

Breaking the stone and beating the bug: managing ureterolithiasis with *Enterococcus faecium* in a high-risk patient

Flavia Coman^{1,*}, Catrinel-Ana Codău¹, Bogdan Novac^{1,2}

¹Grigore T. Popa University of Medicine and Pharmacy, Iasi, Romania. ²Urology and Kidney Transplant Clinic, "Dr. C. I. Parhon" Clinical Hospital, Iasi, Romania.

*Correspondence: Flavia Coman, Grigore T. Popa University of Medicine and Pharmacy, 16 Universitatii str, Iasi, Romania. Email: comanflavia2010@gmail.com

How to cite this article: Coman F, Codau CA, Novac B. Breaking the stone and beating the bug: managing ureterolithiasis with *Enterococcus faecium* in a high-risk patient. Arch Clin Cases. 2025;12(1):51-53. doi: 10.22551/2025.46.1201.10312

ABSTRACT

Ureteral lithiasis in high-risk patients demands a personalized approach due to the interplay of multiple comorbidities and procedural risks. This case report examines a 66-year-old female with recurrent lower ureteral stones resistant to multiple extracorporeal shock wave lithotripsy sessions, complicated by multidrug-resistant *Enterococcus faecium* infections, chronic coronary syndrome, heart failure with preserved ejection fraction, diabetes mellitus, and a history of ischemic stroke. The failure of conservative treatments required a shift to ureteroscopic laser lithotripsy, preceded by cardiovascular risk optimization and targeted antimicrobial therapy based on advanced microbial diagnostics. Postoperative imaging confirmed complete stone clearance and correct stent placement, ensuring ureteral patency. This case underscores the necessity of multidisciplinary management, integrating precise infection control, cardiovascular stabilization, and minimally invasive techniques to achieve a favorable outcome in a complex patient.

KEYWORDS: ureteral lithiasis; *E. faecium*; extracorporeal shock wave lithotripsy (ESWL); minimally invasive ureteroscopic intervention

INTRODUCTION

Globally, ureteral lithiasis affects up to 12% of the population, with its etiology often linked to genetic predispositions, dietary habits, and environmental factors [1,2]. In high-risk patients, such as the one presented in this case, the presence of significant cardiovascular comorbidities, including chronic coronary syndrome and a history of ischemic stroke, alongside diabetes mellitus and recurrent multidrug-resistant infections, posed considerable therapeutic challenges. The need for a carefully tailored approach, balancing the risks of surgical intervention with comorbidity management, was critical to ensuring a favorable outcome. This report details the complex case of a patient with recurrent lower ureteral stones, emphasizing the importance of multidisciplinary decision-making and individualized therapeutic strategies in achieving optimal care.

CASE PRESENTATION

A 66-year-old female patient with a history of chronic coronary syndrome (NYHA Class II), stage 2 hypertension, and type 2 diabetes mellitus presented with right flank pain,

recurrent hematuria, and urinary tract infections. She had suffered an ischemic stroke in 2017 and was deemed a high-risk surgical candidate due to her extensive comorbidities, which also included a right adrenal adenoma and chronic heart failure with preserved ejection fraction. Her therapeutic regimen included dual antiplatelet therapy (aspirin and clopidogrel) for secondary stroke prevention, a beta-blocker and ACE inhibitor for heart failure management, calcium channel blockers and diuretics for hypertension, as well as metformin for diabetes control.

The patient's urological issues began in 2016 with recurrent right-sided ureteral stones, including calcium oxalate calculi ranging from 4 to 8 mm in size, occurring approximately twice per year. Over the years, she underwent multiple extracorporeal shock wave lithotripsy (ESWL) procedures with partial success. In 2024, a CT scan and radiography revealed a 1 cm lower ureteral stone (Figure 1) and a double J stent was placed to maintain ureteral patency. This episode was further complicated by a urinary tract infection caused by multidrug-resistant *Enterococcus faecium*, necessitating targeted antibiotic therapy with linezolid 600 mg twice daily for 10 days.

To manage the possible risks, the patient underwent preoperative cardiac optimization, including a treadmill stress test and transthoracic echocardiography, which confirmed stable coronary disease and preserved ejection fraction.

Received: December 2024; **Accepted after review:** March 2025; **Published:** March 2025.



