of primary nephrectomy in 48% of cases, in 38% of cases nephrectomy is performed at 3 weeks after eco-guided percutaneous nephrostomy and drainage of pus, primary eco-guided percutaneous nephrostomy was applied in 4 cases with a positive result, the resumption of kidney function. In 3 cases, patients did not survive until surgery (severe urosepsis and secondary septic shock). In conclusion nephrectomy is the surgical treatment of choice. The best treatment is to diagnose and treat urinary stones, which is the main etiologic factor.

Key-words: *Pyonephrosis, nephrectomy, ecoguided percutaneous nephrostomy, urosepsis*

1. Introduction

Pyonephrosis represents the anatomoclinical syndrome that associates the suppurative destruction of renal parenchyma and renal collecting system because of an obstructed kidney with secondary perinephritis and irreversible loss of kidney function [7, 8]. Because of the extent of the infection and the presence of urinary obstruction, sepsis may rapidly ensue, requiring rapid diagnosis and management [4].

1.1. Etiology.

The most common cause of pyonephrosis is represented by kidney stones.

Pyonephrosis other etiological types are: non-lithiasic pyonephrosis of unspecified cause; secondary pyonephrosis in congenital urinary tract anomalies; secondary pyonephrosis after urinary tract surgery [7]

Basically, any cause of urinary tract obstruction can lead to pyonephrosis. Depending on the mechanism by which obstruction

occurs, the most common causes are:

Intrinsic obstruction causes: lithiasic ureteral obstruction; partially or totally obstructive kidney stones (calculus impacted in pyeloureteral junction, coral calculus); pyeloureteral junction syndrome; upper tract urothelial tumours; clots; papillary necrosis. Extrinsic obstruction causes: infiltrative bladder tumours with obstruction or compression of the ureteral orifice; prostatic carcinoma; inferior polar renal cyst; lower polar vessel; retroperitoneal lymphadenopathy; retroperitoneal fibrosis [11].

Incriminated organisms in pyonephrosis are *Proteus*, *E. coli*, *Enterobacter*, *Klebsiella* *Pseudomonas*. Gender distribution weighs in favour of females (73%) than men (27%) [5, 7, 13].

Positive diagnosis is based on the clinical criteria (lumbar pain, nephromegaly, fever pyuria), in conjunction with the paraclinical investigations (ultrasound signs, CT, intravenous urography).

Draining pus at the mounting of the percutaneous nephrostomy and the lack of urine output resumption certifies the pyonephrosis diagnosis [7, 8, 11].

1.2. Differential diagnosis.

Most commonly, pyonephrosis is confused with kidney cancer, which may have some common elements (pain, nephromegaly, fever and sometimes haematuria). The distinction is performed using imaging means (CT, ultrasound). The distinction from other septic renal collections that clinical evolves like pyonephrosis (renal abscess, perinephric abscess) is performed using imaging means (ultrasound, CT intravenous urography). In obstructive acute pyelonephritis the affected kidney resumes the diuresis after removal of the obstacle and draining the cavities. In infected hidronephrosis the parenchyma doesn't present suppurative destructive lesions and the perinephritis is missing. The bacillary pyonephrosis is another entity that enters into discussion in the differential diagnosis [1, 2, 3, 7, 8, 11].

1.3. Evolution. Prognosis.

Without treatment the pyonephrosis prognosis has a poor outcome and the disease progresses to serious complications culminating in toxicoseptic shock and death [10], [11].

The most redoubtable complication of the pyonephrosis is the urosepsis, whose mortality ranges varies between 20% and 42% [6]. The local evolution is represented by the progressive extension of inflammatory and suppurative phenomena and with the development of adhesion between the affected kidney and surrounding organs (with increased surgical risk on the right side due to the relations with duodenum and inferior vena cava) [7, 14].

1.4. Treatment.

The treatment of choice for patients diagnosed with pyonephrosis regardless of aetiology remains total nephrectomy. In selected cases, partial nephrectomy may be an option [10].

