Urethral Calculus as an Uncommon Cause of Acute Urinary Retention in Women Diagnosis and Management: A Case Report

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ABSTRACT

BACKGROUND: Urethral calculi causing acute urinary retention is a highly uncommon condition in women, which poses distinctive difficulties in diagnosis and treatment. This report presents the case of a 52-year-old woman who experienced acute urinary retention caused by a urethral stone. It emphasizes the effective use of minimally invasive methods and underscores the importance of comprehensive multidisciplinary treatment.

CASE PRESENTATION: A 52-year-old woman patient arrived with acute urinary retention symptoms that lasted 6 hours. She complained of pain in the perineal and periurethral regions. She struggled with poorly managed type 2 diabetes, metabolic syndrome, and frequent cystitis. The examination showed the presence of a 2-cm stone in the urethra. The treatment utilised retrograde propulsion and laser fragmentation. Postoperative magnetic resonance imaging results were normal, and follow-up care involved managing diabetes and adopting lifestyle changes to prevent the recurrence of cystitis and stones for 6 months.

CONCLUSION: Urethral calculi exceptionally cause acute urinary retention in women. To achieve successful outcomes and prevent recurrence, it is crucial to prioritize prompt, minimally invasive treatment, and comprehensive management.

KEYWORDS: Acute urinary retention, urethral calculi, women urethra, laser lithotripsy, minimally invasive treatment, emergency urology

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Highlights

- The medical literature only reports the fifth case of acute urinary retention in women due to a urethral stone.
- A multidisciplinary approach is crucial to achieve effective management, including emergency response, detailed diagnostics, and tailored treatments.
- Minimally invasive techniques like retrograde propulsion and in situ laser fragmentation successfully treated the condition.
- Poorly controlled diabetes, metabolic syndrome, and frequent cystitis contributed to stone formation.
- The use of ultrasound, magnetic resonance imaging, cystoscopy, and holmium laser fragmentation was crucial to effectively diagnosing and treating urethral calculus.

Introduction

The occurrence of acute urinary retention (AUR) in women, especially due to urethral calculus, is a rare and complex clinical situation. In this case report, the focus is on a 52-year-old woman who developed AUR as a result of a large stone in her urethra. The report also covers the management of her condition. These cases are rare and constitute only a small portion of urinary stone disease. This case is significant not only because of its rarity, but also because it highlights the successful use of minimally invasive techniques to treat acute disease. The broader consequences highlight the need for a comprehensive etiological evaluation to identify underlying factors such as metabolic syndrome, recurrent urinary infections, and urethral diverticulum. These factors play a critical role in the guide of both short-term management and long-term preventive strategies. The report highlights the importance of taking a multidisciplinary approach, which involves combining emergency response, thorough diagnostic work, and personalised medical treatments to achieve the best results for patients. Through sharing this case, our goal is to add to the current knowledge on AUR caused by urethral calculi in women. This will provide valuable information that can improve the precision of diagnosis and the effectiveness of treatment in similar cases in the future.

Case Presentation

In this report, we describe a case involving a 52-year-old woman who came to the emergency department with an AUR that lasted for 6 hours. She also complained of pain in the perineal and periurethral areas. The patient had no previous surgery or notable family medical history. Despite receiving metformin treatment for noninsulin-dependent type 2 diabetes mellitus for 5 years, her condition remained poorly

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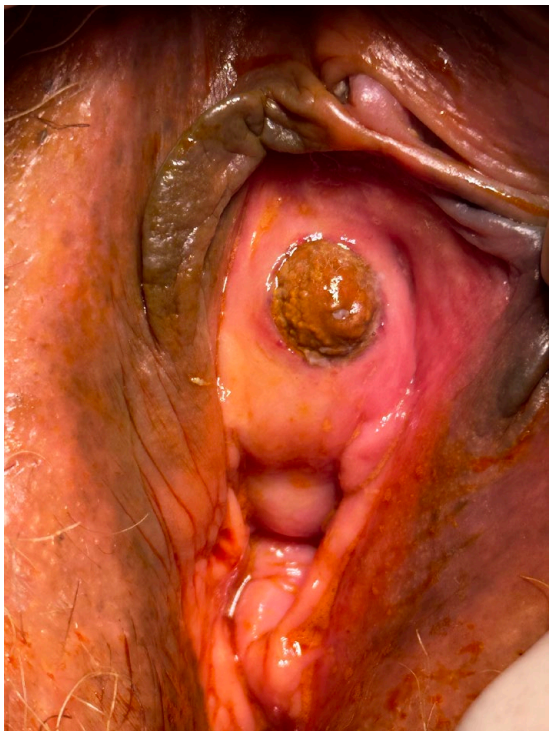