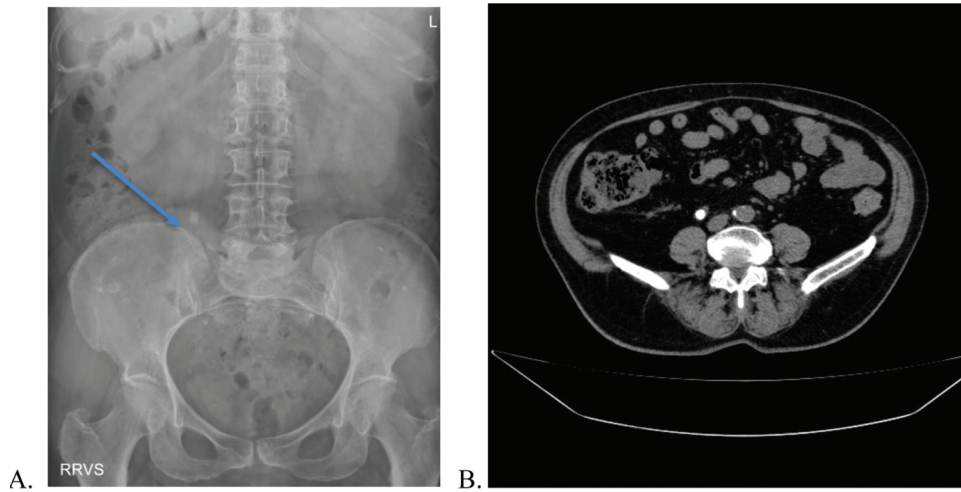


Fig. 1. Preoperative radiograph and CT (axial image taken at the level of the inferior abdomen) of the patient, illustrating a 1 cm lower ureteral stone.

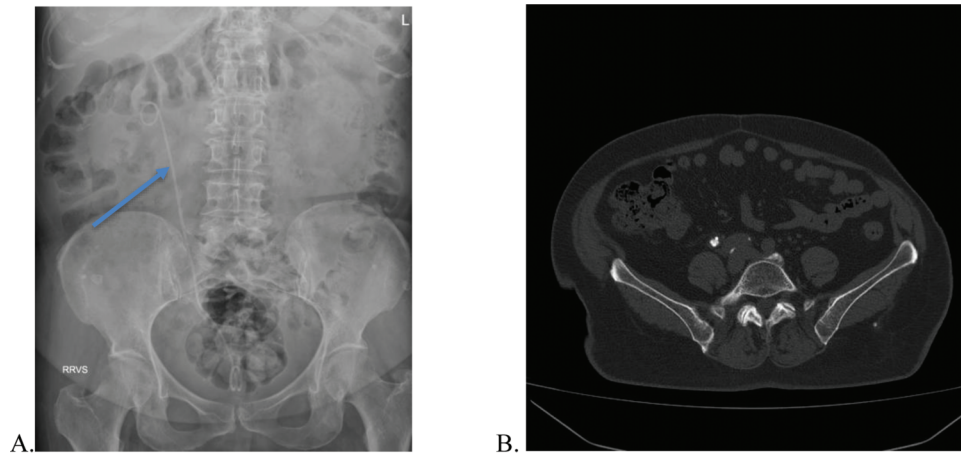


Fig. 2. Postoperative radiograph and CT (axial image taken at the level of the inferior abdomen), showing successful stone fragmentation and placement of the double J stent.

Antiplatelet therapy (aspirin and clopidogrel) was temporarily interrupted 5 days before surgery, with bridging anticoagulation using enoxaparin 1 mg/kg twice daily. Beta-blockers were continued to maintain hemodynamic stability, and intraoperative ECG monitoring ensured early detection of potential arrhythmias. Careful monitoring during and after the procedure ensured hemodynamic stability and successful recovery.

Given her diabetes mellitus, perioperative glucose management was a priority. Preoperative glycemic control was optimized through insulin regimen adjustments, with a targeted 10% increase in basal insulin dose to maintain euglycemia and minimize surgical complications. Continuous glucose monitoring ensured stability, reducing the risk of postoperative infections and enhanced recovery. Additionally, endocrinology consultation was sought due to the presence of adrenal pathology (right adrenal adenoma), which required evaluation for potential endocrine imbalances beyond glycemic control. No additional hormonal abnormalities were identified.

Ureteroscopic laser lithotripsy was performed two days after the CT scan in 2024, successfully fragmenting the stone,

and relieving the obstruction. The procedure followed a standard approach, with Holmium:YAG laser lithotripsy used for stone disintegration and active stone retrieval to minimize residual fragments. The post-surgical CT scan and radiography confirmed the absence of residual stones and the correct positioning of a newly placed double J stent, ensuring adequate urinary drainage and preventing early ureteral stricture formation (Figure 2). The patient was discharged in stable condition with recommendations for follow-up to monitor recurrence and renal function. She was prescribed tamsulosin 0.4 mg daily for ureteral relaxation, analgesics as needed, and a short course of prophylactic antibiotics (ciprofloxacin 500 mg twice daily for 5 days) to reduce the risk of post-procedural infection.

