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MEGAURETHER IN CHILDREN

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The monograph is devoted to the problem of congenital megaureter in children. The book describes traditional and modern diagnostic methods such as the integral capture index and ureteral transit of urine. Data on endoscopic methods of operations such as high-pressure balloon dilation and the introduction of a volume-forming substance are presented. Methods of open neo-implantation operations on the ureterovesical segment are also considered in detail.

For pediatric surgeons, pediatric urologists, family doctors and other specialists.

LIST OF ABBREVIATIONS

UUT - upper urinary tract

DNSG - dynamic nephroscintigraphy

ICI - integral capture index

UUT - urinary tract

MG - megaureter

MCUG - micturition cystourethrography

MSCT - multislice computed tomography

MPS - ureterovesical segment

UTI - ureteral transit of urine

OM - obstructive megaureter

VUR - vesicoureteral reflux;

RM - refluxing megaureter

fig . - drawing

SNSG - static nephroscintigraphy

Ultrasound - ultrasound examination

$T_{1/2}$ - half-life of the radiopharmaceutical;

T_{max} - time of maximum accumulation of radiopharmaceutical

COP - chronic obstructive pyelonephritis

CRF - chronic renal failure

EU - excretory urography

CDK - color Doppler mapping

PLS - pyelocalyceal system

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INTRODUCTION

Megaureter is a pathology of the urinary system, which is one of the severe developmental defects. According to the World Health Organization (WHO), the frequency of occurrence and structure of diseases in children and adolescents occupy one of the leading places among the pathologies of all organs and systems. According to researchers, megaureter accounts for 40% of diseases in this group. Urodynamic disorders contribute to the development of chronic obstructive pyelonephritis and in 23-27% of cases in children can lead to chronic renal failure (CRF).

Every year, a large number of scientific studies concerning the problem of ureteral obstruction in children are published in scientific journals and in medical conference programs. The interest of pediatric urologists is caused by the high frequency of occurrence and the increase in the number of prenatal and early diagnostics of this disease at all levels of health care, the lack of a unified opinion on the factors of its development and, consequently, the use of many different methods of surgical correction, as well as preoperative algorithms for preparing the patient for treatment and the appointment of postoperative care and drug treatment.

Among patients of early age with congenital pathologies development - congenital anomalies of urinary paths meet up to 40% of cases . The majority of congenital anomalies of urinary path are diagnosed at age from several months up to 10 years old , there are cases of sudden diagnostis during researc regarding other complaints . Big meaning plays level of development in diagnostic methods and general level of medicine in each region .

In most cases, the manifestation of congenital anomalies of the ureters in children depends not so much on the stage as on the time of onset of the disease and the presence of secondary complications in each patient, their appearance and increase.

Recently , authors mentioned that the trend of increasing cases of diagnosis of megaureter continues. The obstruction of urine flow caused by this disease is the

condition for pyelonephritis and further deformation (scarring) of the renal parenchyma with loss of function of this organ. In late diagnostics and incorrect treatment strategy in 23-27% of children develops one of the most formidable complications - chronic renal insufficiency .

At present, the evaluation of the results of surgical treatment is mainly carried out on the basis of ultrasound and X-ray examination methods. These methods only allow visual and sufficient subjectively assess the dynamics of the disease without taking into account their ability to adequately transport urine.

At present, within the framework of the development of the national health care system, many initiatives are being undertaken to improve the effectiveness of surgical treatment of children suffering from congenital anomalies of the urinary system. In this direction, in particular, the possibility of early diagnosis, minimally invasive and rational methods of surgical treatment of megaureter and obstructive uropathies in general are taken into account.

HISTORY OF THE DEVELOPMENT OF THE VIEW OF MEGAURETHER IN CHILDREN

In 1923, Caulk found a patient with distal ureteral dilation without hydronephrosis and called the condition megaloureter . Thirty years later, Swenson identified neurogenic causes of megacolon and megaureter and treated his patients with urinary diversion, skin ureteralization, intestinal augmentation, and forced peristalsis. Stephens , Nesbitt , and Withycombe recommended observation,

doubling of fluid intake, and removal of the abnormal kidney with dilated ureter when urinary tract infection developed. They developed operations and approaches to the ureter.

Johnston , Hendren , and Creevy proposed surgical treatment by removing the distal (narrowed) section of the ureter and implanting it into the bladder, similar to surgeries for VUR. Williams demonstrated with his studies that primary megaureter with less pronounced manifestations can undergo regression and gradual healing over time with excellent clinical and radiological remote results.

Thus, according to B. Haid (2017), megaureter is the result of a congenital defect in the development of the ureter, which is accompanied by a violation of innervation and the antireflux mechanism or its absence. The presence of various approaches to the timing of a particular diagnostic measure or the choice of treatment method depending on the causes makes this area a very relevant section of pediatric surgery.

In the works of Menovshchikov L. (2015) it is indicated that the surgeon's tactics for megaureter depend on age, type of disease and severity of urodynamic disorders .

In most clinical cases , conservative (drug) treatment of megaureter is ineffective or ineffective overall and depends not only on the degree of the disease, but also on the duration of the disease and the presence of concomitant pathologies.

Currently, according to studies conducted by Lin (2022), the standard in megaureter surgery is open ureteral transplantation (reimplantation) with adherence to the principle of implementing antireflux protection mechanisms, most often using the technique proposed by Co hen in 1972, or the Politano - Лeadbetter method , developed somewhat earlier, in 1958. These operations are well studied, time-tested and show an efficiency of more than 90 % , according to many studies.

However, there are limitations in the use of this type of surgery, especially in infants, where the technical aspects of the method may clash with anatomical

features, such as a pronounced discrepancy between the size of the dilated ureter and bladder in relation to age. Therefore, the choice of reconstructive plastic surgery at any stage of megaureter does not always seem questionable. Minimally invasive surgical intervention methods, such as laparoscopic and vesicoscopic ureteral reimplantation are currently being actively developed.

As a minimally invasive alternative to reimplantation , according to Shumaker A. (2023) transurethral endoscopic stenting of the urethrovesical segment is proposed with an efficiency of 50% to 90%, according to data from various authors.

However, in the course of the research conducted by Carrol D. (2010) the effectiveness of stenting varies significantly depending on the investigator and the technique. For example, studies conducted by Carrol D (2010) showed the efficiency of the method from 40% to 90%. While in the works conducted by Pavlov A.Yu. (2015) the results were less impressive, amounting to about 50%.

Ortiz (2018) emphasizes the potential of the method of high-pressure balloon dilation of the urethrovesical segment followed by internal stenting. This method, which was introduced relatively recently, also shows good results with an efficiency of 65% to 85%.

However, some unresolved issues remain, such as defining the best efficacy criteria and comparative studies of different treatments in homogeneous age groups of patients.

More detailed studies are needed to determine the best treatment methods for this disease in children depending on the different conditions and age characteristics of the patients.

The ureterovesical segment (UVS) is a structure that is important both anatomically and functionally. The components of this segment are the ureteral orifices, submucosal, intramural , and juxtavesical sections.

The main function of this segment is to ensure the unimpeded outflow of urine excreted from the kidneys through the ureters into the bladder and to prevent urine reflux. The mechanisms of transport in the ureterovesical segment

remain a subject of debate. For example, according to Yu.A. Pytel et al. (1986), the main factor providing transport is the suction mechanism, in which there is a sharp decrease in the tone and diameter of the ureter, and the excreted urine flows into the bladder.

Megaureter , considered as a malformation of the urinary system, which can be characterized by neuromuscular dysplasia of its walls, is pathology of functional work, combination with a source of renal tissue and hidden variants of disorders of the ureter.

Deterioration of urodynamic parameters often leads to the development of chronic obstructive pyelonephritis (COP) in childhood, ultimately becoming one of the causes of chronic renal failure in 23-27%.

In pediatric urology, the problem of megaureter is one of the most controversial and relevant, this pathology often leads to various kidney complications, which negatively affects the child as a whole. This state of affairs is due to several factors:

- Disruption of the normal outflow of excreted urine through the ureter prevents the effective evacuation of microbial flora penetrating and developing in the urinary tract, causing acute and chronic inflammation of the kidneys.
- The negative effect on intrarenal blood flow is influenced by the increase in hydrostatic pressure in the renal system.

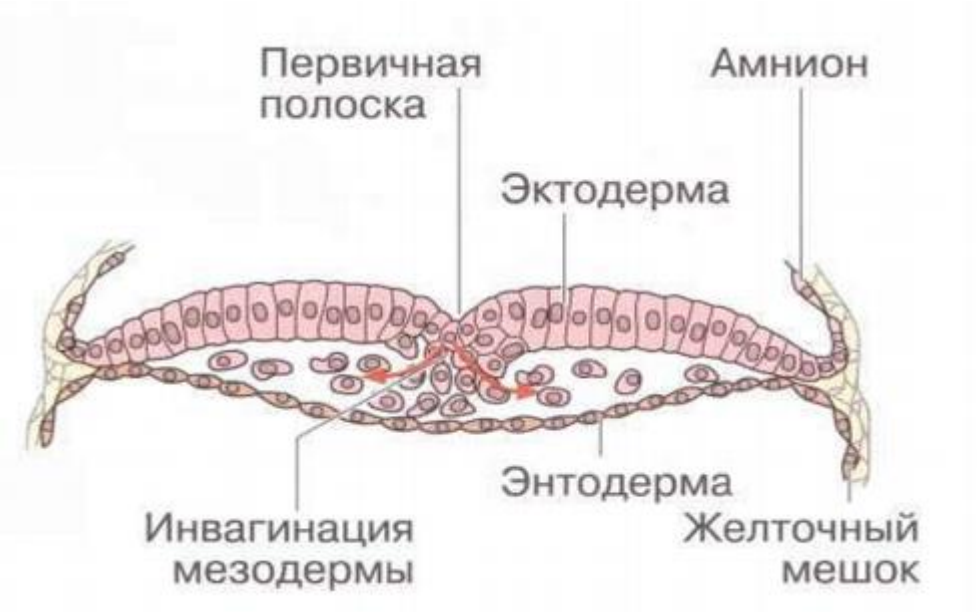
Surgical intervention is required for megaureter , accompanied by a constantly recurring course of pyelonephritis, which causes a sudden decrease in kidney function, and is also accompanied by acute urinary retention. The essence of the operation for this disease is the restoration of urine flow through the urinary tract, which is the main goal of treatment and prevention of complications of megaureter and reducing the number of children with disabilities .

AGE-RELATED CHARACTERISTICS AND DEVELOPMENTAL MALFORMATIONS OF THE UROGENITAL SYSTEM

The development of the urinary and genitourinary ducts is a single process in embryogenesis. Based on embryological data, the genitourinary system can be divided into two parts:

- kidneys and urinary tract (urinary system)
- reproductive system

These two systems develop from the middle germ layer (mesoderm) and during embryonic development initially open together into a common cavity, the cloaca.



Cross-section of the embryonic disc; in the region of the primitive streak, cells migrate inward and form the middle germinal layer, the mesoderm, between the ectoderm and endoderm

During embryonic development (at 3 weeks), the mesoderm differentiates into three parts:

1. Dorsal segmented part – somites

2. The ventral unsegmented part, which is divided into the somatopleura and splanchnopleura , forming the lining coelomic cavity.

3. The intermediate part, which connects the dorsal and ventral parts of the mesoderm.

It is from the intermediate part of the mesoderm that the excretory organs of a human are formed. The slide shows the beginning of differentiation of the mesoderm and a cross-section of the embryo

During embryonic development, the urinary system goes through three stages (phases):

Stage I - formation of the pronephros (anterior or head kidney, since it is located in the cranial part of the embryo).

The pronephros consists of several segmentally located primitive tubules, the so-called protonephridia .

- **One end** of these tubules, opening into the secondary body cavity, is expanded in the form of a funnel and is provided with cilia. Arteries, branching off segmentally from the aorta and anastomosing with each other, form a vascular glomerulus near the funnels of the protonephridia .

- **The second end** of the protonephridia opens into the excretory duct of the pronephrine , which flows into the cloaca.

The canals form the pronephros duct (Leiden duct), which opens into the cloaca.

Stage II – formation of the primary or trunk kidney, mesonephros (Wolffian body), which is laid down caudally in relation to forebrains **.**

The Wolffian body is a system of 20-25 segmental, highly convoluted tubules (metanephridia).

- **One end** of the tubule already resembles a double-walled cup, enclosing the vascular glomerulus.

- **The second end** of the metanephridia flows into the excretory duct of the pronephric kidney , which is now called the mesonephric duct, or Wolffian duct, which opens into the cloaca.

The perimesonephric duct or Müllerian duct, is formed from the mesothelium near the Wolffian duct .

Stage III – formation of a permanent or final kidney.

The metanephros (secondary or pelvic kidney) is laid down in the embryo in the 2nd month of the intrauterine period.

It has a dual origin – from metanephrogenic tissue and the metanephric duct.

-The caudal end of the metanephric diverticulum lengthens, from which the ureter is formed, at this stage there is still a connection with the cloaca.

- The cranial end, growing into the metanephrogenic tissue, expands - the future renal pelvis, then outgrowths form on it, from which the large and small renal calyces will form, and then the collecting tubules.

Simultaneously formation of nephrogenic tissue into renal tissue occurs .

All the excretory ducts of the definitive kidney arise from the Wolffian duct, and the urinary tubules and Malpighian glomeruli arise from nephrogenic tissue. From the dorsal wall of the Wolffian duct, where it empties into the cloaca, a blind protrusion with a widening at the end is formed, which grows upward in the direction of the nephrogenic cord. Soon the widened end of this protrusion is surrounded by nephrogenic tissue.

The ureteral rudiment (formed in the 5th-6th week of embryogenesis from the material of the Wolffian ducts) grows in two directions.

- Cranially, it connects with the metanephros , divides, giving rise to the growth of the pelvis, calyces, and then the collecting ducts, growing into the metanephrogenic blastema and stimulating the development of the kidney.

-The caudal end of the ureteric rudiment gradually reaches the urogenital sinus, separates from the cloaca and transforms into the ureterovesical segment.

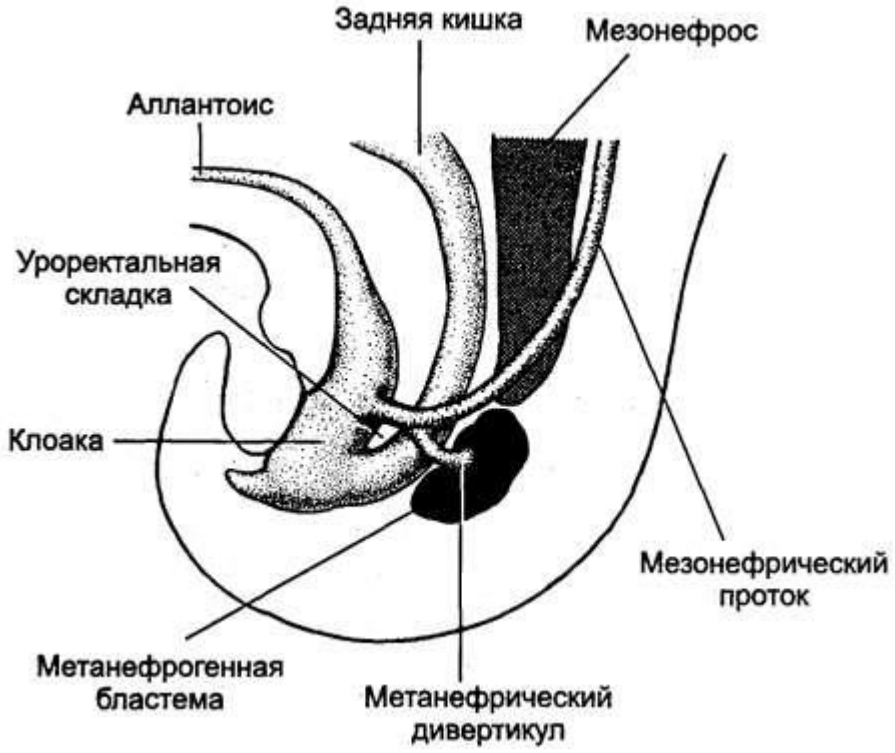
Changing from a tubular form to a leaf form, the ureters open into the lumen of the bladder with pinpoint openings. In the intrauterine period, these openings are covered with a thin membrane (Hwall's membrane);

The development of the urinary bladder and urinary tract is associated with the transformation of the cloaca.

The urinary bladder is formed during the 2nd month (at 5 weeks) of embryogenesis. At the same time, the urorectal septum is introduced into the cloaca in the frontal plane, the elongation of which leads to the division of the urogenital

sinus, into which the Wolffian and Müllerian ducts flow, and the rectum in embryos of 6-7 weeks .

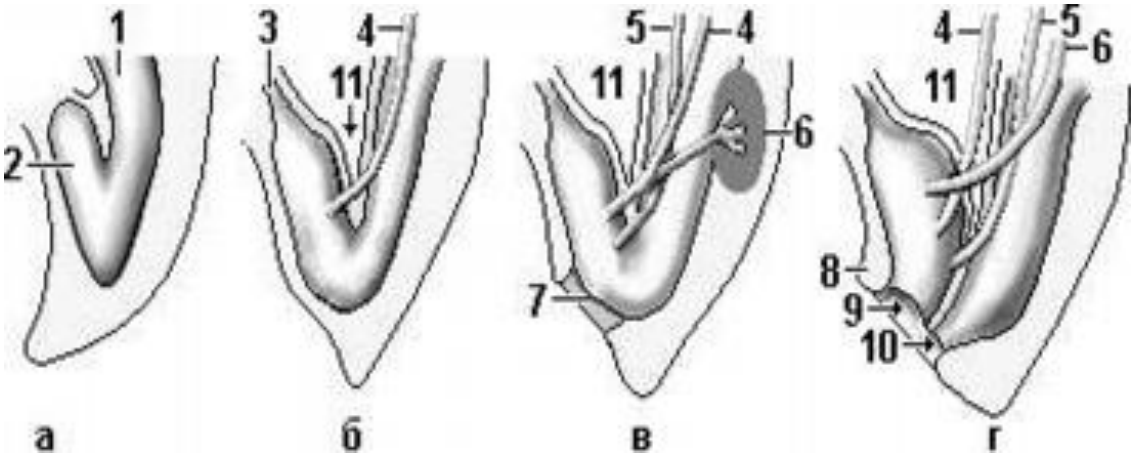
However, it is important to remember that the epithelium of the posterior wall of the bladder, where the Wolffian duct enters, develops from the mesoderm - the triangle of the bladder. And the rest of the bladder is a derivative of the endoderm.



Urethra. At the 4th-7th week of gestation (the length of the embryo is 6-13 mm), under the influence of testosterone from the fetal testicles, differentiation of the rudimentary epithelium of the lower urinary tract and closure of the urethral groove occurs .

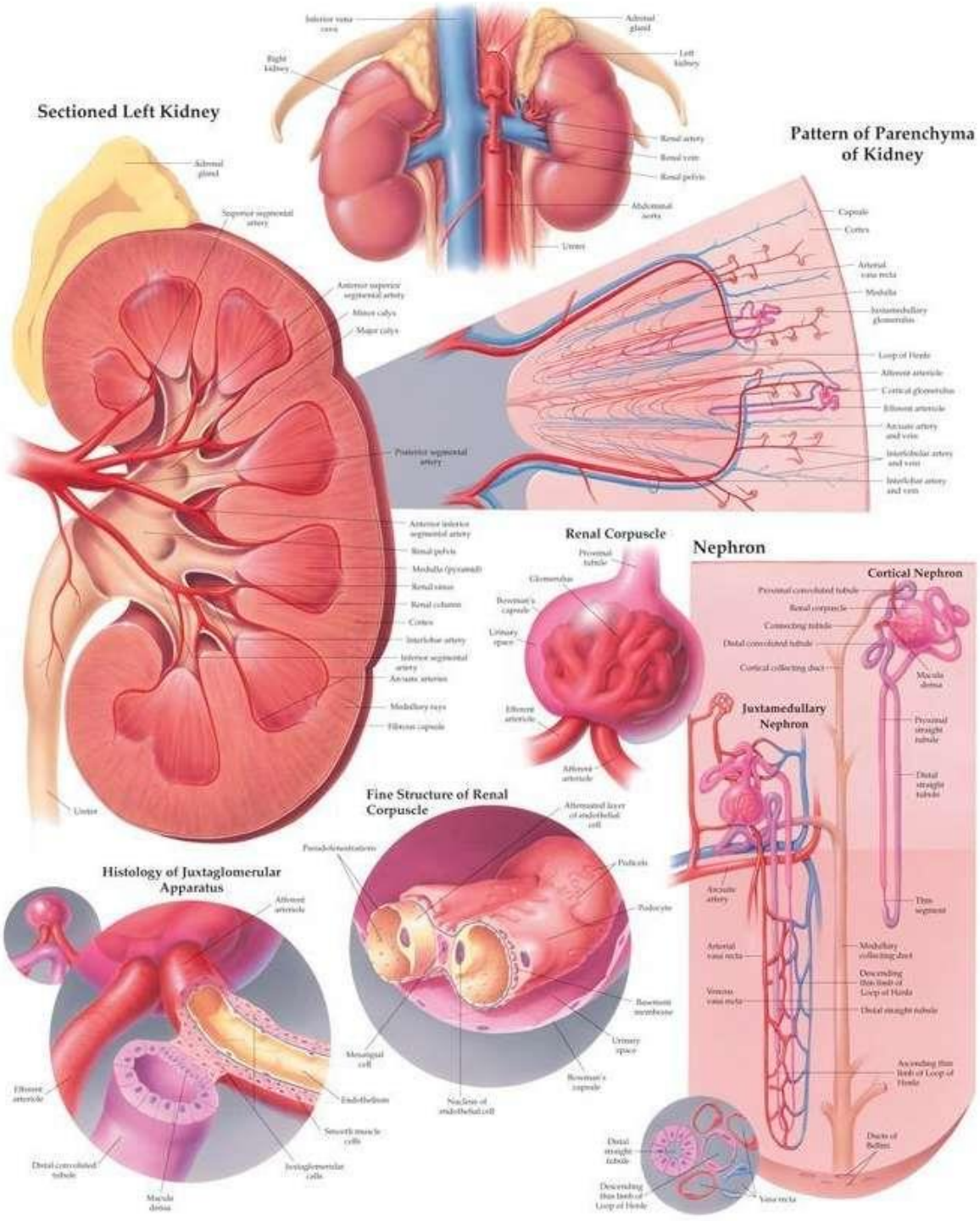
Of practical importance are also the changes occurring with the urinary duct - urachus , which serves in the embryo and fetus to divert primary urine into the amniotic fluid. This is the allantoid stalk - a tubular formation originating from the top of the urinary bladder and going to the navel.

Normally, at the 20th week of intrauterine development (fetus 25 cm long, weighing 340 g), the urachus obliterates and turns into the median umbilical ligament.



Development of the urinary bladder (sagittal section; a - 2nd week of intrauterine life of the fetus; b - 3rd week; c - 5th week; d - 7th week). *1 - primitive intestine; 2 - allantois ; 3 - urachus ; 4 - Wolffian duct; 5 - Müllerian duct; 6 - metanephros and ureter; 7 - cloacal membrane; 8 - genital tubercle; 9 - urogenital sinus; 10 - anus ; 11 - coelom (abdominal cavity; excavatio rectovesical).*

After birth, the kidneys have a relatively large mass (2 times more in relation to body mass compared to adults). □□ The high physiological mobility of the kidneys in young children during breathing and when changing body position is due to the relatively long and stretchable —renal pedicle, weak development of the fibrous capsule and perirenal tissue. Kidneys up to 2-4 years retain a lobular structure, which determines their uneven surface. □□ The lymphatic vessels of the kidneys are closely connected with the intestinal vessels, which is the cause of infection of these organs from each other.



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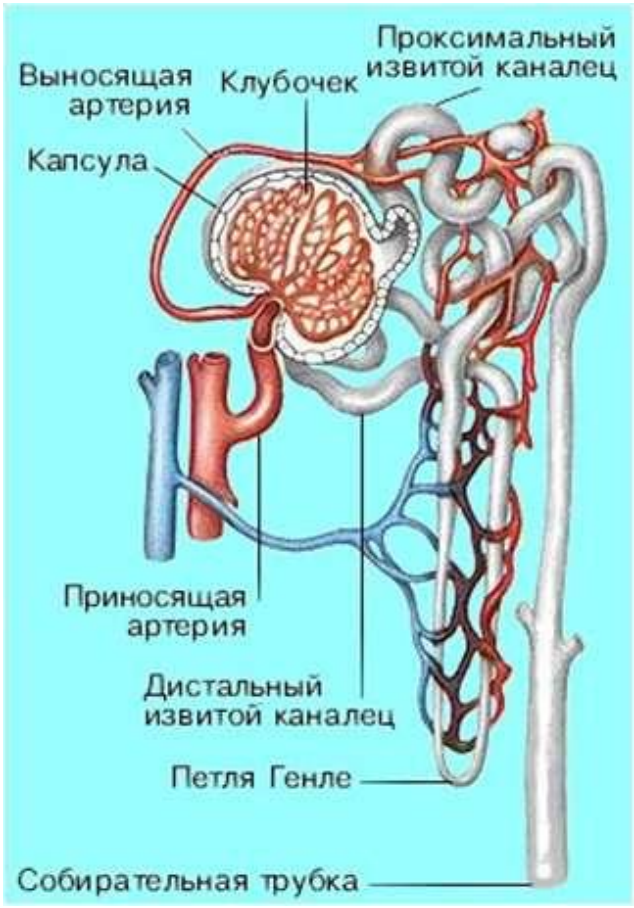

The lymphatic vessels of the kidneys are closely connected with the vessels of the intestine, which is the reason for the infection of these organs from each other.

In children under two years of age, the nephron is not differentiated enough. In the fetus and newborn, the visceral layer of the renal glomerulus capsule consists of cuboidal epithelium, which makes the filtration process difficult. In children under 2 months , cuboidal epithelium is present in all renal glomeruli; in the 4th month of a child's life , flat epithelium begins to appear in the glomeruli located closer to the medulla, and by 8 months , flat epithelium is also found in the peripheral glomeruli.

At the age of 2-4 years, the child reamains of cubic epithelium can still be found; after 5 years, the structure of the glomeruli becomes the same as in adults.

The process of morphological maturation of the glomerular barrier includes flattening of the endothelial cells, the appearance of holes in them (fenestra), the formation of a common basement membrane between the endothelium and podocytes , and the formation of podocyte legs (cells of the visceral epithelial layer of the Shumlyansky -Bowman capsule).

Topography . The topography of the kidneys changes with age, since the child's body growth is many times faster than the growth rate of the kidney. Due to the relatively large size of the kidneys and the relatively short lumbar spine, the

kidneys in a newborn are located lower than in older children, the lower pole of the kidney is located below the iliac crest.

The upper pole of the left kidney is projected at the level of the lower edge of ThXI , and the right one is located lower by half the height of the vertebra. By 3-5 months, the upper edge of the left kidney drops to the middle of ThXII , and by 1 year - to its lower edge, which is associated with the rapid growth of the spinal column.

The lower pole of the kidney in children over 2 years of age is located above the iliac crest. After 5-7 years, the position of the kidneys relatively to the spine is similar to adult. The difference in the position of the contralateral kidneys normally does not exceed the height of the body of one lumbar vertebra. The kidneys in young children are located almost parallel, only at an older age does their upper poles converge.

The "renal pedicle" in a newborn is relatively long, its constituent artery and veins are located obliquely. Subsequently, the "renal pedicle" gradually assumes a horizontal position.

The perirenal tissue in newborns and young children is underdeveloped, so the anterior surface of the kidneys is separated from the surrounding organs only by a thin layer of parietal peritoneum.

Weak development of the perirenal tissue, as well as the pre- and retrorenal fascia, determines the significant mobility of the kidneys in young children. An increase in the volume of perirenal tissue occurs by 8-9 years of age during the period of reduction of the subcutaneous fat layer. By this age, the formation of the fixation mechanisms of the kidney is completed.

Normally, in older children, the kidney shifts no more than 1.8% of the body length.

