

Managing of Pyonephrosis: About 42 Cases

Doumer Abderrahmane, Alafifi Mahmoud, Safieddine Mehdi*, Moataz Amine, Dakir Mohamed, Debbagh Adil, Aboutaieb Rachid

Department of Urology, CHU Ibn Rochd, Casablanca, Morocco

ABSTRACT

Introduction: Pyonephrosis is a critical complication of pyelonephritis, often precipitating swift escalation to sepsis and eventual renal function decline necessitating nephrectomy. Prompt recognition of pyonephrosis based on clinical or radiological indicators is of utmost importance in patients with pyelonephritis. This study aimed to describe the evolutionary profile of pyonephrosis after treatment by studying their epidemiological, clinical, paraclinical, and therapeutic aspects in the urology department of Ibn Rochd Hospital. **Materials and methods:** Descriptive retrospective study spread over a period of 5 years (2019–2023) including patients with pyonephrosis in the urology department. **Results:** Among 42 patients who have been diagnosed with pyonephrosis, the mean age was 42 years, and 67% were males. The most common clinical symptom was flank pain in 90.47% of cases, followed by febrile syndrome in 18 patients (42.85%). *Escherichia coli* were the most common causative organism in 20 (47.61%). Renal ultrasound allowed us to evoke the diagnosis in 71.42% of cases and urine CT scan confirmed diagnosis in the majority of cases. The etiology was lithiasis in 78.57% of cases. The treatment was based on broad-spectrum antibiotic therapy combined with urinary bypass. Percutaneous nephrostomy was successfully done in 40 patients (95.24%). After treatment of the acute episode, all our patients underwent nephrectomy. The outcome was reassuring in 71.44% of cases, the main complications were parietal suppuration (28.57%). The mortality was 9.52%. **Conclusion:** Pyonephrosis is becoming less common. Prompt intervention with antibiotics and drainage procedures, is imperative to prevent systemic complications and preserve renal function. Early detection and management of pyonephrosis is a must to prevent the onset of pyonephrosis.

INTRODUCTION

Pyonephrosis is a severe kidney disease defined by the renal parenchyma's destruction by a suppurative process within the dilated pyelocalicial cavities. It can be suspected clinically but its diagnosis is based on imaging. Pyonephrosis can be accompanied by sepsis or deterioration in the overall health condition, potentially escalating to a life-threatening state.

Vol No: 06, Issue: 02

Received Date: April 13, 2024

Published Date: May 21, 2024

*Corresponding Author

Safieddine Mehdi

Department of Urology, CHU Ibn Rochd, Casablanca, Morocco, Phone: +212615964557

E-mail: mr.mehdi.safi@gmail.com

Citation: Abderrahmane D, et al. (2024). Managing of Pyonephrosis: About 42 Cases. *Mathews J Urol Nephrol.* 6(2):21.

Copyright: Abderrahmane D, et al. © (2024). This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Despite current clinical and radiological knowledge, it remains a mystery for surgeons.

The objective aim of this study is to describe the evolutionary profile of pyonephrosis after surgical treatment by studying their epidemiological, clinical, paraclinical, and therapeutic aspects in the urology department of Ibn Rochd Hospital.

MATERIELS AND METHODS

This was a descriptive retrospective study conducted over a span of 5 years, from June 2019, to June 2023. This study included patients under observation for pyonephrosis at the Urology Department of Ibn Rochd Hospital in Casablanca. A comprehensive analysis of the epidemiological, clinical, paraclinical, therapeutic, evolutionary, and histological aspects was performed. Data were systematically gathered

using an operational sheet designed to cover all relevant study objectives, ensuring comprehensive coverage of the various aspects under investigation.

RESULTS

42 patients were included in this study. The average age of the patients was 42 years old for extremes of 25 and 75 years old. We noted a male predominance (67%) with the involvement of 27 men and 15 women.

32 of the cases (76.19%) had a low socio-economic (SE) level. The main history of the interview was urinary lithiasis found in 27 patients (64.28%), followed by high blood pressure in 14 patients (33.33%), diabetes in 8 patients (19.04%), bladder tumor in 3 patient (7.14%), and Crohn's disease in 1 patient (2.38%) (Table 1).

Table 1. Breakdown of Patients by History

Medical History	Number of cases	Percentage (%)
Urinary Lithiase	27	64.28
Hypertension	14	33.33
Diabetes	8	19.04
Bladder tumor	3	7.14
Crohn's disease	1	2.38

The main clinical signs were back pain, which was the main sign for discovery found in 38 patients (90.47%), followed by febrile syndrome made of fever and chills in 18 patients

(42.85%), and pyuria in 10 patients (23.8%). Clinical examination found lumbar contact in 64.28% (27 patients) and fistula in four cases (9.52%) (Figure 1).

