



OPTIMAL TREATMENT OF HYDRONEPHROSIS IN CHILDREN

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Abstract:

Hydronephrosis may be nonobstructive and may not require surgical treatment. Corrected hydronephrosis is also common. This is when the kidney still does not contract after repair of the pelvic-ureteric segment, the dilated calyces remain wide enough, but urine flow is restored. This is often the case when a kidney with very poor function is operated on. The main thing we are fighting for is not to narrow the pelvis, but to restore the outflow from the kidney. In such cases it is sometimes necessary to perform a second operation when the child grows up.

Keywords: hydronephrosis, surgical treatment, kidney

INTRODUCTION. The international classification on the degrees of hydronephrosis is SFU (Society of fetal urology, International society of prenatal urology). According to this classification, there are 5 degrees of hydronephrosis (0 to 4). The SFU grades 2 and 3 of hydronephrosis in most children resolve on their own in the first year of life as they grow. This happens because the infant is predominantly lying down and has weak and underdeveloped pelvic muscles. As the child grows, the urinary tract begins to "mature". The smooth muscles of the intestine mature, the skeleton and musculature matures, and the same happens to the smooth muscles of the upper urinary tract. In an upright position, it is much easier for the urinary tract to work.

Causes of hydronephrosis in children

The cause of hydronephrosis may be intrauterine malformation: stricture, stenosis of the pelvic-ureteric segment, an extra vessel, high ureteral outflow, stone, tumour, external adhesions.

Symptoms of the disease

If hydronephrosis is not diagnosed intrauterine, it may not manifest itself for a long time (if hydronephrotic transformation is not associated with acute renal obstruction). That is why, as part of the dispensary of children of the first year of life necessarily perform ultrasound of the abdominal cavity, including the organs of the urinary system. This is a screening ultrasound, which will allow to suspect a malformation of the urinary system and detect it before complications, such as acute

inflammatory process due to impaired urine outflow from the kidney.

If it is a hydronephrotic transformation without impaired kidney function, it is almost impossible to suspect it. Therefore, we instruct parents not to neglect the dispensary examination of children and carry it out in full. That is, they should take urine tests and perform ultrasound examinations.

Diagnostic methods

Given the possibilities of prenatal diagnosis, often fetal ultrasound can establish the diagnosis even before birth.

However, doctors do not always detect this pathology in the fetus during ultrasound examinations during routine screening at 20-22 and 31-33 weeks of pregnancy. But if the violation is detected, it is called, as a rule, not hydronephrosis, and intrauterine pyeloectasia - enlargement of the pelvis.

Quite often we come across the fact that specialists of intrauterine diagnostics, seeing a unilateral process, a small enlargement of the pelvis, tell mothers that the child will be born, "will be prescribed", and everything will pass. Perhaps this is correct from the point of view of preserving the peace of mind of the pregnant woman. But any mother who was informed during pregnancy about the improper formation of the kidney and urinary tract of the foetus, should understand that on 5 - 7 days after the birth of the baby must be ultrasound screening. It is in the 5-7 days, and not earlier, because



in the first days after birth through the ureter of the child does not yet pass a sufficient amount of fluid, kidneys excrete little urine and ultrasound diagnosis will not be so informative. It is on the 5th - 7th day after birth that the child's diuresis is formed. Therefore, if it is not a critical condition of the child, bilateral process or poor biochemical blood counts, ultrasound screening is advisable to carry out on the 5th -7th day of the child's life.

Ultrasound is a screening method that allows you to suspect a developmental abnormality (abnormally developed kidney, enlarged pelvis, dilated calyx, etc.). But to establish the diagnosis of hydronephrosis, this study is not enough.

The most important thing in the diagnosis of hydronephrotic transformation is to determine the functional state of the kidney and upper urinary tract. That is, it is important to preserve the function of the kidney (secretory, responsible for the formation and accumulation of urine and excretory) and urodynamics of the upper urinary tract (an indicator of how quickly the urine through the upper urinary tract enters the bladder). Excretory urography, accepted in our country in most clinics, even performed on the most modern digital equipment, by its methodology will not allow to diagnose hydronephrosis, this study gives an idea only about the anatomical state of the kidney.

Dynamic scintigraphy is the only method that allows you to assess the picture of the disease, to understand whether the disease is obstructive and requires surgical correction. In some cases, in addition to ultrasound and dynamic scintigraphy, we perform a computed tomography (CT) scan to determine the cause of hydronephrosis, the anatomy of the kidney and surgical planning.