Capsule fibrosa of kidney becomes pronounced by the age of 5 years , and by the age of 10-14 years its structure approaches that of an adult.

The surface of the kidney in newborns and young children is knobby due to the lobular structure of the kidney. The knobbly appearance of the kidney persists for up to 2-5 years, and then gradually disappears.

In young children, the thickness of the renal medulla is greater than the thickness of the cortex (4:1). The development of the cortex is particularly intensive at the age of 5-9 and 16-19 years. □□ Its mass increases due to the growth in length and width of the convoluted tubules and ascending parts of the nephron loops. The growth of the medulla ceases by the age of 12.

In general, starting from the neonatal period , the thickness of the cortical layer increases by 4 times, and the medulla by 2 times.

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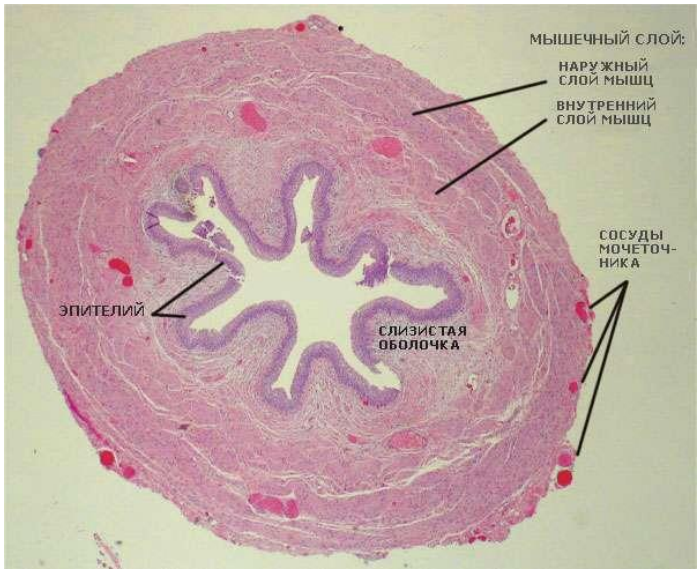
Kidney development after birth is particularly intensive during the first year of life and continues until the age of 20-22. Moreover, during the first three weeks, new nephrons are formed, and then further growth of the kidney occurs due to the increase in mass and differentiation of existing structures: the diameter of the glomeruli , the length and diameter of the tubules, especially the thin segment of the loop of Henle , increases, the structure of the renal epithelium changes. □□ The kidneys begin to function in the 9th week of intrauterine development, excreting

urine into the amniotic fluid, thus participating in the regulation of the water-electrolyte balance of the embryo. However, the main organ that regulates homeostasis and excretion of metabolic products in the fetus is the placenta.

The functional maturation of the kidneys after birth occurs very quickly and the main processes occurring in them approach those of adults by the age of 2.

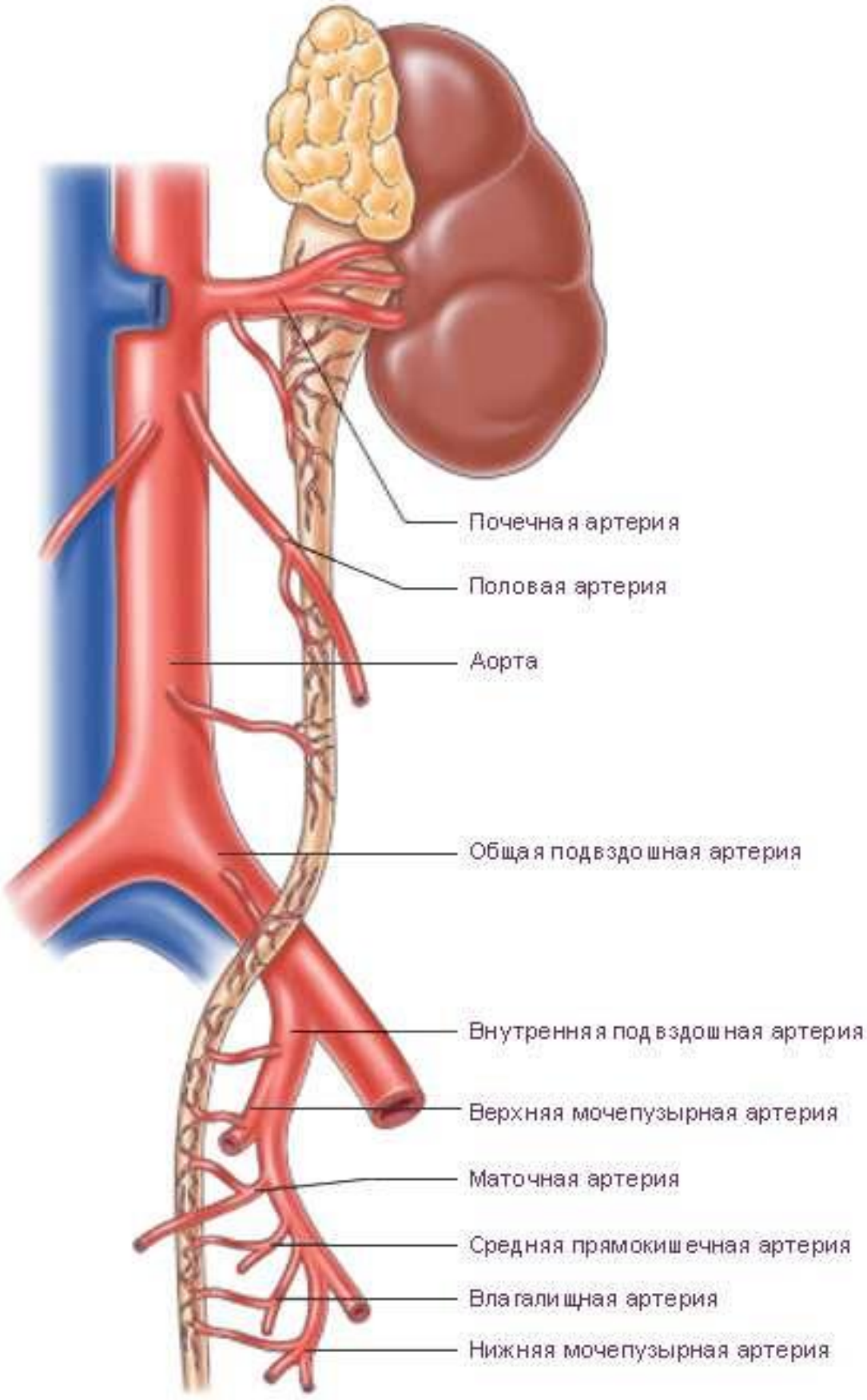
The optimal level of kidney function is reached by 10-11 years, and the maximum by 18 years.



The urinary tract is also not mature enough at birth. The renal pelvis is relatively well developed, it is wide, its walls are thin and hypotonic due to the weak development of elastic and muscle fibers. The renal pelvis in 90-91% of children at birth is located intrarenally (in adults - in 36%).

The ureters are relatively wider than in adults, hypotonic , have a tortuous course, are more mobile and easily displaced. Due to the weak development of the muscular layer in the first years of life, there are no clear contractile movements of

the renal pelvis and ureters, which, in combination with their hypotonia, creates conditions for urine stagnation even in healthy children.



The urinary bladder. In newborns, it is oval in shape and is located higher than in adults. At an early age, it is located higher, partially entering the abdominal cavity, which causes its significant mobility. The mucous membrane is well developed, relatively thick, delicate, the folds and lacunae are poorly developed. Elastic and muscle tissue are insufficiently developed, which is associated with low contractility and easy extensibility of the urinary bladder, and a small capacity with a large amount of daily urine explains frequent urination, but with age, the child's muscle layer and elastic fibers thicken. The capacity of the urinary bladder in a newborn is 50 ml, at 1 year - 200 ml.

Urethra. In girls, it is short, the external opening often gapes, and is located close to the anus; the external valves covering the entrance are poorly developed.

In boys at birth, it is 5-6 cm long and has a more pronounced curvature than in adults. The mucous membrane is thin, delicate, covered with easily exfoliated epithelium. The venous plexus system and elastic tissue are poorly developed, which causes its easy compression. □□ Weak development of the sphincters of the renal pelvis, ureters and bladder causes frequent occurrence of functional reflux (in 15% of healthy children), which, under unfavorable conditions, contributes to infection of the renal pelvis and interstitial tissue of the kidneys

ANOMALIES IN THE DEVELOPMENT OF THE URETERS

1. Anomalies in the number of ureters Agenesis (aplasia) of the ureter is the absence of the ureter. Usually combined with the absence of the kidney or its dysplasia. Can be unilateral or bilateral.

Ureteral duplication (syn .: double ureter) is a common defect, it can be unilateral or bilateral, complete (2 ureters with 2 renal pelvises and two openings in the urinary bladder) and partial (part of the ureter is doubled, the so-called split ureter). The level of splitting varies. Complete duplication is usually bilateral, partial - unilateral.

Ureteral tripling is a rare anomaly. It can be complete or partial (double ureter with one split).

Quadrupling of the ureter has also been described.

Complete doubling (tripling) occurs as a result of the formation of several ureteric sprouts; incomplete doubling occurs when a ureteric sprout divides before it is introduced into the metanephrogenic blastema.

2. Anomalies of the structure and shape of the ureters Ureteral atresia - occurs due to a violation or absence of canalization of the growing ureteral sprout, which is initially a compact cord . Usually it is localized in the ureteropelvic, vesicoureteric segments or at the level of intersection of the ureter with the iliac vessels. Can be unilateral or bilateral. Bilateral atresia is a lethal defect, accompanied by hydronephrosis and renal dysplasia.

The ureter often ends blindly and sharply expands above the atresia. Sometimes it looks like a fibrous cord.

Hydroureter – dilation and hydrocele of the ureter due to obstruction. May be combined with hydronephrosis or be an isolated defect.

Hypoplasia of the ureter is a segmental or total underdevelopment of the ureter. Segmental hypoplasia is most often observed in the ureteropelvic segment, total hypoplasia is usually combined with hypoplasia of the corresponding kidney, polycystic kidney disease or kidney dysplasia and is characterized by the presence of a very thin ureter along its entire length.

Ureteral diverticulum is a saccular protrusion of the ureter wall of varying size and location. The diverticulum wall contains the same layers as the ureter. It develops as an additional ureteral rudiment. It is most often observed in the perivesical region, usually on the right. It can be unilateral or bilateral.

Ureteral dilatation is a widening of the ureter with wall atrophy. It is usually a consequence of obstruction.

Ureteral dysplasia is characterized by a disorder in the structure of the muscular membrane of the ureter in the form of a disorder in the size and orientation of muscle cells. Macroscopically, it does not differ from megaloureter . The wall of the ureter is thickened. The process is usually bilateral.

Ureteral valves are a duplication of the mucous membrane. Sometimes valve-like folds consist of all layers of the ureter wall. Their direction can be transverse, annular, oblique, longitudinal. In 60% of cases, the valve is located in the upper third, in 20% - in the middle and in 20% - in the lower third of the ureter.

Megaloureter (syn .: achalasia of the ureter, atony of the ureter, neuromuscular dysplasia of the ureter, cystic dilation of the ureter , megaureter) – dilation and lengthening of the ureter, its wall is hypertrophied. It is based on neuromuscular dysfunction.

Annular ureter is a rare developmental defect in which the ureter is twisted into a ring in the middle part.

Congenital ureteral stenosis – occurs due to a disruption of the canalization of the growing ureteral sprout, which is initially a compact cord . It is usually localized in the ureteropelvic, vesicoureteric segments or at the level of the intersection of the ureter with the iliac vessels. It can be unilateral or bilateral.

Ureterocele (syn .: intravesical ureteral cyst, ureterovesical cyst , ureteral orifice hernia) – cystic expansion of the intravesical segment and protrusion of all layers of the ureteral wall into the bladder. Occurrence is facilitated by stenosis and ectopia of the orifice, impaired innervation of the lower segment of the ureter. It can be unilateral or bilateral, simple or ectopic, doubled or non-duplicated ureter.

Retroileal ureter – the ureter is located behind the iliac vessels. An extremely rare anomaly.

Retrocaval ureter (syn .: postcaval ureter , circumcaval ureter) – location of the ureter, usually the right one, behind the inferior vena cava. Occurs as a result of abnormal formation of the venous system in the fetus, when the posterior cardinal vein does not undergo normal reduction and is transformed into the inferior vena cava.

Ovarian vein syndrome – characterized by compression of the ureter by the ovarian veins, observed on the right side. Rare anomaly.

Ectopic ureteral orifice is an abnormal location of the ureteral orifice. It can be unilateral or bilateral. The ectopic orifice can open into the derivatives of the

urogenital sinus (lateral bladder triangle, bladder neck, urethra, paraurethral organs) or in derivatives of the paramesonephric ducts and intestinal tube (vagina, uterus, rectum). In men, the ectopic orifice is most often located in the posterior urethra, vas deferens, seminal vesicles, and epididymis. In women, it is in the vagina, uterus, and on the posterior wall of the urethra.

CLASSIFICATION OF MEGAURETHER

Currently, there are many classifications of this disease. In 1976, at the International Seminar of Pediatric Surgeons and Urologists in the USA, a consensus was reached regarding the standardization of terminology and classification of megaureter. The working group identified primary megaureter as an anomaly of the ureter itself and secondary megaureter as changes in the ureter in response to external influences.

The severity of megaureter is determined by morphological features according to the Pfister-Hendren classification , depending on the impact on the renal pelvis and calyces:

type I - dilated ureter (ureterectasia), but without hydronephrosis

type II - Both ureters are dilated along with the renal pelvis and calyces

Type III - Severe hydronephrosis with deformation of the ureters.

According to the classification criteria proposed by N. A. Lopatkin, three degrees of megaureter are distinguished, taking into account the diameter of the ureter:

A - achalasia of the ureter, B - megaureter , C - hydroureteronephrosis .

Various literature sources suggest the need to separate these types of disease into primary and secondary retention pathologies of the ureters.

According to the international classification, there are three groups: refluxing , obstructive and non-refluxing. non-obstructive . Each of the presented ones is also divided into primary and secondary.

Obstructive - obstruction of the ureter itself, the defect is usually located in the area of the vesicoureteral junction. Refluxing - the only anomaly present is reflux. Non-refluxing Non-obstructive - dilation of the ureter in the absence of both obstruction and reflux. Obstructive refluxing - obstruction of the ureter itself is aggravated by reflux.

Megaureter can be considered as a manifestation of dysplasia, in this case it manifests itself only in the cystoid zone , which is the last or penultimate. In these cases, it makes sense to consider the probability of moments of achalasia of the URES. This point of view on the etiology of the ureters explains the sharp increase in the ureter along its length or in a certain place and suggests the interpretation of achalasia and megaureter as stages of one process.

PATHOGENESIS OF MEGAURETHER DEVELOPMENT

Today, many pediatric urologists conditionally classify megaureter into two types. One of them is associated with a congenital defect in the development of the distal ureter and is conditionally divided into an obstructive type, as well as conditions caused by failure or disruption of the antireflux mechanism.

According to one of the fundamental views of Swenson (1956), the primacy of neuromuscular disorders is currently refused by the results of studies that prove the viability of nerve connections in the ureter and the similarity of the morphology of a narrowed ureter compared to a normally functioning one.

Underdevelopment or complete absence of ganglionic structures in the dilated area of the ureter may not always indicate damage to the nerve structures, since nerve cells in a normal ureter are mainly localized in the vesicoureteral segment. In the etiology of refluxing megaureter, the key role is played by pathology of the organization of muscle structures, more often in the distal section.

The embryology of the pathology was described by Tanagho (1973), the work was based on the study of the process of ureter development in the human

embryo, and is as follows: the distal part of the ureter is the last place where the muscular girdle is formed, and muscular differentiation begins with the circular layer. Unfavorable effects during pregnancy of the child's mother can cause the absence of longitudinal muscles with a predominance of circular muscle fibers, as well as the appearance of fibrous elements, which leads to a violation of the formation of the prevesical part of the ureter.

In the studies of Merlini E. (2005) no organic lesion was found in ureterovesical segment, it was interpreted as violation of urine evacuation linked with functional defeat. It was suggested that the excessively developed circular layer of muscle fibers.

In the study by Tokunaka et all. (1982), changes were described that can be either in a narrowed ureterovesical segment, where the main part is made up of muscle fibers, where they are grouped. In this case, a non-enlarged MPS has a physiological structure, and the detected changes in the ureter wall are interpreted as a lesion of muscle fibers of congenital etiology.

Gregoir et al. (1983) conducted a study of 45 resected ureters, these samples did not reveal any physiological structure. The following changes were noted: collagen hypertrophy (about 60%), muscular dysplasia (20%); fibroepithelial dysembryoplasia , associated with the disposition of the ureter wall. Also, the study noted a non-physiological arrangement of the vessels in the ureter, an increase in the diameter of the arteries compared to their veins, and the approximate surface area occupied by the arterial bed was calculated, which is 200 times larger than that of the ureter of a healthy person.

In the studies of Roth et al. (1983) it was described that the narrowed section of the ureter was characterized by single or multiple pathologies, such as dissociation of muscle fibers, sclerofibrosis and malformation.

Primary obstructive megaureter (POM) is a functional pathology. It is generally accepted that there is an aperistaltic ureter in the ureter segment that is the cause of the disturbance of the peristaltic movements of the ureter and,

also, disrupts the outflow from the upper urinary tract. Today, there are theories regarding the formation of the obstructive form of this disease. In the research of scientists proven developmental disorders or insufficient development of longitudinal muscle fibers in these segments and hypertrophy of compressive circular muscle, leading to narrowing.

Secondary obstructive megaureter is a process that occurs in relation to increased intravesical pressure. The most common factors may be developmental disorders in the spine and neurogenic changes in the bladder.

DIAGNOSTICS

Despite modern diagnostic methods and medical progress, this problem remains important in the context of preventing renal failure and associated complications.

The introduction of antenatal ultrasound diagnostics is a significant step in the early detection of urinary tract anomalies in the fetus. However, despite this progress, megaureter remains one of the main causes of renal failure in children.

Further research, development of new diagnostic and therapeutic methods, and training of medical personnel for early detection and effective treatment may help improve outcomes in this area. Joint efforts of specialists in pediatric urology and urinary tract diagnostics may lead to optimization of the diagnostic and therapeutic process, improved prognosis, and decreased risk of complications in children with megaureter.

To date, there has been considerable disagreement among experts regarding the role of radiation diagnostic methods in this disease. The description and evaluation of the results of their use remain insufficiently perfect, especially from the point of view of considering organs as a single system. Issues related to differential and topical diagnostics of congenital obstructions of the urinary system using radiation methods remain unclear.

Also, when treating patients with megaureter, the attending physician has difficulty determining the indicators of reversibility of changes in the urinary system in the postoperative period and the effectiveness of surgical correction.

The first essays on the possibility of determining the amount of urine coming out of the ureters using ultrasound appeared in scientific literature in the late 80s of the twentieth century. Scientists Kremer et all, showed an experiment with a rubber ball filled with a solution of NaCl and for the first time explained the phenomenon of urine flow. In the works it was shown that the urine flow from the urinary tract can be shown when the specific gravity in two balls differed from each other by at least 0.010 g/ml. After the experiments, it was proposed to carry out a diuretic load on patients, since the density of urine from the ureters and urine in the bladder differed in specific gravity.

Development of ultrasound methods of the kidneys and urinary tract in the prenatal period allows to make a diagnosis in 76% of cases at 16-23 weeks of intrauterine development in 76% of cases, and in 100% of cases after 24 weeks. Studies show that in 58% of cases in children with obstructive megaureter there are no violations of renal hemodynamics. Increased resistive characteristics of arterial renal blood flow are detected only in 16% of cases, which allows to more accurately determine the tactics and prognosis of open surgical or endosurgical treatment of patients in this group.

Sonography also provides the opportunity to detect the presence of pyelectasis , ureteral dilatation, and to describe the shape and diameter of the ureter. These indicators are proposed to evaluate fetal urodynamics . Detected abnormalities in the structure of the urinary tract serve as a direct indication for postpartum ultrasound.

It is important to emphasize that the detected dilation of the upper urinary tract in the antenatal period or in the neonatal period may be due to the functional immaturity of the connection between the bladder and ureters and may be restored to normal values after birth.

A method was also proposed for tracking changes in the size of the renal pelvis, ureter and bladder, while determining the number of ureter contractions at certain intervals after drug administration.

The use of ultrasound does not fully reveal information about the type of disease, and does not take into account the time factor, which in most cases is missed, as a result, patients have significantly reduced kidney function. When using ultrasound with a drug load, it provides more detailed information about the nature of the pathology. Pharmacoechography is an ultrasound method using diuretics , this method is used in older children and adults.

With the development of diagnostic methods and the beginning of the widespread use of Doppler studies (CDK), which make it possible to analyze the nature of blood flow in all parts and structures of the kidney. The data obtained in this way have not only theoretical but also practical significance. This method has good prospects for use in children of the first days and years of life, since one of its undeniable advantages is its non-invasiveness . The criteria that can be obtained from this study, if correctly interpreted, are of high informational value for practical healthcare.

The impoverishment of the intrarenal pattern, the decrease in the time-averaged or minimum (diastolic) blood flow velocity, as well as the decrease in the maximum (systolic) blood flow velocity, while maintaining the resistive characteristics within the age norm are Doppler indicators of a decrease in the functional activity of the kidneys in megaureter. These parameters are evidence that the pathology is organic in nature and require surgical treatment as soon as possible .

Excretory urography plays an important role in the diagnosis of urinary system abnormalities, including megaureter. This method is a valuable tool for obtaining initial information about the condition of the kidneys and upper urinary tract. The data obtained during urography allow us to assess the presence and

location of obstruction in the ureter, and also provides information about the excretory capacity of the kidney.

In case of obstructive megaureter in children visualizes a "blockade" for outflow urine along the ureter , which can be seen on radiographs. In case of bilateral lesions or if the megaureter the only one kidneys this x-ray picture can appear on background poorly filled the patient's bladder . At high stages of obstruction, geniculate bends are formed in the ureter c .

Urography, in addition to studying the anatomy of the upper urinary tract, also allows you to assess the performance of the kidneys. The intensity of the shade of the renal tissue, in the presence of light areas indicates a violation of the function of the corresponding segment of the kidney, it also serves to determine various types of megaureter, based on indirect signs, including an increase in the size of the calyceal-pelvic system after urination . Despite this, micturition cystography is used to determine the megaureter of the refluxing form.

In a detailed examination of children with megaureter, significant importance is attached to various forms of cystography (including X-ray and gas). Such research methods make it possible to demonstrate a violation of the closure function of the vesicoureteral segment, in other words, to confirm or refute the reflux form of megaureter [32 ; p.147]. Contraindications and limitations for the use of this method for megaureter coincide with those that exist for vesicoureteral reflux.

The disadvantages of this type of study include poor imaging of the upper urinary tract . paths , also not provided identification of minor destructive changes . The ability to conduct a study secretory and motor functions of the kidneys in a certain degrees appears only when on The urogram provides a clear image of the upper urinary tract. This circumstance imposes limitations on the application of this method and emphasizes the need to find more advanced diagnostic alternatives.

Multispiral computed tomography (MSCT) and magnetic resonance imaging (MRI) are often used to diagnose uropathies . These methods are highly informative and have minor contraindications.

Radionuclide diagnostic methods are often used to study the individual and total functional capacity of the kidneys, their topography and urodynamics of the upper urinary tract. One of the important components of the examination of patients with megaureter is static nephroscintigraphy (SNSG) using Tc-99m-DMSA. This method allows determining the degree of sclerotic changes in the renal parenchyma, identifying areas with reduced accumulation of the radiopharmaceutical. Thus, this technique is considered an effective indicator of the severity of sclerotic changes in the renal tissue.

This The technique serves as a basis for determining the stage of nephrosclerosis in patients. In addition static Nephroscintigraphy uses dynamic nephroscintigraphy (DSNG), a method based on on registrations radioactivity in the kidneys and blood after introduction radiopharmaceutical preparation in dynamics and on subsequent computer processing obtained data. Possibility of illustrating the kidneys and upper urinary paths , which gives a chance to evaluate their anatomical and topographic condition , and also determine the degree of obstruction or stenosis ureter is the main advantage of this method.

In the study by O'Reily RN, washout of the radiopharmaceutical (WO) was proposed as an evaluation criterion, and the author considered WO less than 5% as an indication for surgical treatment. In children, it was proposed to divide them into four groups based on radiolabeling parameters: Group 1: no functional impairment or clearance deficit less than 25%; Group 2: 26-50%; Group 3: 51-75%; Group 4: from 75% to the functional curve. These groupings allow for highly accurate identification of the compensation process and selection of treatment in accordance with the pathology.

It should be noted that dynamic renal scintigraphy with diuretic load, as well as functional tests with diuretics in other examinations, should be limited to cases requiring differential diagnosis.

The above-mentioned radiographic and echographic methods can indirectly assess urodynamic disturbances with significant urodynamic

dilatation. However, recently, data have appeared in the literature indicating that upper urinary tract urodynamics can be objectively assessed. Some authors have proposed a method for assessing the rate of passage of a radiopharmaceutical through the ureter, but these studies were conducted on adult patients and there is no information on the use of this method in children.

Another diagnostic method, cystoscopy, despite its informativeness, is an invasive procedure that often causes negative emotions and fear in young children. In some cases, anesthesia is required, and its use is limited.

The main methods of screening for obstructive megaloureteritis are ultrasonography, excretory or injection urography and radioisotope nephrography , while microcystourethrography provides information on disturbances in the antireflux mechanism.

Drawing conclusions from the above, at present there is no universally acceptable diagnostic method for accurately determining the transport capacity of the ureter in children with congenital megaureter .

Conservative treatment

Issues related to conservative treatment of megaureter continue to be the subject of discussion at various medical events.

Directly contradictory views are discussed concerning the strategy of treatment of megaureter, most often in neonates and young children. Some authors propose a wait-and-see approach, taking into account the maturation of immature neuromuscular elements of the bladder, while other proponents believe that surgical correction should be performed at an early stage, since, in their opinion, a delay may negatively affect renal function.

According to Heidenreich A. (2004), in individually predisposed patients, recurrent urinary tract infections are a risk factor for renal scarring even after surgical reimplantation of the ureters. In this regard, it is recommended to carry

out prophylactic antibacterial therapy in all children with bladder developmental anomalies, even in the absence of evidence of new renal scarring.

At the same time, Garin E. (2006) expresses doubts about the importance of antibacterial therapy in preventing recurrence of urinary tract infection or formation of scars on the kidneys. The author believes that until new evidence-based recommendations for the treatment of children suffering from urinary tract infections appear, the use of antibacterial prophylaxis will remain a question.

A comparative assessment of the results of surgical and conservative treatment subsequently confirmed the advantage of the surgical method.

It should be noted that the vast majority of researchers share a unanimous opinion regarding the need for surgical treatment for this disease, since there is a risk of loss of kidney function. The effectiveness of treatment depends on the patient's age: the earlier the corrective surgery is performed, the greater the chances of compensation of kidney function, which has a favorable effect on the prognosis for the treatment of pyelonephritis.

From the literature review it follows that conservative treatment in case of malformation is not a promising approach. Such treatment can be used in the preoperative period, since with careful selection of antibacterial agents it is possible to achieve remission of pyelonephritis for a short period, and in rare cases - for several months. Thus, long-term antimicrobial and antiseptic prophylaxis does not make it possible to completely eliminate urinary tract infections or prevent kidney scarring. In addition, it is not known whether long-term prophylaxis or treatment is more rational in all cases of active urinary tract infections. At the moment, without clear clinical recommendations, the use of long-term antibacterial prophylaxis to prevent the consequences of megaureter remains practical, based on the available information. All of the above emphasizes that conservative methods rarely reach delivered goals. The time lost on conservative treatment may be too expensive to prove that restoration of

contractility and patency of the ureter is possible with medical care. On the other hand, conservative treatment may have a dual purpose. It may serve as a preoperative preparation option in children, including in the early stages of the disease, if it cannot be the only treatment option. However, if normal renal function is detected, surgical treatment should be temporarily abandoned. This is due to the fact that differential diagnosis of neuromuscular dysplasia of the ureters, functional obstruction of the ureters and growth imbalance in young children is difficult.

