

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Giant pyonephrosis related to nephrolithiasis in diabetes woman: A case report[☆]

Miloud Chakit, PhD^{a,*}, Rachid Ayoub Zahir, MD^b, Abdelhalem Mesfioui, PhD^a

^a Biology and Health laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra Morocco

^b Head of Urology Department, El Idrissi Hospital, Kenitra, Morocco

ARTICLE INFO

Article history:

Received 4 January 2024

Revised 12 March 2024

Accepted 18 March 2024

Keywords:

Nephrectomy

Pyonephrosis

Urolithiasis

Diabetes

Case report

ABSTRACT

Pyelonephritis is one of the main systemic bacterial infections encountered in emergency departments. We present a case of diabetes woman aged 30 years referred to our urology department of El-Idrissi Hospital, Kenitra (Morocco) for recurrent episodes of urinary tract infection, multiple urolithiasis, chills, unilateral lower back pain, chills and severe hydronephrosis. Abdominal CT showed a non-functioning obstructed kidney with pyelic and ureteral stones. Nephroureterectomy was performed by extraperitoneal nephrectomy for avoiding any more extended nephrectomy incision or second iliac incision, this technic ensures nephroureterectomy with minimal risk of affecting the distal ureter, that sometimes follows nephrectomy.

Diabetes and urolithiasis coexistence in a patient may cause severe pyonephrosis leading to nephroureterectomy.

© 2024 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Pyonephrosis is a severe infection related to a retention of pus in the dilated urinary tract with destruction of the renal parenchyma. The causes are generally renal damage, persistent urinary obstruction, urolithiasis and urinary system infection [1]. The incidence of pyonephrosis is higher in older female patients and affects mostly the left kidney [2]. Several causes are related to its aetiology like urinary tract infection,

urolithiasis, urinary obstruction, lipid metabolism abnormalities, lymphatic obstruction and impaired immune system [3]. The diagnosis is based primarily on renal ultrasound and CT images. Late management may result in death by septic shock.

In this case, we will report a massive pyonephrosis with an atypical germ accidentally discovered in front of an image of sub-occlusive syndrome and managed by nephrectomy. We will discuss the causative agents and therapeutic management based on a review of the literature.

[☆] Competing Interests: The authors declare no financial interests or personal relationships which may be considered as potential competing interests. No author is an editorial board member or editor in chief or associate editor or guest editor for the radiology case reports journal.

* Corresponding author.

E-mail address: miloud.chakit@uit.ac.ma (M. Chakit).

<https://doi.org/10.1016/j.radcr.2024.03.044>

1930-0433/© 2024 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



Fig. 1 – KUB demonstrates multiple stones in both kidneys.

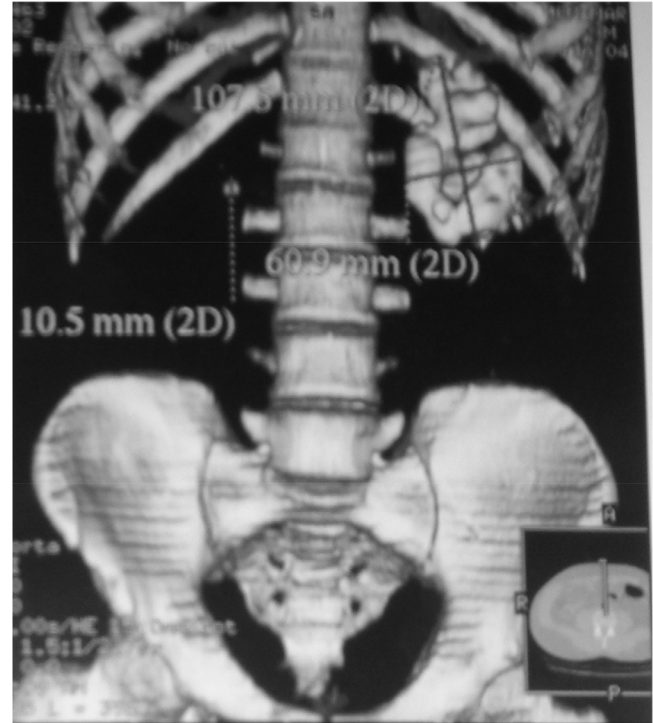


Fig. 2 – CT with reconstruction shows hydronephrotic kidney with multiple stones.

