

ISSN 2063-5346



METHODS OF SURGICAL CORRECTION OF MEGAURETER IN CHILDREN

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Article History: Received: 10.05.2023

Revised: 29.05.2023

Accepted: 09.06.2023

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DOI:10.48047/ecb/2023.12.9.164

Annotation. Rationale. Megaureter (MG) is a severe pathology of the urinary system. According to the World Health Organization, malformations of the urinary system in children occupy one of the leading places among the pathologies of all organs and systems in terms of the number and structure of diseases. Megaureter accounts for up to 40% of diseases in this group according to various authors. Violation of urodynamic indicators contribute to the development of chronic obstructive pyelonephritis, which can lead to chronic renal failure in 23-27% of cases in children. An increase in the number of early diagnosis of this disease, the use of various diagnostic methods, the presence of a large number of surgical treatment methods, and a high percentage of unsatisfactory results make this disease an urgent issue in pediatric surgery.

Purpose of the study. To determine the effectiveness of endoscopic and reconstructive plastic surgery in children.

Materials and methods. The study presents the results of treatment of 116 patients with reflux and obstructive megaureter at the Department of Pediatric Surgery No. 2 of Samara State Medical University for the period from 2010 to 2022.

Results. When deciding to apply endoscopic correction, the prevalence of the evacuation and closure function of the ureterovesical segment (MPS) was determined, if the patient had a minimal impairment of the evacuation function and a violation of the closure function prevailed, it was proposed to manage such children by endoscopic administration of the volume of the forming substance, and ureteral calibration was also mandatory. - cystic segment with a ureteral catheter (According to Charrier's table No. 3, No. 4, No. 5), depending on the physiological size of the MPS.

Conclusion. The results of the examination revealed that the rhodynamic characteristics of positive results after

endoscopic correction of MG in terms of 3-6 months indicated a clear dependence of the treatment results on the method of forming a bolus in the ureterovesical segment

When studying the urodynamic characteristics of positive results in children with megaureter in groups with Politano-Leadbeter and extravesical ureter reimplantation showed better results.

Relevance. Megaureter (MG) is a severe pathology of the urinary system. According to the World Health Organization, malformations of the urinary system in children occupy one of the leading places among the pathologies of all organs and systems in terms of the number and structure of diseases. Megaureter accounts for up to 40% of diseases in this group according to different authors [1,2,3,4,5]. Violation of urodynamic indicators contribute to the development of chronic obstructive pyelonephritis, which can lead to chronic renal failure in 23-27% of cases in children. In pediatric practice, megaureter is one of the most pressing problems that most often leads to renal complications. This is determined by several factors:

- violation of the passage of urine through the ureter does not provide normal evacuation of the microbial flora penetrating the urinary tract, which causes chronic inflammation of the kidneys;

-Pathological effects on renal blood flow are increased intrarenal hydrostatic pressure.[2,6]

Megaureter which is accompanied by a continuously recurrent course of pyelonephritis, acute urinary retention or causing a sharp decrease in kidney function is subject to surgical intervention, the essence of surgical intervention is to normalize urodynamics, which is an indispensable component of complex treatment and prevention of complications of congenital megaureter.

To date, more than 200 methods of surgical correction of this disease in children have been proposed. The choice of method and method of surgery is determined by the nature and degree of the clinical manifestation of the disease, the presence of complications and the general condition of the patient [7,8,9].

Purpose of the study. To determine the effectiveness of endoscopic and reconstructive plastic surgery in children.

Material and methods. 116 patients aged 3 months to 16 years were examined and treated with various forms of primary megaureter. Patients underwent general clinical and all urological examinations.

Table 1. Distribution of operated patients depending on the form and severity of MG.

| Degree | Form | Refluxing | obstructive | Total |
|----------|------|-----------|-------------|-------|
| 1 degree | | 12 | 2 | 14 |
| 2 degree | | 15 | 17 | 32 |
| 3 degree | | 23 | 22 | 45 |
| | | 50 | 41 | 91 |

Research results. When deciding to use endoscopic correction the prevalence of the evacuation and closure function of the ureterovesical segment (MPS) was determined, if the patient had a minimal impairment of the evacuation function and a violation of the closure function prevailed, it was proposed to manage such children by endoscopic administration of the volume of the forming substance, and the ureterovesical segment was also calibrated with a ureteral catheter (According to Charrier's table No. 3, No. 4, No. 5) depending on the physiological size of the MPS.