Surgical and endoscopic methods of treatment of megaureter.

From the analysis of literary data it was revealed that there is no single standardized approach to the choice of method, time and volume, as well as to the age when surgical intervention should be applied.

The methods of operation depend on the type of disease, the patient's age, the degree of megaureter, the anatomy of the orifice. Currently, there are about 90 different types of neoimplantation.

This may create certain difficulties and discrepancies when comparing and conducting a comparative assessment of the results of surgical treatment obtained by different researchers.

The general principle of all open surgeries is the resection of the pathological area and its transplantation into the bladder. Implantation of the ureter into a hollow organ that serves as a reservoir for collecting urine always requires the creation of an antireflux mechanism. To achieve the principle of submucous placement of the ureter, two approaches are used: extravesical and intravesical.

The most common today are Cohen's operations, extravesical Ureterocystoneostomy (Lich - Gregoroir) and Politano's method .

The question of the acceptable length of ureteral resection is controversial in the literature. There are two groups of authors who determine the required length visually or by palpation and use data obtained from excretory urograms.

Politano-Leatbetter operation (1958) is one of the most widely used methods combining intravesical and extravesical techniques. Recent data on long-term results indicate an efficiency of 93-96% and complications of 5-10%. In 4-4.6% of children, a postoperative complication is observed, often manifested by persistent vesicoureteral reflux (VUR). In 1% of cases, postoperative stenosis may develop, often in the first few years after surgery. In 7% of children, ureteral obstruction accompanied by inflammatory tissue edema occurs in the early postoperative period. A rare complication, occurring in 0.5% of patients and associated with intravesical ureteral melting and peritoneal adhesions, is colon trauma.

One of the main disadvantages of the Politano-Leadbetter ureteral anastomosis is considered to be severe postoperative bladder spasm and it is difficult to correct. However, the formation of neointima in the anatomically favorable zone of the urethral-vesical triangle, which facilitates subsequent endoscopic manipulations with the ureter, is an important advantage. The Politano-Leadbetter procedure also provides the opportunity to correct bilateral VUR in one stage, including to a significant extent.

The complication rate of this procedure is very low: 0.5% persistence of VUR and 0.5-1% stenosis of the vesicoureteral segment. Injury to the branches of the femoral-pelvic nerve, leading to impaired sensitivity, is a non-standard complication of this manipulation.

A new approach to extravesical ureteral cystostomy, which differs from the standard Lich-Gregoir procedure ; A. Yu. Pavlov and co-authors were informed of 100% effectiveness of the transformed extravesical ureteral cystostomy in children with vesicoureteral reflux (VUR). In addition to the above advantages of the extravesical technique, this technique has many additional privileges, such as the ability to create a non-ossified membrane that is easily accessible for subsequent endoscopic manipulations on the contralateral kidney if necessary, the ability to create a submucosal tunnel

anywhere in the bladder, and the ability to model the ureter during dilation. The need for cystoscopy before surgery to assess the anatomical features of the ureteral orifice and the impossibility of constructing the ureter in severe cases of vesicoureteral reflux (VUR) are disadvantages of the technique Lich - Gregoir. The average postoperative time to removal of the urethral catheter was 7.4 days, and the Lich-Gregoir procedure itself took 115 minutes.

These calculated results illustrate the advantages and disadvantages of each technique and can be useful in choosing the most appropriate approach depending on the specific circumstances and characteristics of the patient.

There are reports in the literature on endoscopic treatment of ureteral formations in adults, mainly due to organic ureteral obstruction. In children, a similar approach to the treatment of giant ureteral obstruction was presented in the work of N.V. Dorasveli (1990), who described two successful cases of endoscopic ureteroplasty using a Fogarty balloon dilator in children. Despite these studies, endoscopic treatment of pediatric patients has not found wide application in practice. This is due to the insufficient development of the technique of endoscopic interventions on the ureterovesical segment, the absence of differential diagnostic criteria for different forms of this disease and the unclear indications for such intervention.

Proponents of minimally invasive procedures consider them a legitimate primary intervention under any circumstances. They strive to have this method used as early as possible, even in the neonatal period. This point of view is justified, firstly, by the fact that decompression allows determining the compensatory capacity of the affected kidney and renal segments and avoiding unnecessary organ-preserving surgery. Secondly, decompression of the ureter after achieving ureteral patency facilitates reconstruction of the ureterovesical segment and, if necessary, plastic interventions.

With the development of endoscopic minimally invasive technologies in pediatric surgery, laparoscopic extravesical Cystoanastomosis of the ureter with the

bladder began to be used in children's megaureter. The effectiveness of this procedure is similar to other invasive methods (90-98%). However, despite the effectiveness, the duration of laparoscopic surgery is 4-6 times longer than open surgery.

An experimental study in which Teflon was introduced into the ureteral orifice in experimental animals was conducted in 1984 by Puri P. and O'Donnel B. These studies made it possible to develop a mechanism that became the basis for the development of endoscopic methods for the treatment of VUR in Europe and the United States. This method was called STING (suburethral transurethral injection).

The essence of the STING method is that a drug is introduced into the wall of the bladder, closing the urethral opening and lengthening the intravesical section of the urethra. The procedure is carried out under direct visible control, the needle is inserted into the submucosa of the bladder, 2-3 mm below the opening of the ureter, at 6 o'clock on a regular dial. After this, the needle is inserted into the proper layer of the submucosa of the ureter, then the suspension.

In 2004, a modernized version of the STING method was developed, which was called HIT (Hydrodistention Implantation Technique). The main difference of this technique is the preliminary displacement of the ureteral opening before the introduction of the volume-forming substance.

Another improved method is the HIT2 (double HIT) method, in which bulking agents are injected at two points - proximal and distal to the ureteral orifice.

Megaureter is a significant problem in pediatric surgery. It is important to emphasize that surgical treatment of such cases is often accompanied by a high percentage of unsatisfactory results. The lack of clear indications for the choice of surgical tactics is associated with the lack of accurate diagnostic methods that can directly assess the functional aspects of the urinary tract. In addition, there are no developed differential diagnostic criteria that would allow choosing the optimal methods for treating megaureter in children. This study, conducted on the basis of current data, can play an important role in the development of more

effective and individualized approaches to the diagnosis and treatment of megaureter in children.

1. General characteristics of the examined patients

As part of the dissertation work, a comprehensive examination of 102 patients with obstructive and refluxing forms of megaureter was conducted according to the international classification of MU (2016). Patients were undergoing inpatient examination and treatment in the pediatric surgery department (71 patients) of the Samarkand Regional Children's Multidisciplinary Medical Center (chief physician - MD Azizov M.K.) and 52 patients of the Research Institute of Pediatric Surgery (head - Corresponding Member of the Russian Academy of Sciences, Professor S.P. Yatsyk) of the Federal State Autonomous Institution National Medical Research Center for Health Care of the Ministry of Health of the Russian Federation (director - MD Professor Fisenko A.P.).

The age of the examined children ranged from 3 months to 17 years 11 months. The study involved 67 (65.7%) boys and 35 (34.3%) girls . The dissertation research covered the period from 2019 to 2023 and also included an analysis of archival material collected since 2000. To analyze the results by age, the periodization of childhood according to WHO (2021) was used. The distribution of the examined children according to age and gender is presented in Table 1.

Table 1

Distribution of children with megaureter by gender and age

Age / Gender	Up to a year	1-3 years	4-7 years	8-11 years	12-18 years old	Total
Boys	10 (9.8%)	2 7 (2 6.5%)	15 (14.7%)	8 (7.9%)	7 (6.8%)	67 (6 5 , 7%)

Girls	2 (2 , 0%)	1 4 (1 3.7%)	10 (9.8%)	5 (4.9%)	4 3.9%)	35 (3 4.3%)
Total	12 (11.8%)	41 (40.2%)	25 (24.5%)	13 (12.8%)	11 (10.7%)	102 (100%)

As can be seen from Table 2.1, children aged 1 to 7 years predominated (64.7 %) , the largest group were children aged 1-3 years (40.2%), and the smallest group (9.7%) were patients aged 12-18 years; 12 patients under 1 year also took part in the study. It is worth noting that boys were encountered 2 times more often than girls, accounting for 65.7% and 34.3%, respectively.

The distribution depending on the form of the disease, side and degree of damage is presented in Table 2.

Table 2

Distribution of patients by type and degree of disease into groups

Megaureter form / Defeated side	Obstructive		Refluxing		
	II degree	III degree	II degree	III degree	Total
Right-sided	2(2%)	12(12%)	4(4%)	6(5%)	24(23%)
Left-sided	13(13%)	11(11%)	3(3%)	8(8%)	35(35%)
Bilateral	8(8%)	17(16%)	8(8%)	10(10%)	43(42%)
Total	23(23%)	40(39%)	15(15%)	24(23%)	102(100%)
	63(62%)		39(38%)		

As can be seen from Table 2, the largest proportion of patients were patients with the obstructive form of megaureter 62%. In the study, children with unilateral pathology were more common than with bilateral pathology 58% and 42%, respectively, patients with stage 3 of the disease also prevailed in both groups (39% and 23%), and patients with stage 2 were 23% and 15%. When

analyzing the results, the corresponding studies were performed on each affected ureter, the number of patients and affected ureters is presented in Table 3.

Table 3

Number of diseased and affected ureters

Megaureter form	Obstructive		Refluxing		Total
	II degree	III degree	II degree	III degree	
Quantity sick	23	40	15	24	102
Number of ureters	31	57	23	34	145

The total number of ureters examined in 102 sick children was 145 units.

To evaluate the treatment results, patients were divided into four groups depending on the treatment performed. The distribution by groups is presented in Table 4.

Table 4

Distribution of examined patients into groups

Form / Group	Obstructive	Refluxing	Total
Group I	12 (57.1%)	9 (42.9%)	21(100%)
II group	10 (55.6%)	8 (44.4%)	18 (100%)
II I group	18 (64.3%)	10 (35.7%)	28 (100%)
IV group	23 (65.7%)	12 (34.3%)	35(100%)
Total	63 (62%)	39 (38%)	102 (100%)

The first group is represented by 21 (15%) patients. This group includes children who underwent endoscopic treatment.

The second group includes 18 (23%) patients who received surgical treatment using the Cohen method.

The third group consists of 28 (35%) patients who underwent the Politano-Leadbetter operation.

The fourth group consists of 35 (21%) patients who received surgical treatment using the extravesical ureterocystoanastomosis.

All patients were examined both before and after surgical or conservative treatment.

To compare the diagnostic results, the results of the comparison group study were used as the norm indicators. This group included children hospitalized in the pediatric surgery and nephrology department primarily with symptoms of urinary tract infection. The X-ray urological study did not reveal any urodynamic disorders.

2. Methods of examination of children with megaureter used in the work

Each child included in this study underwent a comprehensive laboratory and instrumental examination, which included an assessment of anamnestic data, including the history of the development of the disease, as well as an analysis of complaints and clinical picture.

2.1. Laboratory research methods: The studies were conducted in the laboratory department of the Samarkand Regional Children's Medical Center (Head of Department - M. B. Khamidova) and in the clinical hematology laboratory of the Scientific Center of Health of the Russian Academy of Medical Sciences (Head - Doctor of Medical Sciences E. L. Semikina).

General blood test: This analysis assessed the inflammatory process in the body (conducted on the Mindray device) BC -2300 (China). The following parameters were studied: Total leukocyte level: the norm was considered to be 4-9*109/l. Level of neutrophils in the blood (normal: from 2500 to 6000 per microliter of blood). Erythrocyte sedimentation rate (normal: 2-15 mm/hour in girls, 2-10 mm/hour in boys).

General urine test. (The study was conducted on the Mindray device UA 90 (China) was performed to identify the following indicators: leukocyturia (normal: up to 3 cells in the field of vision in boys, up to 5 cells in the field of

vision in girls), bacteriuria (normal: no bacteria in urine), hematuria (normal: no erythrocytes in urine sediment).

Blood biochemistry. Conducted to assess renal function, (study conducted on Mindray BA 88 A (China) evaluated the following parameters: urea (normal for children under 14 years old – 1.5 – 6.5 mmol/l), creatinine (normal: for children under 1 year old 15-35 μmol /l; for adolescents (under 15 years old) 40-80 μmol /l;); residual nitrogen infants (< 1 year old) 1.43 – 6.78 mmol/l; children (> 1 year old) 1.79 – 6.43 mmol/l.

Urine culture for sterility. The study was conducted before the operation and after 6-12 months in the follow-up. Urine culture was performed quantitatively using HiCrome UTI Agar nutrient agar (India). Bacteria were incubated on blood agar plates at a temperature of 37°C for 18-24 hours. After this time, these plates with cultures were examined under a microscope to determine the type of strains and the presence of possible dissociation of colonies. The sensitivity of the isolated bacteria to various antibiotics was determined in accordance with "Determination of antibiotic susceptibility of microorganisms by the disk diffusion method" (ISO 20776-1:2019). Bacterial resistance was determined through the lowest concentration of antibiotic that can stop noticeable growth of the microorganism. The diagnosis of bacteriuria was considered confirmed if more than 105 colony-forming units (CFU) of bacteria were detected in 1 ml of urine taken from the midstream, as well as in the presence of microorganisms of one species in urine obtained by catheter in an amount of 104 CFU/ml or higher.

2.2. Instrumental research methods

Ultrasound examination. Sonography of the kidneys, ureters and bladder was performed in the functional diagnostics section of the Samarkand Regional Children's Medical and Medical Center (Head of Department A.B. Khurramov) and in the ultrasound diagnostics department of the Scientific Center of Health Care of the Russian Academy of Medical Sciences (Head of Department MD, Professor I.V.

Dvoryakovsky). Toshiba ultrasound machines were used to conduct the study. Xario 200 (Japan) and " Logic 9" from GE Medical Systems (USA) using linear sensors in B-mode (frequency 7-12 MHz) and convex sensors using color Doppler mapping mode frequency 7.0 MHz.

Dopplerography of the vesicoureteral discharge. And the study was conducted using pulse-wave Dopplerography and was carried out on the Sono ultrasound machine. Scape SSI 5000 using convex 3.5-5 MHz sensors . The following urine output parameters were recorded: duration time, maximum speed and frequency of urine output, also in patients with refluxing megaureter was used to record urine reflux.

Excretory urography: The study was conducted after mandatory preliminary preparation (diet, cleansing enemas, administration of simethicone- based drugs) on BWM DPF 4 and Legacy " Advantx " devices from GE Medical Systems. The X-ray contrast agents were " triombrast " from " Farmak " (Ukraine) and " urografin " from "Bayer" (Germany).

To improve the efficiency of describing radiographic images, methods for calculating mathematical indices of the length of the ureter and the diameters of the upper, middle and lower thirds of the ureters, RMO (the average value of the radius of the obstructively altered ureter), VMO (the volume of the obstructively altered ureter) were used.

The values of these parameters were determined using the technique (B.Yu.Bosin , M.A.Filipkin . Roentgen diagnostics in pediatrics. Manual for doctors: in 2 volumes. Volume 2. Edited by V.F. Baklanova, Moscow, 1988) as follows: $VMO = n * RMO^2 * LMO$, where n is 3.1415926, RMO is the average value of the radius of the obstructively deformed ureter, LMO is the length of the obstructively altered ureter in cm. Then, using the formula: $RMO = (D1 + D2 + D3) / 6$, the average value of the radius of the obstructively deformed ureter was determined, where D1, D2, D3 are the diameters of its upper, middle and lower thirds.

Voiding cystography: In this study the degree of damage and the size of the ureter, reflux (passive and active), and the nature of the megaureter were assessed.

As radiocontrast agents, 10-15% solutions of " triombrast " from the company " Farmak " (Ukraine) and " urografin " from the company "Bayer" (Germany) were used.

Radionuclide research methods: Patients underwent static and dynamic renal scintigraphy in the Department of Nuclear and Radiation Medicine of the Federal State Budgetary Institution "Scientific Center of Rentgenology and Radiology" under the direction of Professor of the Russian Academy of Sciences D.K. Fomin, National Children's Medical Center. A broad-spectrum emission gamma tomograph from General Electric called "Millenium-MPR" was used.

In the study, a preparation based on Technetium 99m-Technemag was used as a radioactive label. It is excreted in the convoluted tubules of the nephron, and the preparation is mostly excreted through the kidneys. The preparation is administered to children intravenously. The activity was determined in accordance with the method of D.K. Fomin [99] and averaged from 80 to 140 MBq. The radiation dose was from 0.40 to 0.55 mSv.

The study included two stages. At the first stage, dynamic renal scintigraphy was performed to assess the secretory and excretory function of the kidneys. To determine the secretory function of the kidneys, the sharpness and height of the renographic curve, as well as the T-max index (the time of maximum accumulation of the radiopharmaceutical in the kidneys, normally 3-5 minutes) were analyzed.

Evaluation of the excretory function of the kidneys included measuring the rate of passage of the radiopharmaceutical through the cortex of the organ and the kidney as a whole. The half-life index of the radioactive substance (T1/2) was used as an indicator of the time during which radioactivity in the kidney reaches its maximum value and the renographic curve decreases by 50%; T1/2 was calculated

separately for the cortex and the entire organ; T1/2 was calculated for the cortex and the entire organ; T1/2 was calculated for the kidney and the entire organ.

When using 99mTc-Technemag, the normal value of this indicator did not exceed 12 minutes. If the half-life exceeded 20 minutes (i.e. the duration of the study), the rate of elimination of the radiopharmaceutical during the study was taken into account.

Children were recommended physical activity in combination with fluid loading for 30 minutes after the main stage. Then static scintigraphy of the lumbar and pelvic regions was performed for 1 minute. Visual assessment and mathematical calculations were used to assess the degree of ischemia. Vacuolization of the collecting system was considered satisfactory if the activity of the radiopharmaceutical in the projection of the calyceal-pelvic system decreased more than fourfold.

The detection of reflux from the bladder to the ureter was the next step of the study. Each patient is given an appropriate amount of water and asked to refrain from urinating as long as possible. If there is a need to urinate, dynamic scintigraphy of the lumbar region and small pelvis is performed. The patient sits on the vein with his back to the sensor. The study is performed during exercise (30 seconds), during urination and for 2 minutes after urination. A 128x128 pixel matrix is used for the study, the duration of a series of frames is 5 seconds.

The images obtained at the end of the study are analyzed, including visual assessment of the scintigrams and construction of the "activity-time" curves for the ureters and pelvis. The size of the area of interest in the ureter is half the height of the given image and 2.5 images in width. An increase in the activity of the radiopharmaceutical by more than 15% in the ureter and/or pelvis is considered a sign of reflux. This value is determined visually or by constructing the "radioactivity-time" curve. The level of retrograde projection of radioactive markers into the ureter, in other words the lower, middle, upper third or pelvis determines the height of reflux.

When evaluating scintigraphy data, the uptake of the radiopharmaceutical by each kidney and the activity of the radiopharmaceutical at the injection site are calculated. Then, the integral uptake index (IUI) is calculated, reflecting the uptake of the radiopharmaceutical by each kidney in proportion to the radioactivity introduced into the bloodstream, according to the following formula:

$$\text{ИИЗ (справа/слева)} = \frac{\text{U справа/слева} - \text{B справа/слева}) * 100}{\text{SF-SE-I}}$$

Где U - общий захват РФП почкой (в тысячах ударов целевой области прямой и обратной проекциях); B - общая активность "метки" в окружающей ткани (фон) в прямой и обратной проекциях (в тысячах ударов целевой области).

SF - активность полного шприца (тысячи импульсных единиц за 20 секунд),

SE - активность пустого шприца (20 с, тысячи единиц импульсов),

I - доза РФП в месте инъекции.

Normal IIS values for each kidney in healthy individuals range from 44 to 72; in the presence of two kidneys, the overall IIS value is 97-142. Values below 46 in each kidney and below 97 in the case of one kidney may indicate impaired viability of the renal parenchyma.

Considering the information content of radionuclide methods in assessing urine transit through the ureters (UTU) [60], the UTU rate was calculated for all patients.

The MTM study was conducted when the child was sitting or lying in a horizontal plane. The calculation was performed on the v\3 and n\3 projections of both ureters, a matrix with a resolution of 64x64 was used. The duration of one image in the series was 5 seconds.

When receiving data, a curve of the activity-time relationship was constructed from the recording sites, after which the difference in the speed of the two curves (from the upper third of the ureter and the lower third of the

ureter) was determined to obtain the MTM index. With a normally functioning ureter, the transient function in the upper and lower thirds should correspond to each other or be in the positive ranges.

$$UTU = \left(\frac{A}{\mathrm{B}}U/_{L}\right) - \left(\frac{A}{\mathrm{B}}U/_{L}\right)$$

Where - MTM (MTM) - ureteral transit of urine.

A - Activity of radiopharmaceuticals during passage with urine through the ureter

B – Unit of time during the passage of the radiopharmaceutical through the ureter

U/3 upper third of the ureter

L/3 lower third of the ureter

This interpretation is based on the different background in different segments of the ureters background illumination coming from the bladder. When the result of the study is obtained within the negative numbers (-), it indicates the phenomena of violation of the passage of urine in the ureters.

3. Methods of treatment of children with megaureter used in the work

3.1. Endoscopic treatment of megaureter. Minimally invasive treatment of refluxing megaureter involves injection of a volume-forming substance in the case of isolated vesicoureteral reflux. This results in "lengthening" of the submucosal tunnel and restoration of the locking function of the vesicoureteral junction. In the case of the obstructive type, high-pressure balloon dilation is performed.

The procedure of endoscopic correction of the reflux type involves the formation of a bolus by introducing a volume-forming substance into the submucosal layer into the wall of the bladder in the area of the ureteral entrance below its mouth. The principle of this type of treatment is to form a support for the formation or strengthening of the antireflux mechanism.

During the endoscopic correction procedure, an endoscopic stand from Karl is used. Storz with straight and 30°-Karl optics Storz Hopkins 3 , as well as Karl cystoscopes Storz 9 Ch and 11 Ch . The synthetic biopolymer Dam + from Noltrex LLC is used as a bulking agent .

At the beginning, diagnostic cystoscopy was performed, which plays an important role in preliminary diagnostics before surgery. It provided an opportunity to more accurately determine the cause, the condition of the mucous and submucous layers was assessed. Then, the introduction was carried out through special Puri injection needles on flexible conductors, the volume of the injected substance is selected individually and visually assessed by the formation of a tubercle under the mouth of the ureter.

Balloon high pressure dilation. In the correction of the obstructive type, balloon dilation was performed using a balloon catheter from the company " Biorad Medisys PVT". The balloon catheter was inserted through a flexible guidewire, and the ureters were dilated; the size ranged from 6 Fr to 12 Fr with a pressure of 2 to 4 bar depending on age. The criteria for successful dilation were considered to be abundant urine output with easy passage of the bougie or balloon.

Non-implantation operations - surgical intervention aimed at restoring normal urodynamics, is an integral part of the complex treatment and prevention of complications in congenital megaureter.

Regardless of the causes leading to urodynamics disorders, the goal of surgical treatment is to create an unimpeded urine flow, eliminating vesicoureteral reflux. Despite the extensive arsenal of reconstructive and plastic surgeries for this pathology, the opinion of most clinicians is in favor of resection of the terminal section of the ureter with its subsequent implantation into the bladder with antireflux protection. In surgical practice, methods of forming ureterocystoanastomoses are widely used, such as the Cohen , Politano-Leadbetter , extravesical ureterocystoanastomosis (Lich-Gregoir). Each of the above methods has its own advantages and disadvantages, which became the subject of analysis of the results of treatment of patients.

3.2 Cohen's operation is a treatment method in which the ureter is mobilized and an artificial submucosal tunnel is created, followed by resection of the anus in the transverse direction. In a bilateral operation, both ureters are directed into a single submucosal tunnel, and the ratio of the ureter width to the submucosal tunnel length is 1:5. After the operation, a rubber diversion was placed in the anterior cavity of the bladder, and the ureters were intubated with a Nelaton cathete. Urine was drained through a vesicostomy in boys and a Folly catheter in girls.

In the surgical intervention, suture material from the company " BBraun " or " Ethicon " was used. The urothelium was sutured with PDS/ Vycryl / Monosyn 5/0 material (needle with code HR17), a two-row continuous suture of PDS/ Vycryl / Monosyn 3/0 was applied to the urinary bladder.

3.3. Operation Politano-Leatbetter was performed using a combined approach and consisted of removing the isolated ureter, amputating it, and then implanting it into the bladder in such a way that the artificially created submucosal tunnel ended at the site of the original opening. During the operation, the length of the newly created submucosal tunnel exceeded the width of the transplanted ureter. After the operation, rubber drains were installed in the anterior wall of the bladder and the submucosal space, a Nelaton catheter was used to drain the ureters, and a cystostomy or urethral catheter was used to drain the bladder. BBraun or Ethicon products were used for suturing. Fixation of the ureters and suturing of the bladder mucosa were performed using PDS/ Vycryl / Monosyn 5/0, and PDS/ Vycryl / Monosyn 3/0 was used to close the bladder wound .

3. 4. Extravesical surgery ureterocystoanastomosis (Lich - Gregoir) was performed through the Pfannenstiel approach. The rectus abdominis muscle is bluntly moved, the peritoneum is pulled up. The ureter is isolated and fixed. If the terminal section of the ureter is stenotic, it is resected to healthy tissue. If the diameter of the ureter exceeds 2 cm, 3-5 cm of it is resected to 1-1.5 cm in diameter.

Then a common submucosal tunnel is created, into which a part of the ureter is neoimplanted, maintaining a diameter/length ratio of 1:2 or 1:2.5. The artificial opening is sutured using 4/0-5/0 PDS/ Vycryl / Monosun material . The bladder is closed with two rows of PDS/ Vycryl / Monosun sutures , the wound is sutured tightly in layers.

4.Statistical processing of the obtained data:

Diagnostic efficiency was determined with the calculation of sensitivity, diagnostic accuracy and specificity .

Sensitivity method was determined by formula:

$$Se = \frac{P.s.}{S} \times 100\%, \text{ where}$$

Se – sensitivity of the method;

Ps – true positive results revealed by the method;

S – the number of examined patients.

Diagnostic accuracy method was calculated by formula :

$$DT = \frac{Ps + NH}{N} \times 100\%, \text{ where e}$$

DT – diagnostic effectiveness of the method;

Ps – true positive results, revealed by the method;

NH – true negative results, revealed by the method;

n – number of surveys.

Specification of the method was applied according to the formula :

$$Sp = \frac{NH}{S} \times 100\%, \text{ where e}$$

Sp – specificity of the method;

NH – true negative results, revealed by the method;

S – number of examined patients.

The statistical processing of the obtained results was carried out using the variation statistics method on the computer program “Excel” with the calculation of the arithmetic mean (M), its error (m), and the standard deviation (o). The reliability of the obtained results was assessed using the Student's criterion (t). Correlation analysis was carried out using the least squares method using the application software packages "Statistica 6.1" (StatSoft, Inc., USA), "Microsoft Excel" - 2007.

3. Main clinical characteristics of megaureter in children

Clinical manifestations of megaureter in children may vary, but in most cases they are characterized by scanty clinical symptoms. In the process of studying the cards, an analysis was made of the initial appeal of the parents of the sick child to the doctor regarding complaints arising from this pathology for the purpose of diagnosis and treatment, which is reflected in Fig. 3.1.

