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# Urology Case Reports

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Pediatrics

## Case report: A rare case of pediatric female bladder neck obstruction

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### ARTICLE INFO

#### Keywords:

Pediatric  
Female  
PBNO  
TUIBN

### ABSTRACT

A 3-year-old girl with a chief complaint of lower urinary tract symptoms (LUTS) for 3 years was admitted in our center. Urinary ultrasonography showed left hydronephrosis with ureteral dilatation and left solitary kidney. Voiding cystourethrography indicated left vesicoureteral reflux and trabeculated bladder wall. Urodynamics study revealed the low flow rate and high detrusor pressure. Cystoscopy showed trabeculated bladder wall with elevation of the bladder neck. Then we performed transurethral bladder neck incision tentatively. The patient recovered from LUTS and the upper urinary tract dilation disappeared postoperatively.

### 1. Introduction

Primary bladder neck obstruction (PBNO) refers to obstruction of urine discharge from the bladder. It is a rare condition in women and usually cause lower urinary tract symptoms (LUTS) and secondary upper urinary tract symptoms, negatively affecting patient prognosis.<sup>1</sup> Videourodynamic study (VUD) is the primary method used for diagnosing PBNO. But the recognized diagnostic criteria have not yet been established for children.

### 2. Case presentation

A 3-year-old girl presented with urinary tract infection (UTI) with voiding dysfunction, suffering frequent micturition, urgent micturition and dysuria for 3 years. She visited local hospital for treatment. Ultrasonography revealed the left hydronephrosis with full ureteral dilatation and left solitary kidney. Left grade IV vesicoureteral reflux (VUR) and trabeculated bladder wall was detected using voiding cystourethrography (VCUG) (Fig. 1A). Urodynamics study (UDS) revealed the maximum flow rate (Q<sub>max</sub>) was 6.6 ml/s, the average urine flow rate was 0.6 ml/s, detrusor pressure at maximum flow rate (P<sub>det.Qmax</sub>) was 34 cmH<sub>2</sub>O (Fig. 1B). No involuntary contraction of the detrusor muscle was observed. She was diagnosed with neurogenic bladder and treated with alpha-blockers for 1 month, but it is not effective. Subsequently, they visited our hospital for consultation. We conducted magnetic resonance imaging (MRI) for her to exclude the spinal cord disease.

Cystoscopy revealed elevation of the bladder neck and multiple bladder trabeculation in the bladder wall. PBNO was suspected to be a likely cause of LUTS in this patient.

Operation was performed after controlling the UTI. The bladder neck incision (BNI) at the 5 and 7 o'clock positions were performed using a 10 Fr cold knife. The tip of an 8F catheter was cut off without damaging the water balloon and the catheter was inserted into the bladder. The bladder was washed with warm normal saline solution until the drainage liquid became clear.

The operative time was 10 minutes, with estimated bleeding volume of 20 ml. No intraoperative or major postoperative complications were observed. The catheter was removed on POD4, and she was discharged after resuming spontaneous urination. On POD 7, her LUTS was relieved and self-controlled urination was achieved. 3 months postoperative, ultrasound showed left hydronephrosis had disappeared. VCUG revealed that left VUR had eliminated, the bladder wall was smooth (Fig. 2A). UDS showed the Q<sub>max</sub> rose to 18.0 ml/s, mean urinary flow rate was improved to 2.2 ml/s, P<sub>det.Qmax</sub> decreased to 16.9 cmH<sub>2</sub>O, maximum bladder volume was 375 ml, and residual urine volume was 15 ml (Fig. 2B). The patient was followed up for 22 months, recurrent urinary tract infections and ureteral reflux were not observed, and the LUTS had almost disappeared.

### 3. Discussion

It has been estimated that bladder outlet obstruction (BOO) accounts

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<https://doi.org/10.1016/j.eucr.2023.102514>

Received 29 June 2023; Received in revised form 23 July 2023; Accepted 28 July 2023

