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Giant Anterior Urethral Stone Complicated by Acute Urinary Retention and Bilateral Hydronephrosis: A Rare Case Report and Management Approach

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Abstract

Introduction: Urethral lithiasis is a less common urological pathology and accounts for about 0.3-2% of the urinary stones; this always occurs in conditions of anatomical or functional alterations of the urethra and might cause severe lower urinary tract symptoms, acute retention of urine, and serious complications.

Case Presentation: We report the case of a 59-year-old hypertensive male presenting with an 8-year history of progressive LUTS complicated by bilateral lumbar pain, intermittent hematuria, and acute urinary retention. In this case, physical examination and imaging showed a large (24 x 16-mm) urethral stone obstructing the penile urethra, severe hydronephrosis on both sides, a number of diverticula involving the bladder wall, and two small stones within the bladder. The acute urinary retention was relieved by emergency cystostomy, and definitive surgery consisted of urethrolithotomy via the perineal approach and endoscopic removal of the bladder stones. Bilateral double-J stents were placed to relieve the hydronephrosis. The postoperative recovery was uneventful, with complete normalization of renal function. Spectrophotometric analysis revealed the stone to be predominantly composed of calcium oxalate monohydrate, which helped in the institution of preventive measures such as dietary modifications, increased hydration, and alkalinization of urine.

Conclusion: This case highlights the difficulties of diagnosing and managing anterior urethral lithiasis, most especially large-size calculi complications. Early management, together with individual prophylaxis, ensures the avoidance of recurrences while preserving renal function.

Keywords: Urethral lithiasis; Penile urethra; Lower urinary symptoms; Urethrolithotomy; Hydronephrosis; Calcium oxalate stone; Bladder calculi; Urinary obstruction

Introduction

Urethral lithiasis is a rather rare pathology. It constitutes 0.3-2% of all urinary stones. Anatomical and functional urethra pathologies usually accompany urethral lithiasis [1-13]. These may be primary or secondary stones-those forming directly within the urethra or those forming elsewhere in the urinary tract that migrate downward to become stuck within the urethra [2]. Primary stones are usually associated with urinary stasis, often resulting from anatomical abnormalities such as urethral diverticula or strictures [3]. Clinically, the presentation of urethral lithiasis includes symptoms of LUTS: dysuria, acute urinary retention, hematuria, or pain localized in the perineum, penis, or groin [4]. Though diagnosis is usually made early for those cases presenting with underlying anomalies, it can also lead to recurrent urinary tract infections or, in severe conditions, complete

obstruction of urine. Major complications such as Fournier's gangrene or sepsis are rare but have been reported in advanced cases, particularly in the absence of prompt management [5]. However, in uncomplicated cases, rapid intervention, often via endoscopic procedures, provides effective resolution with favorable clinical outcomes [6]. We present the case of a 59-year-old male patient who presented to the emergency department with urethral lithiasis complicated by acute urinary retention, in the absence of signs of Fournier's gangrene or sepsis. This case illustrates the difficulty of diagnosis and treatment of this rare pathology and contributes to the literature regarding how to manage urethral calculi in non-complicated scenarios.

Case Presentation

History

A 59-year-old patient, hypertensive and on treatment, with no notable medical history, was admitted to the hospital with LUTS that had evolved over the past 8 years. These symptoms, both obstructive and irritative in nature, have recently been complicated, over the past 3 months, by bilateral non-febrile lumbar pain, intermittent hematuria, and the passage of stones. The patient also described a progressive decrease in urinary output, which culminated, one day before presentation, in an episode of acute urinary retention. These symptoms were often accompanied by painful symptoms in the penis, especially worsened after penetrative sexual intercourse, besides recurrent hematuria and urethral discharge. The patient is married and has maintained good penile erectile function, though he has often avoided sexual intercourse during this period due to the discomfort his symptoms have caused.

Examination Revealed

Afebrile male patient, pulse 88 beats per minute, blood pressure 140/90 mmHg, with bilateral tenderness in the lumbar region on palpation, without anorexia, fever, or rigors. The urinary bladder was palpable and distended painlessly to present acute retention of urine. On genital examination, a hard lesion was detected on the ventral surface of the penis, though there was no urethral discharge or local evidence of infection. The external genitalia did not present with any oedema or necrosis of the skin. No clinical evidence of sepsis or gangrene was present. To alleviate the pain, the insertion of a urinary catheter was tried. The procedure was unsuccessful in accommodating the catheter. The inability to place the catheter meant that the patient remained in discomfort

Investigations

FBC showed hemoglobin of 10.5 g/dl, leukocytosis of 16.2 x 10^9/L with 82% neutrophilia, and a platelet count of 245 x 10^9/L. The renal function tests showed impaired renal function with a blood urea of 22.5 mmol/L and an elevated creatinine of 620 µmol/L, along with hyponatremia, with a sodium of 125 mmol/L and hyperkalemia with a potassium of 5.3 mmol/L. Renal ultrasound showed bilateral hydronephrosis in the case of a full bladder.

