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## THE TRANSURETHRAL TREATMENT OF PRIMARY HIGH GRADE VESICoureTERAL REFLUX IN CHILDREN

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## ТРАНСУРЕТРАЛЬНОЕ ЛЕЧЕНИЕ ПЕРВИЧНОГО ПУЗЫРНО-МОЧЕТОЧНИКОВОГО РЕФЛЮКСА ВЫСОКОЙ СТЕПЕНИ ТЯЖЕСТИ У ДЕТЕЙ

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**Summary.** Vesicoureteral reflux constitutes up to 30 percent of anomalies of urinary tract among children and the late diagnosis is characterized by the complications, such as, the scarring in the kidneys. Although the conservative management of first and second-grade vesicoureteral reflux is effective between 60 and 70 percent of cases, in advanced grades, in the absence of operative intervention, the disease may lead to recurrent pyelonephritis with potentially irreversible kidney damage. For this reason, early diagnosis and operative intervention are useful for preventing recurrent urinary tract infections and kidney parenchyma damage. Although the minimally invasive transurethral correction method has shown high levels of effectiveness in the early and middle grades of vesicoureteral reflux in children, it also demonstrates effective results in the advanced grades of the disease.

The study aims to select the method of endoscopic treatment and analyze the results based on the causes of disturbances in the antireflux mechanism of the ureterovesical segment. For this purpose, from 2019 to 2023, endoscopic treatment was performed in 65 children (90 ureters) at the clinic of the Tashkent Pediatric Medical Institute, department of pediatric urology. Based on the results of the study, both short-term and long-term outcomes of the surgery were analyzed for 65 patients. It was also confirmed that endoscopic correction is an effective method that leads to successful results in cases of high-grade vesicoureteral reflux.

**Key words:** vesicoureteral reflux, transurethral treatment, diagnosis, treatment, children.

**Резюме.** Пузырно-мочеточниковый рефлюкс составляет до 30 процентов аномалий мочевыводящих путей у детей, а поздняя диагностика характеризуется осложнениями, такими как рубцевание почек. Хотя консервативное лечение пузырно-мочеточникового рефлюкса первой и второй степени эффективно в 60–70 процентах случаев, на поздних стадиях при отсутствии оперативного вмешательства заболевание может привести к рецидивирующему пиелонефриту с потенциально необратимым поражением почек. По этой причине ранняя диагностика и оперативное вмешательство полезны для профилактики рецидивирующих инфекций мочевыводящих путей и повреждения паренхимы почек. Хотя метод минимально инвазивной трансуретральной коррекции показал высокий уровень эффективности при ранних и средних стадиях пузырно-мочеточникового рефлюкса у детей, он также демонстрирует эффективные результаты при поздних стадиях заболевания. Цель исследования – определить причины нарушений антирефлюксного механизма уретровезикального сегмента и анализ результатов выбранного метода эндоскопической коррекции первичного пузырно-мочеточникового рефлюкса у детей. С этой целью в клинике Ташкентского педиатрического медицинского института, в отделении детской урологии, с 2019 по 2023 год была проведена эндоскопическая коррекция у 65 детей (90 мочеточников). По результатам исследования были проанализированы как ближайшие, так и отдалённые результаты операции у 65 пациентов. Также было подтверждено, что эндоскопическая коррекция является эффективным методом, который приводит к успешным результатам при высокой степени пузырно-мочеточникового рефлюкса у детей.

**Ключевые слова:** пузырно-мочеточниковый рефлюкс, трансуретральное лечение, диагностика, лечение, дети.

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**Introduction:** Vesicoureteral reflux constitutes up to 30 percent of anomalies of urinary tract among children and the late diagnosis is characterized by the complications, such as, the scarring in the kidneys [1, 2]. Although the conservative management of first and second-grade vesicoureteral reflux is effective between 60 and 70 percent of cases, in advanced grades, in the absence of operative intervention, the disease may lead to recurrent pyelonephritis with potentially irreversible kidney damage [3]. For this reason, early diagnosis and operative intervention are useful for preventing recurrent urinary tract infections and kidney parenchyma damage. Although the minimally invasive transurethral correction method has shown high levels of effectiveness in the early and middle grades of vesicoureteral reflux in children, it also demonstrates effective results in the advanced grades of the disease [4, 5].

Vesicoureteral reflux is the retrograde pooling of urine from the bladder into ureter, which occurs among 1-2 percent of children and among 40 percent of those children who suffer from the infections of urinary tract. There are three main directions, which cause vesicoureteral reflux among children. First, there may be a congenital anomaly in the anti-reflux mechanisms of the vesicoureteral segment. Second is the development of fibroblastic transformation secondary to the inflammation in the vesicoureteral segment. The third is vesicoureteral reflux due to nerve damage. Among them, the first one is considered to be primary vesicoureteral reflux and several anatomic factors play a role in the vesicoureteral segment [6, 7].

