DIAGNOSIS AND TREATMENT OF RARE URETERAL PATHOLOGY IN CHILDREN

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Objective. To improve the diagnosis and treatment of urethral pathology in boys through transurethral valve resection.

Materials and methods. The article presents a clinical example of 2 boys with rare forms of the urethral valve and urethral cyst, which led to impaired urination and the development of a urinary infection. In one child, the anterior urethral valve was accompanied by anorectal developmental anomaly. The patient was successfully operated on – proctoplasty.

Results. The children were observed in the distant period. After 3 months, all clinical manifestations of the disease completely disappeared, and there were no complaints from parents. Urination normalized, signs of urinary infection disappeared. No symptoms of urethral stricture were detected.

Conclusion. The variation of the anterior urethral valve, which divides the urethral cavity into two parts, is extremely rare. An anterior urethral cyst is also a rare urethral pathology that contributes to the development of infravesical obstruction. Diagnosis and timely elimination of the valve and cyst prevents the development of urinary system obstruction. These clinical observations indicate the need for ultrasound screening of pregnant women and timely detection of the pathology and its elimination.

Keywords: *urethra, congenital anomalies, urethral valve, urethral stricture, infravesical obstruction.*

Introduction. Urethral valves and cysts are congenital malformations of the urethra that subsequently lead to bladder outlet obstruction. The most common type is the posterior urethral valve. Anterior urethral valves and cysts are rarer. Urethral valves and cysts cause significant obstruction, which can lead to disability in children.

Among all prenatally detected malformations, the proportion of renal and urinary tract malformations ranges from 26 to 28%. Among these patients, one of the most severe groups are children with infravesical obstruction. Posterior urethral valves (PUVs) are a malformation of the urethra and the most common cause of infravesical obstruction among boys, occurring in one in 8,000 to 25,000 newborn boys [1, 2]. There are also rarer urethral pathologies in boys, located below the bulbar portion and causing no less suffering during urination in children. These pathologies include urethral cysts and urethral valves. Late diagnosis of posterior urethral valves (PUVs), anterior urethral valves (AUVs), and urethral cysts contributes to the development of renal complications, leading to chronic kidney disease (13–64%) and patient disability, and worsens bladder function. Long-term prognosis is determined by the extent of renal damage and changes in the upper urinary tract, as well as bladder dysfunction. All children who have had or have had posterior urethral valves, anterior urethral valves, and urethral cysts removed require follow-up care until adolescence. Several treatment options are available for these conditions. The treatment of choice is endoscopic destruction of the urethral valve and cyst under visual control. Complications occur in 5–25% of cases [3, 4, 5].

Purpose of the study. To improve the diagnosis and treatment of urethral pathology in boys by transurethral resection of the valve and urethral cysts with a holmium laser in children.

Material and research methods. Our material is based on the results of the examination and treatment of two children with anterior urethral valves and postbulbar cysts in 2023–2024. Both boys underwent standard clinical and laboratory tests preoperatively, including blood biochemistry, glomerular filtration rate (GFR) and tubular reabsorption to assess renal function, urine cultures, renal ultrasound with Doppler ultrasonography, bladder ultrasound with residual urine determination, and excretory urography.

Operation. Transurethral resection (TUR) of the anterior urethral valves and urethral cyst was performed using a laser resectoscope. We used a Holmium Medical Laser SPHL-10 holmium laser with a 7-Ch cystoscope sheath. Following resection of the valve and urethral cyst, an 8–10 Ch Foley catheter was inserted for 10 days. After removal of the urethral catheter and restoration of normal urination, a follow-up ultrasound was performed before discharge to determine residual urine volume.

