



Urethral stones and benign prostatic hyperplasia: Presentation of a rare case

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Abstract

An 86-year-old male patient presented with urinary incontinence, fever, weakness, and hematuria. Investigations revealed benign prostatic hyperplasia (BPH) with multiple bladder stones and several stones in both the anterior and posterior urethra, without causing acute urinary retention (AUR). During the same session, endoscopic urethral stone treatment, open transvesical prostatectomy, and cystolithotomy were performed. Benign prostatic hyperplasia and urethral stones can lead to acute urinary retention. However, in this case, the patient did not develop acute urinary retention despite having both benign prostatic hyperplasia and multiple urethral stones at the same time. This case demonstrates that multiple causes of urinary obstruction may coexist without resulting in AUR. It also highlights the feasibility of combining different surgical techniques in treatment. Factors such as the concomitant comorbidities, stone and prostate size and location, condition of the patient, and duration of the symptoms must be considered to establish an appropriate treatment strategy.



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Introduction

Benign Prostatic Hyperplasia (BPH) is one of the most common causes of lower urinary tract symptoms in men, with its incidence increasing with age. It is diagnosed in approximately 30-40% of men during the fourth decade of life and its prevalence reaches nearly 70-80% in individuals over 80 years old [1]. BPH can lead to bladder outlet obstruction, resulting in urinary distension, bladder stones, and structural changes in the bladder and detrusor muscle, such as bladder diverticulum and detrusor instability. Bladder stones originating from BPH may migrate into the urethra, exacerbating lower urinary tract symptoms. Clinically, primary urethral stones are rarely seen, whereas secondary urethral stones are more common. Urethral stones are typically expelled with the urinary stream. However, in conditions where voiding function is impaired, such as neurogenic bladder, incomplete emptying can lead to urinary stasis. This may result in the formation of urethral stones, the accumulation of residual stone fragments in the

urethra, and consequently, hinder their expulsion [2]. In this study, we present a rare case of a patient with long-standing lower urinary tract symptoms, neurogenic bladder, a large prostate volume, and multiple stones in both the bladder and urethra, but without any symptoms related to urinary retention.

Case Presentation

An 86-year-old male patient presented to our clinic with intermittent hematuria, urinary incontinence, dribbling of urine, and complaints of fever and weakness over the past three days. His medical history revealed that he suffered from Alzheimer's disease and heart failure. The patient had a 15-year history of ongoing difficulty in urination despite medical treatment. He was advised to undergo prostate surgery at another center but refused the operation. Physical examination revealed a poor general condition and a fever of 38.5 °C, while other vital signs were normal. During inspection, the bladder appeared globular and dribbling incontinence was observed. An attempt to insert a catheter in a patient with overflow incontinence was unsuccessful because there was a stone in the penile urethra.

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Laboratory results showed a C-Reactive Protein (CRP) level of 175 mg/L and creatinine of 2.1 mg/dL, with urinalysis revealing abundant leukocytes. The patient was admitted after undergoing contrast-free abdominal CT and urine culture examinations. The urine culture revealed ESBL (+) *E. coli* growth. Imaging showed multiple stones from the urethra to the bladder. The prostate volume was

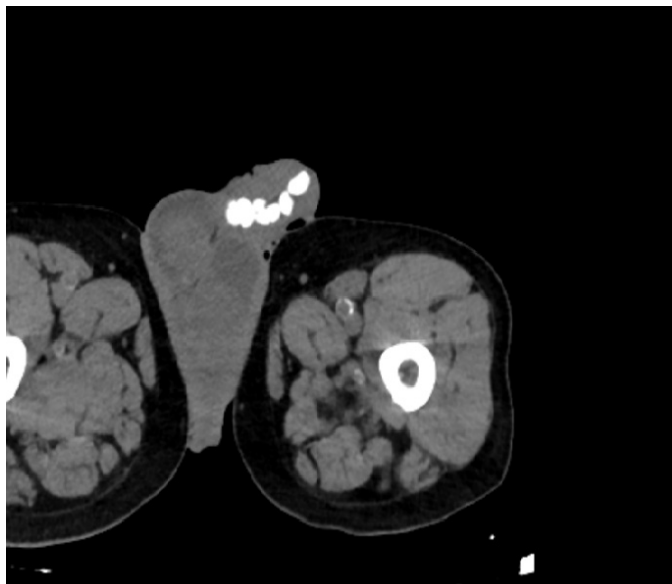


Figure 1. Stones in the anterior urethra.