Antibiotic susceptibility testing confirmed resistance to vancomycin and beta-lactams, but susceptibility to linezolid and amikacin. This pathogen is relatively uncommon in urinary tract infections, particularly in non-hospitalized patients, but its presence was likely facilitated by prior antibiotic exposure and diabetes-related immune dysfunction. Management required advanced microbial diagnostics,

including PCR assays and mass spectrometry to tailor antibiotic therapy effectively. PCR testing identified genes associated with vancomycin resistance (*vanA* and *vanB*), confirming the need for alternative treatment options. The patient was prescribed with a targeted antimicrobial regimen, including linezolid and aminoglycosides to prevent septicemia and manage recurrent infections.

Metabolic analyses, including 24-hour urine collection and serum biochemical tests, revealed hypercalciuria and hypocitraturia, both of which are well-established risk factors for calcium oxalate stone formation. Serum studies ruled out secondary causes such as hyperparathyroidism and hyperuricemia (parathyroid hormone and serum uric acid levels were within normal limits), while a detailed urine supersaturation analysis confirmed a high propensity for calcium oxalate crystallization, highlighting the need for citrate therapy. These findings informed a targeted prevention strategy, including potassium citrate 30 mEq/day to correct hypocitraturia and dietary modifications with increased fluid intake (≥ 2.5 L/day) and reduced sodium consumption (< 2 g/day) to lower urinary calcium excretion.

DISCUSSION

Managing high-risk patients with recurrent ureteral lithiasis involves a careful balance between addressing comorbid conditions and ensuring safe and effective urological treatment. In this case, the interplay of cardiovascular disease, diabetes mellitus, and multidrug-resistant infections presented substantial challenges, requiring a multidisciplinary approach to achieve optimal outcomes.

Cardiovascular comorbidities, including chronic coronary syndrome and a history of ischemic stroke, significantly influenced the treatment strategy and heightened perioperative risks such as arrhythmias and thromboembolic events.

Diabetes mellitus further complicated the clinical picture by increasing susceptibility to infection and delaying wound healing, along with infectious complications, which posed an additional layer of complexity due to a history of multidrug-resistant *Enterococcus faecium* infections. Precision in antibiotic selection was essential to avoid exacerbating resistance and to ensure adequate control of the pathogen.

Paraclinical investigations were pivotal in guiding treatment and preventing recurrence of both infection and stone formation.

Low-dose computed tomography (CT) imaging enabled precise visualization and localization of the stone, allowing for accurate surgical planning. This technology minimizes radiation exposure compared to standard CT scans, a key benefit for patients with recurrent lithiasis who undergo repeated imaging [3].

Flexible ureteroscopes complemented the laser technology by providing unmatched maneuverability within the urinary

tract, even in anatomically complex scenarios. Their precise navigation capabilities minimized trauma and ensured thorough stone clearance, reducing the risk of residual fragments that could lead to recurrent obstruction or infection [4].

CONCLUSION

This case highlights the complexity of managing recurrent ureteral lithiasis in an elderly high-risk patient with multiple comorbidities. A multidisciplinary approach was essential, balancing urological intervention with cardiovascular and metabolic risk optimization. Preoperative evaluation, including stress testing and echocardiography, minimized cardiac risk, while an anticoagulation bridging strategy with enoxaparin ensured thromboembolic protection. Targeted antibiotic therapy with linezolid and amikacin prevented infectious complications. Metabolic management, including potassium citrate supplementation and dietary modifications, aimed to reduce future stone recurrence. Low-dose CT imaging and fluoroscopically guided stent placement optimized surgical outcomes. This case underscores the importance of individualized, multidisciplinary management in complex patients, improving both safety and prognosis.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Conflict of Interest

The author declares that he has no conflict of interest.

Funding

Nothing to declare

REFERENCES

- Lombardo R, Tzelves L, Geraghty R, et al. Follow-up of urolithiasis patients after treatment: an algorithm from the EAU Urolithiasis Panel. *World J Urol.* 2024 Mar 28;42(1):202. PMID: 38546854. doi: 10.1007/s00345-024-04872-y.
- Karagöz MA, Güven S, Tefik T, et al. Attitudes of urologists on metabolic evaluation for urolithiasis: outcomes of a global survey from 57 countries. *Urolithiasis.* 2022 Dec;50(6):711-20. PMID: 36169664. doi: 10.1007/s00240-022-01362-x.
- Kluner C, Hein PA, Gralla O, et al. Does ultra-low-dose CT with a radiation dose equivalent to that of KUB suffice to detect renal and ureteral calculi? *J Comput Assist Tomogr.* 2006 Jan-Feb;30(1):44-50. Epub 2016 May 27. PMID: 27238616. doi: 10.1097/01.rct.0000191685.58838.ef.
- Assimos D, Krambeck A, Miller NL, et al. Surgical Management of Stones: American Urological Association/Endourological Society Guideline, PART I. *J Urol.* 2016 Oct;196(4):1153-60. Epub 2016 May 27. PMID: 27238616. doi: 10.1016/j.juro.2016.05.090.