At the first stage, cystoscopy was performed, it is of great importance in preoperative diagnosis, allowing to clarify the immediate cause. Telescopes with a viewing angle of 0° and 30° were used for diagnostic cystoscopy. During cystoscopy, the condition of the mucosal and

When grading the severity of the disease, the Pfister-Henderson classification was used (Pfister RC, Hendren WH, 1978). All patients were divided into 2 groups according to the nature of the disease: group 1 - 61 patients with reflux, group 2 - 55 patients with obstructive form of megaureter. Due to the exacerbation of COP, the presence of chronic renal failure, malnutrition and anemia in 25 children, surgical treatment was delayed until the condition stabilized. Endoscopic methods of treatment were used in 29 patients with refluxing MG. Reconstructive plastic surgery was performed in 62 patients with reflux and obstructive forms of MG.

submucosal layers of the bladder was primarily assessed. The state of Lieto's triangle, the shape and location of the orifices were also assessed, the length of the submucosal section of the ureters was calibrated, and the degree of hydrodilatation was determined. Then the second stage proceeded directly to the endoscopic correction of reflux, for this purpose special injection needles (P. Puri needle) on flexible tubular nylon conductors and biopolymer material (Dam Plus, AquaTouch Jelly). In the treatment of patients with endoscopic methods of treatment, 3 methods were used: - STING technique - Subureteral Transurethral Injection) - the introduction of a polymer into the wall of the bladder below the mouth of the ureter - HIT Method - Hydrodistention Implantation Technique) - the introduction of a polymer into the distal portion of the intramural ureter; - Double

HIT2 method - injection of the polymer into the distal and proximal parts of the intramural ureter.

Endoscopic transurethral correction of

Table 2. The nature of the performed endoscopic interventions for megaureter in children

| Severity | Endoscopic treatments | | | Total |
|----------|-----------------------|-------|--------|-------|
| | STING | HIT I | HIT II | |
| Easy | 2 | 1 | 2 | 5 |
| Medium | 2 | 3 | 3 | 8 |
| heavy | 1 | 2 | 3 | 6 |
| Total | 5 | 5 | 8 | 19 |

At the initial stages of the study, for all degrees of severity of the megaureter, the STING method was used, which, as experience has shown, does not always provide a positive result, especially in moderate and severe VUR. Subsequently, with moderate and severe degrees of megaureter, endoscopic correction was performed according to the HITI and HITII methods [10].

Postoperative stay of patients in the hospital averaged 1.93 ± 0.32 days (1-3 days). Patients were discharged with a recommendation to drink plenty of water and take uroseptics. The dynamics of emptying the pyelocaliceal system and the ureter was assessed under ultrasound control, which was performed after 1 month. Re-hospitalization was carried out after 3-6 months, depending on the persistence or relief of clinical signs of the disease. The results of the correction were evaluated by excretory urography and voiding cystography.

In 23% of patients in the immediate postoperative period, developed transient complications (exacerbation of cystitis and pyelonephritis, dysuria) were eliminated by conservative measures, using broad-spectrum antibiotics (cephalosporins of the II and III generation) and uroseptics (canephron, tutukon), as well as selective

antispasmodics (Oxybutynin), effectively relaxing the detrusors .

refluxing forms of megaureter was performed in all three degrees of severity: mild, moderate and severe.

antispasmodics (Oxybutynin), effectively relaxing the detrusors .

When evaluating the results of correction according to HIT 1 in terms of 3-6 months. after treatment of an average degree of megaureter , in all 5 patients, an expansion of the upper urinary tract was not observed on excretory urography. On 4 (83.3%) ureters, a positive result was noted, on 1 (11.1%), a decrease in the degree of reflux by 1-2 degrees was registered, on 1 (5.6%) - no changes, i.e. the degree of reflux was maintained.