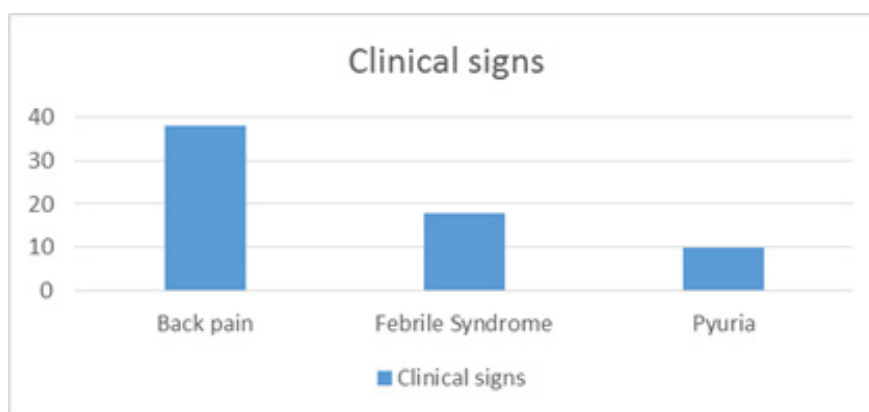


Figure 1. Main clinical signs of pyonephrosis in our study

Radiologically, unpredicted x-rays of the urinary tract were routinely requested objectifying systematically. Radiolucent stones in 14 patients (33.33%). Renal ultrasound made it possible to suspect the diagnosis in 30 patients (71.42%), showing dilation of the pyelocaliceal cavities with finely echogenic content associated with the destruction of the

renal parenchyma. Urinary CT scan confirmed diagnosis, often showing the image of the bear Paw, and indicating the etiology was lithiasis in 33 patients (78.57%), followed by Ureteropelvic junction (UPJ) in 5 patients (11.9%) then 3 case of compression by bladder tumor (7.14%) and 1 case retroperitoneal fibrosis (2.38%) (Figure 2).

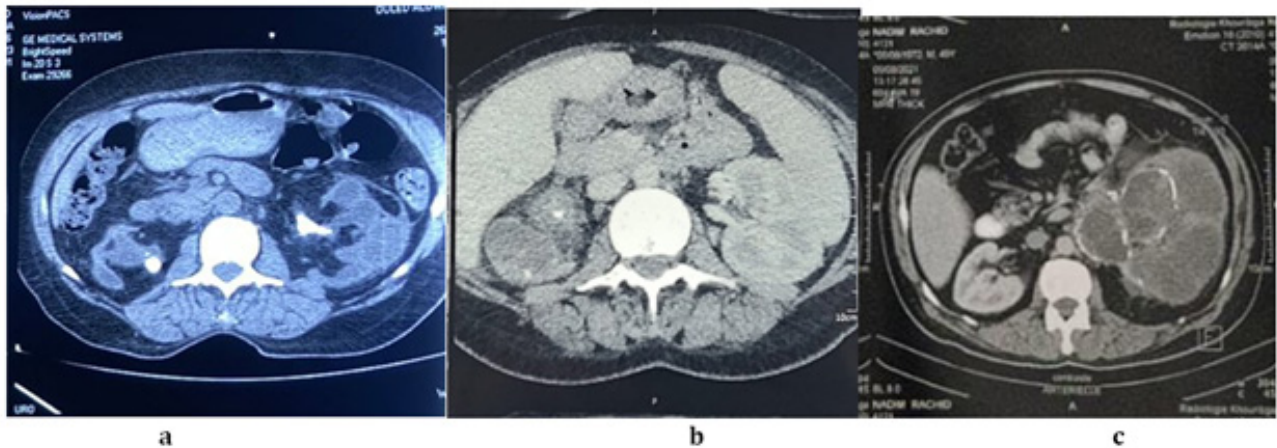


Figure 2. CT images of pyonephrosis due to pyelic lithiasis (a,b) and to ureteropelvic junction (c).

Laboratory tests found inflammatory disturbed balance due to high Reactive Protein C and leukocytosis in 29 patients (69.04%), anemia in 15 patients (35.71%), renal failure in 7 patients (16,66%). Cytobacteriological urine examination isolated germs in 33 patients (78.57%) with a predominance of *Escherichia coli* in 20 cases (47.61%), followed by 7 cases

of *Klebsiella* (16.66%), 4 cases of *Proteus mirabilis* (9.52%), 1 case of *Enterococcus faecalis* (2.38%), and 1 case of *Staphylococcus saprophyticus* (2.38%). However, CEBU was polymorphic in 5 patients (11.9%) and sterile in 4 patients (Figure 3).