Study results. *First observation.* Child G. was born full-term in the city maternity hospital on May 16, 2020, weighing 3,400 g and with an Apgar score of 7. He was admitted to the clinic after birth with a

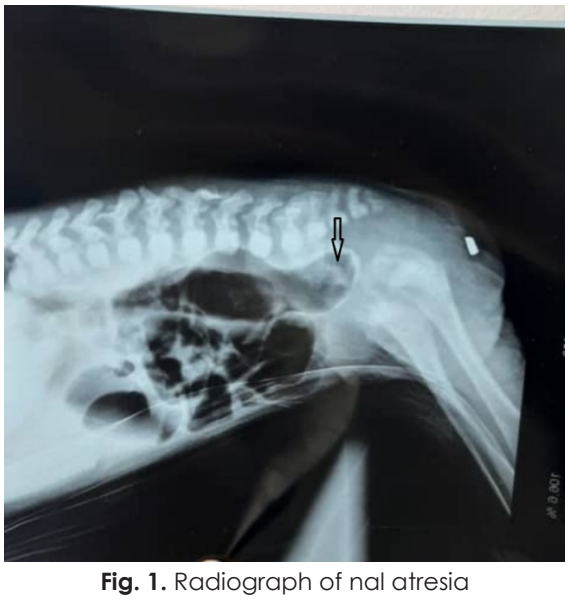

Fig. 1. Radiograph of nal atresia

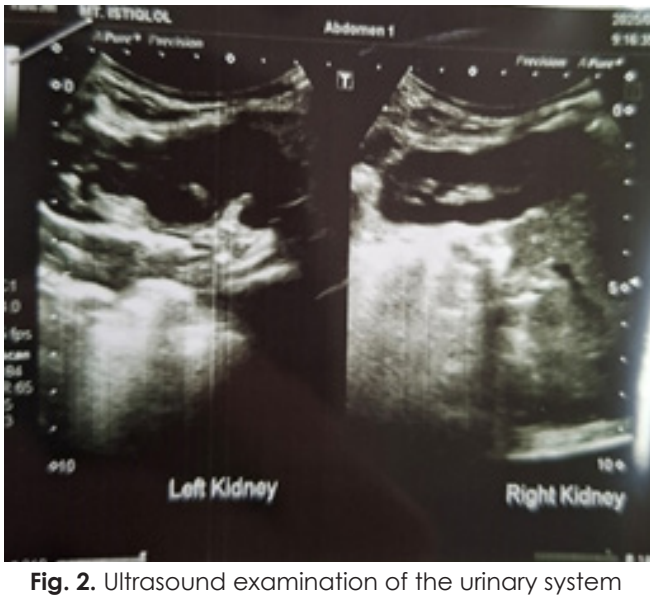

Fig. 2. Ultrasound examination of the urinary system

diagnosis of anal and rectal atresia. The child's condition is satisfactory. The cry is loud. The skin is pink and velvety. Visible mucous membranes are pink and moist. Respirations are 38 times per minute. Auscultation reveals puerile breathing in the lungs. Pulse is 158 beats per minute. Heart sounds are rhythmic. The abdomen is not distended and soft to palpation. The liver 1,5 cm beyond the costal margin. The kidneys are not palpable. Laboratory tests revealed no pathology. On examination, the child's anus is absent, and there is hyperpigmentation of the skin at the site of the presumed anus. An abdominal X-ray was taken in the prone position with the patient's head down using a device developed at the clinic for imaging anorectal malformations. The X-ray shows high rectal atresia, with the distance between the blind end of the rectum and the presumed anus being 3 cm (fig. 1).

An ultrasound examination of the urinary system was performed, which showed a picture of grade II ureterohydronephrosis on the left, due to vesicoureteral reflux (fig. 2).

