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Periurethral urinoma mimicking scrotal cellulitis in a child: an unusual presentation of congenital anterior urethral diverticulum

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Case Report

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Abstract

Background

Periurethral urinoma is a rare condition in pediatric patients and may represent an atypical manifestation of underlying urethral anomalies. Its diagnosis is often challenging due to nonspecific clinical features that mimic common genitourinary infections.

Case presentation

We report the case of a 4-year-old boy presenting with fever, dysuria, and scrotal swelling, initially managed as a urinary tract infection complicated by cellulitis. Despite appropriate antibiotic therapy, symptoms persisted. Serial ultrasonography demonstrated a progressively enlarging fluid collection in the penoscrotal region. Subsequent cystourethrography and urethrocystoscopy revealed a periurethral cavity communicating with the urethral lumen, consistent with a periurethral urinoma secondary to congenital anterior urethral diverticulum. Clinical improvement was achieved following urinary diversion and definitive surgical repair.

Conclusion

This case highlights the importance of considering urethral malformations in children with persistent genitourinary symptoms unresponsive to standard therapy. Early recognition is essential to prevent misdiagnosis, avoid unnecessary prolonged antibiotic treatment, and ensure timely management.

INTRODUCTION

Periurethral urinoma is an uncommon condition in children, typically resulting from urethral injury, obstruction, or infection leading to urine extravasation into surrounding tissues. Congenital anterior urethral diverticulum (CAUD) is a rare malformation that may cause variable degrees of lower urinary tract obstruction. Its clinical presentation is often nonspecific and may mimic more common conditions, such as urinary tract infections or soft tissue infections, resulting in potential diagnostic delay. To our knowledge, periurethral urinoma as the initial manifestation of CAUD in children has been only rarely described.

We report a case of periurethral urinoma in a child as the presenting feature of CAUD, highlighting the diagnostic challenges and the importance of early urological evaluation in atypical or refractory presentations.

Case presentation

A 4-year-old boy came to the emergency department (ED) for a 3-day history of fever (> 38°C), dysuria, testicular swelling, and pain. He had been receiving oral amoxicillin–clavulanate for two days for a presumed urinary tract infection (UTI).

His past medical history was notable for recurrent urinary tract infections since toilet training and short stature in therapy with Growth Hormone. No prior urological investigations had been performed.

On physical examination, the patient appeared in moderate discomfort. Marked edema and erythema of the scrotal and suprapubic regions were observed. The testes were difficult to palpate due to swelling and tenderness. The penile foreskin was edematous without discharge. Vital signs were within normal limits, and the patient was afebrile at presentation.

The clinical course has been summarized in Table 1.

Diagnostic workup

Laboratory investigations revealed elevated inflammatory markers (C-reactive protein 6 mg/dL), with normal renal function and blood cell count. Urinalysis showed leukocyturia, hematuria, and positive nitrites. Urine culture was collected.

Scrotal and soft tissue ultrasonography demonstrated increased echogenicity and hyperemia of the subcutaneous tissues, consistent with cellulitis. Urinary tract ultrasound revealed mild left pelvic dilatation and distal ureteral enlargement.

Clinical course

Empirical intravenous antibiotic therapy with ceftriaxone was initiated, along with anti-inflammatory treatment (systemic bethametasone and topical steroid) and analgesia (Paracetamol). Despite initial partial improvement in inflammatory markers, the patient continued to experience dysuria, reduced urinary flow, and persistent suprapubic swelling. Urine samples for culture turned negative. These findings raised suspicion of an alternative underlying diagnosis.

Follow-up ultrasonography revealed a multiloculated fluid collection in the penoscrotal region, measuring approximately 2 cm, later increasing in size despite ongoing therapy (even with the addiction of metronidazole IV). Given the persistence of symptoms, a urinary catheter was placed, resulting in temporary clinical improvement and reduction of pain and swelling.

Repeated US showed persistence of the fluid collection (Fig. 1); to exclude possible signs of immunodeficiency, immunological workup was performed and resulted normal.

On 12th day after admission, considering the good clinical condition with no fever and no systemic symptoms, the VC was removed.