The best results of endoscopic correction of RA were achieved when performing HIT 2 surgery in patients with moderate and severe degree. Positive results within 3-6 months. after the intervention were noted in 8 (87.9%) ureters, in 5 (8.6%) - a decrease in the degree of reflux by only one degree, in 1 (3.4%) cases, a severe degree of reflux remained.

When choosing the type of operation, they relied on the functional state of the kidney and the degree of preservation of the dynamic activity of the ureter. Loss of kidney function due to irreversible destructive changes in the parenchyma was considered a contraindication to reconstructive plastic surgery. In connection with the complete loss of kidney

function, 8 patients underwent primary nephroureterectomy .

Taking into account the ability of the ureter to sharp stretch under the influence of urinary retention and no less striking contraction after obstruction removal, which is a feature of the ureter in children, predominantly of early age, neoimplantation of the ureter without narrowing was performed if its diameter did not exceed 1 cm.

If the ureter had a diameter of 2 cm or more, then it was narrowed for 3 cm 5 cm to a size of 1 cm 1,5 cm in diameter and neoimplanted into the bladder with passage in the submucosal layer for no more than 2 2.5 cm. the ratio between the diameter and length of the submucosal ureter was observed as 1 to 2 or 1 to 2,5 cm. Synthetic absorbable sutures on an atraumatic needle of the Vycril type were used as suture

material. Plus 4/0 -5/0, Monocryl 4/0 -5/0, and Vycril Rapid 3/0-4/0.

Regardless of whether the refluxing or obstructive type of megaureter, the surgical tactics consisted in resection of the ureterovesical segment of the ureter and subsequent neoimplantation into the bladder with antireflux protection.

When choosing the type of surgical treatment of the megaureter , the state of the contralateral kidney, the frequency of exacerbation of obstructive pyelonephritis, the preservation of the renal parenchyma, and the degree of ureteral dysplasia were taken into account. When determining the surgical tactics, the stage, the degree of the megaureter , the functional state of the kidney, the presence of complications and their nature were taken into account. Types of reconstructive plastic surgery are shown in the table.

Table 3 . Number and type of operations depending on the cause of MG

| Type of operation | Cause of MG, Degree | | | | | | TOTAL |
|--------------------------------------|---------------------|----|-----|-----------|----|-----|-------|
| | obstructive | | | Refluxing | | | |
| | I | II | III | I | II | III | |
| Politano Ledbetter | - | 5 | 6 | 4 | 3 | 6 | 24 |
| Cohen | - | 4 | 5 | 4 | 4 | 3 | 19 |
| Extravesical ureterocystoanastomosis | - | 3 | 7 | 1 | 5 | 5 | 21 |
| nephroureterectomy | | | 2 | | | 6 | 8 |
| TOTAL | - | 12 | 18 | 9 | 12 | 21 | 72 |

As can be seen from the table, the operation Politano-Leadbetter was performed in 24 children with MG. Cohen's operation - y 19 Extravesical ureterocystoanastomosis was performed in 21 children. In patients with exacerbation of COP, the complex of preoperative preparation included antibacterial therapy (cephalosporins II and III generation) and uroseptics (canephron , tutukon), as well as selective antispasmodics (Oxybutynin) . Antibiotics

were selected individually, according to the sensitivity of the urine microflora. Good results have been obtained from the use of antibiotics in combination with ceftriaxone with metrid , gentamicin with amoxicillin or amoxiclav + nitrofurantoin preparations . Antibacterial treatment was carried out in combination with vitamin therapy, according to indications, by blood and plasma transfusion . The criterion of readiness for surgery was the good general

condition of the child, the absence of inflammatory changes in blood tests. In children with bilateral lesions, preoperative preparation was aimed at reducing azotemia and restoring acid-base balance.

To analyze the success of the operations, X-ray planimetry was used, as is known, ES and voiding cystography to this day remain reliable criteria in the evaluation of surgical treatment of megaureter in

children. In this regard, comparison of the data of mathematical analysis of ES and cystograms, in our opinion, is a reliable criterion for evaluating the performed reconstructive plastic surgery for megaureter in children (Table 4.5).