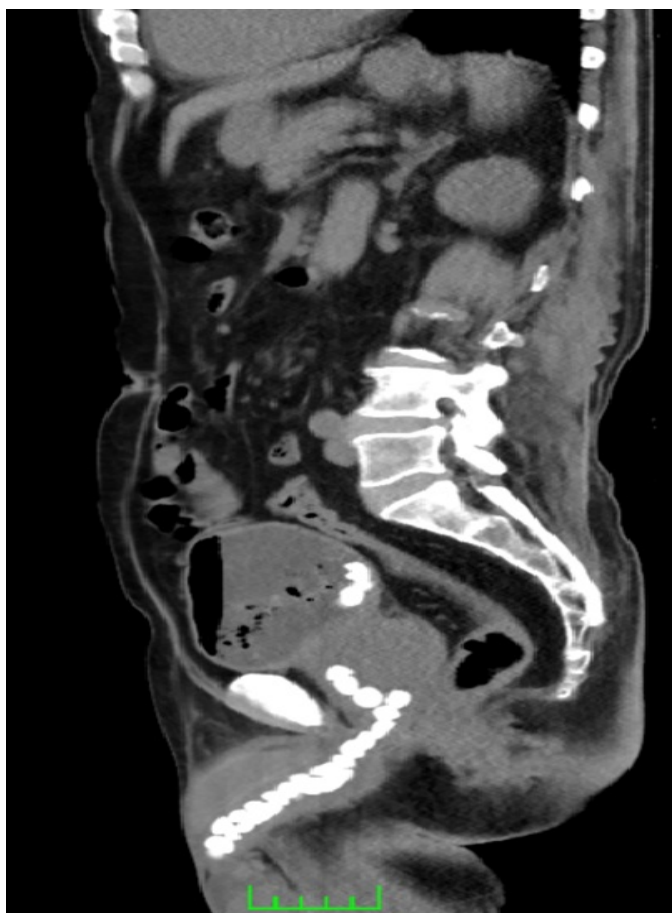


Figure 2. CT images of stones in the urethra and bladder. Abbreviations: CT: Computerized Tomography.



Figure 3. CT images of stones in the urethra and bladder. Abbreviations: CT: Computerized Tomography.



Figure 4. Post-operative imaging of the patient. No stones are observed, and the catheter balloon in the bladder is visible.

200 cm³, and there were advanced bladder trabeculations (Figures 1-3).

Despite the suspicion of neurogenic bladder, the presence

of hematuria, frequent urinary tract infection episodes, and multiple stones necessitated urological surgical intervention following the treatment of the infection. The patient was evaluated as high-risk for surgery during anesthesia preparations. Given the neurogenic component and comorbidities, the risks of surgery and high complication risks were explained to the patient. The patient consented to surgery, and meropenem 2x1 g IV antibiotic therapy was initiated by our infectious diseases department. The creatinine levels dropped to 1.4 mg/dL during the preoperative hospitalization period. After the urine culture results became negative, the patient was operated.

During the operation, cysto-urethroscopy was performed first, and stones from the penile urethra to the prostatic urethra were removed individually using foreign body forceps. Since the stones were appropriately sized, all were removed via cysto-urethroscopy without the need for internal urethrotomy. Subsequently, in the supine position with a transvesical approach, an open prostatectomy and cystolithotomy were performed. The removed prostate weighed 195 grams. The operation lasted 90 minutes, and no blood transfusion was needed. The patient had an uneventful postoperative course, with positive primary wound healing and no complications. Pathological examination confirmed BPH with chronic inflammation. On the 10th postoperative day, imaging showed no stones (Figure 4), and the catheter was removed while monitoring the patient's ability to urinate. For the patient unable to urinate unaided, a catheter was reinserted, and urodynamic testing confirmed the diagnosis of neurogenic bladder, after which clean intermittent catheterization was initiated. During routine follow-ups at six months, it was observed that symptoms such as hematuria, burning sensation during urination, and fever did not recur. Signed consent for this case report was obtained from the patient on April 13, 2022.

Discussion

Urethral stones are among the rarest types of urinary tract stones, presenting with a wide variety of clinical symptoms. "Patients may present with acute urinary retention, weak urinary stream, frequent urination, hematuria, urethral trauma, dysuria, a sensation of a mass in the penis, and pain in the peno-rectal or perineal regions [2]. Although urethral stones can emerge as primary stones, secondary urethral stones, which result from the migration of stones from the bladder, ureters, or kidneys into the urethra, are more common. In a study conducted by Koga et al. [3] showed that 32% of patients had stones located in different parts of the urinary system.

Most urethral stones are expelled spontaneously through the urethral lumen. However, a significant proportion of stones, particularly those located in the posterior urethra, fail to pass naturally. Various etiological factors contribute to the retention of these stones, including prior endo-urological procedures, neurogenic bladder, infections, foreign bodies, and structural abnormalities of the urethra [2,4]. In our case, the multiple stones that were present in the urethra were presumed to be retained due to neurogenic bladder.