In 1812 W. Waldeyer mentioned that surface muscle fibers of the bladder detrusor continue up to juxtavesical parts of the ureter. (Waldeyer's sheath).

In 1983 D. Beurton said that Waldeyer's sheath consists of two surface areas and deep parts. The deep part consists of muscle fiber, extravascular area tissues, and intramural parts of the ureter. In this, proximal fibres are fixated to the groin part. The distal part participates in the development of triangular trigone. Surface area 2-3 cm proximally is fixated on the adventitia layer of ureter.

In 1972 V. Polito identified that the main factor behind the valve mechanism of vesicoureteral segment was that the ratio of the mucosa of the ureter to its diameter was 3:1. In this minimal ratio is 2:1 and the maximal one is 5:1.

Testut, Rolliche, Mendelson, Tillaux, Disse (2020) identified the age-adjusted anatomic norms of the angle where the juxtavesical part of the ureter meets intramural part. In babies, the angle is equilateral, while in older children it forms an acute angle (Figure 1).

**Purpose:** the selection of effective endoscopic treatment type based on the cause of the disturbance of antireflux mechanism in the ureterovesical segment.

**Material and Methods:** Investigations were carried out among 65 patients (90 urinary tract) at the Children's Hospital of Tashkent Pediatric Medical Institute between 2019-2023. 40 (61,5%) of patients were female, while 25 (38,5) of patients were male. The age of patients ranged from 6 months to 5 years old. 12 (18,4%) of patients were below 1 years old, 34 (52,3%) of patients were between 1-3 years old, 19 of patients (29,2%) were between 3-5 years old. (Table 1).

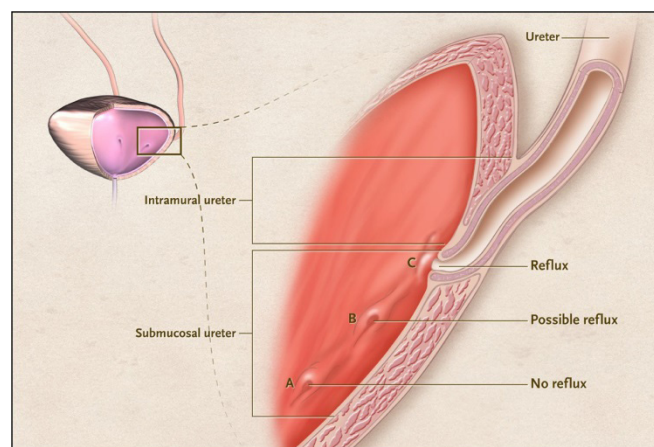


Figure 1

Table 1

**The distribution of patients by their age, gender and the part of the body  
where vesicoureteral reflux occurred**

Vesicoureteral reflux	Age of patient (year old)			Gender		Total
	Below 1	1–3	3–5	Male	Female	
Unilateral	4	21	15	14	26	40
Bilateral	8	13	4	11	14	25
Total	12	34	19	25	40	65

All the patients underwent the following clinical and laboratory investigations: complete blood count, uranalysis, zimnitsky urine test, bio-chemical tests (urea, creatinine); instrumental investigations: Ultrasound (organs of the urinary tract), micturition cystography, (for selected patients) MSCT urography and renography. All the patients underwent perioperative diagnostic urethroscopy. The method of endoscopic correction treatment was selected based on the degree of hydrodilation identified during the urethroscopy. In the cases of hydrodilation degree of H1 and H2, STING (Subureteral transurethral injection) and HIT1 (Hydrodistention implantation technique) methods, in the cases of hydrodilation degree of H3, HIT2 (Double hydrodistention implantation technique) method was used (Figure 2). Synthetic polyacrylamide gel (DAM+) – space filling medication was used into all the patients.

If the first endoscopic treatment showed little improvement, repeated endoscopic correction was conducted.

In the uranalysis, leucocyturgy, and anti-bacterial therapy that were sensitive to the identified microorganism and uroseptic medication were used. In the ultrasound unilateral renal hypoplasia was identified among 13 patients, while bilateral renal hypoplasia was identified among 7 patients. Grade 4 reflux was diagnosed in 76 (84,4%) urinary vesicles, while grade 5 reflux was diagnosed among 14 (15,5%) according to the International Reflux Study Committee classification (1981) (Figure 3).

