

Management of Severe Infectious Complications in a Patient with Bilateral Staghorn Kidney Stones and Xanthogranulomatous Pyelonephritis: A Case Study

Type: Case Study

Received: March 20, 2025

Published: May 03, 2025

Citation:

Elena Cuiban., et al. "Management of Severe Infectious Complications in a Patient with Bilateral Staghorn Kidney Stones and Xanthogranulomatous Pyelonephritis: A Case Study". PriMera Scientific Medicine and Public Health 6.5 (2025): 02-07.

Copyright:

© 2025 Elena Cuiban., et al. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Flavia Liliana Turcu^{1,2}, Elena Cuiban^{1,2*}, Ileana Adela Vacaroiu^{1,2}, Mitrea Ana-Raluca³ and Baboi Daniel^{4,5}

¹*Department of Nephrology, Carol Davila University of Medicine and Pharmacy, 020021 Bucharest, Romania*

²*Department of Nephrology, Sfântul Ioan Clinical Emergency Hospital, 042122 Bucharest, Romania*

³*Discipline of Physical Medicine and Rehabilitation (Medical Recovery Neurology), Elias Clinical Emergency Hospital, 011461 Bucharest, Romania*

⁴*Department of Medical Semiology, Carol Davila University of Medicine and Pharmacy, 020021 Bucharest, Romania*

⁵*Department of Gastroenterology, Sfântul Ioan Clinical Emergency Hospital, 042122 Bucharest, Romania*

***Corresponding Author:** Elena Cuiban, Department of Nephrology, Carol Davila University of Medicine and Pharmacy, 020021 Bucharest, Romania; Department of Nephrology, Sfântul Ioan Clinical Emergency Hospital, 042122 Bucharest, Romania.

Abstract

Staghorn calculi are a serious therapeutical challenge in clinical practice.

They can determine multiple complications represented by persistent pain, haematuria, chronic kidney disease, and various types of urinary tract infections including the urinary sepsis.

The consequences of the associated infectious complications can vary from urinary tract infections and recurrent urinary tract infections to pyelonephritis, renal abscesses and even pyonephrosis with perirenal abscesses or xanthogranulomatous pyelonephritis.

The case that will be presented shows that the treatment of the staghorn calculi with the associated infectious complications, especially if they determine secondary urosepsis, is not only complex, multimodal and multidisciplinary, but unfortunately sometimes major surgical options like nephrectomy could be necessary as a life-saving option.

Keywords: staghorn calculus; infectious complications; renal abscess; xanthogranulomatous pyelonephritis; nephrectomy

Abbreviations

percutaneous nephrolithotomy (PCNL), ureterorenoscopy (URS), extracorporeal shockwaves lithotripsy (ESWL).

Introduction

Staghorn calculi are large kidney stones that grow into the renal pelvis and one or more calyceal groups. They are commonly associated with urinary tract infections caused by urease-producing bacteria. In plenty of patients, the staghorn calculi are difficult to treat due to their large size as well as the presence of multiple associated co-morbidities which determine a significant surgical and anaesthetic risk. Unfortunately, it is quite common that in patients diagnosed with staghorn calculi the treatment is delayed in many cases for many reasons associated with patient decision, co-morbidities, etc. The treatment delay will highly likely favour the increased incidence of infectious complications that will significantly affect or even destroy the renal parenchyma and determine chronic kidney disease. Sometimes life-threatening complications like urosepsis will need hospital admission and sophisticated medical and surgical treatment.

Case presentation

Patient E.R. 68 years old presented to the Emergency Unit for pyuria, feeling unwell and having hypotension 60 mm Hg and tachycardia 110/minute, temperature 38.1 degrees Celsius that have started a couple of hours ago.

History taking revealed that the patient had been admitted about 3 weeks ago in the Urology Department of a different hospital for similar symptoms and was treated with iv antibiotics and fluids. On that occasion, she was investigated with a chest-abdomen-pelvis scan which described bilateral staghorn stones. Bilateral ureteric stenting was considered as necessary and performed uneventfully the next day.

Patient was discharged home on oral antibiotics and was initially fine but after about one week, when she was visiting a family member, she described the above-mentioned symptoms and was brought by an ambulance to the Emergency Unit in our hospital.

Her Past Medical History included hypertension and bilateral staghorn stones which were not treated as patient declined previously the open surgical approach- open nephrolithotomy- which was offered about 20 years ago.

She was taking Nifedipine for high blood pressure and she had no drug allergies. She was not drinking alcohol, was never smoking and never ever used any recreational drugs.

Based on her symptoms at presentation, the working diagnosis was urosepsis.