Figure 1. Urethral stone entrapped in the urethral meatus.

managed, as evidenced by her most recent glycated hemoglobin level of 8% a month ago. In addition, she had metabolic syndrome and a body mass index of 28. She experienced frequent episodes of cystitis, averaging 8 per year for the past 3 years, which she treated alone with ciprofloxacin and cefixime, without seeking medical advice. These episodes were characterized by isolated burning sensations during urination, with no other accompanying urinary symptoms. She had reached the postmenopausal stage 2 years ago.

During the examination, palpation revealed a large bladder globe. During the urogenital examination, we discovered a stone, approximately 2 cm in diameter, partially expelled, and blocking the urethral meatus (Figure 1). The stone's movement while attempting to urinate resulted in an abrupt and total AUR. Ultrasound revealed a bladder with normal wall thickness, a significantly enlarged bladder globe, and normal-looking kidneys. Biological tests did not show an electrolyte imbalance or abnormal kidney function, with fasting blood glucose at 1.5 g/L and hemoglobin at 11 g/dL. It was not possible to collect urine for analysis.

Removal was considered too dangerous due to the size and location of the stone. The decision was made to use retrograde propulsion into the bladder, followed by in situ laser fragmentation. Forceps easily repositioned the stone in the bladder during the operation, resolving the AUR and enabling the collection of a urine sample for a negative infection analysis. Cystoscopy and endoscopy showed no abnormalities. The use of a 60 W holmium laser and a 500 µm fiber for laser fragmentation took around an hour (Figure 2), and irrigation helped

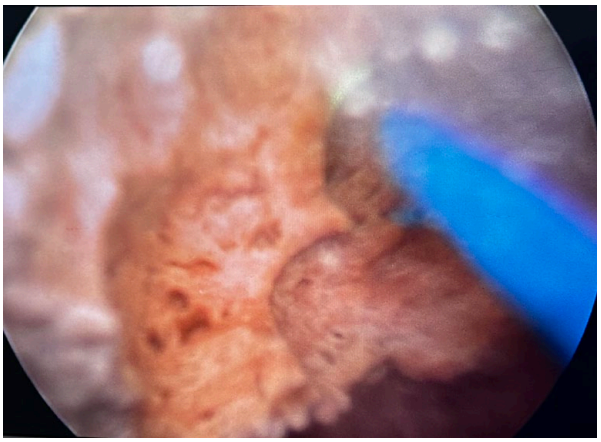

Figure 2. Litholapaxy of the calculus following intravesical expulsion using a holmium laser.

Figure 3. Pelvic magnetic resonance imaging in the sagittal T2 section showing anatomically normal urethra.

with fragment recovery. The placement of a 14 French size latex Foley catheter was followed by its removal after 24 hours.

The postoperative follow-up went without complications. Magnetic resonance imaging conducted the first day after surgery showed no anatomical abnormalities (Figure 3). The patient was cleared for release. Clinical, biological, and radiological evidence has ruled out the neurogenic bladder. Management successfully addressed chronic urinary infections that form lithiasis using diabetes management and metabolic syndrome, behavior changes, topical estrogen therapy, and

methenamine hippurate, resulting in no cystitis or stones after 6 months.