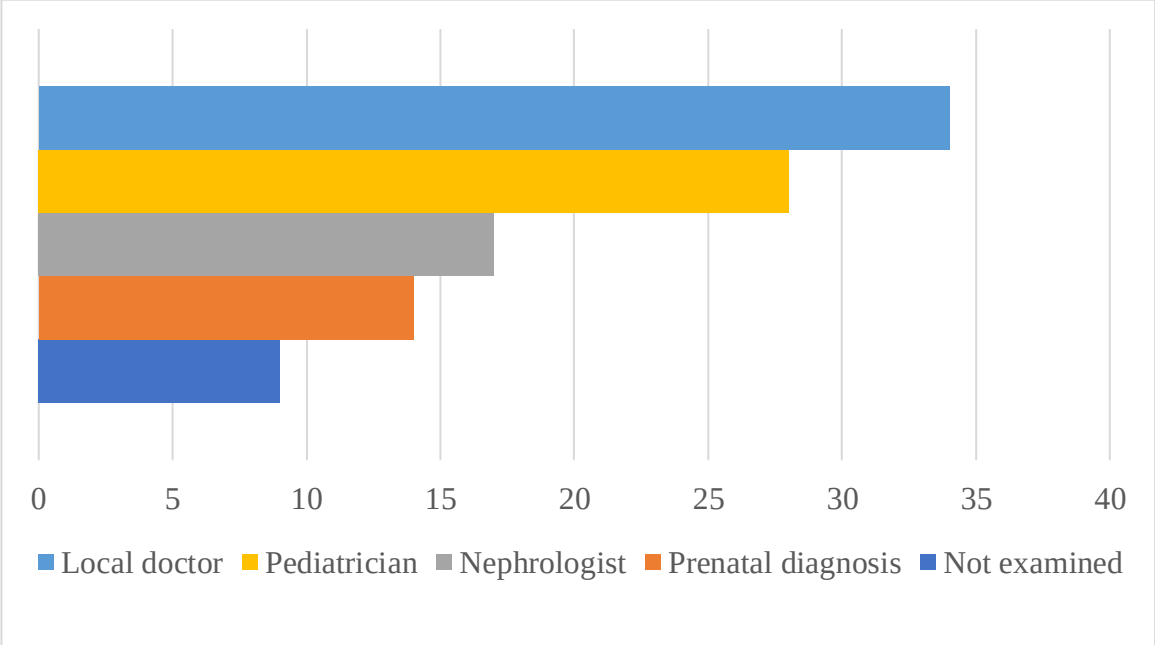


Fig. 3.1 *. Analysis of the initial appeal of patients with the appearance of megaureter symptoms in children*

As can be seen from the data displayed in Fig. 3.1, the largest proportion of patients falls on the first visit of parents regarding the symptoms of the disease to primary health care specialists - district general practitioners in family clinics and rural medical stations 34 (27.6%), also parents of a sick child in a greater number of cases contacted pediatricians in central district hospitals and multidisciplinary medical centers 28 (22.7%).

It was also noted that recently there has been a tendency to increase in the number of prenatal diagnostics of this disease; in our study, this number was 14 (11.3%), a smaller percentage was left by patients who were treated in nephrology departments and were referred to surgical departments by nephrologists 17 (13.8%), in 9 patients there was no information about the initial visit in the medical records.

Complaints (Table 3.1.) about the condition of patients vary depending on their age. The symptoms may include lethargy, rapid fatigue, increased body temperature, and non-localized pain in the abdomen and lumbar region. In children, a latent course of the disease was mainly observed, manifested only by transient leukocyturia, sometimes with isolated manifestations of dysuria. In most children, the symptoms of the disease became obvious after diagnostic measures for other diseases.

The use of ultrasound made it possible to detect changes in the urinary system, such as possible dilation of the kidneys and ureters. Children could receive long-term outpatient treatment from a local doctor or in pediatric departments, presumably with a diagnosis of "urinary tract infection." However, antibacterial therapy led only to temporary improvement, and when it was discontinued, the symptoms returned, which became the basis for consultation with a pediatric surgeon/urologist and subsequent examination.

Acute onset of the disease, manifested by signs such as increased body temperature, symptoms of intoxication, dysuria and significant changes in urine tests (proteinuria, leukocyturia , microhematuria) was noted in 42 children.

Late diagnosis indicates a lack of awareness and low vigilance of parents and primary care physicians regarding the signs of this disease.

Table 3.1

Frequency of clinical signs of megaureter

Symptom / Group	Temperature increase	Abdominal pain	Pain in the lumbar region	Dysuric phenomena	Changes in urine tests	Acute urinary retention
Obstructive type (n= 63)	43 (68 , 2%)	11 (17.4 %)	10 (15.8 %)	14 (22.2 %)	55 (87.3 %)	2 (3.1 %)

Refluxing - type (n – 39)	26 (66.7 %)	6 (15.3 %)	10 (25.6 %)	6 (15.4 %)	36 (92.3 %)	2 (5.1 %)
Total (n – 102)	69 (67.6 %)	17 (16.7 %)	20 (19.6 %)	20 (19.6 %)	91 (89.1 %)	4 (3.92 %)
Comparison group (n=21)	19 (90.4 %)	5 (23.8 %)	8 (38.1 %)	1 (4.7 %)	21 (100 %)	-

Note: *One patient experienced multiple symptoms.*

As the analysis of complaints reflected in Table 3.1 showed, upon admission of children with megaureter, the most common symptom of this disease was changes in urine tests 91 (89.1%), the next most common symptom was an increase in body temperature 69 (67.6%), Also, approximately in equal proportions, there were pains in the lumbar region 20 (19.6%), dysuric phenomena 20 (19.6%) and abdominal pain of various localizations (16.7%), some patients had cases of episodes of acute urinary retention 4 (3.92%). It is also worth noting that in patients with the obstructive form of this disease, almost all signs are expressed more often than in patients with the reflux form of this disease, except for abdominal pain. Also, many patients, regardless of age and type of disease, necessarily noted signs of impaired physical development, poor appetite, rapid fatigue, decreased performance and weakness and anemia.

Table 3.2.

Indicator / Type of MG	Leukocyturia (in the field of vision)	Proteinuria (g/ day)	Urine density	Blood urea (mol/l)	Blood creatinine (µmol /l)

Obstructive (n= 63)	19.0±1.01 **	0.13±0.9	1.012±0.0052	6.38±0.68	84.1±1.0
Refluxing (n= 39)	26.3±1.49	0.01±0.1	1.013±0.0041	6.6±0.7	80.1±0.46 * **
Comparison Group (n= 21)	23.5±0.97	0.15±0.6	1.014 ± 0.005 4	7.1±0.77	86.1±0.86
Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*					

Urine and blood test results of the examined patients

As can be seen from Table 3.2, there are some differences in urine tests in patients of the 3 groups, in particular, the highest leukocyturia was observed in patients with the reflux type, the other indicators did not statistically differ in patients of all 3 groups. Thus, recurrent exacerbations of OCP served as the reason for children to seek medical attention, and on the other hand, they indicated the progression of the pathological process and its course in a complicated form. Based on the above data, the developed program is used in the diagnosis and treatment of megaureter in children (certificate of official registration of the program for electronic computers No. 09273, Agency for Intellectual Property under the Ministry of Innovations of the Republic of Uzbekistan "Program for determining indications for surgical treatment of megaureter in children"). (Appendix 1).

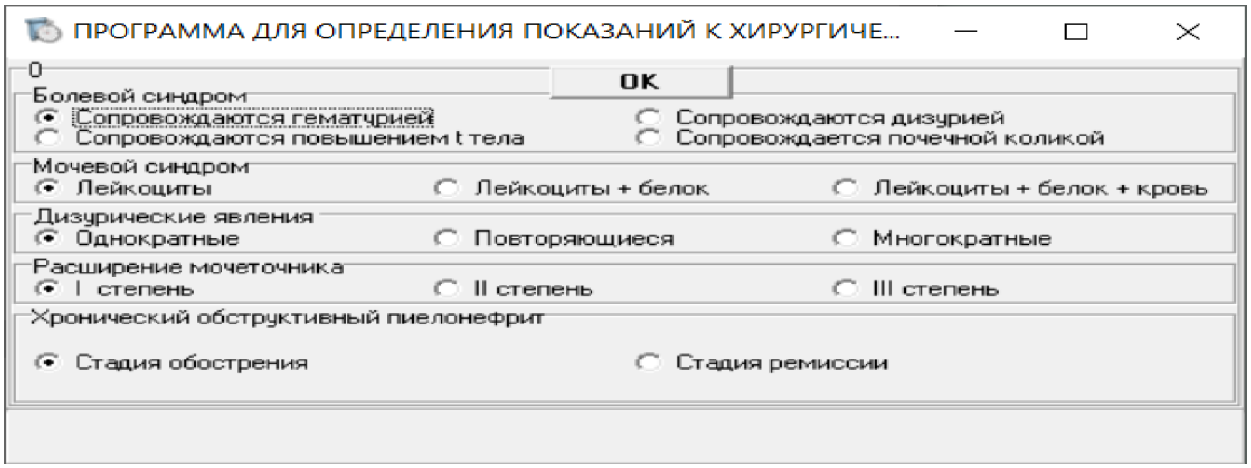


Fig. 3.2. *Program for electronic computers (EC)*

This program includes both objective and subjective signs, as well as instrumental data. These elements provide the necessary information for choosing the most rational method of diagnosis and subsequent determination of treatment tactics.

3.2. The nature of the urine microflora in children

All patients included in the study underwent bacteriological urine culture; microflora was detected in the urine of 58 patients out of 123, or 47.1%. The distribution by microflora composition is presented in Table 3.3.

Figure 3.3.

Distribution by composition of microbial flora

Indicator / View MG	Monoculture	Mixed flora	There was no growth
Obstructive type (n= 63)	19 (30.1%)	13 (20.6 %)	31 (49.2 %)
Refluxing - type (n – 39)	17 (43.6 %)	4 (10.2%)	18 (46.2%)
Comparison group (n=21)	3 (14.3%)	2 (9.5%)	16 (76.2%)

From Table 3.3 it follows that the highest percentage of cultured microflora was found in patients with RM 43.6%, monoculture was cultured more often in patients of all 3 groups, the best results were shown by the analyses of children in the comparison group, in which the percentage of sterile cultures was 76%.

Nine strains of etiologically significant bacteriuria were identified in children, with the Enterobacteria family accounting for the largest proportion. The leading place was occupied by Escherichia coli, accounting for 32.5% of the total number of cases, both in monoculture and in association with other microorganisms. Next in quantity were various types of cocci Staphylococcus, represented in 23.5% of cases, as well as Enterobacter with a specific gravity of 18.75%. Pseudomonas aeruginosa and Candida were found in equal quantities, making up 8.75%. The remaining types of microorganisms were detected in isolated cases; the distribution by type is presented in diagram 3.3.

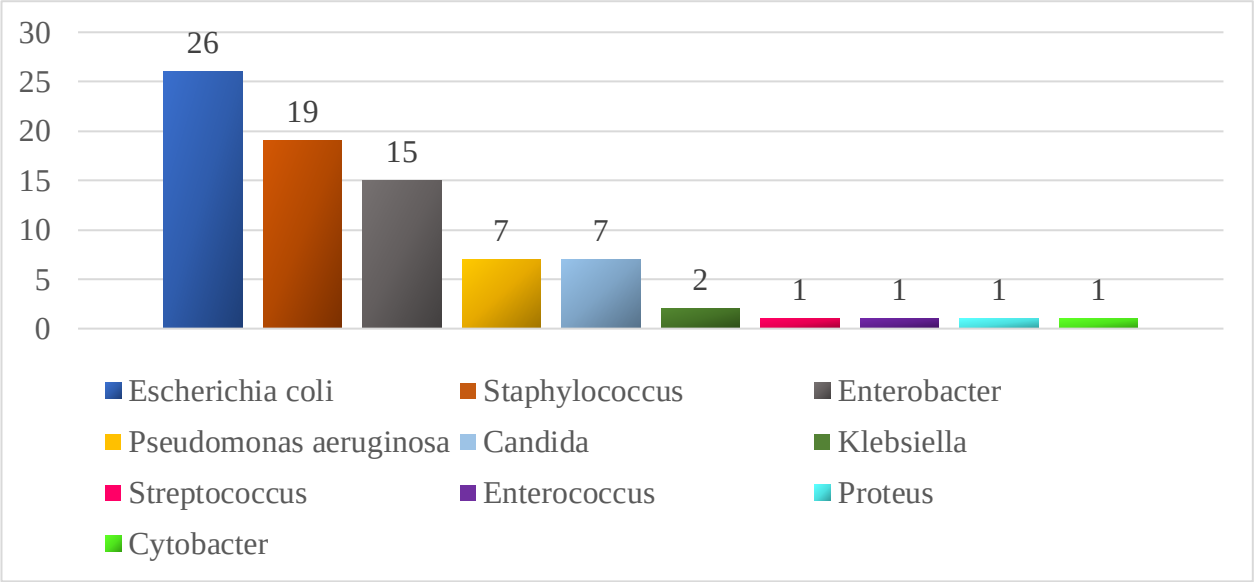


Figure 3.3. *Type and number of pathogens (n = 80)*

In both the nephrology and surgical units, a high level of sterile cultures was determined during the study. These results can be explained by technical difficulties in growing microorganisms of this group, caused by their anaerobic nature. In particular, non-clostridial anaerobes (such as bacteroides, prevotella , actinomycetes, anaerobic cocci) have special requirements for cultivation conditions, which often present technical difficulties for practical implementation.

In a situation where there was no positive clinical response to therapy, even when using maximum doses of the antibiotic, the resistance level of the pathogen was considered high. If high treatment efficiency was achieved only when using the drug in significant quantities or when the infectious agent was located in places where the antibiotic accumulates in large quantities, the resistance level was considered moderate. In cases where standard doses of the antibiotic provided a good therapeutic effect in infections caused by a given organism, the resistance level was considered low.

All bacterial strains isolated from urine were tested for antibiotic sensitivity to the most commonly used drugs in this medical institution.

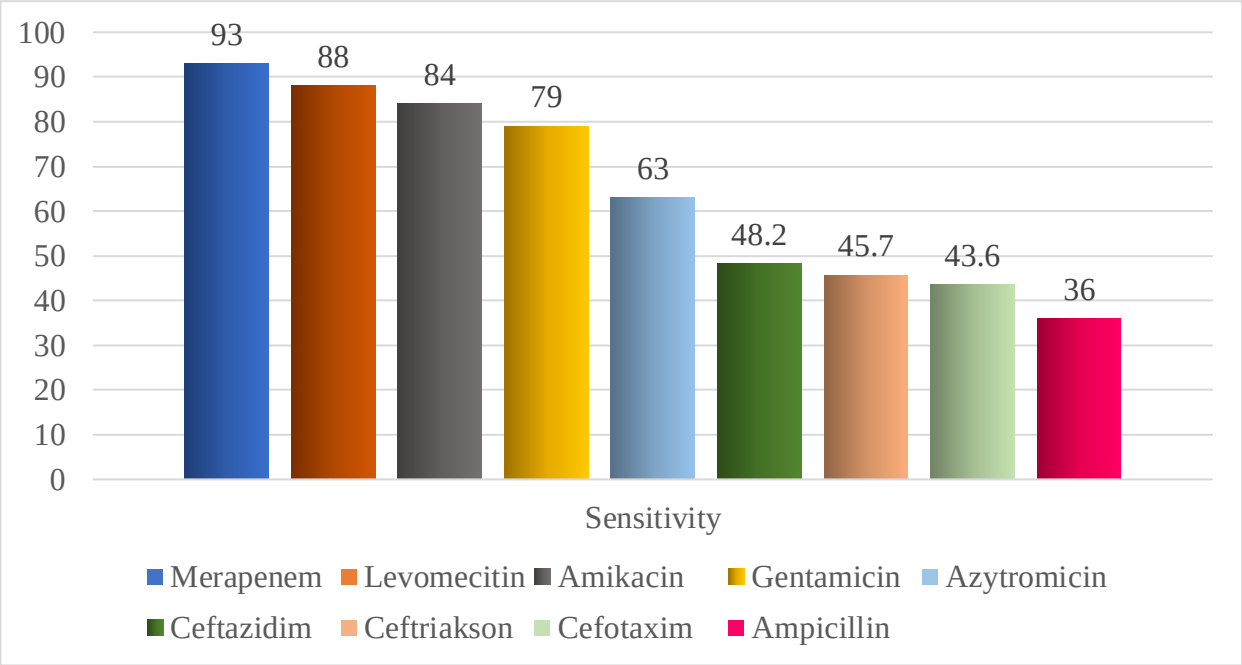


Figure 3.4. *Antibiotic sensitivity of isolated microflora (%)*

As can be seen from Fig. 3.4. most strains were sensitive to aminoglycosides 79% and 84%, also high sensitivity was observed to meropenem (93%) and chloramphenicol (88%). To antibiotics of the penicillin series , in particular to ampicillin, the percentage of sensitivity was the lowest 36% of those presented. In conclusion, it should be noted that the bacterial background of urine can be subject to continuous changes by the drugs used and a wide range of antiseptic and disinfectants in medical and preventive institutions, it is necessary to carefully monitor changes in antimicrobial sensitivity. This is important for successful antimicrobial therapy of children with megaureter in order to correctly select antimicrobial drugs, taking into account the dynamics of the main bacterial indicators.

3.3. Results of sonographic examinations of children with megaureter.

Screening ultrasound diagnostic methods are widely used at present, they have become common medical procedures and allow to detect many diseases at early stages. With the increasing use of ultrasound in prenatal diagnostics, there is an increase in the number of patients with pre-determined defects in the development of the urinary system at an early age. Ultrasound in the practice of a pediatric

specialist is practically the only widely available and non-invasive method that allows to determine the thickness of the renal parenchyma and the parameters of the collecting system. All patients underwent translumbar and transabdominal ultrasound examination upon admission. During the ultrasound, the following features were assessed: the length and width of the kidney, the thickness of the renal parenchyma, the size of the ureter diameter in its upper, middle and lower thirds, the size of the pelvis, the degree of expansion of the calyces, and the features of the bladder.

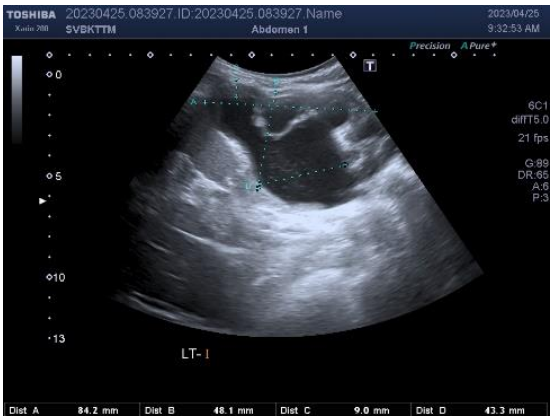


Figure 3.5. *Sonogram of patient D.I. I.b. 10037/1197 with grade III obstructive megaureter*

With megaureter, the sonographic picture changes, such changes as expansion of the ureters and renal cavities occur, which is supplemented by hydronephrosis of the kidneys and tortuosity of the ureter. This algorithm is associated with an increase in hydrostatic pressure in the cavity system of the organ, which puts pressure on the renal parenchyma. As a result of which the renal parenchyma can undergo atrophy. The study included indicators of 145 ureters of patients with megaureter and 21 ureters of children in the comparison group.

The ureter in patients with megaureter usually expands regardless of the filling of the bladder. If its contraction is observed during the examination, a conclusion is made about the preservation of its evacuation function. Depending on the degree of obstruction and reflux in children, the following characteristics were identified. When studying ultrasound data in children with megaureter , regardless of the cause, it was found that before surgery, the length and width of the affected kidney, as well

as the diameter of the ureter in grade III megaureter significantly exceeded the corresponding indicators in patients with grade II megaureter (Table 3.4). This difference was statistically significant and was observed regardless of the age of the patients. In addition, in grade III megaureter, the thickness of the renal parenchyma of the affected kidney was also significantly less compared to grade II megaureter .

Table 3.4

Ultrasound examination parameters in children with megaureter depending on the degree of damage before surgery (n = 145)

Ultrasound indicators (mm)	Comparison group (n=21)	Obstructive MG		RefluxingMG	
		II -st. (n=31)	III -st. (n=57)	II -st. (n=23)	III -st. (n=34)
Length kidneys	71.5±2.3	95.5±0.3 ***	113.2±3.2 ***	86.3±1.5 * **	107.12±1.6 * **
Width kidneys	35.1±1.5	50.3±0.7 ***	68.3±1.9 * **	48.7±1.2 * **	55.6±1.21 * **
Thickness parenchyma	17.1±1.5	12.2±0.7 **	7.1±0.3 * **	14.1±1.7	8.1±1.2 * **
Ureteral diameter	8.0±0.3	11.3±0.4 * **	17.3±0.7 * **	19.1±1.1 * **	23.2±1.3 * **
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*					

Table 3.5

Staged ultrasound monitoring of the state of the organs of the MVS

No. of ultrasound control	Staged ultrasound monitoring of the state of the organs of the MVS
1	At the initial visit or diagnosis of the disease
2	Before surgery - control of initial (preoperative) parameters

3	After removal of drainage elements after reconstructive plastic surgery
4	After 3-6 months to determine patency after reconstructive plastic surgery

Also, universality, non-invasiveness and sufficient information content allowed for stage-by-stage monitoring of the urinary system in children with megaurether. Ultrasound of the parenchyma and the size of the upper urinary tract gave a chance for enhanced monitoring at all stages of disease treatment.

All patients underwent assessment of normal contractility of the ureter, and the following were also examined: - bladder volume, - ureter diameter in the distal section, - area of the renal pelvis-calyceal segment. The number of contractions per 1 minute, including complete contractions (before the ureter walls close) and incomplete (by 1/2–1/3 of the ureter diameter) determined contractility. Such assessment methods were performed after preliminary oral hydration of all subjects, as a rule, the frequency of spontaneous contractions reaches 2 to 7 acts per minute, it increases to 4 or more per minute after stimulation with diuretics.

All patients included in the study underwent an assessment of the effectiveness of this method; in 102 patients with megaureter , this method confirmed the diagnosis in 82 cases, and in 20 cases a false-negative result was obtained; in patients of the comparison group, in 12 cases a false-positive result was obtained, in 9 patients the ultrasound conclusion was correct.

Table 3.6

Efficacy of sonography in megaureter

Ultrasound conclusion on the presence of MG		Ultrasound conclusion on the absence of MG	
MG available	IP 82	MG available	LP 12
MG is missing	LO 20	MG is missing	IO 9
Total		Total	
102		21	

Note: *True positive result; false positive result; false negative result; true negative result.*

Statistical analysis showed that the sensitivity of the method was 80.4 %, the diagnostic accuracy was 74%, and the specificity of this method was 42.8%.

When analyzing the data obtained from the examination of these subgroups, significant differences in the severity of urodynamic disorders in these children were revealed. Leukocyturia was recorded in a larger number of patients with low contractile function (80%), and in 20% of this subgroup of children it correlated with changes in the general blood test. The area of the ureteral sac in the subgroup of children with low contractile ability of the ureter varied from 40 to 90% relative to the normal variants. The degree of ureteral dilation was more significant than in children with normal contractile function of the ureter.

3.4. Doppler characteristics of patients with megaureter

The study of ureterovesical urine output was performed in 88 (130 ureters) children with obstructive and refluxing megaureter and 21 patients in the comparison group, using pulsed-wave Dopplerography. This study was not performed on 14 patients when studying archival material.

In patients with the refluxing form of megaureter, signs of dynamic obstruction were recorded: a decrease in the frequency of 1-3 emissions per minute, also during observation in these patients, a reverse flow of urine into the distal ureter from the bladder, a decrease in the time of emission and maximum speed were recorded (Table 3.7).

Table 3.7

Dopplerographic indices of patients with MG

Type of megaureter	Number of ureters (n)	Dopplerographic indicators				
		Dopplerometry urine emission			Doppler ultrasound of urine backflow (with 1 backflow)	
		Frequency Emissions (in 1 min.)	Duration of 1 emission Ts (sec)	Speed of 1 emission (m/s)	Ts (With)	^{V} max (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.02	-	-
Obstructive megaureter	76	0.5±0.1 ***	3.72±0.2 ***	0.26±0.02	-	-
Refluxing megaureter	54	2.4±0.2	1.74±0.26	0.29±0.03	1.40±0.06	0.12±0.03

Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*

The data shown in Table 3.6 indicate that Doppler examination of the upper urinary tract evacuation function provides information that may be useful for assessing urodynamic disturbances and developing a treatment strategy in children with megaureter .

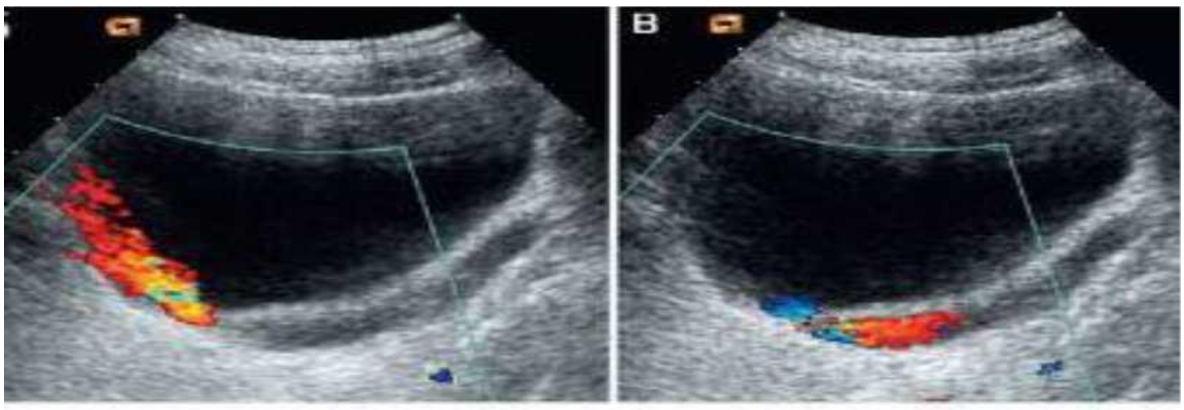


Figure 3.6. *Dopplerographic picture of patient L.G. I.b. 122/03 with refluxing megaureter III degree*

The use of Doppler methods to assess ureteral emissions provides the ability to track the degree of ureteral obstruction. When studying the diagnostic efficiency, the following results were obtained - in 75 cases the diagnosis was confirmed, in 13 patients a false-negative result was obtained, also in 13 cases of the comparison group the diagnosis of megaureter was completely excluded, and in 8 cases false-positive results were obtained.

Table 3.8

Efficiency of Doppler ultrasound in megaureter

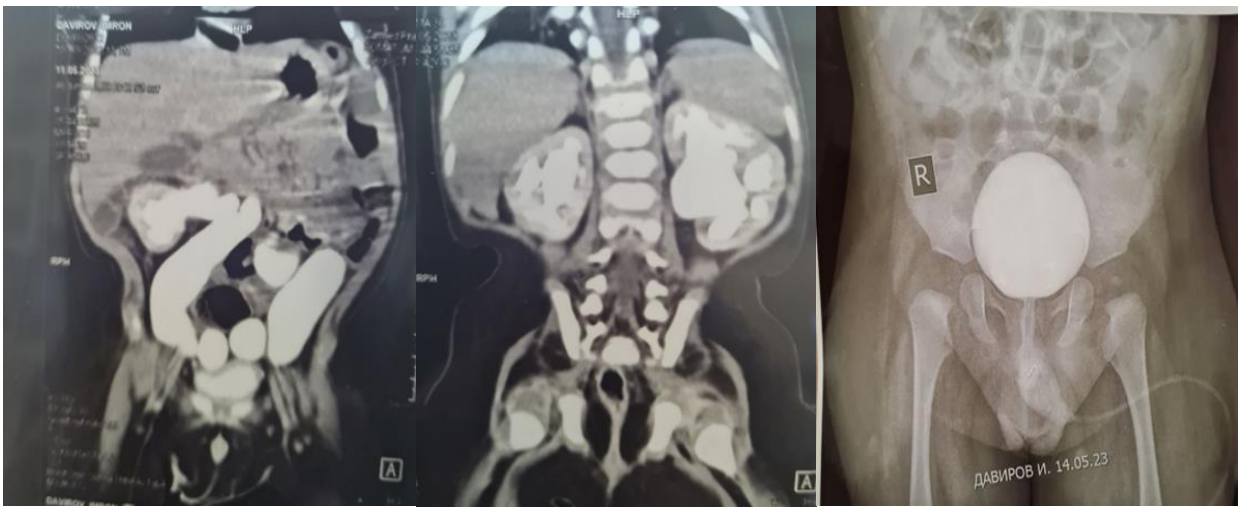
Conclusion on the presence of MG		Conclusion on the absence of MG	
MG available	IP 75	MG available	LP 8
MG is missing	LO 13	MG is missing	IO 13
Total		Total	
88		21	

Note: *True positive result; false positive result; false negative result; true negative result.*

When calculating these indicators, it was determined that the sensitivity of the method was 85.2%, the diagnostic accuracy was 80.7% and the specificity of this method was 62%.

