

Impacted urethral stones in an eleven years old girl: A case report

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Abstract

Although urolithiasis is relatively common, urethral stones are rare, with an incidence of less than 0.3%. They are particularly uncommon in children, occurring 20 times less frequently than in adults, and are rarely seen in females as compared to males. The presence of an obstructing urethral stone resulting in acute urinary retention constitutes a urological emergency and requires immediate intervention. We present an unusual case of impacted urethral stones in a female child who presented to the Paediatric surgery emergency department at Mayo hospital, Lahore on 22nd October 2024. The diagnosis was established based on clinical history and examination, and the stones were retrieved under general anaesthesia. Further evaluation identified no underlying metabolic or anatomical abnormalities, suggesting that the stones originated from the primary urinary source. This case underscores the importance of considering urethral stones in the differential diagnosis of paediatric urinary tract obstruction, despite its rarity.

Keywords: Female urethral calculi, acute urinary retention, urologic emergency.

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Introduction

Acute urinary retention is a common condition encountered in urological practice which may be caused by impacted Urethral stones. These rarely occur in females due to several anatomical and physiological factors, including a shorter and wider urethra, a lower incidence of urethral strictures, and the protective effects of estrogen against stone formation.¹ In paediatric patients, urinary stones typically form in kidneys or bladder with urethral involvement being extremely rare. When present, urethral stones often originate from migrated calculi or from underlying issues like infections or foreign bodies.² The majority of urethral calculi are

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usually calcium oxalate (85%).³

Diagnosing a urethral stone can be challenging due to nonspecific symptoms and the limitations of imaging modalities, which may not always include the entire lower urinary tract. Failure to diagnose an impacted urethral stone can result in long term urethral damage, incontinence and renal insufficiency. Therefore it is crucial to have a comprehensive understanding of urethral stones to facilitate accurate diagnosis and management. We report a rare and unusual case of impacted urethral stones in a female child contributing to the limited existing literature in this unusual condition.

Case Report

An eleven years old female child presented to the emergency department of paediatric surgery Mayo hospital Lahore, on 22nd October 2024 with complaints of urinary retention and suprapubic pain for one day. There was a history of intermittent dysuria and bilateral flank pain for the past three years. She had also started passing stones per urethra, and for the last two months, she had developed urinary incontinence. On examination, the bladder was palpable and a stone-like structure was visible at the urethral meatus with purulent discharge (Fig 1a). The patient was irritable and non-cooperative; therefore, we planned an examination under anaesthesia after initiating intravenous fluids, antibiotics, and analgesia. Examination under anaesthesia showed huge dilated urethra with multiple impacted urethral stones of around 3-4 cm, which were retrieved (Fig 1b). The patient was catheterized and admitted to the ward for further evaluation. Her ultrasound showed right kidney measuring 8.5 x 3.3 cm, echogenic texture, hydronephrosis with proximal hydroureter, debris in pelvicalyceal system and the left kidney measured 9 x 3.2 cm, echogenic texture, hydronephrosis with hydroureter upto middle part, clumped debris with calcific foci in pelvicalyceal system and bladder showed debris with multiple calcific foci. All baselines laboratory investigations were within normal range. Serum calcium was 8.1mg/dL (Normal:8.5-10.5mg/dL), serum magnesium 2.2mg/dL (Normal:1.8-2.4mg/dL) and spot urine calcium was 18mg/dL (Normal: 100 – 300mg/dL). Urine examination showed a pH of 5.5 (Normal:4.5-8), specific gravity of 1.025, pus cells 50+, red blood cells 3-5