Discussion

Urethral stone obstruction is uncommon, making up only 0.3%-1% of urinary stone diseases. Anatomical differences likely play a role in the higher incidence of urethral stone disease in men.[1] In a notable study with 95 patients, there were only 17 women, and among them, only 4 had AUR.[2]

Urethral stones can be classified as primary or secondary. Primary stones form in the urethra as a result of blocking or infection and can cause painful urination, pelvic discomfort, and recurring infections. Women may also have to deal with more frequent urination and incontinence. The bladder or upper tract can produce secondary stones that travel to the urethra, leading to sudden pain, urinary retention, and occasionally haematuria.[1] Stone formation is caused by a combination of factors, such as anatomical abnormalities, bladder dysfunction, obstruction, metabolic conditions, foreign bodies, and infections.[3] The patient's clinical presentation indicates that the stone may have migrated, possibly due to metabolic syndrome and recurrent cystitis.

To diagnose urethral stones, a thorough physical examination were performed, including examining for solid masses on the front wall of the vagina by touching and inspecting the external opening of the urethra. Ultrasound is the preferred option for radiological evaluation because it is widely available, safe, cost-effective, and suitable for cases of AUR. Furthermore, it enables the assessment of the bladder and upper urinary tract, often impacted by urethral calculi.[2] X-ray and computed tomography scans are useful because urethral stones are usually visible with these imaging techniques.[2] In our situation, the clinical symptoms and positive ultrasound results made it unnecessary to use ionizing radiation.

Treating urethral stones involves considering factors such as their size, location, and any additional urethral problems that may be present. There are two options for handling larger movable stones: repositioning them in the bladder for surgical extraction or fragmenting them using a minimally invasive laser.[2] Endoscopic treatments have greatly reduced the complications of bladder stone procedures, resulting in shorter hospital stays, faster recovery, and shorter catheterization times compared with open cystolithotomy,[4] while maintaining similar rates of stone removal. Open cystolithotomy is still considered a viable treatment option in resource-limited areas, despite its higher complication rate.[5] Pneumatic lithotripsy can serve as an alternative if a laser is not accessible, and a nephroscope, resectoscope, or cystoscope can perform both laser and pneumatic fragmentation.[5]

A suprapubic catheter can relieve AUR and facilitate treatment planning or transfer to another facility if these methods fail or are not available. The successful outcome of our patient with holmium lithotripsy underscores the effectiveness of this approach in the treatment of urethral stones.

Of the 17 women in the Mortan et al. study, 13 had stones in the urethral diverticulum. Due to their vague symptoms and limited visualization with ultrasound or urethroscopy, magnetic resonance imaging is the preferred method for diagnosing and planning surgery for urethral diverticula.[6] Surgery is highly recommended if a urethral diverticulum is detected.[7] The patient's etiological evaluation led to her discharge 3 days after surgery.

The focus of this study is on a single case of AUR in a woman due to a urethral calculus restricting its generalisability. The limited duration of monitoring hinders the ability to draw wider conclusions about the reoccurrence and treatment of similar instances. Moreover, the lack of comparison with alternative treatment methods restricts the applicability of the results. To gain a more comprehensive understanding of the effectiveness and results of different approaches to treating urethral calculi in women, future studies should consider including a larger group of participants and conducting longer-term follow-ups.

Conclusion

In conclusion, women rarely experience AUR due to a urethral calculus, but timely and precise treatment is essential. Less invasive methods, such as retrograde propulsion and in situ laser fragmentation, can effectively treat urinary retention. It is crucial to perform an etiological assessment, such as magnetic resonance imaging, to identify root causes and provide guidance for subsequent treatment.

Authors contribution

Ghassane El Omri and Anas Taghouan took part in taking care of the patient, taking photos, researching the bibliography, and writing the article.
Hamza Rais participated in the bibliographic research.
Houry Younes participated in the bibliographic research.
Moussaab Rachid participated in the bibliographic research.
Abdeljalil Heddat participated in the design and approved the final manuscript.
All authors have approved the final version of the manuscript.

Abbreviations

UM6SS: Mohammed VI University of Health Sciences
AUR : acute urinary retention

Availability of data and materials

On request, email the corresponding author.

Ethical approval

Not applicable.

Consent to participate

Written and informed consent were taken.

Consent for publication

Written and informed consent were taken.

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Code availability

Not applicable.

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