A bladder catheterization was performed, and after 12 hours, urine containing meconium began to be excreted. The child was diagnosed with anal and rectal atresia, fistula form, rectovesical fistula, and grade II ureterohydronephrosis. For this reason, a double-barrel sigmoidectomy was performed on May 18, 2020, as an emergency. At 6 months of age that is, on November 20, 2020, a Penia perineal proctoplasty was performed with elimination of the rectovesical fistula and closure of the sigmoidectomy. The postoperative period was uneventful, and the child was discharged from the hospital on the 15th day after the surgery. The child has not been followed up for more than 2 years

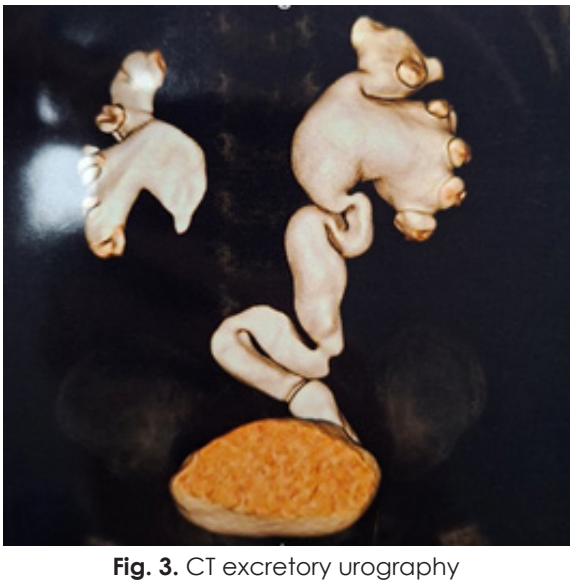

Fig. 3. CT excretory urography

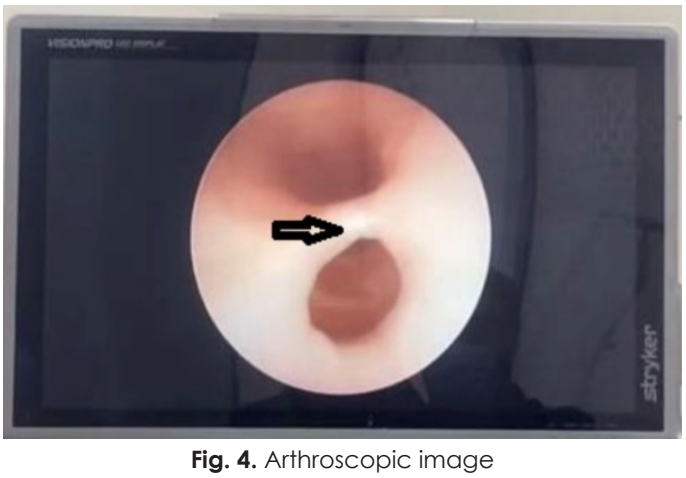

Fig. 4. Arthroscopic image

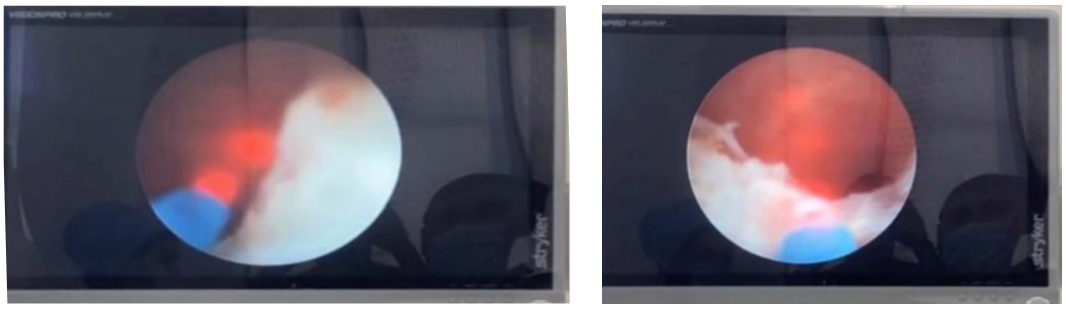

Fig. 5. Holmium laser valve dissection

since the surgery. The child had a weak urinary stream and was hospitalized upon presentation. An ultrasound was performed, which noted dilation of the ureter and ectasia of the renal pelvis of the left kidney. A contrast-enhanced CT scan of the kidney and urinary tract was performed. Grade II ureterohydronephrosis was detected on the left (fig. 3).