Available online 5 August 2023

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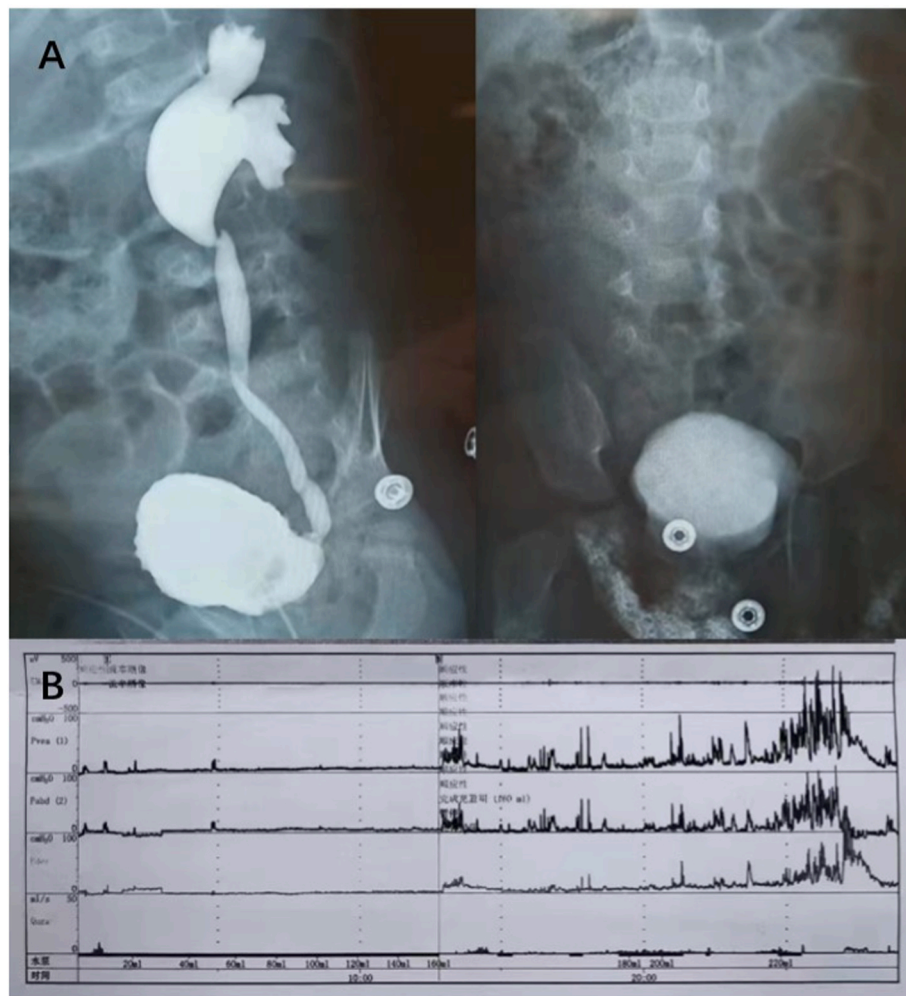


Fig. 1. Related preoperative examination of patients.

(A) Preoperative VCUG indicated left VUR and trabeculated bladder wall; (B) Preoperative UDS revealed the maximum flow rate ( $Q_{max}$ ) was 6.6 ml/s, the average urine flow rate was 0.6ml/s, detrusor pressure at maximum flow rate ( $P_{det.Qmax}$ ) was 34 cmH<sub>2</sub>O.

for between 2.7 and 8% of women referred for the evaluation of lower urinary tract symptoms. Primary bladder neck obstruction (PBNO) is observed in only 1–6% of women with BOO.<sup>2</sup> The main clinical manifestations are lower urinary tract symptoms (LUTS).<sup>1</sup> It may cause secondary upper urinary tract symptoms and also significantly affect patients' prognosis and quality of life.

PBNO is overlooked in women and children, especial in girls. When girls present with detrusor-sphincter dyssynergia, clinicians often don't consider BNO, but rather neurogenic bladder. Neurogenic bladder is most commonly caused by detrusor overactivity in children.<sup>3</sup> This girl had high voiding detrusor pressure and low urinary flow rate but no overactivity occurred. PBNO is suspected to be a likely cause of her LUTS. In fact, some studies have reported that BNO could lead to LUTS in adult women.<sup>4</sup>

Videourodynamic study (VUD) is the primary method of diagnosing BNO in women. A series of studies indicated that  $Q_{max} < 12$  ml/s and  $P_{det.Qmax} > 20$  cm H<sub>2</sub>O constitute obstruction in women. Solomon etc. calculated a bladder outlet obstruction index (BOOI). They defined  $BOOI = P_{det.Qmax} - 2.2 * Q_{max}$ , and found  $BOOI > 18$  to be associated with >90% chance of obstruction.<sup>4</sup> However, the internationally recognized diagnostic criteria have not yet been established, and it is uncertain whether the standard is applicable to children. In our case, the patient met all the above criteria.