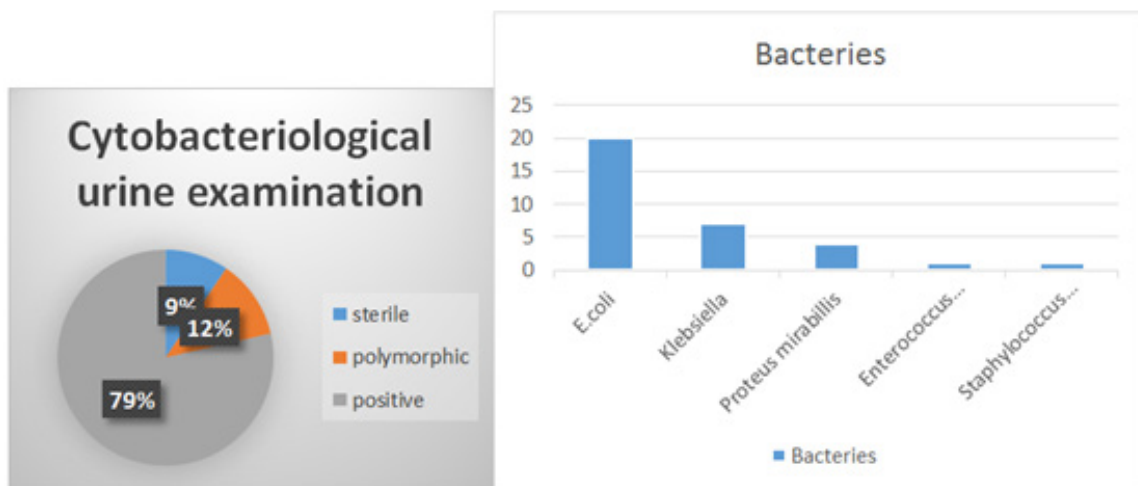


Figure 3. Bacteriological profile on cyto-bacteriological examination of urine.

Regarding therapeutics, medical antibiotic treatment was provided in all patients, it was a bi-antibiotic therapy based on third-generation cephalosporins and aminoglycosides

The bypass of the upper urinary tract was performed in all patients, represented mainly by percutaneous nephrostomy

in 40 patients (95.24%) and the remaining patients were derived by double J-J stent (4.76%).

After urinary bypass and 8-week course of antibiotics, all our patients underwent subcapsular nephrectomy, 10 of them (23.8%) laparoscopically (Figure 4).



Figure 4. Laparoscopic nephrectomy surgical specimen.

Histological study objectified essentially nonspecific pyelonephritis as the main histological form in 40 patients (95.24%), 1 case of squamous cell carcinoma (2.38%), and one case of Kidney Tuberculosis (2.38%).

The outcomes were favorable in 71.44% of cases, the main complications were parietal suppuration (28.57%), followed by chronic kidney failure (IIS) (19.04%), skin fistula (4.76%), and digestive fistula (4.76%). Mortality was 9.52%.

DISCUSSION

Pyonephrosis is characterized by the presence of a purulent collection in the renal cavities, leading to partial or total destruction of the renal parenchyma, posing a life-threatening condition if left untreated [1-4]. This situation constitutes a diagnostic and therapeutic emergency, often associated with severe, chronic, and progressive pre-existing uropathy. The aim of this study is to delineate the evolutionary profile of pyonephrosis following surgical treatment, focusing on its epidemiological, clinical, paraclinical, and therapeutic aspects.

The occurrence of pyonephrosis is not restricted to a specific age group, although it tends to manifest more commonly at an average age of 44 years, with a male predominance of 67%. In contrast, Liang reported a series with an average age of 53.81

years and a female predominance, while Patodia observed an average age of 35 years with a female predominance over a different series [5].

Clinical presentation typically involves a severe infection or even septic shock, characterized by high fever, chills, pain, and sometimes hemodynamic decompensation [2,4,6]. In our series, lower back pain was the primary clinical sign in 90.47% of cases, whereas Roulakakis identified fever as the main clinical sign in 82% of cases, followed by lower back pain in 74% [7]. In severe cases, pyonephrosis may present with septic shock, as reported by Liang in 14% of their patients [6].

Biologically, signs of sepsis are evident, including significant hyperleukocytosis and a major inflammatory syndrome [2,8]. Elevated C-reactive protein (CRP) levels played a crucial role in our diagnosis, with 69.4% of patients showing high CRP measurements, exhibiting a specificity of 89% and sensitivity of 100% [8]. Impaired renal function and anemia are not uncommon at diagnosis, with our study revealing anemia in 35.71% and kidney failure in 16.66% of patients.