Table 4. Indicators of X-ray planimetry data in children with obstructive megaureter, depending on the degree of the disease before and after surgery.

| Degree | X-ray data | | | | | |
|----------------------|------------|-----------|-----------|-----------|-----------|-----------|
| | length | D1 | D 2 | D3 | VMO | RMO |
| III degree | 14.2±0.3 | 2.4±0.03 | 2.3±0.03 | 2.6±0.05* | 67.9±0.7 | 1.2±0.02 |
| II degree | 12.0±0.5 | 2.0±0.1 | 2.1±0.06 | 2.3±0.07 | 50.4±7.3 | 1.0±0.04 |
| After the operations | 10.8±0.3 | 1.14±0.06 | 1.21±0.06 | 1.06±0.06 | 11.8±1.06 | 0.57±0.02 |

Table 5. Indicators of X-ray planimetry data in children with reflux megaureter, depending on the degree of the disease before and after surgery.

| Degree | X-ray data | | | | | |
|----------------------|------------|-----------|-----------|-----------|------------|-----------|
| | length | D1 | D 2 | D3 | VMO | RMO |
| III degree | 17.0±0.6 | 2.4±0.02 | 2.0±0.01 | 2.3±0.05 | 60.7±1.7 | 1.1±0.01 |
| II degree | 9.5±1.1 | 1.7±0.09 | 2.11±0.2 | 1.8±0.1 | 31.27±6.02 | 0.98±0.06 |
| After the operations | 10.5±0.2 | 0.95±0.08 | 0.97±0.08 | 0.85±0.07 | 7.4±0.8 | 0.46±0.02 |

As can be seen from the tables, with megaureter, regardless of the cause after surgery, after 3-6 months, with good and satisfactory results of treatment, there is a significant decrease in X-ray planimetric parameters. Decreased RMO - the average value of the radius of the obstructive ureter, VMO - the volume of the obstructive ureter,

the length of the ureter and the diameters of the upper, middle and lower thirds of the ureters.

The analysis of the ES data indicated an improvement in the evacuation capacity of the new anastomosis, there was a pronounced narrowing, a decrease in length, and filling it with a contrast agent

not all the way, without the formation of knee-shaped bends. Also, for an objective assessment of the success of the operation, nephroscintigraphy was performed with a pharmaceutical preparation Tc ^{99m}

Technemag with the determination of the ureteral transit index before and after the operation. The total number of patients was 29, studied before surgical treatment and 3-6 months after.

Table 6. Indicators of ureteral transit in patients with obstructive megaureter before and after reconstructive plastic surgery

| Side of defeat | Before surgery | After operation |
|----------------|----------------|-----------------|
| sick | -14.8±1.73 | -1.1±0.000037 |
| Healthy | 0.62±0.00012 | |

Table 7. Indicators of ureteral transit in patients with reflux megaureter before and after reconstructive plastic surgery

| Side of defeat | Before surgery | After operation |
|----------------|----------------|-----------------|
| sick | -12.45±0.19 | -7.47±0.13 |
| Healthy | 0.87±0.00012 | |

Conclusions. The results of the examination revealed that the rhodynamic characteristics of positive results after endoscopic correction of MG within 3-6 months indicated a clear dependence of the treatment results on the method of forming a bolus in the ureterovesical segment: with mild severity, the STING method was effective, with moderate degree - HITI and severe - HITII.

When studying the urodynamic characteristics of positive results in children with megaureter in groups with Politano-Leadbeter and extravesical ureteral reimplantation showed better results. Surgical correction in children was performed at the age of 5.60±0.43 years, and due to the complete loss of kidney function, nephroureterectomy was performed in 8 children. In violation of the closing function of the ureterovesical segment, the first clinical signs appeared at the age of 2.83±0.30 years, surgical correction in children with this pathology in this group was performed at the age of 6.80±0.33 years.

With the right technique, timely endoscopic and surgical correction allows you to get a high percentage of positive results.

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