Heminephrectomy come into question when pyonephrosis appears on horseshoe kidney. Pyonephrosis antibiotic treatment is done by the following principles: It is administrated from the beginning, even in the absence of cultures and antibiogram result (cephalosporin + aminoglycoside); It is associated with simultaneous percutaneous drainage of the cavitar pus [7].

In emergency conditions, nephrectomy

may be an impossible goal when a patient presents a degraded biological state, which is why percutaneous nephrostomy, represents a saving gesture. This is done under ultrasound control, ensuring efficient drainage of pus from infected kidney, and is associated with antibiotic treatment, whose purpose is combating septic phenomena (sustaining vital functions, systemic antibiotic therapy) [12].

1.5. Complications.

An important complication that can occur if percutaneous drainage is performed in pyonephrosis is the possibility of opening the pleural cavity, with septic sowing of the pleural cavity and consecutive pleural empyema [11].

Following remission of the septic phenomena, with the improvement of the general condition (usually 2 weeks after percutaneous nephrostomy) nephrectomy is performed [10, 11].

Intraoperative and postoperative complications are the following, in order of frequency: intraoperative lesions of the colon (most commonly on the left); postoperative colic lesions; intraoperative lesions of the duodenum; lesions of the inferior vena cava; dilaceration of inferior pole of the spleen; profound thrombophlebitis; suppurations of the surgical wound; accidental opening of the pleural or peritoneal cavity [10, 11].

2. Material and Methods

This retrospective study aims to assess all patients hospitalized, diagnosed and treated for pyonephrosis in the Urology Clinic of Brasov Emergency County Hospital for a period of 5 years. From November 2010 to October 2015 were admitted 65 cases of pyonephrosis, for which were extracted information from medical records.

The evaluated criteria in this study: age of patients, sex, onset symptoms of pathology with reference to lumbar pain, fever, presence of dysuria, biohumoral and imagistic investigations used to assess and diagnose patients: hemo-leucogram, assessment of renal function by serum levels of urea, uric acid and creatinine, urine culture pre- and postoperative, blood cultures in septic shock case patients. Imaging evaluation of patients was performed by ultrasound and / or radiological: abdominal ultrasound, intravenous urography, computer tomography. Another investigated criteria is the presence or absence in the medical history of the patients of renal and ureteral stones

which have been treated, type 1 or 2 diabetes, presence of genital neoplasia pathology with secondary extrinsic pelvic ureteral obstruction.

Surgical treatment applied to the patients diagnosed with pyonephrosis, evaluated in the study is represented by nephrectomy per primam or nephrectomy at 2-3 weeks after we performed drainage of the renal cavity. Renal cavity drainage was performed by ecoguided percutaneous nephrostomy (external drainage) and in 2 cases we performed internal drainage by installing a JJ ureteral stent.

All patients received systemic antibiotics from the day of admission.

3. Results

The age of the patients diagnosed with pyonephrosis, evaluated in the study, varies from 35 to 73 years old with a median of 62 years and from all the evaluated patients, 45 patients (69%) are women, and 20 patients (31%) are men.

The clinical presentation of the patients admitted to our clinic during the study is outlined by back pain in 84% (55 patients), a percentage slightly increased compared with results of a similar study conducted in Morocco [9], fever and chills are found on 46% (30 patients) of all patients with this pathology and irritative symptoms during miction are found on 75% (49 patients) of subjects included in the study.

In paraclinical investigations, admission urine culture is positive with *Escherichia coli* in 55% of cases, in 9% of cases urine culture is positive with *Enterococcus*, *Klebsiella* in 3% of cases, one subject (1.5%) shows positive urine culture with *Proteus*, and one subject (1.5%) shows positive urine culture with *Pseudomonas* and 20 subjects (30%) with sterile preoperative urine cultures.