Identification of causative bacteria is often accomplished through blood cultures, although clean-catch midstream urine may be negative, particularly in hydronephrosis cases

caused by an obstruction isolating the infectious focus from the rest of the urinary tract [2]. *Escherichia coli* are frequently isolated [9].

Radiological examinations, such as ultrasound and CT scans, are essential for diagnosis [2-3]. Ultrasound demonstrates overall dilation of pyelocaliceal cavities, echogenic debris in urine, and parenchymal changes. CT scans aid in differentiating between hydronephrosis and pyonephrosis, determining the underlying condition (obstacle), and identifying features such as perirenal infiltration.

The primary approach to managing pyonephrosis involves antibiotics, pain relievers, and fever reducers. Initially, antibiotics are chosen empirically, guided by local antibiotic resistance patterns. Subsequently, antibiotic treatment should be tailored according to urine culture results.

Percutaneous nephrostomy (PCN), introduced in 1976, has proven to be a life-saving solution for pyonephrosis, with a success rate between 96 and 99% [10,11]. In our study, PCN was the primary solution in 95.24% of cases. Nephrectomy becomes necessary in cases of persistent shock or non-functional destroyed kidneys. Nephrectomy, although technically challenging, is often performed through lumbotomy to prevent septic contamination of the peritoneal cavity.

Regardless of the surgical technique, continuous clinical and biological monitoring is essential due to the severity and mortality associated with pyonephrosis. Our study reported a mortality rate of 9.52 %, while other studies by Liang and Androulakakis reported rates of 1.4% and 2.6%, respectively [6-7]. Favorable outcomes were observed in 71.44% of cases, with parietal suppuration (28.57%) and chronic kidney failure (19.04%) being the main complications in our series. In comparison, Androulakakis identified parietal suppuration (6.25%), digestive fistula (0.86%), and renal insufficiency (0.86%) as the primary complications in their study.

CONCLUSION

Pyonephrosis constitutes both a diagnostic and therapeutic emergency, with nephrectomy standing as the standard treatment for a fully compromised kidney. The optimal approach involves early prevention, detection, and treatment of lithiasis to avert kidney destruction. Chronic nonspecific pyelonephritis emerged as the prevailing histopathologic form in this context.

REFERENCES

1. Florido C, Herren JL, Pandhi MB, Niemeyer MM. (2020). Emergent Percutaneous Nephrostomy for Pyonephrosis: A Primer for the On-Call Interventional Radiologist. *Semin Intervent Radiol.* 37(1):74-84.
2. Cornu JN, Renard-Penna R, Rouprêt M. (2008). Management of complicated pyelonephritis and kidney abscess. *EMC-Urology.* 1(2) :1-8.
3. Yoder IC, Lindfors KK, Pfister RC. (1984). Diagnosis and treatment of pyonephrosis. *Radiol Clin North Am.* 22(2):407-414.
4. Yoder IC, Pfister RC, Lindfors KK, Newhouse JH. (1983). Pyonephrosis: imaging and intervention. *AJR Am J Roentgenol.* 141(4):735-740.
5. Patodia M, Goel A, Singh V, Singh BP, Sinha RJ, Kumar M, et al. (2017). Are there any predictors of pyonephrosis in patients with renal calculus disease? *Urolithiasis.* 45(4):415-420.
6. Liang X, Huang J, Xing M, He L, Zhu X, Weng Y, et al. (2019). Risk factors and outcomes of urosepsis in patients with calculous pyonephrosis receiving surgical intervention: a single-center retrospective study. *BMC Anesthesiol.* 19(1):61.
7. Androulakakis PA. (1982). Pyonephrosis: a critical review of 131 cases. *Br J Urol.* 54(2):89-92.
8. Wu TT, Lee YH, Tzeng WS, Chen WC, Yu CC, Huang JK. (1994). The role of C-reactive protein and erythrocyte sedimentation rate in the diagnosis of infected hydronephrosis and pyonephrosis. *J Urol.* 152(1):26-28.
9. Kumar LP, Khan I, Kishore A, Gopal M, Behera V. (2023). Pyonephrosis among Patients with Pyelonephritis Admitted in Department of Nephrology and Urology of a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA J Nepal Med Assoc.* 61(258):111-114.
10. Pabon-Ramos WM, Dariushnia SR, Walker TG, d'Othée BJ, Ganguli S, Midia M, et al; Society of Interventional Radiology Standards of Practice Committee. (2016). Quality improvement guidelines for percutaneous nephrostomy. *J Vasc Interv Radiol.* 27(03):410-414.
11. Farrell TA, Hicks ME. (1997). A review of radiologically guided percutaneous nephrostomies in 303 patients. *J Vasc Interv Radiol.* 8 (5):769-774.