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Case Report

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Delayed diagnosis of distal urethral stricture after hypospadias repair in a child: the critical role of physical examination in preventing irreversible renal damage

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ABSTRACT

We present a pediatric case of distal urethral stricture following hypospadias repair, in which prolonged misattribution of lower urinary tract symptoms to functional causes led to delayed diagnosis and irreversible renal damage. A 12-year-old boy with a history of hypospadias repair in infancy presented with urinary incontinence, incomplete bladder emptying, and nocturia. He had previously undergone multiple pharmacologic treatments without improvement. Physical examination revealed a narrowed coronal meatus. Ultrasonography demonstrated bilateral hydronephrosis and bladder wall thickening, while uroflowmetry showed a plateau-shaped curve with severe obstruction. Intraoperatively, the meatus could only be passed with a 4-Fr tube. Because the meatus was at the coronal level, a dorsal plate incision was extended to the glans tip, providing an adequate flap for tubularized incised plate urethroplasty (TIPU). No graft was required. Postoperatively, uroflowmetry normalized and hydronephrosis regressed, but dimercaptosuccinic acid (DMSA) scintigraphy revealed bilateral renal scars. This case highlights the importance of physical examination and uroflowmetry in the long-term follow-up of children after hypospadias repair, as timely recognition of meatal or urethral obstruction can prevent irreversible upper urinary tract damage.

Keywords: Hypospadias repair, urethroplasty, urethral stricture, hydronephrosis, physical examination

INTRODUCTION

Urinary incontinence in children is most often attributed to functional bladder disorders.[1] However, exclusive focus on functional etiologies without thorough evaluation for anatomical abnormalities may result in delayed diagnosis and irreversible upper urinary tract damage. Distal urethral stricture is a rare but important late complication of hypospadias repair, with reported incidences ranging from 5% to 15%.[2]

The European Association of Urology (EAU) guidelines recommend long-term follow-up after hypospadias repair, including uroflowmetry and meatal calibration even in asymptomatic patients.[3,4] This case illustrates the consequences of overlooking anatomical assessment and underscores the critical role of physical examination in early detection.

CASE

A 12-year-old male refugee, who had fled from a war zone, presented to our department with complaints of daytime and nighttime urinary incontinence, incomplete bladder emptying, and increased nocturnal frequency. He had undergone hypospadias repair in infancy, but the exact date, location, and surgical technique were unknown due to lack of records. There was no history of urinary tract infection.

Over the years, the patient had been treated at different centers for presumed functional bladder dysfunction, receiving various combinations of anticholinergics, desmopressin, and imipramine, without significant symptom improvement.

On presentation, physical examination revealed a narrowed coronal meatus. Renal and bladder ultrasonography demonstrated bilateral hydronephrosis (right AP (anteroposterior) diameter 23 mm, left 19 mm) and bladder wall thickening (20 mm). Preoperative uroflowmetry showed a plateau-shaped curve, Qmax (maximum flow rate) 2.1 ml/s, Qave (average flow rate) 1.4 ml/s, voided volume 356 ml, and post-void residual urine of 260 ml (**Figure 1**).

During surgery, the meatus could only be passed with difficulty using a 4-Fr feeding tube. A dorsal plate incision was performed to enlarge the opening, after which

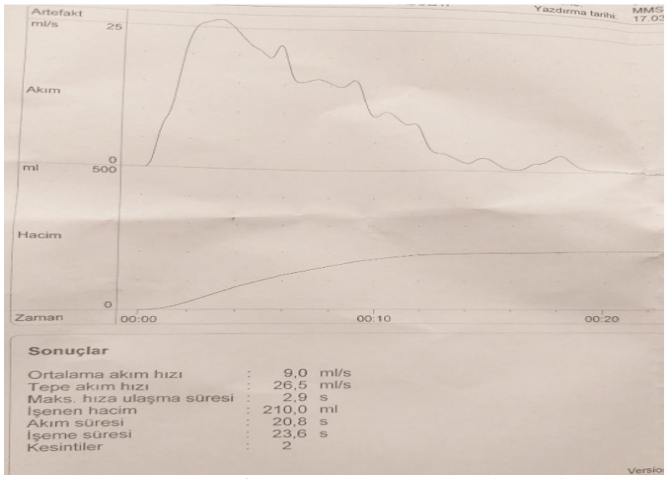

Figure 1. Preoperative uroflowmetry demonstrated a plateau-shaped curve consistent with severe obstruction

cystoscopy was carried out. Because the meatus was located at the coronal level, a dorsal plate incision was extended to the glans tip before cystoscopy, which provided an adequate flap for tubularized incised plate urethroplasty (TIPU). No graft was required.[6,8] The bladder mucosa exhibited minimal trabeculation, both ureteral orifices were in normal location and appearance, no posterior urethral valves were present, and no other strictures were identified. Following cystoscopy, TIPU urethroplasty was completed. A 12-Fr foley bladder catheter was inserted and removed on postoperative day 5; the patient subsequently voided with a strong urinary stream originating from the meatal tip.

At the 1-month follow-up, ultrasonography showed marked regression of hydronephrosis, with complete bladder emptying. Postoperative uroflowmetry revealed a normal bell-shaped curve with Qmax 26.5 ml/s, Qave 9.0 ml/s, voided volume 210 ml, and no residual urine (**Figure 2**). DMSA (dimercaptosuccinic acid) scintigraphy revealed bilateral renal scarring with split renal function of 63% (left) and 37% (right). During the postoperative follow-up, the child was also evaluated by pediatricians at another hospital. As part of their assessment, a voiding cystourethrogram (VCUG) was performed, which showed no signs of vesicoureteral reflux. Unfortunately, long-term follow-up was not possible as the family returned to their home country.

