Case Report

Tailored surgical management of a giant calculus in urethral diverticulum following post-hypospadias repair

Abhishek Saini[1], Hemant Kumar Goel[2], Umesh Sharma[3], Anoop Yadav[1], Dhirendra Singh[1]

From [1]Senior Resident, [2]Professor and Head, [3]Professor, Department of Urology, Atal Bihari Vajpayee Institute of Medical Sciences and Dr. RML Hospital, New Delhi, India

ABSTRACT

Giant urethral calculi are rare, particularly within diverticula arising as late complications of hypospadias repair. We report a 30-year-old male with prior childhood hypospadias surgery who presented with a 2-year history of dysuria and lower urinary tract symptoms. Examination revealed a hard mass along the penile urethra, and imaging confirmed a 6×2 cm calculus within an anterior urethral diverticulum. After managing an associated urinary tract infection, the patient underwent Stage I Johansson's urethroplasty with longitudinal incision, stone extraction, and diverticulectomy. Recovery was uneventful, with Stage II urethroplasty planned. This case highlights the importance of a tailored surgical approach addressing stone burden and anatomical anomalies, which is crucial for successful long-term outcomes.

Key words: Hypospadias repair, Urethral calculus, Urethral diverticulum, Urethroplasty

Urethral stones are an infrequent manifestation of urolithiasis, with most calculi generally identified in the upper urinary tract or bladder. When stones are located in the urethra, they are often associated with underlying structural abnormalities, prior infections, or a history of urological interventions. Urethral calculi account for <1% (0.3%) of all urinary tract calculi, with male urethral diverticula being more likely to contain stones than female counterparts [1]. The formation of calculi in urethral diverticula occurs in about 4–10% of cases, and these calculi predominantly affect the posterior urethra [1]. Cases involving giant urethral calculi are exceedingly rare and are usually reported in individuals with conditions such as urethral diverticula or those who have undergone procedures like hypospadias repair [2,3].

Reporting this case is important as giant calculi within a urethral diverticulum after hypospadias repair are extremely rare, especially with a stone size this large. Such cases highlight challenges in diagnosis and surgical reconstruction, making this report valuable for urologists encountering similar complexities.

CASE PRESENTATION

A 30-year-old male was referred to the Urology department with a 2-year history of lower urinary tract symptoms (LUTS), including dysuria, decreased urinary stream, straining during micturition, and increased frequency of urination.

General examination revealed an afebrile male (temperature: 98.6°F), pulse 88/min, and blood pressure 120/76 mmHg. He appeared moderately nourished with no evidence of pallor or lymphadenopathy. His past medical history included hypospadias repair at the age of 8. On physical examination, findings included penile edema, a narrowed external urethral meatus located subcoronally, and a firm, indurated mass palpable along the ventral surface of the penis. Both testes were palpable in the scrotum and were non-tender.

The patient was initially diagnosed with a urinary tract infection and started on antibiotic therapy. Subsequent plain radiography of the kidneys, ureters, and bladder (KUB) demonstrated a sizable calculus located in the anterior urethra (Fig. 1). Further imaging with non-contrast computed tomography KUB confirmed a 6×2 cm stone within the penile urethra, with no abnormalities in the bilateral upper tracts or urinary bladder, consistent with a diverticulum containing the calculus. In view of the sizeable diverticular calculus, the patient was planned for suprapubic catheterization (SPC), with the anticipation that a staged urethroplasty could be necessary. Following SPC insertion, a micturating cystourethrogram was performed to evaluate the posterior urethra. However, due to pain and patient discomfort, contrast filling could not exceed 40 mL, and the procedure was abandoned. In

Access this article online	
Received - 17 August 2025 Initial Review - 03 September 2025 Accepted - 29 September 2025	Quick Response code
DOI: ***	

Correspondence to: Abhishek Saini, Atal Bihari Vajpayee Institute of Medical Sciences and Dr. RML Hospital, New Delhi, India. E-mail: abhishek5500@gmail.com

addition, X-ray KUB revealed a giant urethral calculus (Fig. 1).