Case presentation

A 30-year-old Woman with a history of diabetes mellitus was followed for 5 years on insulin therapy. The patient presented unilateral lower back pain, severe hydronephrosis and recurrent urolithiasis. His history was normal until the age of 28, when he experienced episodes of unexplained recurrent fever and chills which were treated with antibiotics. He then remained asymptomatic until the age of 29, when he was admitted to the emergency room due to acute unilateral left lower back and iliac pain. The diagnosis revealed appendicitis treated with antibiotics. Nine months later, she developed new recurrent episodes of urinary tract infection and pyelonephritis accompanied by decreased body weight, severe anemia and lower back pain. The renal ultrasound and uroscanner showed severe hydroureteronephrosis with enlarged kidney and multiple urolithiasis (Fig. 1), with no functional kidney. The uroscan confirmed a mute kidney on the left and good compensatory function on the right (Fig. 2). The pre-operative diagnosis showed an obstructive megaureter, multiple urolithiasis and mute renal (Fig. 3). The abdominal CT scan (Fig. 4) show complete lamination of the renal cortex with significant distention of the pyelocalicial cavities and purulent contents of the excretory cavities in favor of a destroyed non-secreting sclerotic kidney. The patient felt too anxious to delay treatment for the renal painful.

The clinical diagnosis shows a conscious patient, with fever at 37.8°C. Biochemical analyzes reveal a creatinine of 14.8 mg/L, normal serum potassium, and a high number of leukocytes. Cytobacteriological examination of urine revealed infection with *Candida albicans*.

The diagnosis of transit disorders was made by an abdominal x-ray which was normal, then an abdominal ultrasound revealed a left pyelocalic dilatation with echogenic content laminating the renal cortex, could be linked to purulent retention.

Under ultrasound guidance, the patient underwent a urinary diversion. Monitoring of the patient's condition was marked by apyrexia and a decrease in the number of white blood cells which approached normal values. Kidney function was diagnosed by a kidney scan which showed a normally functioning right kidney and a non-functioning left kidney.

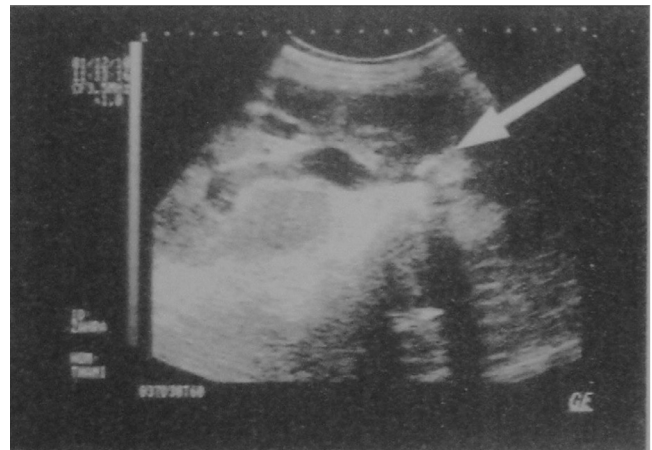


Fig. 3 – Renal ultrasound tomography showing a urinary stone.