The literature emphasizes the preference for minimally invasive methods in the treatment of urethral stones. Endoscopic techniques are frequently chosen due to their ability to evaluate the urethral anatomy thoroughly [5]. However, in cases involving large stones or associated urethral diverticula, open surgical approaches remain the preferred option. Open surgery carries risks such as high infection rates, urethral strictures, delayed wound, and urinary fistulas, which is why it is generally considered a last resort [5]. In our case, the presence of multiple stones from the penile to the posterior urethra made it difficult to push the stones towards the bladder. "Nevertheless, due to the small size of the stones and the absence of other urethral pathologies (such as urethral diverticula or strictures), the stones were successfully removed individually using foreign body forceps during cysto-urethroscopy without the need for an internal urethrotomy.

Benign Prostatic Hyperplasia (BPH) is one of the most common diseases in elderly men, characterized histopathologically by an increased number of epithelial and stromal cells in the periurethral region of the prostate [6]. BPH leads to bladder outlet obstruction, resulting in lower urinary tract symptoms. As the obstruction progresses, detrusor muscle dysfunction can develop. Initially, there is hypertrophy of the detrusor muscle and thickening of the bladder wall, which leads to reduced oxygen levels in the tissue and chronic ischemia. Although contractions initially increase to compensate, over time, detrusor function weakens, and the muscle enters a decompensated state. Even after the obstruction is relieved, detrusor function may not recover if the muscle has already entered the decompensated phase [7]. In our case, it is known that the patient had been experiencing lower urinary tract symptoms for many years and did not receive appropriate treatment due to comorbidities. The clinical presentation suggested deteriorated detrusor function. Although urodynamic studies are indicated preoperatively in patients with BPH-related lower urinary tract symptoms and impaired detrusor function, the presence of hematuria and persistent urinary tract infections due to stones necessitated surgical intervention.

Complications of BPH include acute urinary retention, recurrent macroscopic hematuria, recurrent urinary tract infections, renal insufficiency, and bladder stones. According to the European Association of Urology guidelines, bladder stones are considered a complication of BPH, and surgical treatment of BPH is strongly recommended in the presence of bladder stones [8]. Surgical treatment of symptomatic BPH can be categorized into three main approaches: 1) Minimally Invasive Surgical Therapies (MIST); 2) Simple prostatectomy; and 3) Transurethral procedures.

Currently, endoscopic procedures are the first choice for small to medium-sized prostates. Transurethral resection of the prostate (TURP) is considered the gold standard treatment for BPH. However, in large prostates exceeding 100-150 ml, endoscopic procedures are less preferred due to longer operative times, difficulties in controlling bleeding, and increased complication rates (such as urethral strictures). The surgical treatment of large prostates requires traditional open surgical enucleation via suprapubic and transvesical or retropubic approaches is recom-

mended. These methods are beneficial in patients with multiple bladder stones as they allow simultaneous intervention on the stones, making open simple prostatectomy a useful technique in such cases [9]. In our case, the patient had a prostate volume of 200 ml and multiple bladder stones, making open simple prostatectomy the most suitable option.

In recent years, less invasive alternatives such as laparoscopic and robot-assisted simple prostatectomy have been developed [10,11]. These approaches offer promising results with shorter postoperative duration of catheterization, reduced length of hospital stay, and lower complication rates compared to open surgery. However, open simple prostatectomy has advantages over laparoscopic and robot-assisted techniques, including broader intervention capabilities, direct tactile feedback, ease of intervention in emergencies, and lower costs. In our case, given our extensive experience with open simple prostatectomy in our clinic, we opted for open intervention.

Conclusion

Benign Prostatic Hyperplasia (BPH) and its complications pose significant health challenges for the aging male population. When not treated promptly and adequately, patients may develop severe complications such as detrusor failure, hematuria, and urinary tract infections. In this case presentation, we demonstrate the management of a patient presenting with these symptoms through combined endoscopic urethral stone treatment, transvesical open prostatectomy, and cystolithotomy. This case is extremely rare and underscores the importance of meticulous follow-up and well-planned surgical intervention. In complex cases with multiple comorbidities, it is essential to minimize operative times and prioritize less invasive methods while remaining prepared for open surgical intervention when necessary.

Conflict of Interest

The authors declare no conflict of interest.

Informed Consent

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

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None.

Author Contributions

Ahmet Alper Özdeş; writing- data collection. Rıdvan Cantürk; literature review- data collection. Necip Piriñçi; supervision.

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