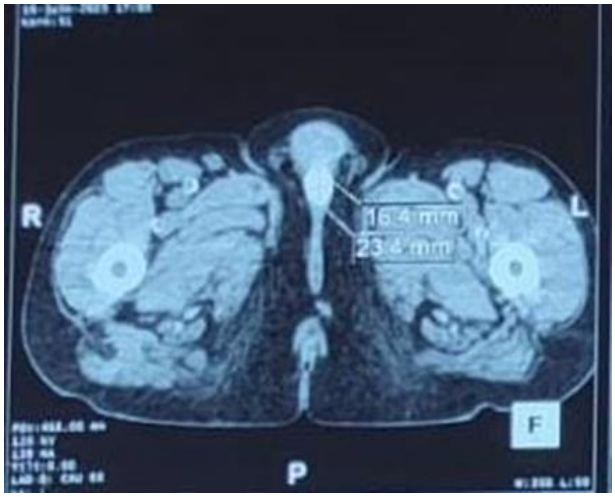

Figure 1: *Axial CT scan showing an anterior urethral stone measuring 23.4 mm x 16.4 mm, associated with obstructive features.*

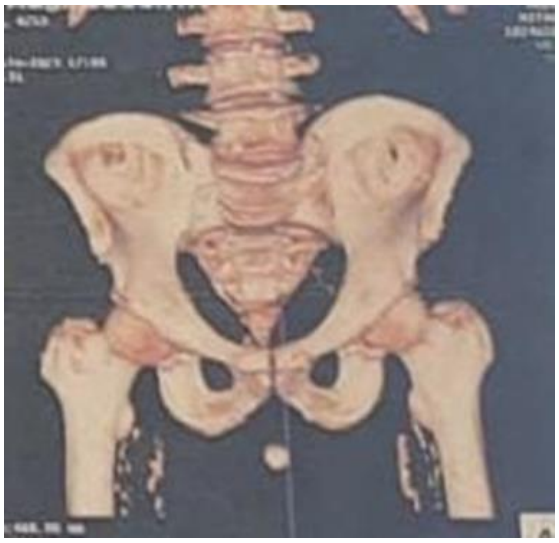

Figure 2: *3D CT reconstruction highlighting the location of the urethral stone in the penile urethra and its anatomical relationships.*

A cystostomy was performed to relieve the urinary retention, with good clinical and biological improvement and normalization of renal function. A delayed uro-CT scan showed a bladder with multiple diverticula secondary to long-standing obstruction and severe bilateral ureterohydronephrosis with moderate thinning of the renal parenchyma. It includes a diverticulum of the posterior-lateral wall that showed two small calculi: a 4 mm one and another one 3 mm in size. A big stone was also diagnosed in the penile urethra. Measuring 24 x 16 mm and density equivalent to calcium -1300 HU. The prostate itself presented calcification and

a total of 81gr. of weight (Figures 1-3). Following its clinical and biologic stabilization the patient underwent surgery, under general anesthetic end. A rigid urethroscopy identified a stone completely obstructing the penile urethra. Through a perineal incision, a urethrolithotomy was performed; the extraction of the intact stone, which measured 24 x 16 mm, was totally completed. A further cystoscopy showed the presence of two other small stones (4 and 3 mm in diameter), respectively, placed in a diverticulum of the right postero-lateral wall of the bladder; using endoscopic forceps, both were removed. Exploration of the upper urinary tract with bilateral ureteroscopy revealed severe bilateral hydronephrosis with no further mechanical obstruction. Bilateral double-J stents were placed to facilitate urinary drainage and decrease renal hydrostatic pressure (Figure 4).

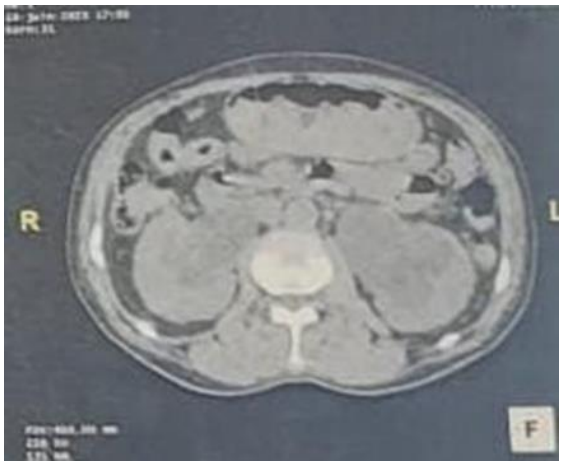

Figure 3: *Axial CT scan showing bilateral hydronephrosis secondary to prolonged urinary obstruction.*