3.5. X-ray anometric parameters of patients with megaureter

With megaurether it is necessary to pay attention to the use of excretory urography and at the same time it is necessary to carry out micturition cystourethrography. To make an accurate diagnosis and determine the degree and shape of the megaurethra. Next, a study of the X-ray planometry indicators is carried out. An analysis of excretory urography was performed on 101 patients.



A **B** **C**

Figure 3.7. *Excretory urograms of D.I. I.b. 10037/1197 with obstructive megaureter (A, B) and cystogram (B)*

Analysis of the results of X-ray examination of the upper urinary tract in obstructive megaurether indicates that the average values of VMO vary from 50.4±7.3 to 67.8±0.7 mm depending on the degree of obstruction. RMO values vary from 1.06±0.04 to 1.2±0.02. The length and diameter of the ureters, according to Table 3.9, also show a tendency to increase with increasing degree of obstruction.

Table 3.9

Indicators of X-ray planimetry data of the ureters in children with OM

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n= 31)	12.0±0.5 **	2.0±0.1	2.1±0.06 **	2.3±0.07	50.4±7.3 *	1.0±0.04
III degree (n= 57)	14.2±0.3 ***	2.4±0.03 ***	2.3±0.03 ***	2.6±0.05	67.9±0.7 ***	1.2±0.02 ***
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*						

In RM, X-ray planimetric methods of studying the ureters revealed a direct proportional relationship between the degree of reflux and the data of mathematical analysis (Table 3.10).

Table 3.10

of X-ray planimetry data of the ureters in children with RM

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n= 23)	9.5±1.1	1.7±0.09	2.11±0.2	1.8±0.1	31.27±6.0	0.98±0.06
III degree (n= 34)	17.03±0.6 ***	2.4±0.02 ***	2.0±0.05	2.3±0.05	69.7±1.7 ***	1.1±0.0 3 **
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*						

With grade II ureters, 1-2 knee bends up to 1 cm long are formed with pronounced bubble-like dilation and dense filling of the entire ureter with a

contrast agent. With grade III megaureter, due to rapid dilation and elongation of the ureter, the number of knee bends 2-3 cm long increases to 3-4. On delayed urograms of patients with grade III megaureter, against the background of rapid dilation and elongation of the ureter, a denser filling of the ureter with a contrast agent is noted and 5-6 knee bends are formed. When studying the results of the obtained excretory urograms , positive conclusions about the presence of the diagnosis were in 96 patients, 6 patients with refluxing megaureter required computed tomography together with micturition cystography to confirm the diagnosis; in the comparison group, in 19 cases the diagnosis was completely excluded, in 2 cases additional methods were required to exclude the diagnosis.

Table 3.11

Efficiency of X-ray planometry in megaureter

Conclusion on the presence of MG		Conclusion on the absence of MG	
MG available	IP 96	MG available	LP 2
MG is missing	LO 6	MG is missing	IO 19
Total		Total	
102		21	

Note: *True positive result; false positive result; false negative result; true negative result.*

Statistical processing of the data showed that the sensitivity of the method was 94.1%, the diagnostic accuracy was 93.5% and the specificity of this method was 90.4%.

3.6. Indicators of static and dynamic nephroscintigraphy in children with megaurethra

In this study, dynamic and static nephroscintigraphy was performed in 74 children (129 ureters).

During static nephroscintigraphy in children with obstructive megaureter type before surgery. On the affected side the following signs corresponding to this disease were observed such as unclear differentiation into segments,

connective tissue changes along the lateral edge of the kidney and diffuse changes (thinning) in the thickness of the renal parenchyma. The average level of the Integral Uptake Index for both kidneys was 124. In 16 patients with the refluxing type of megaureter, there was a violation of the differentiation of the renal parenchyma and isolated areas of reduced accumulation of the radiopharmaceutical (RP) on the affected side. The IUI for the "sick" kidneys ranged from 13 to 52.

Dynamic nephroscintigraphy was performed in 33 patients with obstructive megaureter before surgery. In 16 children, Tmax exceeded 5 minutes, secretion decrease was bilateral in 13 cases. Delayed excretion of the radiopharmaceutical was observed in all patients. Outflow from urine with a kidney preparation was reduced in 16 children. This indicator was 67% of all examined patients. Decreased extrarenal outflow was transient in one patient with grade II megaureter . Reflux was detected in one patient during a micturition test, but was not registered according to multichannel cystourethrography (MCUG). The MTM parameter ranged from -26.48 to 8.28 (mean value -14.8).

In 29 children with reflux megaureter, dynamic nephroscintigraphy was performed before the operation. An increase in Tmax was noted in 12 cases. Impaired excretion of the radiopharmaceutical was noted in all patients without exception. A decrease in the outflow from the kidney was recorded in 13 children on the left side and in one on the right. A decrease in extrarenal outflow was noted in 14 cases. Retrograde reflux of urine was noted in all examined children . MTM varied from -14.21 to -10.08 (with an average value of -12.45). Table 3.12 shows the IUI and MTM indices of the ureters of the children included in the study.

Table 3.12

Nephroscintigraphic indices in patients with MG

Type and extent of damage		IIZ (units)	MTM (units)
Obstructive type	II degree (n= 30)	114 ±3.4	-14.8±1.73 ***

	III degree (n= 36)	98±2.5 ***	-26.8±1.69 ***
Refluxing type	II degree (n= 18)	111 ±2.6	-12.45±0.19 ***
	III degree (n= 33)	90±1.9 ***	-16.45 ± 1.21 ***
Comparison group (n=12)		115±1.66	0.745±0.133
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*			

true positive results were obtained in 60 cases , in 2 cases it was necessary to refer to data from other studies to confirm the diagnosis, in 11 children in the comparison group, urodynamic disorders were not detected, in 1 case the result was determined as false positive.

Table 3.13

Efficiency of nephroscintigraphy in megaureter

Conclusion on the presence of MG		Conclusion on the absence of MG	
MG available	IP 60	MG available	LP 1
MG is missing	LO 2	MG is missing	IO 11
Total		Total	
62		12	

Note: *True positive result; false positive result; false negative result; true negative result.*

In the statistical analysis of the obtained data, the sensitivity of the method was 96.7 %, the diagnostic accuracy was 96% and the specificity of this method was 91.7%.

Conclusions on the chapter

Thus, it should be noted that the most common and non-invasive methods were sonography and Doppler , while the accuracy of these methods was 74% and 80%, respectively, these methods are widely available but do not reflect the degree of preservation and functioning of the organ, there is also no information on the depth of urodynamic disorders . Informative methods were excretory urography followed by X-ray planometry , where the accuracy was 93.5%, this technique also showed high sensitivity and specificity at the levels of 90% and 86%, despite the

widespread use, the disadvantages of these methods were possible allergic reactions to the X-ray contrast agent and radiation received during this study, while this study does not provide information on the degree of preservation of the kidney. The most optimal results for these indicators (sensitivity - 96.7%, accuracy - 96%, specificity - 91.7%) were shown by nephroscintigraphy with determination of the IUI and the level of MTM, which carry high diagnostic information about the degree of preservation and functioning of the organ, as well as the severity of urodynamic disorders .

4. ENDOSCOPIC AND SURGICAL TREATMENT METHODS

When assessing the results of the surgical interventions performed, the following indicators were taken into account: the age of patients, the number of hospital days, the frequency of postoperative complications, economic costs, and the dynamics of the indicators. Doppler, X-ray planometry, integral capture index and ureteral transit of urine; changes in the degree of reflux, ureter diameter and renal hydronephrosis on X-rays. The above data were analyzed and, according to these criteria, divided into 2 groups:

Satisfactory results - improvement of Doppler and X-ray planometry indicators , increase in IIS, decrease in MTM index, decrease in the degree of reflux, decrease in the degree of hydronephrosis, decrease in the diameter of the ureter, as well as the appearance of transient complications (exacerbation of chronic obstructive pulmonary disease, macrohematuria, cystitis, leukocyturia) after their relief.

Unsatisfactory results - persistence or appearance of VUR, narrowing of the anastomosis, angulation of the anastomosis, appearance of dysuria, bolus migration, urohematoma, repeated ureteral stenosis.

4.1. Endoscopic treatment of megaureter

Different forms of megaureter require an individualized approach to the choice of treatment method. A deep analysis of the mechanisms of urodynamic disorders led to a revision of the traditional approach to open surgical correction of obstructive cases. This revision led to an expansion of the possibilities of endosurgical interventions. The technique of balloon dilation with stent placement in the ureter and removal of ureterocele has been introduced into clinical practice (L. Guerra, 2019). The first works with this method were described by NV Dorasvely (1990), where several cases were described using an endovascular balloon dilator Fogerty.

In our study, balloon dilation was performed in the treatment of the obstructive form of megaureter using a balloon catheter from Biorad. Medisystems, India ". The balloon catheter was inserted through a guidewire, the procedure of dilation of the ureters and the ureteral orifice was performed 6 Fr with a pressure of 2 - 4 ATM / bar depending on age. Dilation was considered successful when abundant urine flow was observed with further free passage of the balloon.

Fig. 4.1. *Balloon dilator used in the treatment*

The main principle of endoscopic transurethral treatment of refluxing megaureter was the bolus method of introducing a volume-forming substance to eliminate retrograde urine flow and form a dense support under the ureteral orifice to increase the submucosal length and strengthen the valve mechanism. Despite successful experience in endoscopic correction of upper urinary tract developmental anomalies lasting more than 25 years, most doctors still assess

the degree of pyeloureterectasia according to traditional criteria and often make incorrect decisions about open surgical correction.

In our work, we used a pediatric cystourethroscope from the company "KARL STORZ" (Germany) with a tube No. 9-11 Ch . for the purpose of performing this procedure.

Figure 4.2. *Disposable injection needle used for RM correction*

The first stage included cystoscopy to determine the cause, volume of administration and selection of an acceptable surgical technique. Telescopes with a viewing angle of 0° and 30° were utilized. During cystoscopy, the condition of the mucous and submucous layers of the bladder, the shape and location of the orifices, and the degree of orifice expansion during hydrodilation were analyzed. At the second stage, endoscopic correction of reflux was performed using special flexible tubular injection needles and a water-based biopolymer (Dam +).

The study included 12 patients with OM and 9 with RM, who were divided into subgroups depending on the age category. Differentiation of patients by age is presented in Table 4.1.

Table 4.1

Age distribution of patients

Age subgroup	Number of patients with OM	Number of patients with RM	Total , %
Up to a year	5	-	5 (23 , 8 %)
1-3 years	4	2	6 (28.6, %)
4 - 7 years	3	1	4 (19 %)
8 - 18 years old	-	6	6 (28.6%)
Total	12	9	21 (100 %)

The distribution of patients in the sample depending on the side of the lesion is presented in Table 4.2.

Table 4.2

Distribution of patients in the group by the affected side

Defeated side	Number of patients with OM	Number of patients with RM	Total , %
Left	6	5	11 (47.6 %)
On the right	1	2	3 (14.3 %)
On both sides	5	2	7 (33.3 %)
Total	12	9	21 (100%)

The postoperative hospital stay of patients with OM after BDVD was about 2-4 days. Before discharge, patients were recommended to drink plenty of fluids, use broad-spectrum antibiotics and take uroseptics.

Technical aspects and clinical observation of hyperbaric balloon dilation:

1. No complications such as ureteral perforation or rupture have been reported with the use of guide wires, catheters, dilatation balloons or stents.

2. In two cases, complications such as secondary VUR after BVD were recorded.

3. Microscopic hematuria was observed after BDVD, which spontaneously resolved within 2 days and did not require hemostatic treatment. Macroscopic hematuria was not reported.

4. All patients received antibiotic therapy aimed at sanitizing the upper urinary tract (nitrofurans in doses of 1 mg/kg).

Currently, there are several methods of introduction: STING method (Subureteral Transurethral Injection) - introduction of a volume of the forming substance into the wall of the bladder slightly below the mouth of the ureter, HIT technique (Hydro distention Implantation Technique) - introduction of a volume-forming substance into the distal portion of the intramural ureter and Double HIT - Injection of a bulking agent into both the distal and proximal portions of the intramural ureter. We have preferably used the Double method HIT, as the most effective of the presented methods (Baibikov R.S., 2021; Rakhmatullaev A.A. 2016).

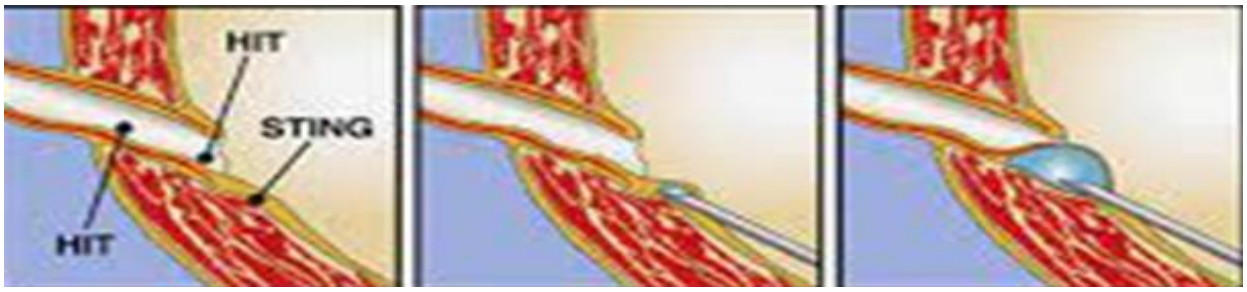


Figure 4.3. *Scheme of introduction of volume-forming substance*

The children's stay in the hospital after surgery varied from 1 to 3 days, fluid intake and broad-spectrum antibiotics were prescribed in the postoperative period; after 1-3 months, an ultrasound assessment of the bladder-local system and the dynamics of ureteral drainage was performed. A routine examination was performed after 3-12 months.

An analysis of aspects and clinical management of patients was carried out with refluxing megaureter after endoscopic administration, the volume of the forming substance:

1. No possible complications, such as allergic reactions to the bulking agent and bleeding at the injection site, have been recorded.

2. Migration of the bulking agent was recorded in one case, which suggests that administration at two points may improve the quality of the procedure.

3. Microhematuria may occur after surgery, but it resolves spontaneously within 2 days and does not require hemostatic therapy. Giant hematuria has not been reported.

4. All patients after this treatment were prescribed antibacterial therapy using antibiotics.

The results of the correction were assessed based on the data of X-ray planometry, ultrasound Dopplerography and nephroscintigraphy.

Below are tables showing the general parameters of patients who underwent the BDVD procedure. To increase statistical reliability, the parameters were measured in the ureters of patients in all studies in the postoperative period.

Table 4.3

Dopplerometric characteristics of the ureters of patients with OM

	Quantity ureters	Dopplerometry		
		Frequency Emissions (in 1 min.)	Duration of 1 emission Ts (sec)	^{V} max (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.05
Before treatment	1 7	0.5±0.1 ***	3.72±0.2***	0.26±0.05
After surgery	1 7	2.6±0.2	2.8±0.4	0.34±0.03
Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*				

Table 4. 4

Dopplerometric characteristics of the ureters of patients with RM

	Frequency Emissions (in 1 min.)	Duration of 1 emission Ts (sec)	Speed 1 emission (m/s)
Comparison group (n=21)	2.8±0.15	2.1±0.3	0.24±0.02
Before surgery (n=11)	2.4±0.2	1.74±0.26	0.29±0.03
After the introduction of the substance (n=11)	2.5±0.36	1.35±0.2*	0.33±0.02
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*			

As can be seen from Table 4.3. In patients with OM, the number of contractions increases and the duration decreases, which confirms a favorable treatment outcome, while there were no statistical differences between the groups.

Then, patients with OM underwent X-ray planometry to assess the satisfactory outcome of the treatment of BDVD, which is shown in Table 4.5.

Table 4.5

X-ray planometric parameters of ureters of patients with OM who received BDVD

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=12)	12.0±0.5	2.0±0.1	2.1±0.06 ***	2.3±0.07	50.4±7.3	1.0±0.04
III degree (n=5)	14.2±0.3 ***	2.4±0.03 **	2.3±0.03 ***	2.6±0.05 *	67.9±0.7 ***	1.2±0.05

After the BDVD (n=17)	11.7±0.3	1.9±0.15	1.5±0.05	2.4±0.08	57.2±2.5	1.1±0.04
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

As can be seen from Table 4.5. the main indicators of patients with OM after dilation the results of which are assessed as positive in the postoperative period there is a shift to the positive side. One of the important indicators of the success of the treatment is the absence of the so-called "hourglass" symptom, which is located in the stricture zone. This symptom not only reflects the degree of rigidity of the structures in the narrowed part of the bladder, but also statistically significantly determines the dependence of the nature of the outcome of the medical intervention on the severity of structural changes.

Table 4.6

X-ray planometric parameters of ureters of patients who received transuretheral injection methods of treatment

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=4)	9.5±1.1	1.7±0.09 ***	2.11±0.2	1.8±0.1	31.27±6.0	0.98±0.06
III degree (n=5)	17.03±0.6 ***	2.4±0.02 ***	2.0±0.01	2.3±0.05 *	69.7±1.7 ***	1.1±0.01
After surgery	9.8±0.6	2.1±0.05	1.9±0.12	1.95±0.16	39.56±2.6	1.05±0.03

(n=11)						
Note: ** - Level of statistically significant difference between groups (*-P<0.05; **-P<0.01; ***- P<0.001)*						

X-ray planometry data, as can be seen from Table 4.6 , in patients who received the introduction of a volume-forming substance did not have a large variation between the methods used, therefore, they were studied according to the results after treatment based on the initial degree of the disease.

As can be seen from Table 4.7. The average level of IUI before surgery in patients with OM was 114 and 98, and after surgery 116 and 105, and in patients with RM 111 and 80 before surgery and 118 and 101 after surgery , these indicators reliably reflect the restoration of renal parameters, MTM also shows values close to zero, which indicates the restoration of urodynamics in this category of patients.

Table 4.7

Nephroscintigraphy and ureteral transit parameters in patients who received BDVD

Type and extent of damage		IIS before surgery (units)	MTM before surgery (units)	IIS after surgery (units)	MTM after surgery (units)
Comparison group (n=12)		115±1.66		0.745±0.133	
Obstructive type	II degree (n=12)	114 ±3.4	-14.8±1.73	116±1.6	0.72±0.022 ***

	III degree (n=5)	98 ±2.5	-26.8±1.69	108±2.9*	1.95±0.059 ***
Refluxing type	II degree (n=4)	111 ±2.6	- 12.45±0.19	118±2.1*	1.28±0.25***
	III degree (n=5)	80 ±1.9	-16.45 ± 1.21	101±1.5***	2.87±0.59***
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*					

We analyzed the results of balloon dilation in patients of all age categories, taking into account the preservation or disappearance of qualitative signs recorded radiographically during the procedure (narrowing of the contour of the dilated balloon in the projection of the ureteral stricture after compression of the dilated balloon in the affected area, called the "hourglass" sign). This makes it possible to determine the relationship between the outcome of balloon dilation and the resistance (rigidity) of the altered tissues in the stricture zone under the influence of the dilating balloon.

A relationship was found between the outcome of the BDVD and the severity of tissue rigidity in the area of ureteral changes, which is known as the "hourglass" symptom. The most favorable results were observed with intraoperative elimination, while the preservation of the "waist" of the dilating balloon after barotherapy is evidence of an unfavorable prognosis for effective elimination of obstruction. The overall probability of a positive outcome in the absence of the "hourglass" symptom was 80%.

Summarizing the results of the analysis of the relationship between the hourglass sign and the outcome of the balloon dilatation of venous vessels (BDVD) procedure, it

is worth noting that the probability of a successful outcome is significantly reduced in the presence of narrowing of the area after the impact of the balloon (which leads to the formation of a contrast defect on the radiograph). Based on this, the hourglass sign is an important prognostic indicator for the entire procedure. The percentage indicators of treatment outcomes for different age groups are presented in Table 4.8.

Table 4.8

Treatment outcomes depending on the age of patients c OM

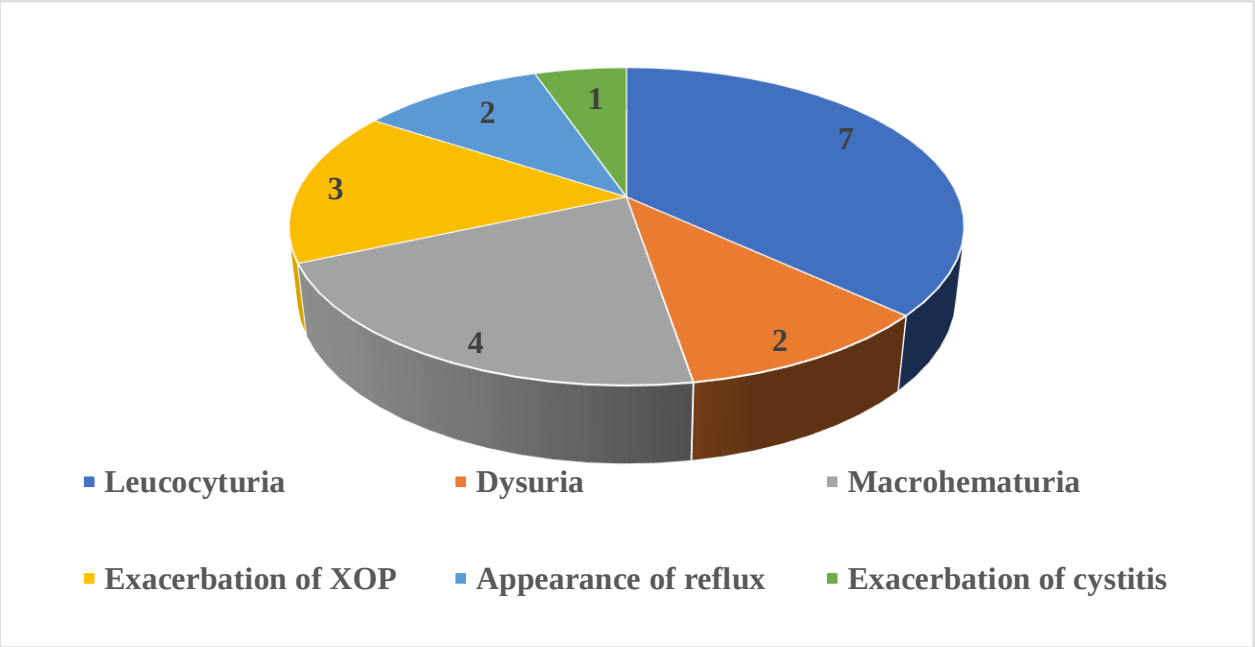
Age subgroup	Number of cases with satisfactory outcome (%)	Number of cases of unsatisfactory outcome, (%)	Total
Up to a year	4 (80%)	1 (20%)	5 (100%)
1-3 years	2 (50%))	2 (50%)	4 (100%)
4 - 7 years	2 (66.6%)	1 (33.4%)	3 (100%)
Total	8 (66.6%)	4 (33.4%)	12 (100%)

A comparative analysis of the data presented in Table 4.8 indicates high efficiency of the balloon dilation method in infants and patients under three years of age (80 and 66.6% of positive results). While in patients over three years of age this method demonstrates a lower level of successful outcomes, amounting to 50%.

Table 4.9

Treatment results depending on the age of patients with RM

Age subgroup	Number of cases with satisfactory outcome (%)	Number of cases of unsatisfactory outcome, (%)	Total
1-3 years	3 (75%)	1 (25%)	4 (100%)
4- 7 years	2 (66.6%)	1 (33.4%)	3 (100%)
8 -1 8 years	1 (50%)	1 (50%)	2 (100%)
Total	6 (66.6%)	3 (33.4%)	9 (100%)



Rice 4.4. *Diagram of analysis of complications in the early postoperative period*

When studying the nature of complications in diagram 4.4 . the leading role was played by non-specific complications such as: leukocyturia and macrohematuria, the most unfavorable were considered to be the appearance of reflux and exacerbation

HOP, although they were registered in a smaller number of patients. Thus, the use of this method in surgical treatment of megaureter in children in the age groups up to one year and from one to three years shows an efficiency of 80%. The average hospital stay was 4.5±1.5 days. The total cost of the procedure was estimated at the time of implementation to be 2911.3 thousand soums.

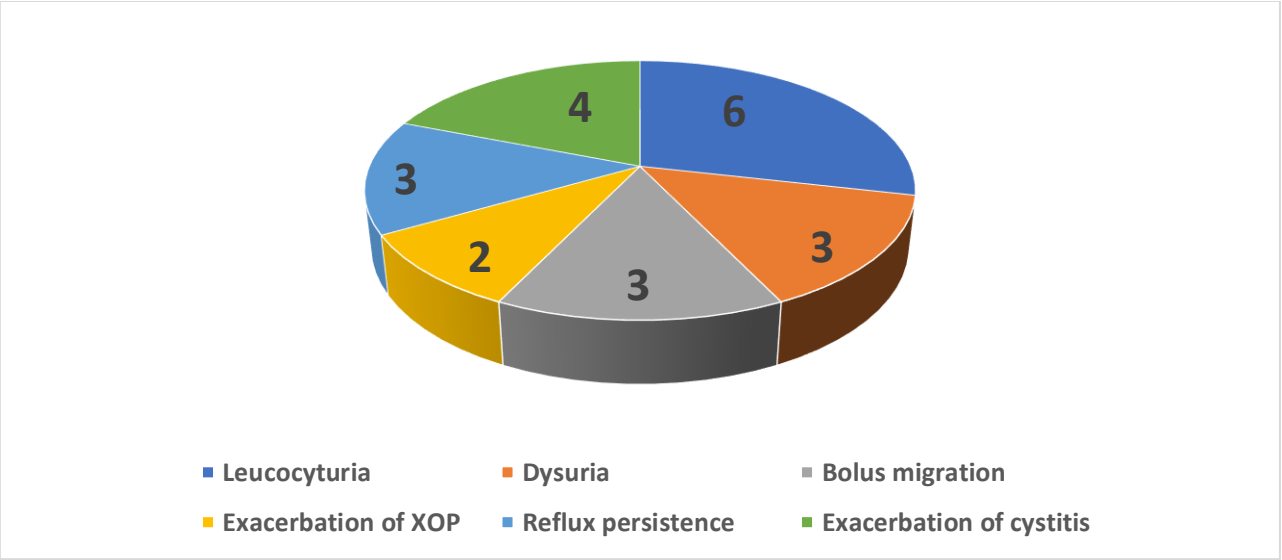


Fig. 4.5 . *Diagram of the analysis of complications in the early postoperative period*

In 37% of patients with RM, complications such as cystitis or pyelonephritis, dysuria developed, which worsened immediately after surgery. These complications were successfully eliminated by conservative measures, such as the use of broad-spectrum antibiotics, uroseptic drugs (Canephron) and selective antispasmodics. In 3 patients in our study, dysuria developed in the postoperative period, and they also had bolus migration during the follow-up study, which we considered unfavorable. The average stay was 5.5 ± 1.5 days.

From diagram 4.6. it is evident that the most frequently encountered complications of the immediate postoperative period are leukocyturia , exacerbation of pyelonephritis and cystitis, regardless of the chosen correction method. When carrying out this procedure, the costs amounted to 2730.0 thousand sums at the time of the procedure, taking into account the price of the volume of the forming substance.

Analysis of the results revealed that favorable results were observed in 9 (81.8%) ureters 3-6 months after surgery, while the degree of reflux decreased in only one (9.1%) case, and severe reflux persisted in one (9.1%) case.

