Title: Urethral Lithiasis After Urethroplasty

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1. Abstract

Objective

To present a rare complication of urethral lithiasis with hair inclusion occurring after urethroplasty, and to underline the importance of long-term follow-up and preventive strategies in post-urethroplasty patients.

Materials and Methods

A 75-year-old male with prior urethral trauma and urethroplasty presented with persistent lower urinary tract symptoms (LUTS) and recurrent urinary tract infections (UTIs). Imaging and endoscopic evaluation identified a urethral stricture, a urethral diverticulum, and radiopaque calculi. The patient underwent laser lithotripsy, stone extraction and Canoxidin treatment.

Results

Endoscopic removal of the stones, which were embedded in hair filaments, resulted in symptomatic improvement. The adjunctive use of Canoxidin was initiated to reduce bacterial colonization and prevent recurrence.

Conclusion

Tricholithiasis (hair-containing stones) within a urethral diverticulum is a rare but clinically relevant complication post urethroplasty. This case emphasizes the need for meticulous surgical technique, awareness of hair-bearing grafts or skin flaps, and long-term surveillance of reconstructive urethral

patients. Further research should aim to define optimal prevention and management strategies for urethral lithiasis in this context.

2. Introduction

Urethroplasty is the gold standard for urethral stricture management, with high success rates. However, complications such as stricture recurrence, diverticulum formation, and stone formation can occur. We present the case of a 75-year-old male with a history of urethral trauma requiring urethroplasty, who developed urethral stones with hair inclusion. The patient had longstanding lower urinary tract symptoms (LUTS) and recurrent urinary tract infections (UTIs). Diagnostic studies revealed urethral stricture with diverticula and lithiasis. Endoscopic intervention confirmed the presence of hair-containing calculi, necessitating surgical removal and developing strategies for preventing lithiasis formation.

3. Clinical Case Description

a. Patient Information

A 75-year-old male ex- smoker, with a medical history of hypertension, glaucoma, seborrheic keratosis and sustained urethral trauma in 1971, requiring urethroplasty**.**

<u>Urological History</u>

In 1971, he suffered urethral trauma from a horse fall, leading to ICU admission and urethroplasty via a Pfannenstiel approach. Surgical records indicate the use of a skin graft for urethral reconstruction. In 2012, he developed lower urinary tract symptoms (LUTS) and recurrent urinary tract infections (UTIs), requiring urological follow-up. In 2014, urethrocystography revealed narrowing of the prostatic urethra and a small diverticulum in the penile urethra (Figure 1). By 2023, his symptoms worsened, with increased difficulty urinating and an intermittent urinary stream.

Figure 1. *Retrograde urethrocystography*

b. Diagnosis

- **Urine Analysis:** Mild leukocyturia, no significant hematuria, normal pH
- **PSA monitoring:** Stable levels (range: 1.5–3.6 ng/mL)
- **Fluoroscopy & Imaging:**
    - Flexible urethrocystoscopy: Narrow annular stricture at 3-4 cm from the meatus, preventing cystoscope passage
    - Urethrocystography: Persistent stricture, diverticulum with small radio-opaque calculus.

c. Treatment

The patient underwent dilation of the urethral stricture (Figure 2) but continued to experience urinary symptoms, necessitating further intervention.

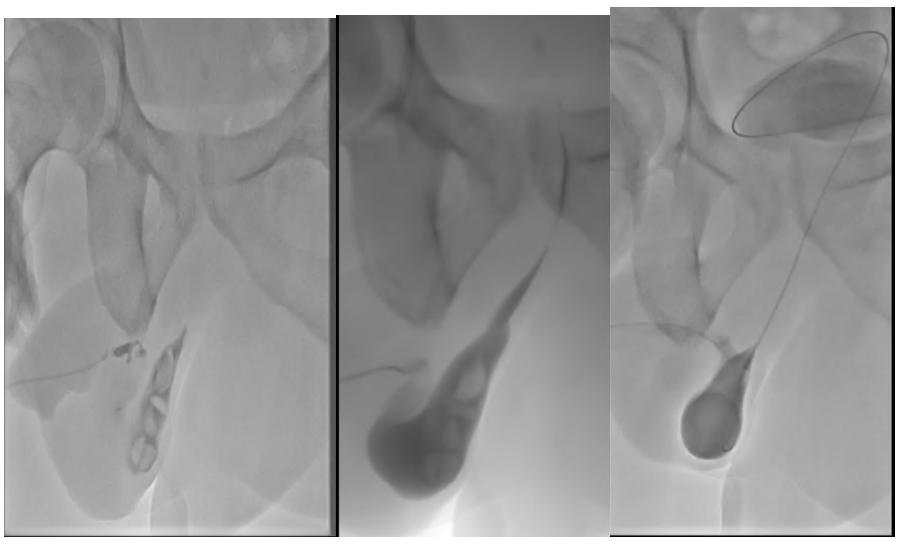

Figure 2. *Dilation of urethral stricture*

Laser lithotripsy and stone extraction were performed, revealing multiple stones embedded within hair in the bulbar urethra. The prostate was bilobed but non-obstructive, and the bladder exhibited good capacity without lesions.
Initial attempts to extract the stones with foreign body forceps and a dormia basket were unsuccessful, necessitating laser fragmentation.
Due to persistent micturition symptoms and the presence of a new urethral stone seen on cystoscopy, the patient underwent urethrotomy, urethrolithotripsy, and cystolithotripsy with laser. A urethrotome was passed to open the penile stricture. The procedure continued to the bulbar urethra, where a stone embedded in a hair matrix was fragmented with laser and extracted for analysis (Figure 3).