In this regard, a cystoscopy was performed, during which a valve of the anterior urethra was revealed, which was located in the transverse direction and dividing the urethra into two equal halves (fig. 4)

This figure shows the transverse position of the so-called valve, with two openings visible. Therefore, the valve was resected with a holmium laser and a catheter was inserted into the urethra for 10 days (fig. 4).

After dissection of the valve, the urethra (fig. 5) is freely passable, the cavity of the bladder and the orifices of the ureters are examined, in which a slight expansion on the left is noted (fig. 6).

The child was discharged in satisfactory condition. A follow-up ultrasound examination of the urinary after 6 months revealed no pathology (fig. 7).

Example two. Baby R. was born on January 28, 2025, in the city maternity hospital, weighing 3,500 grams, with an Apgar score of 6–7. An ultrasound scan during pregnancy revealed grade II ureterohydronephrosis on the left. After discharge from the hospital, the child experienced difficulty urinating, restlessness, and occasional low-grade fever. The child was under the supervision of a pediatrician. However, the child's condition began to worsen, and upon a follow-up visit on March 30, 2025, he was hospitalized and examined. In addition to ureterohydronephrosis on the left, the child was diagnosed with a cyst of the anterior urethra with a diameter of 3,4–3,7 mm (fig. 8). Therefore, the child was hospitalized for examination and treatment with a diagnosis of infravesical obstruction. Anterior urethral cyst. Grade II ureterohydronephrosis on the right. He was examined in the department.

Ultrasound of the urinary system revealed ectasia of the renal pelvis and calyces (fig. 9).

A series of radiographs with contrast showed expansion of the renal pelvis and ureter throughout its entire length (fig. 10).

For diagnostic purposes, a urethrocystoscopy was performed, which revealed the presence of a cystic formation in the anterior part of the urethra; therefore, a resection of the brush was performed with a holmium laser (fig. 11).

Fig. 6. Arthroscopic picture after valve destruction

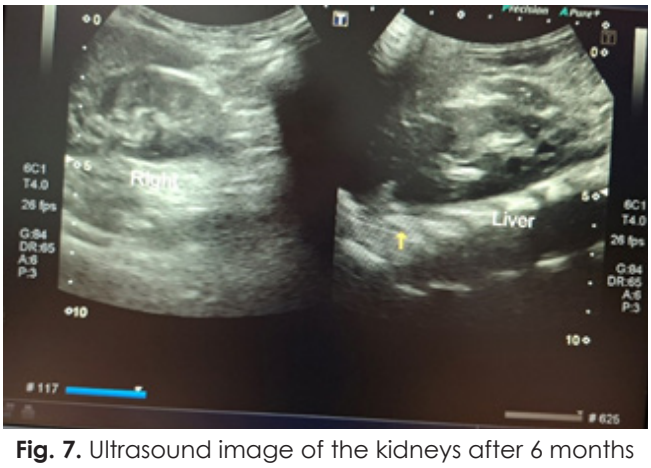

Fig. 7. Ultrasound image of the kidneys after 6 months of surgery to destroy the urethral valve