Patient was admitted under the Nephrology Department and urgent blood tests and blood cultures were taken, an intravenous (iv) cannula was inserted, iv antibiotics Meropenem given and fluid resuscitation was started.

An urethral catheter was inserted for urinary output monitoring, and an urine sample was sent for culture and sensitivity.

Her emergency blood test results were essentially normal including the white cells count, except for a serum creatinine of 2mg/dl and urea of 100 mg/dl.

Chest x-rays were clear and Abdominal x-rays demonstrated bilateral staghorn stones with bilateral ureteral stents which seemed to be correctly positioned (figure 1).



Figure 1

Patient was seen by the on-call urologist who was not concerned and advised for further antibiotic treatment and computer tomography (CT) scan to get more details about the cause of sepsis.

The next day the patient has improved, and a CT scan non-contrast was performed (figure 2).

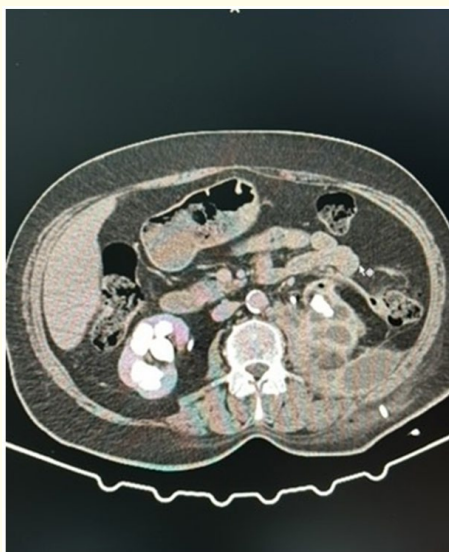


Figure 2

The CT showed staghorn stones bilaterally with abscess on the left side and multiple perirenal abscesses and in the psoas muscle, changes due to xanto-granulomatous and emphysematous pyelonephritis as described in the Radiology report.

Therefore, the patient was transferred to the Urology Department. The next day left lumbar exploration and drainage of a large abscess was performed under local anaesthesia uneventfully and 500 ml of pus were drained.

As the patient continued to have persistent pyuria and has not improved clinically, a repeat CT scan with contrast was requested and performed two days later (Figure 3).



Figure 3

The CT described left uretero-hydronephrosis grade IV with gas inclusions, multiple inhomogeneous fluid collections were found pararenal and retro-renal. Based on the CT findings, the decision was taken to offer left lumbar exploration under general anaesthesia with potential nephrectomy and drainage of the lumbar collection.

The patient was appropriately informed and written consent signed. She was aware about the potential worsening of the kidney function and the eventual need for dialysis which was discussed preoperatively with the Nephrology doctor.

At the time of surgery, nephrectomy and drainage of the lumbar collection was performed. After the surgical treatment, the postoperative evolution was simple, and the patient discharged home on oral antibiotics after 7 days.

Patient was informed that the right JJ stent needs to be changed every 6 months, and she was referred to the appropriate Urology Department to discuss about the surgical treatment of the staghorn stone now on a solitary right kidney.

Her serum creatinine and urea postoperatively remain stable at 2mg/dl and respectively 100mg/dl.

The histology report showed atrophic and sclerotic kidney with suppurative inflammation and chronic xanthogranulomatous pyelonephritis and peri nephritis secondary to staghorn lithiasis.

Discussions

Staghorn calculi might deteriorate the renal function and determine infectious complications, so they should be managed actively with early diagnosis and treatment for a successful outcome.

Blandy and Singh reported a 10-year mortality rate of 28% with conservative treatment [1]. Teichman and colleagues observed the worsening of the kidney function in 28% cases and 67% kidney-related causes of death for those who refused surgery [2].

Another study reported a rate of recurrent urinary tract infections of around 50%, progressive renal failure in about 14% with the need for dialysis in 9%, and a disease-specific mortality of 9% [3].

The current treatment options in staghorn stones are represented by percutaneous nephrolithotomy (PCNL), ureterorenoscopy (URS), extracorporeal lithotripsy (ESWL), combined “sandwich” therapy, open surgery and chemolysis in selected cases.

Percutaneous nephrolithotomy was introduced in 1970s for minimally invasive treatment of small renal stones, and later, due to the availability of sophisticated intracorporeal lithotripsy devices, was extended to treat large staghorn stones [4, 5]. In large series, PCNL determined very good stone clearance rates at around 98.5% and respectively 71% in patients diagnosed with partial or complete staghorn calculi, the complication rate being about 4% [6, 7].

The URS in staghorn stones is performed in selected cases. In a study comparing the results of the combined retrograde flexible ureteroscopy with laser lithotripsy and PCNL versus multiple-access PCNL, showed some advantages for the former one with less blood loss and better stone clearance [8]. Landman and all reported not only no major complications but also a good complete stone clearance of 78% in patients treated with combined URS and PCNL [9].