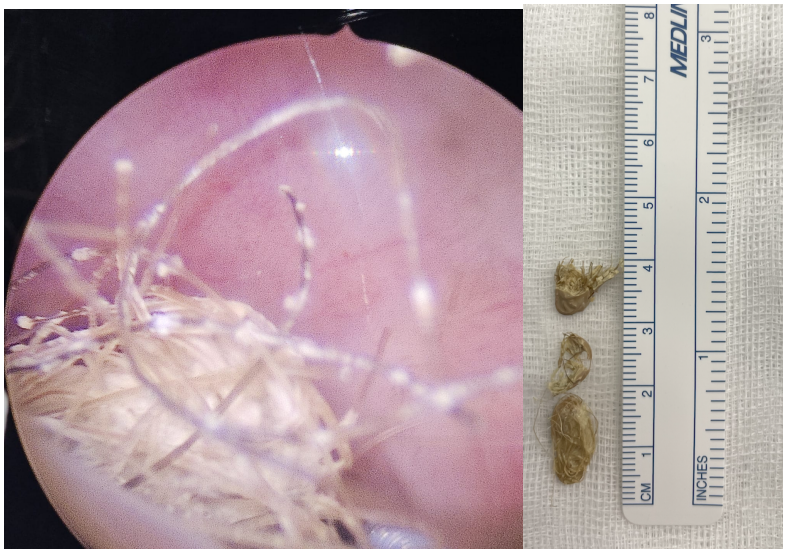

Figure 3. *Tricholithiasis*

Stone analysis revealed a struvite composition, with a concomitant urinary pH of 5. At this stage, conservative management was initiated, including regular follow-up and prescription of Canoxidin (1 tablet every 8 hours).

d. Evolution and Progress

Evolution / Follow-up

- **1st revision (1 month post-op; on Canoxidin)**
  Symptoms: asymptomatic
  Stone composition: struvite (magnesium ammonium phosphate)
  Plan: continue Canoxidin + antibiotics + cystoscopy

- **2nd revision (2 months post-op; on Canoxidin)**
  Symptoms: asymptomatic
  Urinalysis: Clear, pH 5.0 (ref range 5.5–7.0), density 1007 g/L, proteins neg, glucose neg, nitrites neg, leukocytes neg, hematuria neg
  Cystoscopy: Penile urethra normal, urethroplasty bed without calculi, abundant hair follicles; bladder unremarkable
  Plan: continue Canoxidin + flowmetry + control cystoscopy

- **3rd revision (6 month post-op; on Canoxidin)**
  Symptoms: asymptomatic
  Flowmetry: voided volume 199 mL, maximum flow 15.4 mL/s, post-void residual 0 mL
  Cystoscopy: Penile urethra with bends; a stenotic ring at the graft entry requiring dilation (using self-lubricating dilators up to 18 Ch held for 15 min, current calibre 15 Ch). Complete cystoscopy beyond stenosis: urethroplasty bed shows hair and a 3 mm lithiasis; external sphincter and prostate normal; bladder of good aspect and capacity without structural changes.

4. Discussion

Urethral diverticula after urethroplasty may create a site of urinary stasis, predisposing to stone formation. Hair-bearing grafts or skin flaps used in reconstructive urethral surgery may act as a nidus for crystallisation and stone growth — a mechanism recognised in the literature. Hair-containing urethral stones (tricholithiasis) are extremely rare. Endoscopic removal remains the method of choice, but recurrent cases may demand open surgical revision. Preventive strategies should include: meticulous surgical technique (ensuring no hair-bearing tissue is left exposed into the lumen), long-term postoperative surveillance (including periodic cystoscopy and flow studies), and adjunctive measures to reduce infection and stone recurrence. In our case, the use of Canoxidin (containing L-methionine, phytate, theobromine) was deployed to acidify urine, inhibit crystal formation, and ameliorate urinary flow and inflammation. Although literature on Canoxidin in this specific setting is limited, its rationale is consistent: L-methionine leads to urine acidification (helpful against phosphate/struvite stones), phytate binds calcium and inhibits crystallisation, and theobromine may improve urine flow and reduce inflammation. We consider this a plausible adjunct, but acknowledge the need for prospective evidence.

5. Conclusions and Recommendation

Post-urethroplasty urethral lithiasis is an uncommon but clinically significant complication, particularly when hair-containing stones are involved. In patients with urethral diverticula (especially after reconstructive procedures), regular monitoring is essential for early detection of complications. Preventive measures — including attention to surgical technique, long-term follow-up with cystoscopy and flowmetry, and adjunctive therapies such as Canoxidin — may reduce recurrence risk and improve outcomes. Further research (ideally multicentre and prospective) is needed to define optimal preventive protocols in this subgroup.

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