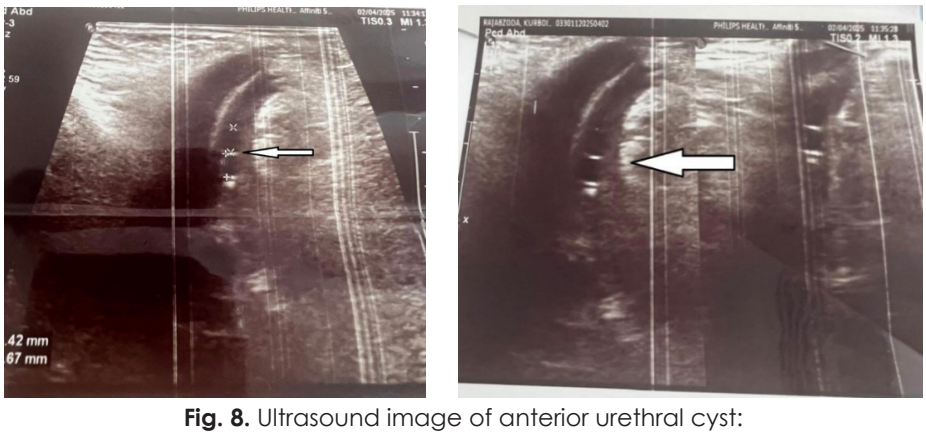

Fig. 8. Ultrasound image of anterior urethral cyst:

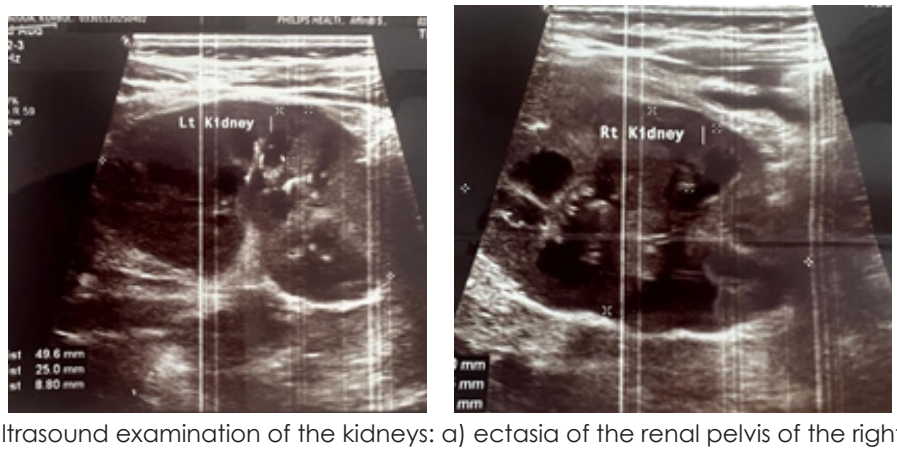

Fig. 9. Ultrasound examination of the kidneys: a) ectasia of the renal pelvis of the right kidney

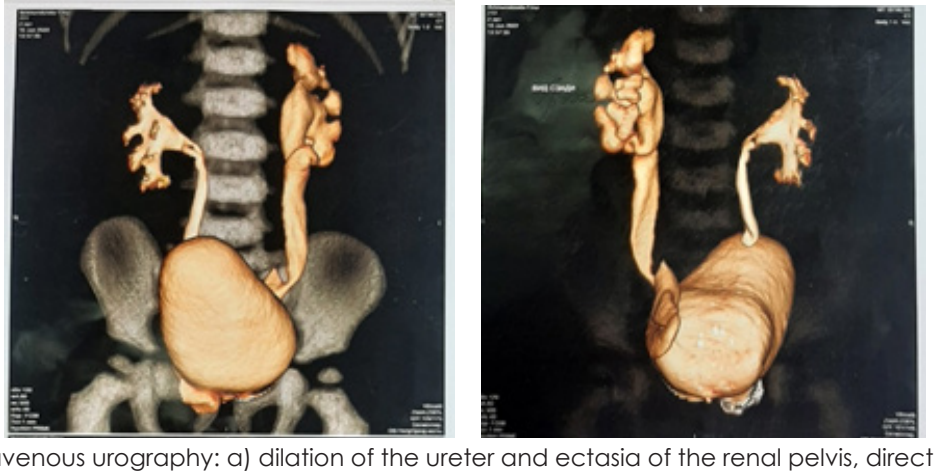

Fig. 10. Intravenous urography: a) dilation of the ureter and ectasia of the renal pelvis, direct projection, b) dilation of the ureter and ectasia of the renal pelvis, posterior projection