Thus, the method of high-pressure balloon dilation can be successfully used for minimally invasive correction of obstructive megaureter in infants and in the first three years of life, this procedure demonstrates a statistically confirmed high probability of positive treatment outcomes, while in older patients this method shows a greater number of unsatisfactory results.

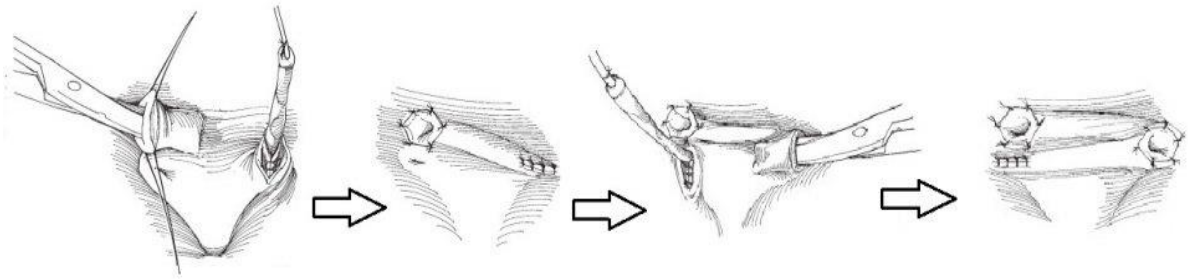
With endoscopic correction of refluxing megaurether the results of the studies confirm the high (75%) effectiveness of the method in children of younger age groups. In older patients, a lower level (66.6 and 50%) of positive outcomes is observed. It is necessary to pay attention to the place and amount of administration of the volume -forming substance, as well as to the chemical

composition, which will significantly determine the dependence of the outcome of the intervention on the severity of structural changes.

4. 2. Neoimplantation using the Kohen method

Ureterocystoanastomosis according to Cohen is one of the methods of surgical interventions. It provides surgical restoration of the required anatomical and functional characteristics, normalizes an antegrade urodynamics and so preserves antireflux mechanism that prevents the backflow of urine from the bladder. Figure 4.6 shows a schematic representation of the main stages of the operation.

Fig. 4.6. *Schematic execution of the main stages of this operation*



This type of surgical intervention was performed on 18 children with obstructive and refluxing forms of the disease. The age distribution and the affected sides are presented in the tables. 4. 10 and 4.11, the majority of patients were children aged 1-3 years, there was also a single case of a patient aged 9 months, he was included in the group of children aged 1-3 years.

Table 4.10

Age distribution of patients who received surgical treatment using the Cohen method

In o age subgroup	Number of patients with OM	Number of patients with RM	Total, %
1-3 years	6	2	8 (44.4 %)
4 - 7 years	2	3	5 (27.8 %)
8 -1 8 years	2	3	5 (27.8 %)
Total	1 0	8	18 (100 %)

Table 4.11

Distribution of patients in the sample taking into account the sides of the lesion

Stor o on defeats	Number of patients with OM	Number of patients with RM	Total, %
Left	4	-	4 (22.2 %)
On the right	3	2	5 (27.8 %)
On both sides	3	6	9 (50 %)
Total	1 0	8	18 (100 %)

However, there are, undoubtedly, limitations to the use of this type of surgical intervention, beyond which the effectiveness of reimplantation is significantly reduced.

It is necessary to note the aspects that influence success of this operation:

1) The tunnel must have sufficient transverse size and length to freely accommodate the ureter and comply with the principle of Paquin. It is located transversely to the longitudinal axis of the bladder, with its upper edge located along the upper edge of the bladder triangle.

2) And anastomosis should formed at the expense of the healthy part of the ureter to exclude repeated obstruction or stenosis of the anastomosis.

3) Drainage of the ureterovesical junction is carried out with a stent for at least 7 days.

Tables 4.12 and 4.13 show the results of Doppler sonography of patients with RM and OM before and after surgical correction using the Cohen method.

Table 4.12

Dopplerometric characteristics of the ureters of patients with OM

	Quantity urine chnikov	Frequency Emissions (per 1 min.)	Duration- 1 emission rate Ts (sec)	Speed 1 emission (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.05
Before treatment	13	0.5±0.1 ***	3.72±0.2 ***	0.26±0.2
After surgery	12	2.05±0.25 *	3,15 ±0,35 *	0.25±0.1
Note: ** - Level of statistically significant difference with the comparison group (*-P<0.05; **-P<0.01;***- P<0.001)*				

As can be seen from Table 4.12, in patients with OM, the number of contractions statistically significantly increases and the duration of the ejection decreases, which confirms a favorable treatment outcome.

When analyzing Table 4.13. There were no statistical differences between the groups in RM patients.

Table 4 .13

Dopplerometric characteristics of the ureters of patients with RM

	Quantity urine chnikov	Frequency Emissions (in 1 min.)	Continued - ity 1 emission Ts (sec)	Speed 1 emission (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.34±0.05
Before surgery	14	2.4±0.2	1.74±0.26	0.29±0.03
After surgery	12	2, 55 ±0, 3 5	1, 75 ±0, 16	0.3 0 ± 0.05
Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*				

The intubator placed in the ureter was removed in most cases within 7 to 11 days (mean 8.5 ± 0.41 days) after surgery. Catheters in the bladder were removed within 8 to 14 days (mean 9.4 ± 0.56 days).

Table 4.14

X-ray planometric parameters of ureters in patients with OM who underwent Cohen's operation

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=7)	12.0±0.5	2.0±0.1	2.1±0.06 ***	2.3±0.07 **	50.4±7.3	1.0±0.04
III degree (n=6)	14.2±0.3 **	2.4±0.03 **	2.3±0.03 **	2.6±0.05	67.9±0.7 **	1.2±0.02
After surgery (n=13)	1 2 , 7 ±0.3	1, 8 ±0, 2	1, 6 ±0, 1	2.5 ± 0.09	61 ±2, 1	1.1± 0.05
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

Tables 4.14 and 4.15 present the results of studying X-ray images using X-ray planometry. As can be seen from the presented tables, radiological changes in some parameters of VMO and RMO may not always differ statistically before and after surgery with already restored urodynamics. Also, based on static nephroscintigraphy performed in 6 children, the average value of IUI was 106. At the same time, on the right, the IUI of the radiopharmaceutical was on average 52, and on the left - 54. Dynamic nephroscintigraphy was performed in 5 patients who underwent surgical treatment for megaureter. In one child, a decrease in secretion of the right kidney was noted. Micturition test revealed retrograde reflux of urine into the ureters in one patient. The MTM parameter was determined for 4 studies and on the side of the surgery it ranged from -1.2 to -0.3, with an average value of -0.9. Changes in the average value of the MTM parameter on the affected side before and after surgical treatment are presented in Table 4.16.

Table 4.15

X-ray planometric parameters of ureters of patients with RM who underwent Cohen's operation

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=8)	9.5±1.1	1.7±0.09 **	2.11±0.2	1.8±0.1	31.27±6.0	0.98±0.06 *
III degree (n=6)	17.03±0.6 ***	2.4±0.05 **	2.0±0.01	2.3±0.05 **	69.7±1.7 ***	1.1±0.03
After surgery (n=14)	11, 9 ±1,1	2.05 ± 0.1	1, 8 ±0,1	1.91±0.12	28,5 ± 2,9	1, 15 ±0.03
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

The patients' stay in hospital in the postoperative period ranged from 12 to 19 days, with an average value of 16.5 ± 1.5 days. In the immediate postoperative period, 3 patients had acute cystitis, 4 had exacerbation of pyelonephritis, and 4 patients had signs of dysuria. This is due to the traumatic nature of the operation.

Table 4.16

MTM indicators ureters in patients undergoing Cohen's surgery

Type and extent of damage	IIZ before surgery	MTM before surgery	IIZ after surgery	MTM after surgery

Comparison group (n=12)		115±1.66		0.745±0.133	
Obstructive type	II st. (n=8)	114 ±3.4	-14.4±1.6	118±1.8	1.25±0.29 ***
	III st. (n=6)	98±2.5	-26.5±1.5	107 ±1.2**	4.25±0.55 ***
Refluxing - type	II st. (n=7)	111 ±2.6	- 12.77±0.1 3	1 17 ±1.6	1.01±0.03 ***
	III st. (n=6)	90±1.9	-17.15 ± 1,21	99 ±2.2 **	2.15±0.99 ***
Note: ** - Level of statistically significant difference between groups (*-P<0.05; **-P<0.01; ***- P<0.001)*					

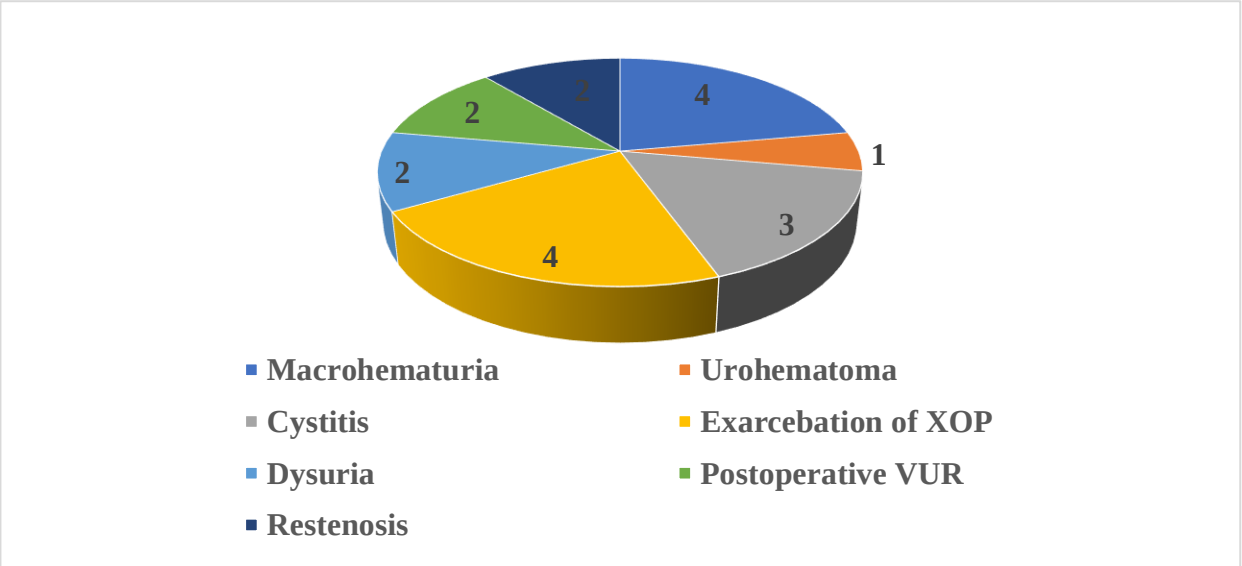
Table 4.17 presents the results of treatment of patients using Cohen's surgical correction method.

Table 4.17

Treatment results depending on the age of patients

Age subgroup	Number of cases with satisfactory outcome (%)	Number of cases of unsatisfactory outcome, (%)	total
1-3 years	5 (62.5%)	3 (37.5%)	8 (100%)
4- 7 years	4 (80%)	1 (20%)	5 (100%)
8 -1 8 years	3 (60%)	2 (40%)	5 (100%)
Total	12 (66.7%)	6 (33.3%)	18 (100%)

As can be seen from Table 4.17, the highest positive results were obtained in patients aged 4-8 years, which indicates that this age is optimal for choosing this surgical technique.



Rice. 4.7. *Analysis of complications in the early postoperative period*

The most serious complication of this procedure is bleeding from the Lieto triangle, as shown in Fig. 4.7. This is due to the formation of a submucosal tunnel in the blood-supplied part of the bladder due to its anatomical features. Bleeding from the triangle may require reoperation and/or hemostasis of the surgical wound, which may negatively affect the outcome of the operation. Access during this operation is especially associated with complete dissection of the bladder wall and scar formation, which may disrupt the innervation of the bladder. The total cost of the operation was 2336.1 thousand soums at the time of the operation.

Cohen's ureteral reimplantation, used in the surgical treatment of megaureter in children in the age subgroups under consideration, demonstrates a statistically significant correlation with the patient's age. However, in older patients who underwent this operation, a relatively low level of positive surgical outcomes is noted (66.7%). The main factor in surgical failure is postoperative urinary retention, associated, for the most part, with anatomical disproportion between the sizes of the ureter and bladder. In conclusion, it can be noted that antireflux surgery reimplantation may be recommended for correction in children over one year of age. However, the relatively high level of morbidity

and trauma of this surgical intervention, as well as its non-physiological nature, should be taken into account.

4.3 Neoimplantation using the Politano - Leadbetter method

One of the types of surgical treatment methods used is the Politano-Lidbetter operation, first described in 1958. This type of operation is also performed through an incision in the anterior wall of the bladder and is based on the principle of mobilizing the ureter and its reimplantation through a newly formed submucosal tunnel.

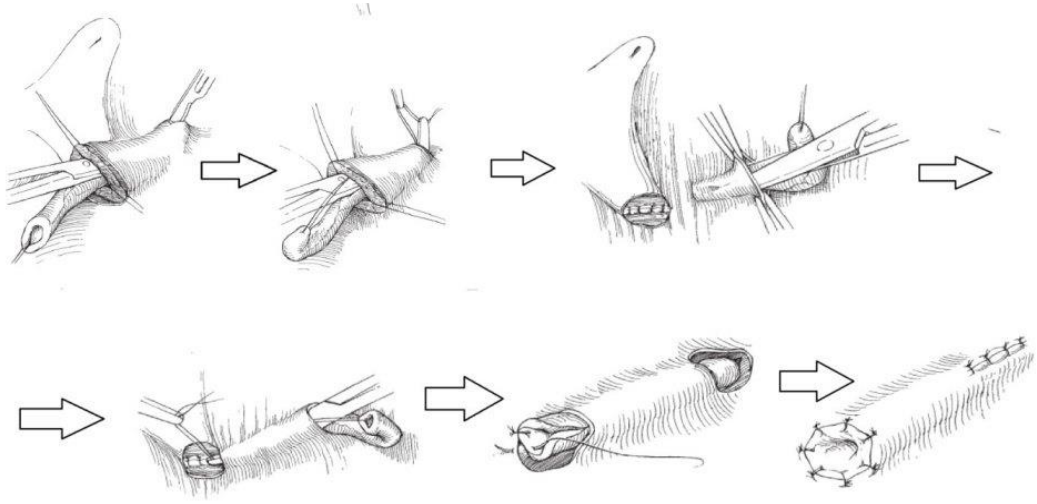


Fig. 4.8. *Scheme of the implementation of the main stages of the Politano-Leadbetter operation*

The operation is shown schematically in Fig. 4.8. Due to the prevalence of this type of operation, there are some techniques that do not use the old orifice, since morphological studies show significant structural changes found in the mucosa of the bladder and detrusor in this area. They are most likely a consequence of long-term chronic bladder infection and, in some patients, a developmental defect. In this regard, when performing this operation, a new orifice is created 0.5-1 cm medial to the old one in the area of the bladder triangle; before applying the anastomosis, 1.5-2 mm of the terminal section of

the ureter is excised. The age distribution of treated patients is presented in Table 4.17.

Table 4.17

Age distribution of patients who received surgical treatment using the Politano-Lidbetter method

Age subgroup	Number of patients with OM	Number of patients with RM	Total , %
1-3 years	8	5	13 (4 6 , 4 %)
4 - 7 years	5	3	8 (28 , 6 %)
8 -1 8 years	5	2	7 (25%)
Total	1 8	10	28 (100%)

This method of surgical intervention was used in 28 children, patients aged 1-3 years made up the majority of 46.4%, there was also a single case of a patient aged 4 months who was included in the 1-3 years group.

As can be seen from Table 4.18, the number of patients with unilateral lesions corresponded to each other 42.8 and 39.2%, respectively, while bilateral lesions were present in only 18% of patients.

Table 4. 18

The affected side of patients who received surgical treatment using the Politano-Lidbetter method

Defeated side	Number of patients with OM	Number of patients with RM	Total, %
Left	9	3	12 (42.8%)
On the right	7	4	11 (39.2) %)
On both sides	2	3	5 (18 %)
Total	18	10	28 (100%)

The main actions that determine the possibility of obtaining positive results are:

It is necessary to note the aspects that influence the success of this operation:

1) The tunnel should have sufficient transverse size and length to freely accommodate the ureter and comply with the Paquin principle. It is located transversely to the longitudinal axis of the bladder, with its upper edge located along the upper edge of the bladder triangle.

2) The anastomosis should be formed using the healthy portion of the ureter to prevent re-obstruction or stenosis of the anastomosis.

3) Drainage of the ureterovesical junction is performed with a stent for at least 7 days.

Tables 4.19 and 4.20 present the results of Doppler ultrasound examination of patients with MG.

Table 4.19

Dopplerometric characteristics of the ureters of patients with OM

	Quantity urine chnikov	Frequency Emissions	Continuator 1 emission rate Ts (sec)	^{V} max (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.05
Before treatment	18	0.5±0.1 ***	3.72±0.2 ***	0.26±0.02
After surgery	16	2, 1 ±0,1 ***	3 , 25 ±0.38 *	0.29±0.2 5
Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*				

As can be seen from the presented tables, in the OM and RM forms, Doppler methods do not show statistically significant changes, except for changes in the number of emissions in patients with OM.

Table 4.20

Dopplerometric characteristics of the ureters of patients with RM

	Quantity urine chnikov	Frequency Emissions (in 1 min.)	Continued - ity 1 emission Ts (sec)	Speed 1 emission (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.34±0.05
Before surgery	13	2.4±0.2	1.74±0.26	0.29±0.03
After surgery	12	2.6 1 ±0.25	1.8 7 ±0.1 3	0, 27 ±0,0 3
Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*				

During the operation, the distal part of the ureter was resected with a length of 3 to 8 cm, the average length was 4.3 cm, which probably correlates with the characteristics of the pathology and the individual characteristics of the patients. The drainage tube left in the perivesical area was removed in all patients on the 2nd-4th day after surgery, provided there was no discharge. This may indicate successful healing and no complications.

The tables present the X-ray planometry indicators in patients with OM and RM before and after surgery.

Table 4.21

X-ray planometric parameters of ureters in patients with OM who underwent the Politano-Lidbetter operation

Degree	X-ray planimetry data					
	Length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=6)	12.0±0.5	2.0±0.1	2.1±0.06 * *	2.3±0.07	50.4±7.3	1.0±0.04
III degree (n=12)	14.2±0.3 ***	2.4±0.2 **	2.3±0.09 ***	2.6±0.05	67.9±1.7 *	1.2±0.05
After surgery (n=17)	1 2 , 1 ±0, 2	1, 85 ±0.1	1, 55 ±0, 12	2.5 ± 0.10	60 ±2, 6	1.05 ± 0.07

Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*

Table 4.22

X-ray planometric parameters of ureters of patients with RM who underwent Politano-Lidbetter operation

Degree	X-ray planimetry data					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.0 5	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=2)	9.5±1.1	1.7±0.09	2.11±0.2	1.8±0.1	31.27±6.0	0.98±0.06
III degree (n=11)	17.03±0.6 ***	2.4±0.06 ***	2.0±0.01	2.3±0.05 **	69.7±1.7 ***	1.1±0.01
After surgery (n=13)	10.8±0.5	1.9±0.05	1.98±0.05	1.84±0.14	28.1±1.5	1.03±0.04
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

Nephroscintigraphy study was performed in 6 children and the results are presented in Table 4.23. The data analysis revealed that the average IUI was 108 overall, 62 on the right and 46 for the radiopharmaceutical injected into the left kidney.

Table 4 .23

Indicators of IUI and MTM of the ureters in patients who underwent the Politano-Lidbetter procedure

Type and extent of damage	IIS before surgery (units)	MTM before surgery (units)	IIS after surgery (units)	MTM after surgery (units)
Comparison group (n=12)	115±1.66		0.745±0.133	

Obstructive type	II st. (n=6)	111 ±2.6	-11.92±0.22	116±2.0	0.91±0.02 ***
	III st. (n=12)	90±1.9	-16.55 ± 1.55	107±1.6 ***	1.99±0.51 ***
Refluxing type	II st. (n=2)	114 ±3.4	-14.9±1.1	117±2.6	1.35±0.3 ***
	III st. (n=11)	98±2.5	-29.8±1.81	110±1.3 ***	3.47±0.45 ***
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*					

The results of the study did not show a decrease in secretion. A delay in the excretion of the radiopharmaceutical was noted in one child on the left side and in one on the right. The micturition test did not reveal retrograde urine reflux into the ureters. The average parameter was determined for 6 studies and varied from -1.3 to -0.5 (average value -0.95) on the side of the operation.

Table 4.24

Treatment outcomes depending on the age of patients

Age subgroup	Number of cases with satisfactory outcome (%)	Number of cases of unsatisfactory outcome, (%)	total
1-3 years	11 (84.6 %)	2 (15,4 %)	13 (100%)
4- 7 years	7 (87.5%)	1 (12.5%)	8 (100%)
8 -1 8 years	6 (85.7%)	1 (14.3%)	7 (100%)
Total	24 (8 5 ,7 %)	4 (14.3 %)	28 (100%)

As can be seen from Table 4.27. statistically, the results of the operation did not correlate with the patient's age and, on average, in all age groups, the figures exceeded 80% . However, it is worth considering that the classical implementation of this operation, described by the authors, has a significant

drawback. First of all, the operation is carried out entirely intravesically, which can cause various complications, which are presented in Diagram 4.9.

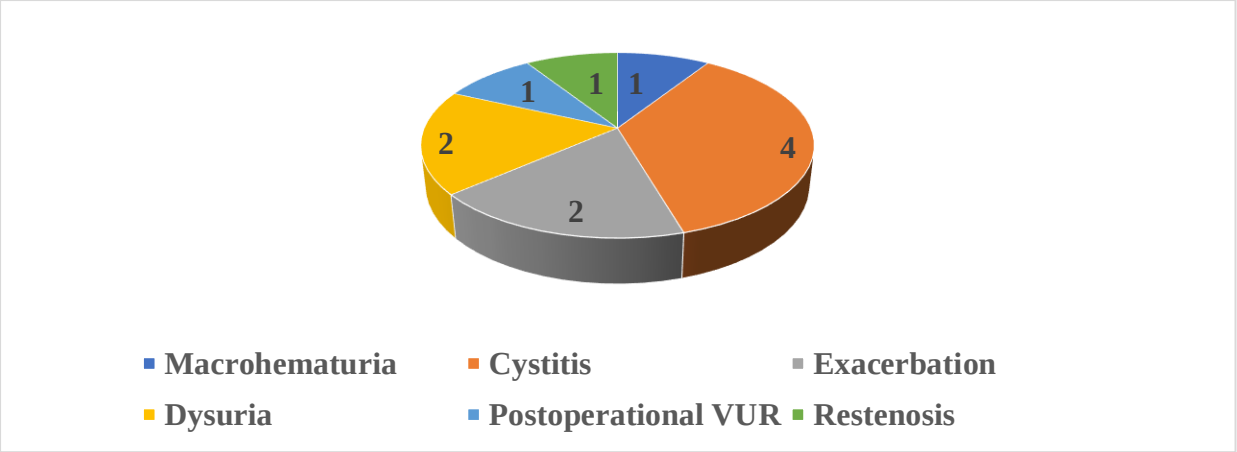


Fig . 4.9. Complication analysis diagram EARLY POST OPERATIONAL PERIOD

As can be seen from diagram 4.10, the Politano-Leadbetter operation is accompanied by specific complications, such as scar formation at the site of bladder opening, angulation prevesical ureter due to the anastomosis technique used and the formation of strictures in the vesicoureteral anastomosis, which are not amenable to endoscopic correction. A radiographic sign of ureter angulation is its transformation into the shape of a fish hook. This significantly reduces the possibility of renal catheterization if necessary, for example, in urolithiasis. The use of such a traumatic method of ureterocystoanastomosis in the absence of ureteral dilation is limited or may be unjustified. Result and you conducted survey V the nearest postoperational period , together with successful recovery , require analysis . The average time of hospital stay was 13.3±1.2 days. The average costs of this surgical intervention amounted to 2153.4 thousand soums.

Thus, the Politano-Lidbetter ureteral reimplantation technique for treating megaureter in children in the age groups under consideration does not depend on the patient's age. The results of the study show that each of the patient groups under consideration has unsatisfactory results associated with surgical treatment. The best results are observed in children of older age groups.

The main factors of surgical failure in patients are the development of angulation prevesical ureter and postoperative postmicturition residual urinary

volume associated with anatomical disproportion between the sizes of the ureter and bladder in children.

Operation Reimplantation using the Politano-Lidbetter method can be an effective solution for correction in children over one year of age. However, it should be noted that the use of this method is limited by the relatively high level of trauma to the bladder.

4 .4. Lich-Gregoire extravesical ureterocystoneoanastomosis operation (Lich - Greg o ir)

Extravesical surgery Ureterocystoanastomosis allows performing antireflux surgery without opening the bladder.

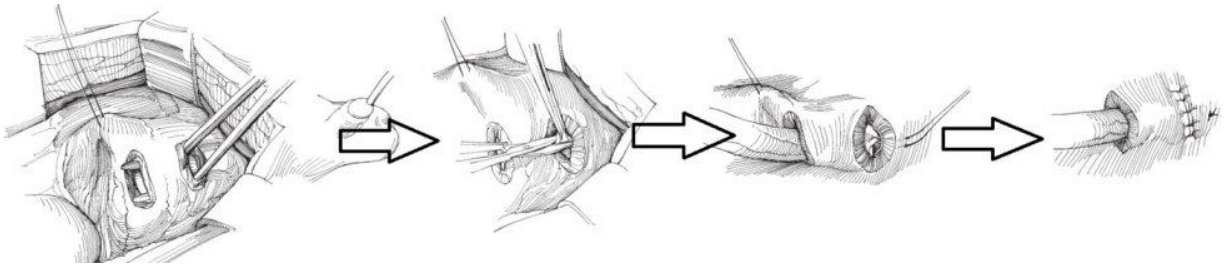


Fig. 4.10. *Schematic representation of the stages of the extravesical operation ureterocystoanastomosis*

The technique is schematically presented in Figure 4.10. Ureterocystoanastomosis using the above-described technique was performed in 35 children. The age distribution of patients is shown in Table 4.25.

Table 4.25

Age distribution of patients who received surgical treatment using the extravesical method ureterocystoneoanastomosis

Age subgroup	Number of patients with OM	Number of patients with RM	Total, %
Up to a year	3	2	5 (14.3 %)
1-3 years	13	3	16 (45.7 %)
4 - 7 years	4	4	8 (22.8 %)
8 -1 8 years	3	3	6 (17.2 %)

Total	23	12	35 (100 %)

The majority of treated patients were aged 1 to 3 years, followed by patients aged 4 to 8, and older patients made up a small proportion.

In the treatment by this surgical method, patients with bilateral pathology predominated 22, patients with unilateral pathology remained a smaller part. The distribution of patients by the sides of the lesion is presented in Table 4.26.

Table 4.2 6

Distribution of patients in the sample taking into account the sides of the lesion

Defeated side	Number of patients with OM	Number of patients with RM	Total, %
Left	5	3	8 (22.8 %)
On the right	3	2	5 (14.4 %)
On both sides	15	7	22 (62.8 %)
Total	23	12	35 (100 %)

As can be seen from the Doppler parameters (Tables 4.27, 4.28) of patients with megaureter, the frequency of emissions increased in patients with OM from 0.5±0.1 to 2.2±0.15, while in patients with RM there is a slight change in this parameter.

Table 4.27

Dopplerometric characteristics of the ureters of patients with OM

	Quantity urine chnikov	Frequency Emissions (in 1 min.)	Duration- 1 emission rate Ts (sec)	Speed 1 emission (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.05
Before treatment	28	0.5±0.1 ***	3.72±0.2 ***	0.26±0.02
After surgery	24	2, 2 ±0.15 **	3, 3 ±0,3 **	0.27 ± 0.1

Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*

Also, the duration of the ejection decreased by 0.4 sec with small changes in volume in patients with OM, whereas in patients with RM these indicators change in small volumes and have no statistical difference. The economic costs of carrying out this type of surgical intervention amounted to 1982.2 thousand soums.