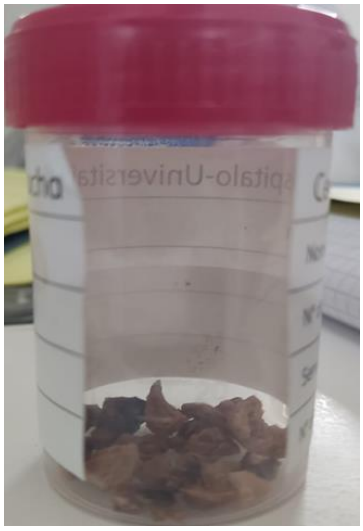

Figure 4: *Photograph of the extracted stone fragments following urethrolithotomy.*

While an enlarged prostate (81 g) was identified, no transurethral resection was immediately performed, and he was medically managed with tamsulosin, pending possible delayed surgical intervention. A urinary catheter was then placed to ensure proper drainage, whereas the cystostomy was maintained temporarily as an adjunctive measure for drainage. An appropriate antibiotic therapy regimen was continued in the postoperative period to prevent infection and maintain close monitoring of renal function. The postoperative period was uneventful, with full recovery of urinary function along with biological normalization. Five months later, he underwent a transurethral resection of the prostate with a normal PSA. Histopathological examination showed adenomyofibroma with no evidence of malignancy. Spectrophotometric analysis of the calculus revealed the main component of 89% calcium oxalate monohydrate (whewellite) with a minor component of 11% calcium phosphate (hydroxyapatite). Based on these findings, preventive recommendations were established to avoid recurrence. The dietary measures included restriction of oxalate-rich foods such as spinach, rhubarb, beets, and chocolate, limitation of salt intake in order to reduce urinary calcium excretion. The adequate hydration was considered imperative, with the intake of more than 2 liters of water a day to assure the dilution of the urine and the reduction in concentration of lithogenic substances. In addition, medical treatment to mildly alkalinize the urine with urinary alkalinizers, like potassium citrate, was recommended to raise the pH of the urine and thus prevent crystallization of the calcium oxalate. All these procedures taken together, together with follow-up care regularly, constitute appropriate treatment for calculi prevention as well as for maintaining renal function.

Discussion

Urethral lithiasis is a rare condition that poses important clinical and therapeutic challenges. Since urethral calculi account for only 0.3-2% of all urinary stones, they are often associated with anatomical or functional abnormalities such as urethral strictures, diverticula, or chronic urinary stasis [7]. The case described here underlines the diagnostic and therapeutic challenge of a big urethral stone causing acute urinary retention that required surgical intervention. From a clinical viewpoint, this patient's presentation of LUTS, hematuria, and penile pain evolving over several years is typical for the symptomatology of urethral stones. Acute urinary retention, as in this case, is a well-documented complication, especially in the case of complete obstruction of the urethral lumen by the stone [8]. This reflects systemic manifestations of protracted urinary obstruction and associated hydronephrosis with a rise in renal markers, indicating the urgency for timely intervention to prevent irreversible renal damage. Imaging was an essential modality during the work-up. The findings of bilateral hydronephrosis, bladder diverticula, and a large-sized urethral stone of dimensions 24 x 16 mm on uro-CT suggested chronic obstructive uropathy. Bladder diverticula are usually indicative of elevated intravesical pressure with chronic

obstruction. This can eventually lead to the formation of stones due to stasis of urine with crystal precipitation [9].

Large and obstructive urethral calculi need a surgical approach. In the case presented herein, urethrolithotomy through a perineal incision allowed removal of the calculus; cystoscopy and ureteroscopy enabled the retrieval of other calculi in the bladder and bilateral placement of double-J stents to relieve hydronephrosis. This combined approach was considered necessary as multiple stones along with significant abnormalities were noted in this patient, per the literature [10]. Spectrophotometric analysis of the stone revealed that it was predominantly composed of calcium oxalate monohydrate (whewellite) with a minor component of calcium phosphate (hydroxyapatite). This composition is typical for metabolic lithogenic factors such as hyperoxaluria and hypercalciuria and underlines the importance of targeted prevention. The measures proposed, namely dietary oxalate reduction, adequate hydration, and urinary alkalinization with potassium citrate, are in line with the guidelines on prevention of calcium oxalate stones [11]. Here, an empirical and, at the same time, clinically pragmatic approach included the decision for a delay to TURP against the continuation with medical management under tamsulosin, the immediate obstruction thereby being addressed along with postponement of BPH surgery. Histopathology revealing adenomyofibroma, clear of malignancy, further stamps the benign core of the described condition, quite in tune with similar reports as represented in the literature [12].

Conclusion

In other words, this case emphasizes a multidisciplinary approach in the management of urethral lithiasis, considering both the immediate obstruction and prevention of recurrence. The good clinical outcome described for this patient points out the role of timely surgical intervention associated with tailored preventive measures. Further studies might shed light on the long-term outcomes of similar management strategies, especially for large and complex urethral stones.

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