Following counseling, the patient opted for urethroplasty and was scheduled for Stage I Johansson's Urethroplasty and stone retrieval. The patient was initiated on intravenous Ceftriaxone 1 g twice daily for 5 days, based on urine culture and sensitivity, with clinical improvement. The pre-operative picture was shown (Fig. 2a). After induction of regional anesthesia and sterile preparation, a longitudinal penile skin and urethral incision was made over the ventral aspect, exposing the diverticulum and calculus. The 5×1.5 cm stone was extracted in Toto (Fig. 2b and c); meticulous dissection and complete excision of the diverticular sac were performed. Edges of the healthy urethra were sutured to the skin for epithelial healing (Johansson's Stage I). Proximal urethrostomy was created, and a 16 Fr Foley catheter was left *in situ*. Stage I Urethroplasty involves opening the urethral plate and suturing it to the penile skin, allowing healing and preparation for the second stage, which aims to reconstruct a tube with a buccal or skin graft after adequate healing. In this patient, a staged approach provides optimal management by first removing the stone and diverticulum, allowing resolution of inflammation and providing healthy tissue for later urethral reconstruction [4]. This is standard in cases with tissue loss or poor local conditions after failed hypospadias surgery [5].

The post-operative course was uneventful, with the patient experiencing no complications following catheter removal. At 3 months postoperatively, the patient had no fever or recurrence of symptoms. Uroflowmetry demonstrated a maximum flow rate (Qmax) of 21 mL/s. The patient is scheduled for second-stage urethroplasty at 6 months.

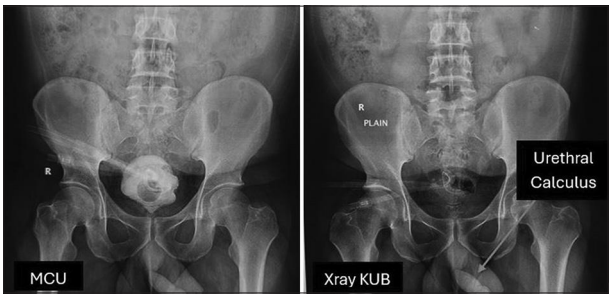

Figure 1: Micturating cystourethrogram and X-ray kidneys, ureters, and bladder demonstrating giant urethral calculus

DISCUSSION

Urethral stones are an uncommon form of urolithiasis, representing a minimal proportion of all urinary tract calculi. They are most often secondary to underlying obstructive conditions or chronic infections [1]. The occurrence of giant urethral stones is exceptionally uncommon. In patients with a history of hypospadias repair, anatomical deviations and tissue changes may predispose to diverticulum formation, leading to chronic stasis and calculi development [2]. Literature suggests that between 4% and 10% of patients with urethral diverticula may develop calculi, typically due to chronic urinary stasis [3,6]. Post-operative diverticula develop in about 10–15% of individuals following hypospadias repair, with a higher incidence linked to more severe primary defects. Most patients with diverticula tend to have perineal or proximal anatomical abnormalities [4,6].

In this case, a 30-year-old male presented with voiding LUTS and was found to have a giant calculus lodged in the anterior urethra. The structural alterations observed in this case are likely attributable to the patient's history of hypospadias repair. The diverticulum wall, lacking both a muscular layer and surrounding cavernous tissue, exhibits inherent structural weakness [7]. This leads to the formation of a thin-walled sac filled with urine that relies on external compression for drainage. The absence of contractile function in the diverticulum wall leads to urinary stasis, which predisposes to recurrent infections and calculus formation [6,8].

Minor, asymptomatic diverticula may be effectively managed through manual compression of the urethra following voiding to facilitate complete drainage. Cases involving large diverticula, significant stone burden, or a complex history of prior surgeries often necessitate surgical reconstruction for effective management. Smaller diverticula (typically <4 cm) are often managed via excision with primary closure, whereas larger or complex cases may necessitate substitution

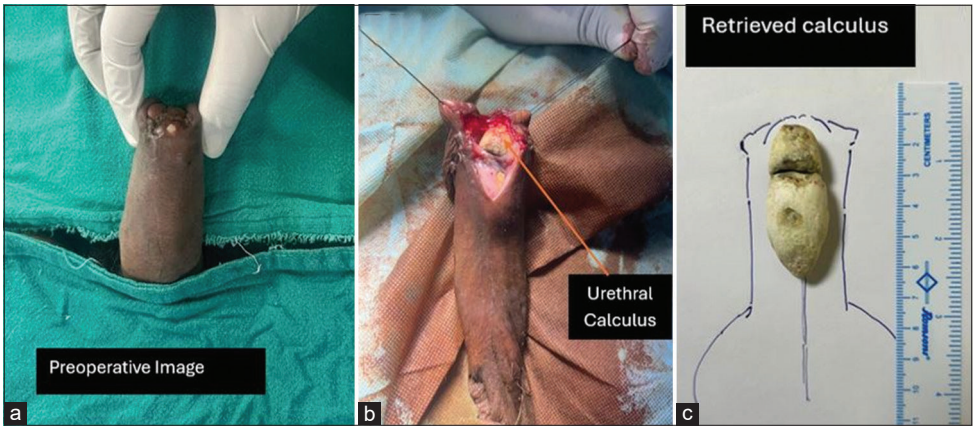

Figure 2: (a) Pre-operative image, (b) Intraoperative picture during Stage I Johansson's urethroplasty; and (c) demonstrating urethral calculus after retrieval