Table 4.28

Dopplerometric characteristics of the ureters of patients with RM

	Quantity urine chnikov	Frequency Emissions (in 1 min.)	Continued - ity 1 emission Ts (sec)	Speed 1 emission (m/s)
Comparison group	21	2.8±0.15	2.1±0.3	0.24±0.05
Before surgery	16	2.4±0.2	1.74±0.26	0.29±0.03
After surgery	13	2.6 2 ± 0.05	1, 91 ±0,1 9	0.28 ± 0.07

Note: ** - Level of statistically significant difference with the comparison group (*- P <0.05; **- P <0.01; ***- P <0.001)*

Tables 4.29 and 4.30 present the results of X-ray planometric studies; the picture of this group of patients indicates positive dynamics of all the main indicators of the operated patients.

Table 4.29

X-ray planometric parameters of ureters of patients with OM who underwent surgery.

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=5)	12.0±0.5	2.0±0.1	2.1±0.08 * **	2.3±0.07	50.4±7.3	1.0±0.04

III degree (n=18)	14.2±0.3 ***	2.4±0.03 **	2.3±0.09 ***	2.6±0.05 **	67.9±0.7 **	2.2±0.09 ***
After surgery (n=21)	1 1 , 9 ±0, 3	1, 82 ±0,1 8	1.5 3 ± 0.13	2, 25 ±0, 15	55 ± 3 , 8	1, 06 ±0,04
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

Table 4.30

X-ray planometric indicators ureters of patients with RM who underwent surgery

Degree	X-ray planimetry data (mm)					
	length	D1	D2	D3	VMO	RMO
Group Comparisons (n=21)	9.4±0.6	1.8±0.05	1.9±0.05	1.85±0.5	32.7±1.8	1.0±0.02
II degree (n=7)	9.5±1.1	1.7±0.09 ***	2.11±0.2	1.8±0.1	31.27±6.0	0.98±0.06
III degree (n=16)	17.3±0.6 ***	2.4±0.02 ***	2.0±0.04	2.3±0.05	69.7±1.7 ***	1.1±0.04
After surgery (n=19)	9.95±0.5	2.05±0.03	1.91±0.9	1.87±0.26	30.45±3.1	1.03±0.04
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*						

The following results were found in the analysis of the obtained data: the total isotope capture index (ICE) averaged 111 and 90 in patients with RM and 114 and 98 in patients with OM. Changes in the average value of the MTM parameter on the affected side before and after surgical treatment are presented in the table.

As shown in Table 4.31, the MTM parameter was determined for 33 studies, and on the side of the operation it ranged from -2.95 to -0.9, with a mean value of -

1.66. The results of the study showed a decrease in the secretion of the right kidney in 1 child. Delayed elimination of the radiopharmaceutical was noted in 2 children on the left side and in 1 child on the right. Decreased intrarenal outflow was found in 2 patients in the left kidney and in 1 child on the right. Decreased extrarenal outflow was found in 1 patient on the left side, representing the minimum value of the MTM parameter.

Table 4. 3 1

Indicators of IUI and ureteral transit in patients undergoing extravesical surgery ureterocystoanastomosis

Type and extent of damage		IIS before surgery (units)	MTM before surgery (units)	IIS after surgery (units)	MTM after surgery (units)
Comparison group (n=12)		115±1.66		0.745±0.133	
Obstructive type	II st. (n=4)	114 ±3.4	-14.8±1.9	118±1.3	1.15±0.1 ***
	III st. (n=13)	98±2.5	-27.2±1.72	111±1.9 ***	2.95±0.57 ***
Refluxing type	II st. (n=5)	111 ±2.6	- 12.01±0.15	119 ±1.1 *	0.89±0.016 ***
	III c t.(n=11)	90±1.9	-16.15 ± 1.44	109±0.9 ***	1.90±0.10 ***
Note: ** - Level of statistically significant difference between groups (*- P <0.05; **- P <0.01; ***- P <0.001)*					

In a comparative analysis of postoperative results of transvesical and extravesical ureterocystoanastomoses, the Lich-Gregoir operation has the following advantages:

- Minimal trauma: The Lich-Gregoir procedure is the least traumatic, which significantly reduces the risk of injury to the bladder mucosa. This is especially important in the area of the Lieto triangle.

- Positive course of the postoperative period: Patients who have undergone the Lich-Gregoir operation have a favorable postoperative course. This is due to minimal trauma, which facilitates easy care of patients.

- Early removal of the urethral catheter: Using the Lich-Gregoir method allows for early removal of the urethral catheter, which reduces the risk of bladder infection and promotes faster recovery.

- Reduced hospital stay: Patients who underwent the Lich-Gregoir procedure have shorter hospital stays after surgery (10.3±1.4 days), indicating more effective postoperative recovery.

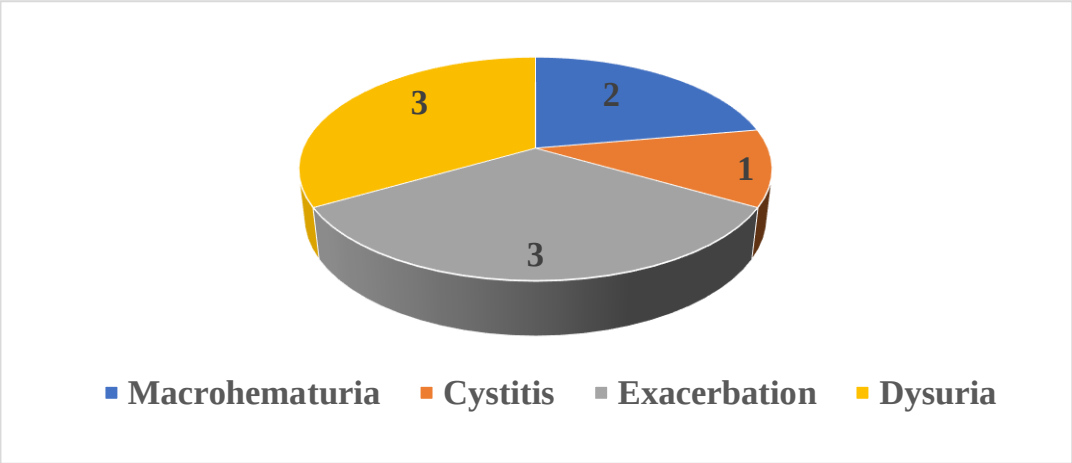
The analysis of postoperative treatment results is presented in Table 4.32.

Table 4.32

Treatment outcomes depending on the age of patients

Age subgroup	Number of cases with satisfactory outcome (%)	Number of cases of unsatisfactory outcome, (%)	Total
Up to a year	3 (60%)	2 (40%)	5 (100%)
1-3 years	1 4 (8 7.5%)	2 (1 2 , 5 %)	16 (100%)
4- 7 years	7 (8 7.5 %)	1 (1 2 ,5 %)	8 (100%)
8 -1 8 years	6 (10 0%)	0 (0%)	6 (100%)
Total	30 (88.6 %)	5 (11,4 %)	35 (100%)

As can be seen from the results presented in Table 4.35, there is a high level of positive treatment results for patients; the most favorable results were obtained in patients of older age groups, while the level of positive results for the remaining patients averaged 87%. Figure 4.12 presents an analysis of postoperative complications after the surgical intervention.



Rice 4.11 *Analysis of complications in the early postoperative period*

As can be seen from Fig. 4.11, no specific complications of this method were noted, while complications were observed, phenomena inherent in all operations performed on the RUS. And antireflux Lich-Gregoir ureteral reimplantation in the treatment of megaureter in children demonstrates the most successful results (88.6%) of the positive outcome of surgical treatment. This method, as can be seen from the above tables, is the least traumatic and physiological, which affects postoperative recovery and fewer complications and unsatisfactory results, and is the operation of choice for the correction of children with this pathology.

Thus, based on the data obtained, it can be stated that the use of minimally invasive methods, in particular, BDVD, shows the best results (80%) in children under 1 year of age, methods of transurethral administration of volume-forming substances, high (75%) statistically significant efficiency of the endoscopic correction method in the treatment of refluxing megaureter in children of older age groups. When comparing the results of the 3 most common methods, methods ureteral reimplantation the highest results of positive methods Politano-Lidbetter and extravesical ureterocystoanastomosis according to Lich-Gregoire 85% and 88%, respectively, while a high percentage of positive results was noted in children aged 1-3 years. When performing extravesical methods in comparison with intravesical methods, there was a smaller number and there were no specific complications inherent in these methods such as bleeding and angulation. When comparing the cost-effectiveness of open neoimplant operations, the highest average costs were for

the Cohen operation (2336.1 thousand soums), while for the Politano-Lidbetter operation (2153.4 thousand) and extravesical ureterocystoanastomosis (1982.2 thousand) accounted for 8% and 16% less expenses, respectively. The greatest economic efficiency was achieved when performing the operation of extravesical ureterocystoanastomosis , which was the lowest rate among all types of surgical treatment of this pathology.

CONCLUSION

In pediatric medical practice, megaureter is one of the most pressing problems, often encountering renal complications. Among all childhood diseases, urinary system development anomalies are the most common. According to the World Health Organization, megaureter accounts for up to 40% of all diseases in this group, according to various sources.

Disturbances in urodynamic parameters lead to chronic obstructive pyelonephritis, which subsequently is a predisposing factor in the development of chronic renal failure in 23-27% of cases in children. This is due to several factors. With megaureter, there is a violation of the normal evacuation of microbial flora penetrating the urinary tract, which creates conditions for chronic inflammation of the kidneys. Also, with MG, increased intrarenal hydrostatic pressure is detected. This effect can have a negative effect on blood flow in the kidneys, which contributes to the development of chronic changes in kidney tissue. For megaureter, combined with constant relapses of pyelonephritis, acute urinary retention or leading to a sharp decrease in kidney function, surgical intervention is recommended. The essence of the operation is to normalize urodynamics, which is an integral component of complex treatment in order to prevent complications.

The vastness of early diagnostics of this pathology, the use of various diagnostic methods, the existence of a huge number of surgical treatment methods, and the high percentage of unsatisfactory results make this disease a pressing issue in pediatric surgery. Therefore, the study of possible methods of effective diagnostics that allow pathogenetically sound surgical tactics in each specific type of this disease is a priority and promising one.

The aim of the study is the improvement of diagnostic and treatment results for megaureter in children was achieved through the use of radionuclide methods for assessing the urodynamics of the upper urinary tract.

The patients included in the study were undergoing inpatient treatment in the Department of Pediatric Surgery of the Samarkand Regional Children's

Multidisciplinary Medical and Research Institute of Pediatric Surgery of the Federal State Budgetary Institution NMIC ZD Ministry of Health of the Russian Federation, for various forms of megaureter, namely: obstructive and refluxing forms. All patients were examined both before and after surgical and conservative treatment. For the dissertation, 123 children (76 boys and 47 girls) in the age category from 3 months to 17 years 11 months were examined. The study took place from 2019 to 2023, and an assessment of archival material starting from 2000 was also carried out. The bulk of the examined patients were in the age range from 1 to 7 years (49.79%), patients under 1 year of age accounted for 21.7%, and over 7 years of age - 27.1%. Moreover, in boys the megaureter had a higher rate (61.7%) than in girls (38.9%).

The diagnostics of megaureter included a number of standard and special methods of examination. Among the standard methods were clinical and biochemical blood tests, general urine analysis, Addis -Kakovsky and Zemnitsky tests , bacterial urine culture, survey radiography, excretory urography, micturition cysto-ureterography . Special methods included static nephroscintigraphy, dynamic nephroscintigraphy, dopplerography of the ureteral-vesical output, cystoscopy, and X-ray planometry. These methods provided a more detailed study of the structure and function of the urinary tract, which made it possible to accurately determine the presence and nature of the megaureter.

Analysis of the initial appeal of parents regarding the symptoms of the disease to primary health care specialists - district general practitioners in family clinics and rural medical stations 34 (27.6%), also parents of a sick child in a greater number of cases contacted pediatricians in central district hospitals and multidisciplinary medical centers 28 (22.7%). It was also noted that recently there has been a tendency to increase the number of prenatal diagnostics of this disease in our study this number was 14 (11.3%), a smaller percentage were patients who were treated in nephrology departments and were referred to surgical departments by nephrologists 17 (13.8%).

As the analysis of complaints upon admission of children with megaureter showed , the largest proportion of patients came with complaints of changes in urine tests 112 (91%) and increased body temperature 88 (71.5%), also in approximately equal proportions there were pains in the lumbar region 26 (21.1%), abdominal pain of various localizations (17.9%), dysuric phenomena 21 (17%), in some patients there were cases of episodes of acute urinary retention 4 (3.25%) these signs were observed separately or in combination.

In bacteriological analysis of blood, monoculture was detected in 39 (67.2%) of the total number, in other cases, mixed microbial flora was cultured in 19 (32.8%). In children, 9 strains of etiologically significant bacteriuria were detected, among which the enterobacteria family predominated. The most common strain was Escherichia coli, detected in 32.5% of cases both in monoculture and in association with other microorganisms. Next in quantity were various types of cocci Staphylococcus, accounting for 23.5% of detected cases. Enterobacter occupied third place with a frequency of 18.75%. Pseudomonas aeruginosa and Candida were found with equal frequencies of 8.75%, and the remaining types of microorganisms were found in isolated quantities. Ultrasonography (US) of patients with megaureter showed that the length and width of the affected kidney and the diameter of the ureter before surgery were much higher in patients with grade III megaureter compared to patients with grade II. This difference was statistically significant ($p < 0.001$) and did not depend on the patient's age. The parenchyma thickness of the affected kidney was also significantly smaller in grade III megaureter compared to grade II megaureter ($p < 0.001$).

Using pulsed-wave Doppler analysis of ureterovesical urine flow in children with obstructive megaureter , a significant decrease in the frequency of current (less than once every 2-3 minutes), an increase in the duration of current (3.54 ± 0.18 s) and a decrease in the maximum flow rate (0.22 ± 0.02 m/s) were noted. In children with organic obstruction, these changes are associated with significant dysplasia of the ureteral wall. In children with reflux megaureter, signs of dynamic obstruction

were observed: a decrease in the frequency of urination (1-3 times / min), backflow of urine from the bladder to the distal ureter, a decrease in the time of urination (1.54 ± 0.18 s) and a decrease in the maximum flow rate (0.22 ± 0.02 m/s).

Mathematical evaluation of the X-ray method of examination of the upper urinary tract demonstrated that with obstructive megaureter, the average values of volumetric urinary obstruction (VUO) varied depending on the degree from 50.8 ± 7.8 to 66.7 ± 2.5. The indices of retention urinary obstruction (RMO) varied from 1.06 ± 0.04 to 1.2 ± 0.02. The length and diameter of the ureter also tended to increase in absolute values with increasing degree of obstruction.

Static nephroscintigraphy for the obstructive type was performed before surgery in 17 children with IID, the overall average was 124. The MTM parameter was determined in 16 patients before surgery and ranged from -26.48 to 8.28 (average value -14.8).

In static nephroscintigraphy in patients with the reflux type, the analysis of the study data showed that in these patients on the affected side (14 observations) the IUI for the “sick” kidneys was in the range from 13 to 52. The MTM parameter was calculated for 12 ureters and ranged from -14.21 to -10.08 (mean value -12.45).

The results of operations were analyzed in 102 patients who underwent endoscopic and open surgical interventions both in the immediate and remote periods. Examinations were conducted before the operation, one week after the operation, and at discharge. The follow-up was studied in the period from 6 months to 1 year after surgical manipulations. When analyzing the remote results, the severity of urinary retention in the upper urinary tract, as well as the effect of eliminating the identified urination disorders, were taken into account.

In the first group of patients who received endoscopic treatment (BDVD and transurethral injection of a bulking agent), the rate of positive outcomes was 60% and 80%, with the best results being obtained in younger children.

Treatment with balloon dilation of the ureter was performed in 12 patients with obstructive megaureter. The average probability of a positive outcome in the

absence of the "hourglass" symptom was 80%. The method of transurethral endoscopic balloon dilation in surgical treatment of megaureter in children under one year and from one to three years shows high statistically significant efficiency.

According to the analysis of postoperative complications, the best results in the correction of reflux megaurether were achieved using the DOUBLE HIT method. Positive results in the period of 3-6 months after surgery were recorded in 9 (81.8%) patients, in 1 (9.1%) case there was a decrease in the degree of reflux by only one degree, in 1 (9.1%) case a severe degree of reflux remained.

The choice of the strategy for surgical treatment of megaureter took into account several aspects, including the condition of the healthy kidney, the frequency of the inflammatory process in the affected organ, the size and functioning of the ureteral tract, the stage and severity of megaureter, complications and their nature.

Cohen's operation (the second group) was performed on 18 children with obstructive and refluxing forms of the disease. In older patients who underwent this operation, a relatively low level of positive results is observed (66.7%). After the operation, patients were in hospital for 12-19 days (16.5±1.5 days). Postoperative bleeding; development of a scar that prevents normal contractility of the bladder; inability to straighten the kinks of the dilated ureter - these complications, regardless of the patient's age, influenced the high percentage of unsatisfactory results.

The third group (28 patients) who received the Politano-Lidbetter ureteral reimplantation operation , as well as the previous one is connected with the age division of patients . The level of satisfactory and positive results was 85.7%. The obtained results show that in each of the presented groups of patients there are unsatisfactory results associated with surgical treatment. The best results are demonstrated by children of older age groups. The average time of hospital stay was 13.3±1.2 days. The main negative factor after surgery in patients is the formation of angulation prevesical ureter associated with the discrepancy between the sizes of the ureter and bladder in children.

In the fourth group, 35 patients received extravesical ureterocystoanastomosis according to Lich-Gregoire, positive cases were obtained in 88.6% of cases, which was the most effective method among all types of reimplantations performed. A reduction in the duration of postoperative stay by 20% and 15%, respectively, was noted.

A comparative analysis of the results of 3 types of open operations to create a ureteral-vesical anastomosis revealed a number of advantages of this operation, such as low trauma, no damage to the bladder mucosa, which is significant in the area of the Lieto triangle. Moreover, the postoperative period is more favorable, easier patient care and a low risk of bladder contamination due to early removal of the urethral catheter. This is combined with a reduction in postoperative hospital stay to 10.3 ± 1.4 days.

Thus, based on the data obtained, it can be stated that the use of minimally invasive methods, in particular, BDVD, shows the best results (80%) in children under 1 year of age, methods of transurethral administration of volume-forming substances, high (75%) statistically significant efficiency of the endoscopic correction method in the treatment of refluxing megaureter in children of older age groups. When comparing the results of the 3 most common methods, methods ureteral reimplantation the highest results of positive methods Politano-Lidbetter and extravesical ureterocystoanastomosis according to Lich-Gregoire 85% and 88%, respectively, while a high percentage of positive results was noted in children aged 1-3 years. When performing extravesical methods in comparison with intravesical methods, there was a smaller number and there were no specific complications inherent in these methods such as bleeding and angulation. When comparing the cost-effectiveness of open neoimplant operations, the highest average costs were for the Cohen operation (2336.1 thousand soums), while for the Politano-Lidbetter operation (2153.4 thousand) and extravesical ureterocystoanastomosis (1982.2 thousand) accounted for 8% and 16% less expenses, respectively. The greatest economic efficiency was achieved when performing the operation of extravesical

ureterocystoanastomosis, which was the lowest rate among all types of surgical treatment of this pathology.

CONCLUSIONS

1. Analysis of the clinical course of the disease showed that MG is most often found in children aged 1-3 years (40.2%) and preschool age (24.5%), in children under one year of age the disease may have a latent course, the most common symptoms of megaureter in children are the presence of pathological changes in urine tests (89.1%), increased body temperature (67.6%) and pain of various localizations (36.3 %).

2. The study found that Sonography (72%) and Doppler (66%) have satisfactory diagnostic indicators for MU in children, but do not reflect the degree of preservation and functioning of the organ, and do not provide information on the depth of urodynamic disorders. More informative methods were excretory urography followed by X-ray planometry; the efficiency was about 90%. Nephroscintigraphy with determination of IUI and MTM level showed sensitivity of 95%, accuracy of 98%, specificity of 93%, it provides valuable data on the degree of preservation and functioning of the organ, as well as the severity of urodynamic disorders.

3. Endoscopic methods of treating MG in children are promising surgical interventions that do not require lengthy preoperative preparation, are low-traumatic, have the shortest hospital stay among all types of surgical interventions (4.5 and 5.5 days) and allow improving urodynamic parameters in young children with high degrees of disease; in the treatment of obstructive megaureter, the BDVD technique is recommended for patients under 1 year of age, this type of treatment allows obtaining the best results (80%) . In patients with refluxing megaureter, obtaining a positive result also depends on the age and method of bolus formation, with the highest positive results obtained in patients aged 1-3 years (75%).

4. In a comparison of open surgical techniques for ureteral neoimplantation , the study showed that extravesical Ureterocystoanastomosis (Lich - Greg method) is the preferred method due to high positive results (88.6%), low risk of complications and shorter hospital stay (10.3±1.4 days) .

5. Based on the results of radionuclide studies, it was determined that with the obstructive form of megaurethra , the effectiveness of the operation was maximum (change in ureteral transit towards improving the norm by 13.5 times), with corrected refluxing megaureter, the change in this indicator occurs more slowly (increases only 1.7 times compared to preoperative indicators), which allows us to assume the most favorable prognosis for the course of this disease in children with the obstructive form.

6. The ureteral transit rate is a non-invasive method for assessing the transport function of the ureter in children. In children without urodynamic disorders, the normal MTM rate is 0.745±0.133. A decrease in ureteral transit is observed in urodynamic pathologies. Urodynamic disorders in children with obstructive megaureter (the average value before the preoperative indicator is -21.4±1.77) are higher than in children with refluxing megaureter (mean preoperative value -14.3±1.334)

PRACTICAL RECOMMENDATIONS

1. The use of ureteral transit rate calculation is an integral part of the process of performing dynamic nephroscintigraphy in children suffering from this disease. This calculation is necessary to determine the severity of the urodynamic disorder and to more accurately assess the function of the ureters in this context.

2. Endoscopic treatment methods demonstrate the greatest effectiveness in age groups up to 1 year and from 1 to 3 years, open surgical methods of ureteral reimplantation demonstrate high positive results in children aged 3 years and older.

3. In children with megaureter at low degrees, it is advisable to use endoscopic methods of surgical correction; if the above methods are ineffective or at high degrees of this pathology, the most optimal solution is reimplantation of the ureter using the extravesical method.

4. The criteria for choosing a surgical method of correction should be: 1) a decrease in the integral capture index on the affected side below 40% based on static nephroscintigraphy data ; 2) negative ureteral transit values during dynamic nephroscintigraphy ; 3) an increase in the size of the ureter by more than 10 mm.

5. conduct the analysis of the value in the period from 3 to 6 months after the surgical intervention. This stage is key to studying the level of restoration of the upper urinary tract function and determining the effectiveness of the surgical correction.

REFERENCES .

1. Ayvazyan A. V., Voyno-Yasenetsky A. M. Developmental defects of the kidneys and ureters. - 1988. P. 323-396

2. Adamenko O. B. Clinical and morphological rationale for conservative treatment of obstructive ureteral diseases in children. *Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation.* 2015;5(3): 113-114.

3. Ainakulov A. D. Transurethral endoscopic treatment of congenital obstructive megaureter in children. *Endoscopic surgery.* 2011; 17(3):44-46.

4. Ainakulov A. D. Differentiated approach to the treatment of primary obstructive megaureter in children. *Pediatric surgery.* 2014; (5): 16-18.

5. Al-Kadi K.M. Surgical correction of primary non-refluxing forms of megaureter in children. Remote results: Abstract of a PhD thesis. Moscow, 2004; 39 p.

6. Aliev, M. M., Rakhmatullaev, A. A., Terebaev , B. A., Sattarov, H. A., & Sultanov, A. K. (2015). Remote results of surgical correction of vesicoureteral reflux in children. *Reproductive health of children and adolescents*, (2 (61)), 89-95.

7. Akhmedov Yu.M., Akhmedzhanov I.A., Mavlyanov Sh.Kh., Mavlyanov F.Sh., Ibragimov K.N., Kurbanov Zh.Zh. X-ray planimetric methods for diagnosing obstructive uropathies in children. Saratov Scientific and Medical Journal, 2017.

8. Akhmedov Yu.M., Akhmedzhanov I.A., Mavlyanov F.Sh. Intravesical surgical correction of the distal ureter in children. // Vest.vr. about pr.2006g st . 205.

9. Akhmetshin R.Z., Gumerov A.A., Smakov Sh.S., Konovalov S.A. et al. Diagnostics and treatment of obstructive uropathies in newborns. Proceedings of the 2nd Congress of pediatric urologists-andrologists. M. 2011; 13.

10. Burkin, A. G. (2012). "Radionuclide assessment of urodynamics in obstructive uropathies in children: dissertation for the degree of candidate of medical sciences. M; 2012.

11. Burkin, A. G., Yatsyk, S. P., Nikolaev, S. N., & Volodko, E. A. (2021). Modern principles of treatment of vesicoureteral reflux in children. *Pediatrics named after G. N. Speransky* , (4).

12. Burkin, A. G., Yatsyk, S. P., Nikolaev, S. N., Volodko, E. A., & Sergeeva, S. V. (2021). Modern view on the diagnosis of vesicoureteral reflux in children. *Child and Adolescent Reproductive Health* , *17* (1), 16-32.

13. Galkin V.N., Razin M.P. Embryogenesis and clinical malformations of the urinary system // Educational and methodological manual for students of medical universities Kirov. - 2014 - 36 p.

14. Derzhavin V.M., Kazanskaya I.V., Vishnevsky E.L. Diagnostics of urological diseases in children. // -M., Medicine, 1984.- 214 p.

15. Pediatric surgery: national guide / ed. Yu.F. Isakova , A.F. Dronova . M.: GEOTAR-Media. 2009. 1168 s

16. Dubrov V.I., Kagantsov I.M. Comparison of the results of intravesical and extravesical Ureteral reimplantation for bilateral refluxing megaureter in children. *Bulletin of Urology* . 2020;8(2):21-28. https://d o i. o rg/10.21886/2308-6424-2020-8-2-21-28

17. Erokhin A.P., Blagoveshchenskaya O.V., Kovarsky S.L. Complications in surgical treatment of megaureter in children // Urol . I nephrol . - 1981. - No. 1. - P.27-30

18. Zakharova I. N., Gerasimova N. P., Savelyeva O. V. Radioisotope research methods in pyelonephritis in children // Proceedings of the III Russian Congress "Modern Technologies in Pediatrics and Pediatric Surgery". - M., 2004. - P. 256-262.

19. Zakharova I.N., Mumladze E.B., Voronenko O.A., Zakharkina E.V. Radiocontrast methods of examination in pediatric nephrology. // Attending Physician. - 2005.-№ 9. - P. 43-47.

20. Zevgenidze G.A. (ed.) Clinical Roentgenology – T.;.- M.: Medicine, 1985.-149s.

21. Ignatova M.S. Pathology of the urinary system in children (modern aspects).// - Nephrology and Dialysis, 2004.-N 2.-P.127-132

22. Ignashin N.S., Martov A.G., Morozov A.V., Perelman V.M., Teodorovich O.V. Diapeutics in urology // - M.: Poligran , 1993. -P. 60-84.

23. Kazanskaya I.V., Recommendations of the 2nd school on pediatric urology-andrology " Megaureter in children". 24-25.10.2007.

24. Karpachev, S. A., Zorkin , S. N., Bayazitov, R. R., & Uvarov, B. N. (2022). Pneumovesicoscopic approach for Cohen's ureteral reimplantation in children. *Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation, Eco-Vector LLC* , *12* , 75.

25. Karpachev, S. A., Zorkin , S. N., Gurskaya, A. S., Tarzyan , A. O., Bayazitov, R. R., & Zhamynchiev , E. K. (2020). Ureteral reimplantation in infants using pneumovesicoscopic access. *Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation* , *10* (S), 70-70.