From all 65 treated patients, there were 9 cases (14%) that at admission presented septic shock, in which blood cultures were positive with *Enterococcus* in 4 cases and with *Escherichia Coli* in 5 cases.

Only on 15 subjects (23%) harvested admission CBC shows neutrophilic leukocytosis; 2 subjects included in the study present in medical history nephrectomy surgery for tumour pathology, no patient had solitary congenital kidney or "horseshoe" kidney, but we found impaired renal function, with renal failure in 20 cases (31%).

From the medical history of the patients we observed that 16 subjects (24%) underwent surgeries to treat upper urinary lithiasis and from all patients, in 53 cases we found lithiasic obstruction either in the lumbar segment of the ureter (26 cases) or in the pelvic segment of the ureter (16 cases); 11 patients have coral calculus; 6 cases of genital neoplasia with secondary pelvic ureteral obstruction.

In 20 cases (31%) the patients shows in medical history type 1 or 2 diabetes.



Fig. 1. Image of a pyonephrotic kidney, intraoperative aspect.

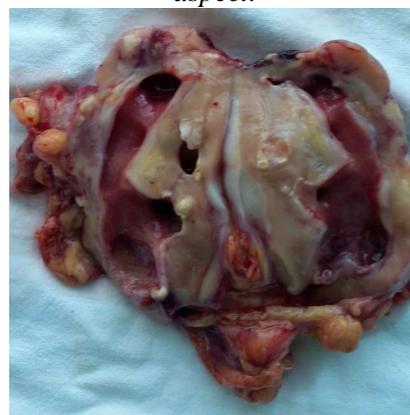


Fig. 2. Image of the same pyonephrotic kidney, postoperative aspect.

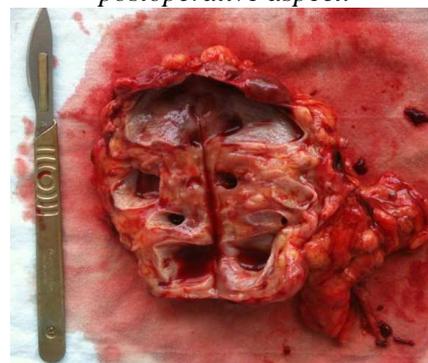


Fig. 3. Image of a pyonephrotic kidney, postoperative aspect.

In all cases, the diagnosis was imagistic confirmed through ultrasound complemented by intravenous urography in 35 cases (54%), CT scan without contrast in 20 cases (31%) - patients had a degree of renal insufficiency and 9 patients had been ultrasound investigated and performed emergency surgical intervention.

Therapeutic attitude used in most of the cases was nephrectomy per primam in 48% cases (31 subjects); in 3% cases (2 subjects) internal drainage was performed with ureteral stent "JJ" with no resumption of kidney function in three weeks, after which nephrectomy was performed; in 38% of cases (25 subjects) we performed external drainage through eco-guided percutaneous nephrostomy and after draining kidney cavities and reduction of the perinephritic process we performed nephrectomy; on 4 patients, after performing eco-guided percutaneous nephrostomy with drainage of the renal cavities we observed the resumption of kidney function; 3 cases in which, patients are presenting at admission symptoms of urosepsis and secondary septic shock, did not survive.

4. Conclusions:

Eco-guided percutaneous nephrostomy as first intention in the surgical treatment of pyonephrosis reduce the degree of kidney expansion by draining the pus from renal cavities, reduce the degree of secondary perinephritis of this pathology, consequently definitive surgical treatment, the nephrectomy, can be done with lower operatory septic risks, fewer possible postoperative complications and intraoperative renal pedicle approach is much easier.

Nephrectomy is the surgical treatment of choice if contralateral kidney is healthy, and also in case in which the patient has an unique surgical kidney, patient will receive dialysis.

This pathology, untreated promptly can lead to exitus due to the large potential of septic shock, especially in immunocompromised patients (diabetes, neoplastic, burned).

Lithiasis obstruction is the predominant etiologic factor.

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