urethroplasty using grafts. Given that most male urethral diverticula are secondary to previous surgical or medical interventions, reconstructive surgery in these cases tends to be more complex and is associated with a higher risk of complications compared to isolated urethral stricture repairs. In addition, diverticula are often associated with scar tissue and fibrosis, complicating repairs due to larger tissue defects [9].

Surgical management is the primary treatment for such cases, especially for a large calculi burden [10]. Our management involved urethroplasty combined with stone extraction, consistent with established guidelines that advocate for a definitive surgical approach in cases of substantial stone burden. Alternative modalities, including pneumatic and ultrasonic lithotripsy, have also been described in the literature, particularly for managing large calculi. However, open or endoscopic surgery with direct extraction remains the most effective, particularly when dealing with anatomically challenging cases [9,11].

Individuals with diverticula or strictures following hypospadias repair often require long-term monitoring, as disrupted urinary flow and increased intraluminal pressure in these regions can lead to recurrent calculus formation [12]. Post-operative follow-up indicates that individualized surgical strategies targeting the underlying anatomical defect can lead to positive clinical outcomes.

CONCLUSION

The presence of a giant urethral calculus in males with a history of hypospadias repair represents a distinct and complex clinical scenario, necessitating early diagnosis and appropriately planned surgical intervention. This case underscores the need for a high index of suspicion in patients with recurrent LUTS and a surgical history of hypospadias.

ACKNOWLEDGMENT

We are grateful to the Department of Urology and Renal Transplant, ABVIMS, and Dr. RML Hospital for providing the necessary resources and technical support for data collection.

REFERENCES

1. Mohanty D, Garg P, Jain B, Bhatt S. Male urethral diverticulum having multiple stones. Ann Med Health Sci Res 2014;4(Suppl 1):S53-5.
2. Giannakis I, Kaltsas A, Takenaka A, Sofikitis N, Zachariou A. Urethral diverticulum with stone formation in an adult male after hypospadias repair: A case presentation. Urol Case Rep 2023;51:102624.
3. Gadimaliyev E. Urethral diverticulum calculi in a male: A case report. Case Rep Urol 2013;2013:437106.
4. Griggs-Demmin A, Patel S, Faisal F, Saoud C, Salimian K, Cohen A. Acquired male urethral diverticulum complicated by calculi: A case report. Urol Case Rep 2021;39:101837.
5. Sun M, Xu W, Guo S, Ma W, Xu H, Sun R. Giant urethral calculus in anterior urethral diverticulum: A case report. BMC Urol 2019;19:71.
6. Thakur N, Sabale VP, Mane D, Mullay A. Male urethral diverticulum uncommon entity: Our experience. Urol Ann 2016;8:478-82.
7. Kaczmarek K, Gołąb A, Soczawa M, Słojewski M. Urethral stone of unexpected size: Case report and short literature review. Open Med (Wars) 2016;11:7-10.
8. Geavlete P, Mulțescu R, Georgescu D, Geavlete B. Treatment of urethral lithiasis and foreign bodies. In: Endoscopic Diagnosis and Treatment in Urethral Pathology. United States: Academic Press; 2016. p. 105-27.
9. Venkatanarasimha N, Freeman SJ, Dubbins PA. Posterior urethral diverticulum on transrectal sonography. J Ultrasound Med 2009;28:827-9.
10. Demir O, Kefi A, Cahangirov A, Cihan A, Obuz F, Esen AA, *et al*. The giant calculus within the prostatic urethra. Urol Res 2011;39:319-21.
11. Putra AF, Sugianto R, Zhafirrahman M, Muhamad, Tirtayasa PM. A 25-year neglected giant anterior urethral stone associated with urethral diverticulum and urethrocutaneous fistula: A case report. Int J Surg Case Rep 2025;127:110972.
12. Gu Y, Dai Z, Song L. Giant anterior urethral diverticulum with posterior urethral false passage masquerading as incontinence after pelvic fracture urethral injury: A case report. BMC Urol 2025;25:194.

Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Saini A, Goel HK, Sharma U, Yadav A, Singh D. Tailored surgical management of a giant calculus in urethral diverticulum following post-hypospadias repair. Indian J Case Reports. 2025; October 15 [Epub ahead of print].