ESWL has determined a significant progress in the minimally invasive treatment of patients with kidney stones but unfortunately is not a promising option for the staghorn stones, with studies reporting a stone clearance rate raising from 18% to 67% [7, 10]. ESWL required two or more sessions in the vast majority of patients (86%) to achieve a decent stone clearance rate of 60%, with complications identified in around 13%. Additional procedures to complete the stone removal were necessary in about 18.4% of cases [11].

The combined “sandwich” therapy involves the association of two different therapeutic methods. After the initial PCNL is performed aiming to reduce the stone burden, the ESWL will treat the stone fragments which were not accessible to PCNL. The analysis of 100 patients who had combined therapy for struvite staghorn calculi described complete stone clearance in 78% cases, but with a hospital stay of 12.2 days. Blood transfusion was reported as necessary in about 14% of patients [12].

Open surgery (anatomic nephrolithotomy) is now dedicated only to very selected cases using the open surgical approach, which is lumbar or subcostal, and once the kidney is individualized, an avascular plane is identified for the renal incision and stone removal [13].

Chemolysis or stone dissolution therapy using different solution is rarely used and further studies remain to clarify its role [14].

Conclusions

The poor patient compliance has delayed the planned surgical treatment and thus the infectious complication secondary to the staghorn calculus on the left kidney occurred. The initial input of the Nephrologist not only offered the appropriate medical and antibiotic treatment of the urosepsis, a severe life-threatening infectious complication, but was also essential in the diagnostic accuracy. The urologic management was tailored in two different hospitals from simple to complex, from JJ stenting initially to lumbar drainage and unfortunately to nephrectomy finally. This clinical case confirms that the patients with staghorn calculi should be early diagnosed, and surgical treatment discussed and offered as soon as possible. The infectious complications in this type of stone disease can potentially be prevented by the proper use of antibiotics or maybe D-mannose or Cranberry extracts can play a role, even if there are currently no studies to confirm their effectiveness.

Competing Interest

The authors declare no conflict of interest in the conduct and reporting of this study.

References

1. Blandy JP and Singh M. "The case for a more aggressive approach to staghorn stones". *J Urol* 115 (1976): 505-506.
2. Teichman JM, Long RD and Hulbert JC. "Long-term renal fate and prognosis after staghorn calculus management". *J Urol* 153 (1995): 1403-1407.
3. Deutsch PG and Subramonian K. "Conservative management of staghorn calculi: a single-center experience". *BJU Int* 118 (2016): 444-450.
4. Diri A and Diri B. "Management of staghorn renal stones". *Ren Fail* 40 (2018): 357-362.
5. Clayman RV, et al. "Percutaneous nephrolithotomy. An approach to branched and staghorn renal calculi". *JAMA* 250 (1983): 73-75.
6. Chibber PJ. "Percutaneous nephrolithotomy for large and staghorn calculi". *J Endourol* 7 (1993): 293-295.
7. Meretyk S, et al. "Complete staghorn calculi: random prospective comparison between extracorporeal shock wave lithotripsy monotherapy and combined with percutaneous nephrostolithotomy". *J Urol* 157 (1997): 780-786.
8. Marguet CG, et al. "Simultaneous combined use of flexible ureteroscopy and percutaneous nephrolithotomy to reduce the number of access tracts in the management of complex renal calculi". *BJU Int* 96 (2005): 1097-1100.
9. Landman J, et al. "Combined percutaneous and retrograde approach to staghorn calculi with application of the ureteral access sheath to facilitate percutaneous nephrolithotomy". *J Urol* 169 (2003): 64-67.
10. Gleeson MJ and Griffith DP. "Extracorporeal shockwave lithotripsy monotherapy for large renal calculi". *Br J Urol* 64 (1989): 329-332.
11. El-Assmy A, et al. "Extracorporeal shock-wave lithotripsy monotherapy of partial staghorn calculi. Prognostic factors and long-term results". *Scand J Urol Nephrol* 40 (2006): 320-325.
12. Stroom SB, Yost A and Dolmatch B. "Combination "sandwich" therapy for extensive renal calculi in 100 consecutive patients: immediate, long-term and stratified results from a 10-year experience". *J Urol* 158 (1997): 342-345.
13. Smith M and Boyce WH. "Anatrophic nephrotomy and plastic calyrrhaphy". *J Urol* 99 (1968): 521-527.
14. Tiselius HG, et al. "Minimally invasive treatment of infection staghorn stones with shock wave lithotripsy and chemolysis". *Scand J Urol Nephrol* 33 (1999): 286-290.