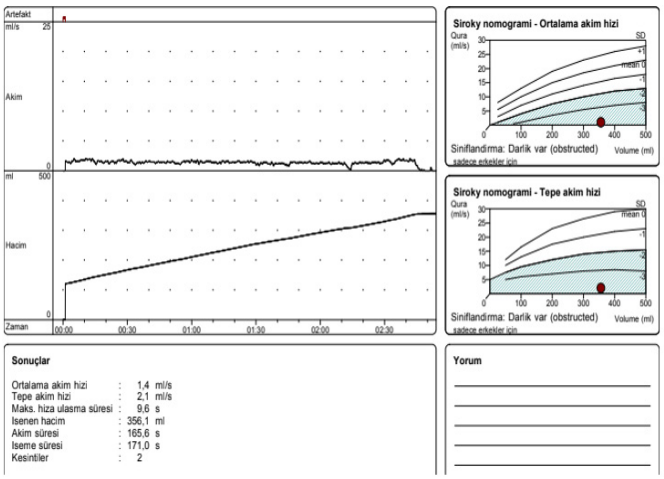

Figure 2. Postoperative uroflowmetry demonstrated a bell-shaped curve indicating normalized urinary flow

DISCUSSION

This case highlights how prolonged misinterpretation of urinary symptoms as purely functional in origin can delay the identification of a surgically correctable anatomical abnormality. The patient had undergone years of medical therapy without benefit, when a simple physical examination could have led to the correct diagnosis earlier.

Distal urethral stricture after hypospadias repair, although uncommon, can cause severe obstruction and lead to hydronephrosis and irreversible renal damage if left untreated. In our patient, creation of a tube was required to allow voiding from the normal anatomical location rather than the distal coronal level. Because the urethra was narrow, a dorsal plate incision was necessary to achieve both functional and cosmetic integrity, making TIPU the appropriate choice. In contrast, simple meatotomy would have left the meatus at the coronal level with a narrow downward-directed stream, resulting in inferior functional and cosmetic outcomes. Moreover, TIPU has been reported to carry lower complication rates than other urethroplasty techniques in distal cases, further supporting our decision.[5,7,9] According to the EAU Paediatric Urology Guidelines (2025), meatal stenosis occurs in 5–15% of cases after hypospadias repair, particularly when the meatus is reconstructed under tension. Although graft use may further reduce the risk of restenosis, TIPU alone remains an accepted and reliable option in distal cases, balancing functional durability with favorable cosmesis.[3,9,10]

EAU Paediatric Urology Guidelines (2025) stress the need for long-term follow-up in hypospadias patients, with periodic physical examination and uroflowmetry even in the absence of symptoms.[3,5,7] This case strongly supports these recommendations.

The presence of minimal bladder trabeculation on cystoscopy indicated chronic bladder outlet obstruction, despite the absence of other urethral strictures or posterior urethral valves. The discrepancy between bladder wall thickness on ultrasound and minimal trabeculation on cystoscopy may largely reflect differences in bladder filling volume at the time of assessment, as well as operator- and equipment-related variability. While ultrasound can overestimate thickness in a poorly filled or poorly compliant bladder, cystoscopy may underestimate subtle or focal trabeculation. The presence of minimal bladder trabeculation on cystoscopy indicated chronic bladder outlet obstruction, despite the absence of other urethral strictures or posterior urethral valves. Ultrasonographic assessment of bladder wall thickness is influenced not only by bladder filling status and compliance but also by the operator's experience, making it prone to inter-observer variability. In contrast, cystoscopy provides a direct visual evaluation but may underestimate subtle or focal changes. In our patient, longstanding obstruction likely resulted in muscular hypertrophy detectable by ultrasound, while cystoscopy revealed only mild mucosal changes. This highlights the need to interpret bladder findings in light of both imaging and endoscopic modalities. Although surgical correction restored normal voiding, bilateral renal scarring persisted, underscoring the consequences of delayed diagnosis.

CONCLUSION

Physical examination remains an indispensable, simple, and cost-effective diagnostic tool in pediatric urology. Distal urethral strictures can be easily missed if urinary symptoms are attributed solely to functional disorders. Routine meatal inspection and uroflowmetry should be part of the long-term follow-up after hypospadias repair, as timely recognition and intervention can prevent irreversible upper urinary tract damage.

ETHICAL DECLARATIONS

Informed Consent

Informed consent was obtained from the legal guardians of the pediatric patient described in this report. Where developmentally appropriate, assent was also sought from the child. The inclusion of vulnerable populations in this study adhered to national and international ethical guidelines. Extra care was taken to ensure voluntary participation, understanding, and protection of participant dignity and autonomy.

Peer Review Process

This report underwent external peer review.

Conflict of Interest

The authors declare no conflicts of interest.

Financial Disclosure

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Author Contributions

Concept: HT; Design: HT, NK; Control: HT, NK; Resources: HT, NK; Materials: HT, NK; Data Collection and/or Processing: HT, NK; Analysis and/or Interpretation: HT, NK; Literature Review: HT, NK; Writing the Article: HT, NK; Critical Review: HT, NK.

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