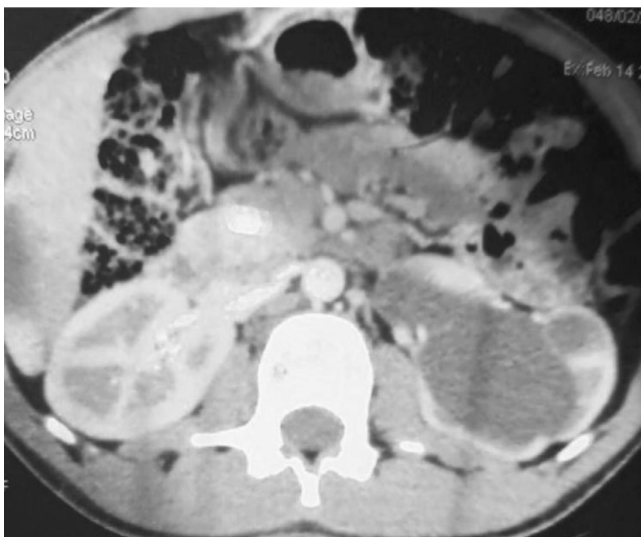


Fig. 4 – Abdominal CT scan showing a destroyed non-secreting sclerotic kidney.



Fig. 5 – Ectomized kidney.

After four weeks, a nephrectomy of the left kidney was performed (Fig. 5). After removing the calculi from the kidney. The stone analysis show monohydrate calcium oxalate (Fig. 6).

Discussion

Urinary stones are solid particles found in the urinary tract, some kidney stones can have a huge size like the bladder stone [4]. They can cause pain, hematuria, nausea, vomiting, and chills with fever related to bacterial urinary tract infections and other symptoms due to several diseases affecting the lo-



Fig. 6 – Stone removed from the pyelic cavity of ectomized kidney.

cal population as neuropsychiatric disorders [5]. Diagnosis is by x-ray imaging, usually a no-exam helical CT scan. Treatment is based on analgesics, antibiotics in case of infection, expulsive medical treatment and, sometimes, minimally invasive surgical interventions (shock wave lithotripsy or endoscopic stone removal), or by traditional therapy using medicinal plants [6–8]. Persistence of the stone in the urinary tract can lead to acute renal failure.

Risk factors differ from population to another. Hypercalciuria constitutes the main risk factor, it represents a hereditary condition a hereditary condition which is mainly found in men (75%) compared to women (50%) suffering from calcium urinary stones; in the case of a family history of stones, the risk of recurrent stones is increased.

Pyonephrosis is an infection of the upper urinary tract characterized by parenchymal damage and causes subsequent loss of renal function [9]. It affects all ages and especially young adults [10]. The average age is between 42 and 51 years [11]. It affects both sexes with a female predominance [12]. In 70% of cases, ureteral obstruction and urinary stone are the main anatomical factor in pyonephrosis. Infection is most commonly caused by *E. coli*, *Klebsiella Pseudomonas*, *Proteus*, or *Enterococcus* [13].

Treatment of pyonephrosis includes percutaneous drainage of pus, placement of a retrograde ureteral stent and in extreme cases, nephrectomy. The antibiotics have no effect in pyonephrosis but a surgery intervention is generally necessary. Percutaneous nephrostomy is the most suitable and least invasive method for draining cells retained in the upper urinary tract.

In our case, the diabetic woman was in serious condition with a non-functional kidney, hence the nephrectomy. The diabetes was a risk factor affecting the physiology of organs [14].

In diabetic patients, the clinical presentation and the infectious organism may be unusual. Radiological imaging and uroscanner are means of early diagnosis of this pathology.

Pyonephrosis can be complicated to serious septic shock and sometimes fatal complications. Percutaneous nephros-

tomy is strongly recommended in the treatment of pyonephrosis and renal scintigraphy is necessary to monitor the functioning of the kidney [15].

Conclusion

Urolithiasis and diabetes coexistence in a patient may complicate a pyelonephritis leading to a gigantic pyonephrosis. In this case, which leads to dysfunction of the affected kidney, nephrectomy remains the unique treatment.