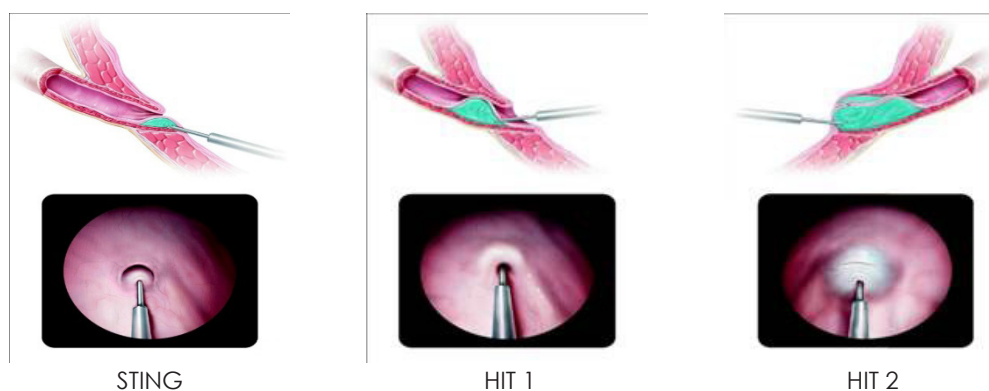


Figure 2

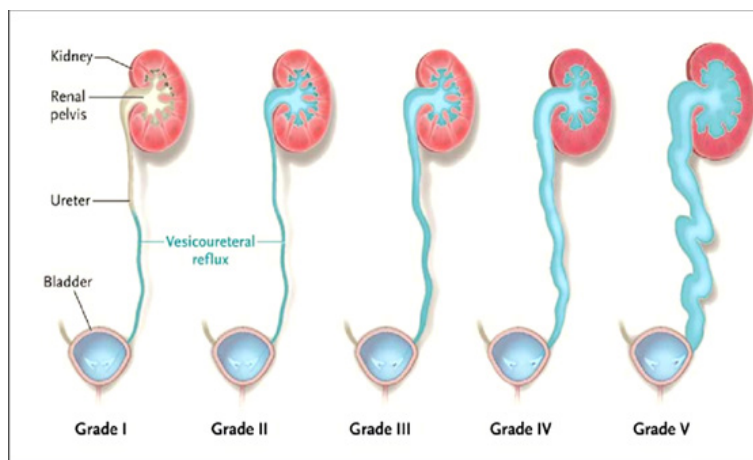


Figure 3



Among the patients with grade 5 vesicoureteral reflux, reflux was reduced to grade 3 in 6 (42,8%) urinary vesicles. When these patients underwent the second endoscopic correction, the treatment was effective in 5 urinary vesicles, while 1 remained unchanged as grade 3. Among the remaining 8 urinary vesicles, the results were not successful in 3, while in the other 5 urinary vesicles, reflux was reduced to grade 4. Following the second endoscopic correction among these patients, vesicoureteral reflux was eliminated in 3 urinary vesicles, while 5 showed no improvement. Two endoscopic interventions didn't yield effectiveness in 6 urinary vesicles and these patients were recommended to undergo pneumovesicoscopic operative intervention.

3 (4,6%) patients had hematuria for 1-2 days following the operation. There was no complications among other patients.

#### **Conclusion.**

The minimally invasive endoscopic transurethral correction method yielded good (48,8%), satisfactory (40,1%) and unsatisfactory (11,1%) results in the treatment of primary advanced grade vesicoureteral reflux. Besides, the lack of post-operative complications and hospitalization also testimony to the effectiveness of this method.

#### **Литература/References**

1. Алиев М.М. и др. Выбор метода антирефлюксной защиты при хирургическом лечении обструктивного мегауретера у детей // Детская хирургия. – 2006. – № 5. – С. 9–13.
2. Алиев М.М. и др. Отдаленные результаты оперативной коррекции пузырно-мочеточникового рефлюкса у детей // Репродуктивное здоровье детей и подростков. – 2015. – № 2 (61). – С. 89–95.
3. Рахматуллаев А., Эргашев М. Эндоскопическое трансуретральное лечение первичного пузырно-мочеточникового рефлюкса высокой степени тяжести у детей: эффективность и отдаленные результаты // Актуальные вопросы детской хирургии. – 2023. – Т. 1. – № 1. – С. 84–84.
4. Рахматуллаев А. и др. Эндоскопическое лечение первичного обструктивного мегауретера у детей // Первая международная конференция общества детских урологов Узбекистана. – 2024. – Т. 1. – № 1. – С. 40–40.
5. Aliev M., Rakhmatullaev A., Terebaev B. Results of Transurethral Correction of Stenotic Developmental Abnormalities of Ureterovesical Junction in Children // Indian Journal of Forensic Medicine & Toxicology. – 2020. – Т. 14. – № 4.
6. Doğan A.B., Özkan K. U. Endoscopic treatment of primary vesicoureteral reflux in children with two different bulking agents, high success and low complication rates: Comparison of Dexell and Vantris.
7. Mina-Riascos, Sergio Hernando Effectiveness and risks of endoscopic management compared to vesicoureteral reimplantation in patients with high-grade vesicoureteral reflux: systematic review and network meta-analysis.