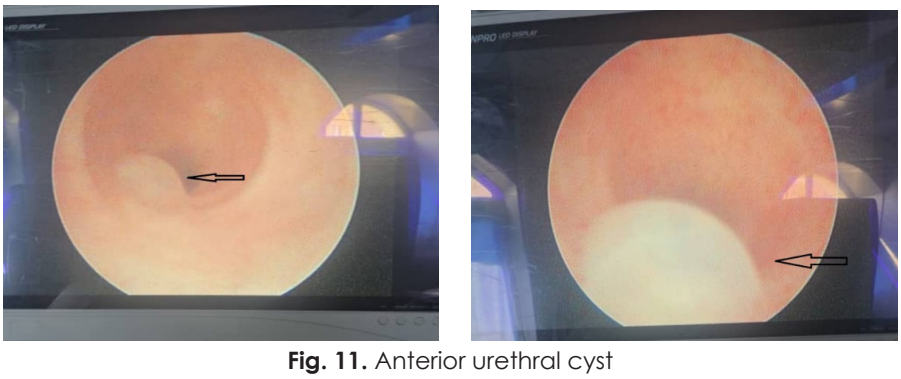

Fig. 11. Anterior urethral cyst

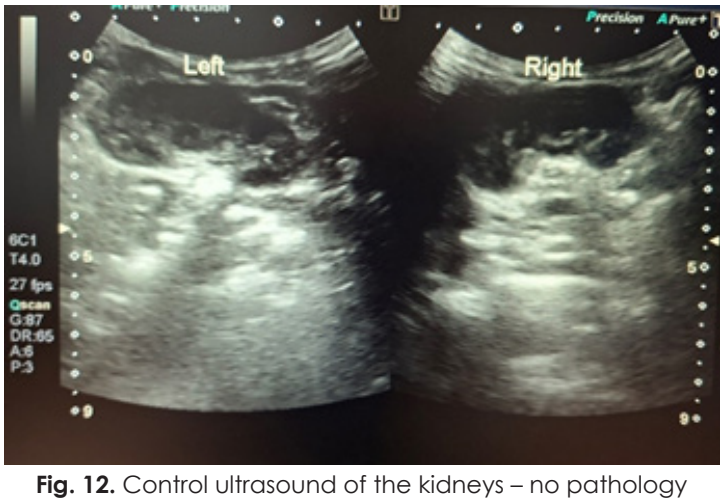

Fig. 12. Control ultrasound of the kidneys – no pathology

No other bladder abnormalities were detected, and a catheter was inserted through the urethra into the bladder for 10 days. A follow-up ultrasound two months later revealed a renal pelvis-calyceal system with a renal parenchyma thickness of 9 mm. The right kidney measured 50 x 28 mm, and the left kidney measured 50 x 26 mm. The child was discharged on the 10th day in satisfactory condition (fig. 12).

Research results. The children were followed up. After three months, all clinical manifestations of the disease had completely resolved, and their parents had no complaints. Urination returned to normal, and the urinary infection resolved. No signs of urethral stricture were detected. Endoscopic ablation of the anterior urethral valve and cyst is a minimally invasive treatment option. Early diagnosis and treatment of rare forms of anterior urethral pathology at an early age allows for the restoration of urinary tract function, normalization of bladder function, and prevention of chronic kidney disease.

Conclusion. A urethral valve that divides the urethral lumen into two parts and is located in the anterior urethra is extremely rare. An anterior urethral cyst is also a rare urethral pathology that leads to bladder outlet obstruction. Diagnosis and timely removal of the cyst prevents the development of urinary tract obstruction. These clinical observations demonstrate the need for ultrasound screening of pregnant women and prompt detection and treatment of any pathology.

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