Authors' contributions

MC and AM Collected clinical details, analyzed the data and drafted the manuscript; MC and RAZ were involved in managing the patient; All authors read and approved the final paper.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

REFERENCES

- [1] Avnet NL, Roberts TW, Goldberg HR. Tumefactive xanthogranulomatous pyelonephritis. *Am J Roentgenol Radium Ther Nucl Med* 1963;90:89–96.
- [2] Quinn F, Dick A, Corbally M, McDermott M, Guiney E. Xanthogranulomatous pyelonephritis in childhood. *Arch Dis Child* 1999;81:483–6.
- [3] Levy M, Baumal R, Eddy AA. Xanthogranulomatous pyelonephritis in children. Etiology, pathogenesis, clinical and radiologic features, and management. *Clin Pediatr (Phila)* 1994;33:360–6. doi:10.1177/000992289403300609.
- [4] Chakit M, Aqira A, Mesfioui A. A case report of a giant bladder stone (12 × 8 cm, 610 g). *Radiol Case Rep* 2024;19(3):970–3. doi:10.1016/j.radcr.2023.11.081.
- [5] Fitah I, Chakit M, El Kadiri M, Brikat S, El Hessni A, Mesfioui A. The evaluation of the social functioning of schizophrenia patients followed up in the health center My El Hassan of Kenitra, Morocco. *Egypt J Neurol Psychiatry Neurosurg* 2023;59(1):125. doi:10.1186/s41983-023-00714-7.
- [6] Chakit M, Aqira A, El Hessni A, Mesfioui A. Place of extracorporeal shockwave lithotripsy in the treatment of urolithiasis in the region of Gharb Chrarda Bni Hssen (Morocco). *Urolithiasis* 2023;51(1):33. doi:10.1007/s00240-023-01407-9.
- [7] Chakit M, El Hessni A, Mesfioui A. Ethnobotanical study of plants used for the treatment of urolithiasis in Morocco. *Pharmacog J* 2022;14(5):542–7. doi:10.5530/pj.2022.14.133.
- [8] Chakit M, Boussekkour R, El Hessni A, Bahbiti Y, Nakache R, El Mustaphi H, et al. Antiurolithiatic activity of aqueous extract of *Ziziphus lotus* on ethylene glycol-induced lithiasis in rats. *Pharmacog J* 2022;14(5):596–602. doi:10.5530/pj.2022.14.141.
- [9] Rabii R, Joual A, Rais H, Fekak H, Moufid K, Bennani S, et al. Pyonephrosis: diagnosis and treatment: report of 14 cases. *Ann Urol (Paris)* 2000;34(3):161–4.
- [10] Harrison GS. The management of pyonephrosis. *Ann R Coll Surg Engl* 1983;65(2):126–7.
- [11] Watt I, Roylance J. Pyonephrosis. *Clin Radiol* 1976;27(4):513–19. doi:10.1016/s0009-9260(76)80118-3.
- [12] Watson RA, Esposito M, Richter F, Irwin RJ, Lang EK. Percutaneous nephrostomy as adjunct management in advanced upper urinary tract infection. *Urology* 1999;54(2):234–9. doi:10.1016/s0090-4295(99)00091-6.
- [13] Klein RD, Hultgren SJ. Urinary tract infections: microbial pathogenesis, host-pathogen interactions and new treatment strategies. *Nat Rev Micro* 2020;18(4):211–26. doi:10.1038/s41579-020-0324-0.
- [14] Baataoui S, Chakit M, Boudhan M, Ouhssine M. Assessment of vitamin D, calcium, cholesterol, and phosphorus status in obese and overweight patients in Kenitra city (Morocco). *Res J Pharm Technol* 2023;16(7):3405–9. doi:10.52711/0974-360X.2023.00563.
- [15] Mosbah A, Guermazi H, Siala A. Percutaneous nephrostomy in the treatment of pyonephrosis. A comparative study apropos of 36 cases. *Ann Urol (Paris)* 1990;24:279–81.