26. Karpenko V.S., Kolesnikov G.F. et al . Functional diagnostics in urology and nephrology // - Kiev: Health, 1977. -P. 134-148.

27. Kasiteridi I.G. Comparative assessment of modern research methods in hydronephrosis: Diss . ... candidate of medical sciences . M.; 2005.

28. Kireeva N.B.; Parshikov V.V.; Khafizova L.A.; Aleynik D.Ya.; Zaugarov M.Yu., Method for treating vesicoureteral reflux in children (Patent of the Russian Federation) 2002129065/14, 2004

29. Korablinov O.V., Urasin R.N., Karavaev A.Yu., Kuzmina O.M., et al. Endoscopic treatment of stenotic megaureter in children. Proceedings of the 2nd Congress of Pediatric Urologists-Andrologists. M. 2011; 41-42.

30. Korovina N.A., Zakharova I.N., Gerasimova N.P., Savelyeva O.V. Functional state of the kidneys in pyelonephritis in children. // Russian pediatric journal. – 2004. -№4. - P. 15 -19.

31. Krasnova E. I., Deryugina L. A., Morozova O. L. Undifferentiated connective tissue dysplasia in the etiopathogenesis of congenital megaureter in children // Pediatric surgery. - 2010. - No. 3. - P. 42-44.

32. Kurzantseva O.M., Murashkovsky A.L., Definition of vesicoureteral reflux in children by various methods of radiation diagnostics. Proceedings of the VII All-Russian Scientific Forum Radiology 2006 // - M., 2006. - P. 147.

33. Levitin A.F. Choice of urine diversion method in children// Urol . i Nephrol . – 1991.- No. 1.- P. 22-25.

34. Levitskaya M.V., Menovshchikova L.B., Mokrushina O.G., Shumikhin V.S., et al. Remote results of endoscopic correction of ureterovesical segment pathology in infants. Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation. 2012; 2(3):3.

35. Lishmanov Yu.B., Chernov V.I. (eds.) Radionuclide diagnostics for practicing physicians - Tomsk.: STT, 2016.- 394 p.

36. Lopatkin N. A., Lyulko A. V. Anomalies of the genitourinary system: Etiology, pathogenesis, research methods, clinical features and diagnostics of genitourinary system defects. Kiev: Zdorov'ya , 1987.

37. Lopatkin N.A., Intermittent vesicoureteral reflux in children // - M., 2004. - 212 p.

38. Mazurin A.V., Vorontsov I.M. Propaedeutics of childhood diseases. - M.: Medicine, 1985.-432 p.

39. Maslyakova G.N., Rossolovsky A.N., Napsheva A.M., Zakharova N.B. Methods for assessing tubulointerstitial changes in surgical treatment of patients with urolithiasis. *Bulletin of Urology* . 2014;(1):3-10. https://doi.org/10.21886/2308-6424-2014-0-1-3-10

40. Milkin R.B., Emanuel V.I. Methodology of isotope renogram analysis // Med.radiologolog . 1977.V.17.№11.P.31-38

41. Murvanidze D.D. Anatomy of the kidneys and ureters in children / D.D. Murvanidze // Issues of clinical and experimental urology. Tbilisi: B. i., 1978. - 200 p.

42. Ostrovsky N.V. Correction of vesicoureteral reflux in children by subureteral injection of polyacrylamide gel “ Formacryl ” // Annals of Surgery, 2000, No. 6, pp. 70-71.

43. Pishchaev, E. V., Kropin , V. A., Osipov, V. V., & Obukhov, N. S. (2022). Optimal ureterocystoanastomosis in children. *Healthcare of Yugra: experience and innovations* , (2 (31)), 13-18.

44. Pugachev A.G. Modern problems of pediatric urology // Russian Bulletin of Perinatology and Pediatrics. - 1995. - №4. –P. 4-9.

45. Pykov M.I., Gurevich A.I. Children's ultrasound diagnostics in uronephrology ; Vidar -M, Moscow, 2007,

46. Pytel Yu.A., Zolotarev I.I. Errors and complications in X-ray examination of the kidneys and urinary tract // - M., Medicine, 1987. - 118 p.

47. Pytel A.Ya., Pugachev A.G. // Essays on pediatric urology. - M., Medicine. - 1977. - 269 p.

48. Rakhmatullaev A.A. Diagnostics and surgical treatment of developmental anomalies of the ureterovesical segment in children // Diss.:… Doctor of Medical Sciences . – Tashkent -2019

49. Sabirzyanova Z. R., Pavlov A. Yu. Results of treatment of obstructive megaureter in children in remote follow-up // Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation. Eco-Vector LLC. - 2022. - V. 12. - P. 121.

50. S. Abirzyanova , Z., Pavlov, A., Sobolevsky, A., Miftyakhetdinova , O., & Simonyan, G. (2022). Non-standard algorithms for the diagnosis of hydronephrosis, megaureter and ureterohydronephrosis in children. Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation LLC "Eco-Vector". 12, 123.

51. Salnikov V. Yu., Zorkin S. N. Optimization of tactics of surgical treatment of primary obstructive megaureter in children of the first years of life // Pediatric surgery. - 2019. - V. 23. - No. 3. - P. 128-133.

52. Seimivsky D.A. Functional disorders of urination in children. Etiology, pathogenesis, treatment (review) // Russian Medical Journal. - 1989. - №8. - P. 9-13.

53. Sidenko A. V., Yatsyk S. P., Rusakov A. A. Detection of renal damage in children with megaureter using segmental analysis of dynamic nephroscintigrams // Pediatriya named after GN Speransky . – 2020. – T. 96. – No. 5.

54. Sidenko, A. V., Yatsyk, S. P., Gerasimova, N. P., Komarova, N. L., Kalashnikova, Yu. V., & Tarzyan , A. O. (2019). Nephroscintigraphy in the diagnosis of kidney damage in obstructive uropathies in children: a literature review. *Pediatrics. Supplement to the journal Consilium Medicum* , (3), 69-77.

55. Smirnov, I. E., Shamov, B. K., Sharkov, S. M., Kucherenko, A. G., & Yatsyk, S. P. (2011). Biomarkers in the diagnosis of megaureter in children. *Russian Pediatric Journal* , (3), 31-36.

56. Solovieva N. I., Vinokurova S. V., Ryzhakova O. S., et al. Expression of gelatinases A and B and endogenous regulators of their activity in immortalized and transformed fibroblasts. *Biomed . Chem.* 2009; 55 (4): 441–450.

57. Stolin A. R., Makarevich V. F., Ermoolenko Yu. A. Radionuclide diagnostics of vesicoureteral reflux // News of radiation diagnostics, Belarus. - 1998. - № 3. - P. 29-31.

58. Tabolin V.A., Verbitsky V.I., Dumova S.V., Popov V.V., Boyadzhan M.B., Chugunova O.L. Vesicoureteral reflux and reflux nephropathy in young children. Methodical recommendations // - M., 2004

59. Fedotov A. A. Comparative analysis of the effectiveness of endoscopic treatment of obstructive megaureter in children //FORCIPE. - 2022. - T. 5. - No. S1. - P. 187.

60. Fomin D.K. Diagnostics of obstructive uropathies in children using nuclear medicine methods // Diss.:… Doctor of Medical Sciences . – M.2008

61. Khvorostov I.N., Zorkin S.N., Dvoryakovsky I.V. et al . Comparative evaluation of the results of Dopplerographic examination of renal vessels and static renoscintigraphy with Tc-DMYA in children with obstructive uropathies // Ultrasound and functional diagnostics. - 2005. - No. 6. - P. 44-52.

62. Khvorostov I.N., Zorkin S.N., Smirnov I.E. Obstructive uropathy . Urology. 2005;4 (1): 73-76.

63. Cheskis A.L., Vinogradov V.I. General principle of surgical correction of malformations of the ureteropelvic and vesicoureteral segments. Materials of the

scientific and practical conference "Pediatric Urology and Prospects of Its Development". Moscow, 1999; 47.

64. Cheskis A.L., Al-Kadi K.M., Vinogradov V.I. et al. Remote results of surgical correction of primary non-refluxing forms of megaureter in children. Bulletin of RUDN . 2004; (1):25.

65. Sharkov S.M., Akhmedov Yu.M. Combined disturbance of urodynamics of the upper urinary tract in children . - Pediatric surgery , 1999 .

66. Sharkov S.M., Yatsyk S.P., Fomin D.K., Akhmedov Yu.M. Upper urinary tract obstruction in children. Monograph. Union of pediatricians of Russia, Moscow 2012, pp. 6-9.

67. Shamov , B.K., Sharkov, S.M., & Yatsyk, S.P.. Modern views on the pathogenesis of megaureter formation in children. Pediatric pharmacology, (2008) 5 (6), 123-124.

68. Shamsiev , A. M., Zh. A. Atakulov , and A. M. Lenyushkin . "Surgical diseases of childhood." Tashkent: Ibn *Sino Publishing House* (2001).

69. Shamsiev A. M., Aliev B. P., Nikolaev S. N. Early endoscopic correction of vesicoureteral reflux in children with spinal dysraphism syndrome // Russian Bulletin of Pediatric Surgery, Anesthesiology and Resuscitation. - 2015. - V. 5. - No. 4. - P. 31-35.

70. Shmitkova E. V. Evaluation of the state of the ureterovesical segment in obstructive uropathies in young children using ultrasound Dopplerography. Abstract of Cand. Sci. (Med.) Dissertation. Moscow. 2004 .

71. Yushko E. I. Classification and etiopathogenesis of primary obstructive megaureter in children // Urology. - 2012. - No. 4. - P. 98-103.

72. Yatsyk S. P. Immunological and radioisotope assessment of the condition of the kidneys and urinary tract in obstructive uropathies in children and adolescents // Moscow. - 2005.

73. Yatsyk S.P., Sentsova T.B., Fomini D.K., Sharkov S.M. Pathogenesis of chronic obstructive pyelonephritis in children and adolescents // M.: 1U1IA. -2007. 176 p.

74. Yatsyk, S. P., Burkin, A. G., Sharkov, S. M., Abramov, K. S., Rusakov, A. A., & Tin, I. F. (2014). Comparative assessment of methods for surgical correction of vesicoureteral reflux in children. *Issues in Contemporary Pediatrics* , *13* (2), 129-131.

75. Yatsyk S.P., Mavlyanov F.Sh., Mavlyanov Sh.H. Diagnosis of obstructive uropathy at the present stage (literature review) // Uzbek journal of case reports . – 2022. – V. 2. – No. 2. – P. 19-23.

76. Yatsyk S. P., Rusakov A. A., Burkin A. G. Radionuclide assessment of the ureteral transport function in obstructive uropathies in children // Reproductive health of children and adolescents. - 2020. - V. 16. - No. 1. - P. 94-100.

77. Yatsyk P.K., Chirkov O.A., Bobkova V.P. Surgical tactics for multiple urinary tract obstructions in children.// Surgery 1991, No. 8, pp. 44-49.

78. Angerri O., Caffaratti J., Garat JM, Villavicencio H. Primary obstructive megaureter : initial experience with endoscopic dilatation ./. *Endourol* . 2007; 21 (9): 999-1004.

79. A ngul o , J. M. , Ortiz , R. , Burg o s , L. , Fern á ndez , B. , O rd oñ ez , J. , & P a rente , A. (2022). End o sc o pic Treatment about f Primary O bstructive Meg a ureter . In *Minim and lly Inv a sive Techniques in Pedi a tric Ur o l o gy : End o ur o l o gy , L a p a r o sc o py a nd R o b o tics* (pp . 261-269). Cham : Springer International Publishing.

80. A nt o ni o u D ., B a lt o gi a nnis N. , S o utis M ., F a vi o u E. , Christ o p o ul o s -

Geroulanos G. Primary non =refluxing megaureter : need for conservative treatment . *Pediatr . Med. Chir* . 2007; 29 (5): 258-261.

81. Arena F., Baldari S., Proietto F., et al . Conservative treatment in primary neonatal megaureter . // European J. Pediatric surgery. - 1998. - Vol . 6. - P. 347-351.

82. A xmed o v Yu.M. , A khmed o v I.Yu. , K a rim o v a GS Is the meg and ureter the pr o blem o f yesterd a y, t o d a y o rt o m o rr o v? //Intern a ci about n a l J o rn a l about f F a rm a ceutic a l Res aa rch Jul-Sep 2020. v o l 12. Issue 1. P.1197-1201

83. A hm a d , T ., R a hm a n , S ., M a lik , A., Kh a n , M . A., & N a w a z , A. (2019). Endoscopic Management of Primary Obstructive Megaureter : Review of 28 Consecutive Cases . *National Editorial Advisory Board* , *30* (7).

84. A hmed o v , Y. M. , Yusup o v . , S. A., A khmed o v , I. Y ., & S a dik o v , Z . Y. (2020). Characteristics of megaureter reconstructive-plastic operations in children. Academy , (4), 109-112.

85. Bernhard Haid , Judith Roesch , Christa Strasser , Joseph Oswald . The method of urine sampling is not a valid predictor for vesicoureteral reflux in children after febrile urinary tract infections . // Journal of Pediatric Urology -2017 , 13, 500.e1e500.e5.

86. B oor P., Floege J. Special series: chronic kidney disease growth factors in renal fibrosis . *Exp. Pharmacol . Physiol* . 2011; 29 (10): 1110 -1111.

87. Buterin T. Megaureter : diss . – University of Rijeka . Faculty of Medicine. Department of Surgery, 2022.

88. Bujons A., Saldana L., Caffaratti J. et al . Can endoscopic balloon dilation for primary obstructive Megaureter be effective in a long -term follow -up? J Pediatr Urol . 2015; 11(1):37- 38.

89. Bustangi , N., Kallas Chemaly , A., Scalabre , A., Khelif, K., Luyckx, S., Steyaert , H.,... & Lopez , M. (2018). Extravesical ureteral reimplantation following Lich- Gregoir technique for the correction of vesico-ureteral reflux retrospective comparative study open vs. laparoscopy . *Frontiers in pediatrics* , *6* , 388.

90. Brock B. O'Neil , Patrick C. Cartwright , Constance Maves , Karin Hoeg , Angela P. Presson , M. Chad Wallis . Reliability of voiding cystourethrogram for the graduation of vesicoureteral reflux // Journal of Pediatric Urology -2014- 10, 107e11.

91. Cauchi J. A., Chandran H. Congenital ureteric strictures: an uncommon cause of Antenatally detected hydronephrosis // Pediatric Surgery International . – 2005. – T. 21. – S. 566-568.

92. Connaughton , D. M., & Hildebrandt , F. (2023). Congenital Anomalies of the Kidney and Urinary Tract . In *Emery and Rimoin's Principles and Practice of Medical Genetics and Genomics* (pp. 3-38). Academic Press.

93. Cho , MH (2010). Renal fibrosis . *Korean journal of pediatrics* , *53* (7), 735.

94. D. Di Renzo , A. Persico , M. Di Nicola , S. Silvaroli , G. Martino , P. Lelli Chiesa . Conservative management of Primary non =refluxing megaureter during the first year of life: A longitudinal observational study // Journal of Pediatric Urology (2015) 11, 226.e1 226.e6.

95. Darge K. Diagnosis of vesicoureteral reflux with ultrasonography //- Pediatric nephrology : journal of the International Pediatric Nephrology Association [Pediatr Nephrol].- 2002 Jan ; 17(1). - P. 52-60.

96. De Kretser DM, O'Hehir RE, Hardy CL et al . The roles of activina and itsbinding protein , follistatin , inflammation and tissue repair // Mol CellEndocrinol . - 2012. - Vol . 359(1-2). - P. 101-6.

97. De los Reyes, T., & Koyle , M. A. (2023). Urinary Tract Infection . In *Pediatric Surgery: Diagnosis and Management* (pp. 1215-1226). Cham : Springer International Publishing.

98. Dekirmendjian , A., & Braga , L. H. (2019). Primary non =refluxing megaureter : analysis of risk factors for spontaneous resolution and surgical intervention *Fr o ntiers in Pedi atrics , 7* , 126 .

99. Demiri, C., Lambropoulos , V., Mouravas , V., Kepertis , C., Godosis , D., Tsopozidi , M., & Spyridakis , I. (2020). Endoscopic treatment of obstructive ureterohydronephrosis in children. *Pan African Medical Journal* , *36* (1).

100. Dendooven A., Ishola D.A. Jr.et al . Oxidative stress in obstructive nephropathy // Int J Exp Path - 2011 - Vol 92 - R. 202-210

101. Doaa YM, Rabab ME Prevalence of Obstructive Uropathy in East Deltachildren // Geget - 2009 - Vol 9 - R. 57-64

102. Dhull , R. S., Joshi , A., & Saha , A. (2018). Nuclear imaging in pediatric kidney disorders . *Indian Pediatrics* , *55* , 591-597.

103. Elder JS Tracking the natural history of infantile hydronephrosis with diuretic renography // J. Urol . -1993. - Jul. 150(1). - R. 276.

104. Esbjörner E, Hansson S, Jacobsson B, Swedish Pediatric Nephrology Association . Management of children with dilating vesico -ureteric reflux in Sweden // Acta Paediatr 2004;93. - P. 37-42.

105. Fettich J.; Colarincha P.; Fischer S. et al . Guidelines for direct radionuclide cystography in children. //- European journal of nuclear medicine and molecule imaging [Eur J Nucl Med Mol Imaging]. - May 2003 ; - 30 (5). - P. 39 - 44.

106. Galia M, Midiri M, Pennisi F, Farina R, Bartolotta TV, De Maria M, Lagalla R. Vesicoureteral reflux in young patients : comparison of voiding color D oppler US with echo enhancement versus voiding cystourethrography for diagnosis or exclusion // Abdom Imaging . 2004. V.29. N 3.-P.303-308.

107. Galloy M.A.; Mandry D.; Pecastings M. et al . Sonocystography : a new method for the diagnosis and follow -up of vesico -ureteric reflux in children. //- Journal de radiologie [J Radiol]. - 2003 Dec; - 84 (12 Pt 2), - P. 2055- 61

108. Gimpel C., Masioniene L., Djakovich N. et al . Complication and long - term outcome outcomeof primaty obstructivemegaureter in childhood . Pediatr Nephrol 2010; 25 (9):1679-1686.

109. Garin , EH, Olavarriya , F., Garcia Nieto , V. et al .: Clinical significance of Primary vesicoureteral reflux and urine antibiotic prophylaxis after acute pyelonephritis : a multicenter, randomized , controlled study // Pediatrics -2006; 117:626.

110. Garnier , S., Harper , L., & Kalfa , N. (2022). Evidence Based Medicine in minimally invasive pediatric urology . *Minimally Invasive Techniques in Pediatric Urology : Endourology , Laparoscopy and Robotics* , 481-495.

111. Esposito , C., Giurin , I., Savanelli , A., Alicchio , F., & Settimi, A. (2011). Current trends in the management of pediatric patients with perineal groove . *Journal of pediatric and adolescent gynecology* , *24* (5), 263-265.

112. Hanson L.A. Prognostic indicators in childhood urine infections . Kidney Int 1982; 21:659

113. Hamid , R., Bhat , N. A., Baba , A. A., Mufti, G. N., Sheikh, K. A., & Bashir , M. I. (2022). Primary obstructive megaureter in children; 10 years ' experience from a tertiary care center. *Urology Annals* , *14* (3), 252-258.

114. Hodges SJ, Werle D., McLorie G., Atala A., Megaureter . Sci World J.2010; 13(10); 603-612

115. Hoquétis L., Le Mandat A., Bouali O. et al . Primary obstructive megaureters : long -term follow -up. Progress en Urologie . 2013; 23(7):470-473.

116. Kaefer M., Misseri R., Frank E., Rhee A., Lee SD Refluxing ureteral reimplantation : a logical method for manageng neonatal UVJ obstruction . J Pediatr Urol . 2014; 10(5):824-830.

117. King LR Megaloureter : definition , diagnosis and management // J. Urol . – 1980. – Vol.123, No. 2. – P. 222–223.

118. Khoury , A. and Bagli , D. Reflux and megaureter . In Campbell-Walsh Urology . 9th ed. Wein, A.J. et al ., Eds. WB Saunders , Philadelphia . (2007)

119. Koesters R., Kaissling V. , Lehir M., Picard N., Theilig E, Gebhardt R., Glick A. V. , Hahnel V. , Hosser H., Grone HJ, Kriz W. Tubular overexpression of tranforming growth factor-betal induces autophagy and fibrosis but not mesenchymal trancition of renal epithelial cells. *Am . J. Pathol* . 2010; 177(2):632-643.

120. Kassite , I., Renaux Petel, M., Chaussy , Y., Eyssartier , E., Alzahrani , K., Sczwarc , C.,... & Binet, A. (2018). High pressure balloon dilatation of Primary obstructive Megaureter in children: a multicenter study. *Frontiers in Pediatrics* , *6* , 329.

121. Manzoni , C. Megaureter . Rays 27, 83–85 . (2002)

122. Farrugia MK, Hitchcock R., Radford A., Burki T, Robb A, Murphy F. British Association of Paediatric Urologicians cosensus statement on the management of the primary obstructive megaureter // Journal of Pediatric Urology - 2014. 10, 26e33

123. Melo , F. F., Vasconcelos , M. A., Mak , R. H., Silva, A. CSE , Dias, C. S., Colosimo , E. A.,... & Oliveira , E. A. (2022). Postnatal urine tract dilatation classification : improvement of the accuracy in predicting kidney injury. *Pediatric Nephrology* , *37* (3), 613-623.

124. Merlini E., Spina P. Primary non =refluxing megaureters // Journal of Pediatric Urology . – 2005. – T . 1. – №. 6. – P . 409-417.

125. Mun C.K., Kenneth C., Yuen J. Robotic-assisted Laparoscopic non =dismembered side- to -side tapered neoureterocystostomy – a technique for maximal ureteric vascular preservation in megaureter patients // Urology Video Journal . – 2023. – P. 100208.

126. Nagy V., B a c a M., Boor A. Primary obstructed megaureter (POM) in children. *Bratislavske Lekarsk Listy* . 2013; 114(11):650-656.

127. Obaidah , A., Mane , S.B., Dhende , N.P., Acharya , H., Goel , N., Thakur , A.A., & Arlikar , J. (2010). Our experience ureteral substitute in pediatrics age group . *Urology* , *75* (6), 1476-1480.

128. Ordóñez , J., Ortiz , R., Parente , A., Burgos , L., Fernández -Bautista , B., Perez- Egido , L., & Angulo , J. M. (2022). Long term outcome of 112 pediatric patients with ureteropelvic junction obstruction treated by endourologic retrograde balloon dilation . *Frontiers in Pediatrics* , 517.

129. Ortiz R., Parente A., Perez - Egido L. et al. Long -Term Outcomes in Primary Obstructive Megaureter Treated by Endoscopic Balloon Dilation . Experience After 100 Cases . *Front Pediatr* . 2018; (6):275-280.

130. Peters C.A., Mandell J., Lebowitz R.L. et. Al . Congenital obstructed megaureters in early infancy : Diagnosis and treatment // J. Urol.- 1989. Vol.192, N 2, p.2.- P. 641-645

131. Pirker M.E., Colhoun E., Puri P. Renal scarring in family vesicoureteral reflux: is prevention possible .// J Urol -2006;176. - P. 1842-6.

132. Pirker ME, Mohanan N, Colhoun E, Barton D, Green A, Puri P. Family vesicoureteral reflux: influence of sex on prevalence and expression // J Urol -2006;176. - P. 1776-80.

133. Piró C., Asensio M., Roca I. et al. Management of Primary congenital megaureter with early diagnosis . Cir Pediatr . 1995; 8(2):51-54.

134. Polito C, Rambaldi PF, Mansi L. Unilateral vesico -ureteric reflux: Low prevalence of controllable renal damage // J Pediatr . – 2001. – Vol . 138. –P. 875-879.

135. Preda I, Jodal U, Sixt R, Stockland E, Hansson S. Normal dimercaptosuccinic acid scintigraphy Makes voiding cystourethrography unnecessary after urine tract infection // J Pediatr 2007;151. - P. 581-4.

136. Puri P, Granata C. Multicenter survey of endoscopic treatment of vesicoureteral reflux using polytetrafluoroethylene // J Urol 1998; 160:1007-11

137. Lee, B. R., Silver, R. I., Partin , A. W., Epstein, J. I., & Gearhart , J. P. (1998). A quantitative histologic analysis of collagen subtypes: the primary obstructed and refluxing megaureter of childhood . *Urology* , *51* (5), 820-823.

138. Li, Z., Yang , K., Li, X., Chen, S., Wang , X., Li, Z., & Li, X. (2022). Minimally invasive ureteral reimplantation or endoscopic management for Primary obstructive megaureter . *Tr a nsl a ti o n a l A ndr o l o gy a nd Ur o l ogy* , *11 (12*), 1786 .

139. Lin, S., Xu, D., He, S., Li, L., Xu, H., & Tang , K. (2022). Ureteral reimplantation for pediatric vesicoureteral reflux and primary obstructive megaureter . *Journal of Pediatric Urology* , *18* (4), 516-e1.

140. Richter, J., Rickard , M., Kim, J. K., Erdman , L., Lorenzo , A. J., & Chua , M. (2022). Predicting the Future of Patients with Obstructive Uropathy —A Comprehensive Review. *Current Pediatrics Reports* , 1-12.

141. Rognon LM Le megauretere obstructive primitive. I. Modelages de l'uretere // J. Urol . Nephrol . – 1983.- Vol . 89, N 10. – P. 718-719

142. Sahadev , R., Spencer, K., Srinivasan , A. K., Long , C. J., & Shukla , A. R. (2019). The robot-assisted extravesical anti -reflux surgery: how we overcame the learning curve. *Frontiers in Pediatrics* , *7* , 93.

143. Seymandi P., Santini L. Primary megaureter detected during the first year of life. Review of case reports in the last 10 years and analysis of prognostic factors . *Ped Med C h ir* . 2002; 24(30):220-222.

144. Shokeir , A.A. and Nijman , RJ Primary megaureter : current trends in diagnosis and treatment . BJU Int. 86, (2000)

145. Shumaker , A. D., Kord , E., Dubrov , V., Bondarenko, S., Visman , Y., Stav , K.,... & Neheman , A. (2023). Laparoscopic Ureteral Reimplantation after Failed Open Surgery. *Eur o pe a n J o urn a l o f Pedi a tric Surgery* , *33* (01), 041-046.

146. Stehr, M., & Schäfer, F. M. (2020). Der Primär Abstract Megaureter (POM)–Eine Domäne conservator Therapy . *Active Urologie* , *51* (02), 127-131

147. Święt oń , D., Grzywińska , M., Czarniak , P., Gołębiewski , A., Durawa , A., Teodorczyk , J.,... & Piskunowicz , M. (2022). The emerging role of MR urography in imaging megaureters in children. *Frontiers in Pediatrics* , *10* .

148. Vedrine, N., Nsabimbona , B., Soares , P., Boiteux , J. P., & Guy, L. (2007). Giant ureterohydronephrosis of the lower segment. *Progress en Urologie : Journal de L'association Francaise D'urologie et de la Society Francaise D'urologie* , *17* (1), 111-113.

149. Velchik MG. Radionuclide imaging of the urine tract . Urol Clin North Am . 1985 Nov;12(4):603-31

150. Vlad , M., Ionescu , N., Ispas , A. T., Ungureanu , E., & Stoica , C. (2007). Morphological study of congenital megaureter . *Rom J Morphol Embryol* , *48* (4), 381-90.

151. Yapar Z.; Sukan A.; Kibar M. Vesicoureteral reflux causing misinterpretation of a Tc-99m DTPA scan // Clinical nuclear medicine [Clin Nucl Med]. - 2002 Apr ; - 27 (4), - P. 290 -2.

152. Yeung CK, Sreedhar B, Sihoe JD, et al . Renal and bladder functional status at diagnosis as predictive factors for the outcome of Primary vesicoureteral reflux in children // J Urol -2006;176. - P. 1152-6.

153. Ylinen E, Ala-Houhala M, Wikstrom S. Risk of renal scarring in vesicoureteral reflux detected either antennatally during the neonatal period // Urology -2003;61. - P. 1238-42.