However, symptoms recurred shortly after catheter removal, with worsening dysuria and decreased urine output. Further evaluation with cystourethrography demonstrated abnormal contrast extravasation in the penoscrotal region. Urethrocystoscopy revealed a discontinuity of the urethral lumen in the distal penile urethra, communicating with a large periurethral cavity.

Compression of the swelling resulted in urine leakage around the catheter, confirming the presence of a periurethral urinoma. Aspiration of the suprapubic swelling initially yielded a small amount of clear fluid, followed by pinkish fluid. Subsequent compression of the same swelling resulted in the expulsion of pinkish urine around the Foley catheter, with complete resolution of the described swelling.

Definitive diagnosis and treatment

These findings suggested an underlying congenital urethral abnormality, most consistent with anterior urethral diverticulum.

The patient underwent surgical repair with urethroplasty. Postoperative recovery was uneventful, with progressive resolution of symptoms, normalization of urinary flow, and no recurrence on follow-up imaging.

He was discharged in good general condition under outpatient urological surveillance. We suggested a re-evaluation with a genetic consultant for comprehensive investigations.

DISCUSSION

This case highlights three key clinical challenges: a misleading initial presentation, delayed diagnosis due to nonspecific findings, and the need for early urological evaluation in refractory cases.

The clinical presentation was initially misleading, with features suggestive of urinary tract infection and soft tissue cellulitis. The persistence of symptoms despite appropriate antibiotic therapy represented a key diagnostic clue, prompting further investigation and urological consultation. The initial misdiagnosis as cellulitis or abscess is understandable, given the presence of local inflammation and systemic symptoms. However, persistence despite appropriate therapy should prompt reconsideration of the diagnosis.

Clinical red flags in this case included persistence of symptoms despite adequate antibiotic therapy, recurrence after catheter removal, and progressive enlargement of the fluid collection.

Periurethral urinoma results from urine extravasation due to urethral disruption or obstruction. In children, it is most commonly associated with trauma, instrumentation, or infection [1–3]. However, congenital urethral anomalies should be considered when no clear precipitating factor is identified.

Among all forms of Congenital Anomalies of Kidneys and Urinary Tract (CAKUTs), CAUD is a rare condition characterized by a saccular outpouching of the anterior urethra [4–7]. It may act as a functional obstruction, leading to urinary stasis, recurrent infections, and progressive dilation. In some cases, increased intraluminal pressure may result in rupture and urine extravasation, as observed in this patient. The diagnosis of CAUD can be challenging, particularly in older children with nonspecific symptoms [8–13]. Imaging studies play a crucial role. Ultrasonography may identify associated complications but is often insufficient for definitive diagnosis. Voiding cystourethrography and endoscopic evaluation remain the gold standard for anatomical assessment [14–18]. A key clinical feature in this case was the recurrence of symptoms following catheter removal, suggesting an underlying structural abnormality. The demonstration of urine leakage upon compression of the swelling was highly indicative of communication with the urinary tract [1, 12, 19, 20]. Management of CAUD depends on symptom severity and anatomical findings. Surgical repair is recommended in symptomatic cases to prevent long-term complications, including recurrent infections, urinary retention, and upper urinary tract damage [3].

This case underscores the importance of considering congenital anomalies in children presenting with persistent or atypical genitourinary symptoms. Early multidisciplinary evaluation involving pediatricians, radiologists, and urologists is essential for timely diagnosis and appropriate management.

A multidisciplinary approach involving pediatricians, radiologists, and urologists was essential in achieving the final diagnosis.

CONCLUSION

Periurethral urinoma is a rare but important differential diagnosis in children presenting with persistent scrotal or perineal swelling unresponsive to standard treatment. Congenital urethral anomalies, including anterior urethral diverticulum, should be considered in such cases, especially in patients with poor urinary stream or recurrent UTIs. Early imaging and multidisciplinary evaluation are crucial to avoid diagnostic delay, unnecessary treatments, and potential long-term complications.

LEARNING POINTS

- - Periurethral urinoma may mimic common conditions such as cellulitis or abscess in children
- - Lack of response to appropriate antibiotic therapy is a key diagnostic warning sign
- - Congenital urethral anomalies can present beyond infancy with atypical fatures
- - Early imaging and endoscopic evaluation are essential for accurate diagnosis
- - Prompt urological management prevents complications and improves outcomes

Abbreviations

CAUD

Congenital anterior urethral diverticulum
ED
emergency department
UTI
Urinary tract infection
IV
intra venous
VC
vesical catheter
US
ultra sound
CAKUT
Congenital Anomalies of Kidneys and Urinary Tract.