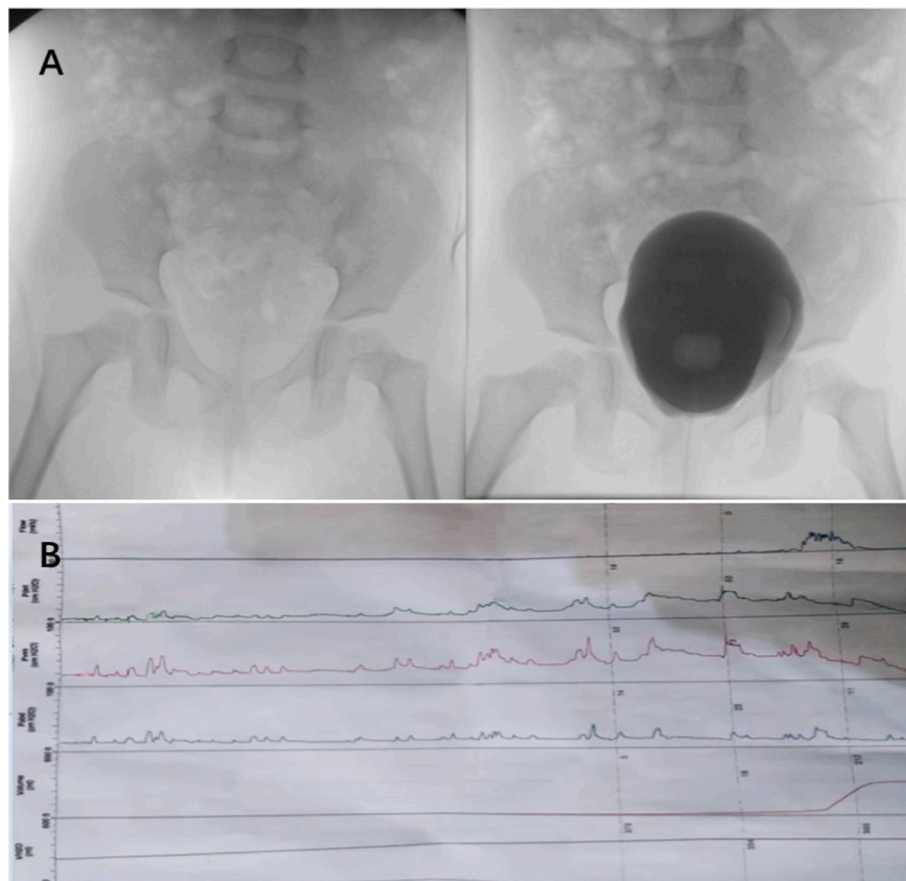
Currently, the treatment of PBNO in girls remains controversial. Treatment options for PBNO in women include watchful waiting,

pharmacotherapy, and surgical intervention. Clean intermittent catheterization (CIC) is recommended for the management of incomplete bladder emptying.<sup>4</sup> However, watchful waiting is only suitable for patients with minimal symptom. The girl suffered from severe LUTS. In addition, there exists the risk of worsening detrusor function in patients with BNO.<sup>1</sup> The pharmacologic treatment option for PBNO is mainly  $\alpha$ -blocker therapy. But it is not effective for the girl. CIC greatly affect the life quality of children and brought heavy burden on their families. In addition, it cannot resolve recurrent UTI.<sup>5</sup> Based on the above factors, transurethral incision of the bladder neck (TUIBN) was tentatively used to relieve the obstruction, and to observe whether it would prevent further deterioration of bladder function.

Surgical intervention of PBNO in women has been discussed in several studies, but it has not been reported for girls. The optimal location for BNI in women is yet to be determined. In our case, BNI was performed at the 5 and 7 o'clock position. The incision was not made too deep to avoid perforation of the vaginal wall.

#### 4. Conclusion

This case showed that pediatric female PBNO is rare but exist, TUIBN is safe and feasible. Further studies are required to define the diagnosis and treatment of pediatric female PBNO.



**Fig. 2.** Related postoperative examination of patients.

(A) Postoperative VCUG revealed that left VUR had eliminated, the bladder wall was smooth; (B) Postoperative UDS showed the Qmax rose to 18.0 ml/s, mean urinary flow rate was improved to 2.2 ml/s, Pdet.Qmax decreased to 16.9 cmH<sub>2</sub>O.

### Funding

This work was supported by the Military Family Planning Fund [18JS001], Beijing Municipal Science and Technology Plan [No. Z181100001718008] and Capital's Funds for Health Improvement [2022-2-5083].

### Author statement

Huixia Zhou: Supervision. Xuexue Lyu: Writing - Original draft preparation. Pin Li: Writing - Reviewing and Editing. Ce Han: Investigation. Ran Zhuo: Data curation.

### Acknowledgement

Nothing to decline.

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