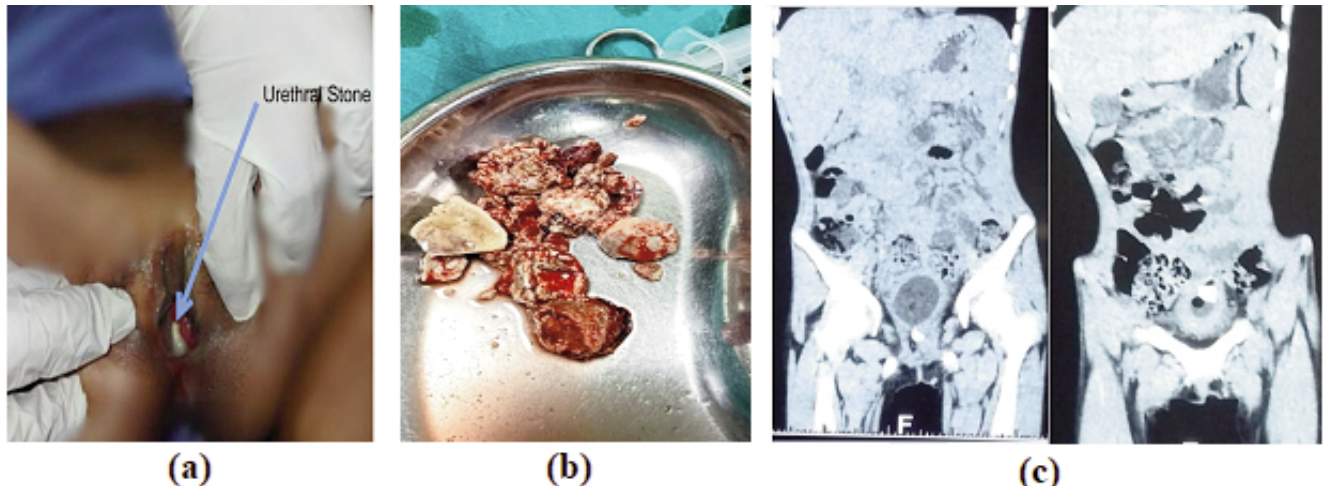


Figure-1: (a) Urethral stone (b) Extracted urethral stones (c) CT scan of the patient showing stone in bladder

and epithelial cells 0-2. Stone analysis report revealed a composition of 70% calcium oxalate and 30% calcium phosphate. Voiding cystourethrogram was done which showed bilateral grade 2 vesicoureteric reflux, few filling defects in the bladder and a wide urethra. Cystoscopy performed on 28th October revealed no stones in the urinary bladder but significant debris, hugely dilated urethra with purulent urine dribbling from it, no urethral diverticulum, multiple mucosal tags at the vulva and common wall of urethra and vagina was partially eroded. The urethral caliber in repeat EUA showed some improvement. The patient was kept on bladder irrigation to clear the debris and continued on antibiotic therapy.

Discussion

Urethral stones are relatively rare, comprising about 1% of all urinary tract stones. The incidence has been documented at a frequency of 7 per 100,000, with a notable male predominance and a male to female ratio of approximately 13:1.⁴ These can be categorized into two types: primary/native and secondary/migrant. Native calculi form due to urinary stasis and infection, often resulting from pre-existing urethral abnormalities such as diverticula, neurogenic bladder and foreign bodies. In contrast, migrant calculi, the more common type, originate in the kidney or bladder and migrate to the urethra.⁵ The manifestation of symptoms in patients with urethral calculi is influenced by multiple factors, including its anatomical location, quantity, dimensions and configuration resulting in a wide range of symptoms such as acute urinary retention, perineal discomfort, haematuria, irritative voiding symptoms, urethral pain and palpable urethral mass.⁶ Diagnosis is typically confirmed through abdominal and pelvic radiography and retrograde urethrogram.⁷ Additional imaging

modalities such as computed tomography (CT) scan provides further anatomical details and insights into upper urinary tract, aiding in diagnosis and treatment. If left untreated, urethral calculi may lead to complications such as urethral diverticulum, abscess, fistula and urinary incontinence.^{8,9} The approach to treating urethral stones is influenced by various factors including its location, size, presence of other structural anomalies and available resources. In resource limited settings treatment options include retrograde manipulation, cystolithotomy, extraction using 2% lidocaine gel and external urethrotomy. In contrast, developed countries offer additional modalities such as Holmium laser lithotripsy, ultrasound fragmentation and extracorporeal shockwave lithotripsy.¹⁰ Performing in situ lithotripsy on an impacted stone is a feasible approach but it carries a risk of urethral injury, particularly when using electro hydraulic and pneumatic lithotripters, whereas the risk is significantly lower with laser lithotripsy.¹ Urethrolithotomy remains an appropriate option for impacted urethral stones in males.¹⁰ However, in females the urethral sphincter's location, surrounding the urethra at its middle third, poses a risk of urinary incontinence due to potential damage to the external urethral sphincter resulting from urethrolithotomy or meatotomy.¹ In this particular case, the diagnosis was made clinically based on child's presentation of acute urinary retention, palpable urethral mass and external meatal pain. The stone's location at the external urethral meatus made extraction following lubrication with 2% lidocaine gel a viable treatment option in this case. The procedure was performed under general anaesthesia. Given the patient's timely presentation and the characteristics of the stone, this approach was successful and represented the most appropriate choice.

Written consent was provided by patient's parents for publishing the case.

Conclusion

Impacted urethral stones in female children are rare and may present with urinary retention. Delay in seeking medical help can lead to complications like urinary incontinence, obstructive uropathy, recurrent urinary tract infection and renal function impairment. Prompt diagnosis and timely intervention are essential to prevent these complications.

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AUTHOR'S CONTRIBUTION:

MNUH: Writing, editing, literature review, gathered relevant information and revision.

Concept, design, writing and editing.

AY: Writing and editing.

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