Declarations

Disclaimer

All authors approved the final version of the paper. All the authors state that no honorarium, grant or other form of payment was given to anyone to produce the manuscript. No conflict of interest has been declared by any of the authors. An informed consent was given by the parents of the patient and is available if requested to the corresponding author.

Declaration of Generative AI and AI-assisted technologies in the writing process

the authors did not used any AI or AI-assisted tools during the preparation of this work and take full responsibility for the content of the publication.

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AS: Conceptualization, Investigation, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization; FT: Conceptualization, Investigation, Data Curation and Writing - Original Draft; EP and CM: Conceptualization, Data Curation, Writing - Review & Editing; MS: Writing - Review & Editing; AC: Conceptualization, Writing - Review & Editing, Supervision, Project administration.

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Table 1

Table 1
Timeline of the clinical course

Time	Event
Day − 3	Fever, dysuria, scrotal swelling
Day 0	ED admission, antibiotics started
Day 3	Persistent symptoms
Day 5–10	Progressive fluid collection on ultrasound
Day 10	Catheter placement → temporary improvement
Day 12	Catheter removal → symptom recurrence
Day 13	Cystourethrography and cystoscopy → diagnosis
+ 2 weeks	Surgical repair
Follow-up	Full recovery

Figures

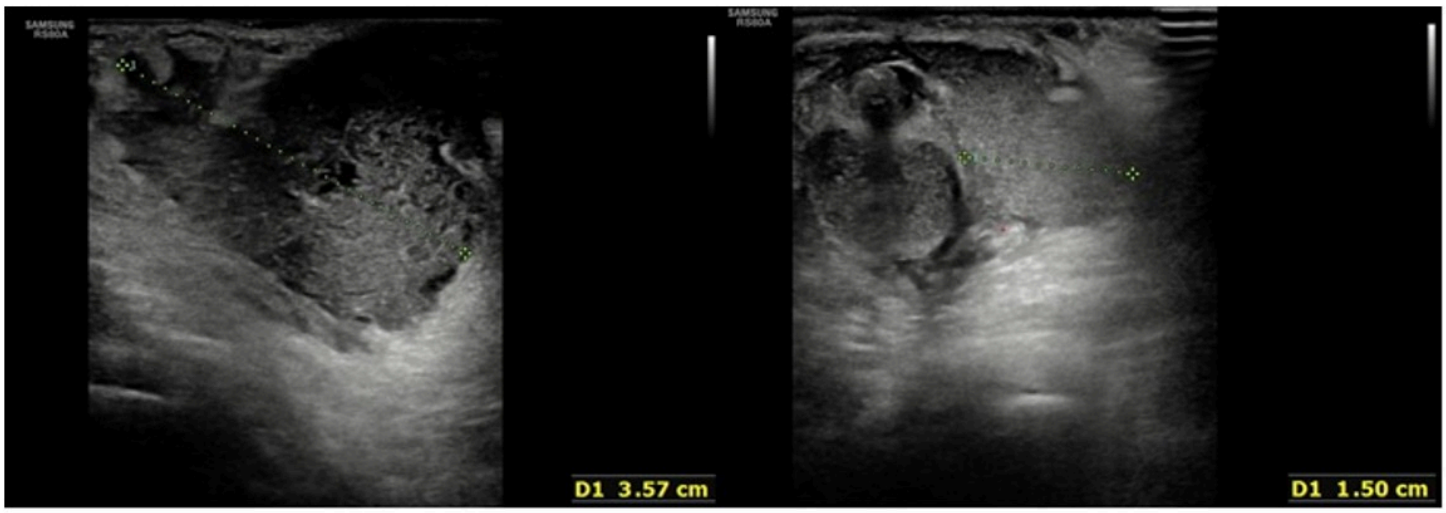


Figure 1

Ultrasound imaging of scrotal mass, showing a multiloculated fluid collection in the scrotal region with surrounding soft tissue edema

Supplementary Files

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