Treatment of hydronephrosis in children

There is no drug therapy for hydronephrosis. But it is important to prevent inflammatory complications. If the dilated pelvis is joined by infection, the outflow of urine from it will be disturbed, an inflammatory process - pyelonephritis - may form.

After the diagnosis is established, when the doctor saw that hydronephrosis is obstructive, that the outflow of urine from the kidney is really disturbed, he begins to form a treatment plan. Surgical treatment is aimed at eliminating the area of narrowing in the ureter and performing plasticity between it and the pelvis. There are different types of intervention:

- classical surgery through an "incision" (lumbotomy),
- laparoscopic (surgery through "punctures" in the abdominal wall),
- retroperitoneoscopic surgery,
- robot-assisted plastics

The basic principles of open surgical correction of hydronephrosis were developed in the middle of the previous century, which allowed in more than 90-95% to obtain a positive result in the elimination of obstruction.

However, with the development of endoscopic techniques and equipment, it became possible to perform such operations using minimally invasive transperitoneal and retroperitoneal access to the pelvic-ureteric segment. Therefore, today all surgical interventions can be divided into 3 large groups:

- 1.Reconstructive surgeries performed in an open manner
- 2.Endoluminal interventions - balloon dilatation, intraluminal dissection of strictures, bouching followed by ureteral stenting
- 3.Laparoscopic, retroperitoneoscopic and video-assisted.

Advantages and disadvantages of open and laparoscopic.

Currently, laparoscopic access is one of the common ones in pyeloplasty in children.

Technique of surgical intervention.

In our institution, Hynes-Anderson pyeloplasty is the leading technique in the treatment of PUS obstruction. The laparoscopic pyeloplasty technique replicates all the steps of open surgery with the advantages of minimally invasiveness.

Requirements for the surgeon: experience in isolation of structures and experience in laparoscopic surgery and substantial skill in laparoscopic anastomosis formation.

Preoperative preparation was aimed at reducing gas formation in the intestine - espumisan, sorbents (activated charcoal) - 3 days, microclyses on the eve of surgery.

Anaesthesiological aid included: combined endotracheal anaesthesia with epidural anaesthesia.

The patient's position was on the side with a bolster in the postnasal region. The first 5 mm trocar was placed open over the umbilical ring for insertion of a 30-degree optic. Two manipulation trocars 5 mm or 3 mm depending on the patient's age were placed on the side of the lesion along the edge of the rectus abdominis muscle with the formation of a rhombus, where the lower apex was the umbilicus, the upper one was the kidney projection.

Less frequently, the 4th port (in 3 cases) was installed additionally on the right side for liver elevation - 2 cases, and for kidney elevation with intrarenal pelvis - 1 case. The intra-abdominal pressure was kept at 8-10\10-12\12-14mm PTst according to the age. Karl Storz 3mm and 5mm instruments were used.



The surgeon has to overcome the difficulties of 2-dimensional space

The surgical assistant holding the camera is to the left of the surgeon and the operator is opposite the child (facing). The operating room nurse is opposite the surgeon-operator.

Surgery

There is little difference in operative technique between left-sided and right-sided pyeloplasty. Although on the left side, according to some authors, it is somewhat easier to operate. On the left side, in the vast majority of cases, access to the LMS was performed after opening the parietal peritoneum and medial displacement of the colon.

If the pelvis is significantly dilated, it can be exposed through the mesentery of the colon on the left side.

The pelvis and ureter are isolated as far as necessary.

Two fixation sutures are placed to hold the pelvis and ureter in place. These are usually 3\0 sutures of any material with a long needle. The needle is straightened beforehand to a straight line and is inserted through the abdominal wall into the abdominal cavity, then grasped with a needle holder, passed through the wall of the pelvis and back out to the anterior abdominal wall and grasped with a clamp. It is not difficult to guide the needle from outside to inside, from inside to outside is more difficult. Therefore, the needle must be cutting and of sufficient length. The suture insertion site is determined by the topography of the kidney and pelvis. After the anchor suture formation, the posterior half-circle of the anastomosis was formed with continuous sutures.

If an aberrant vessel was detected, after mobilisation of the vessels and LMS, the ureter was crossed, transferred to the antevasal position, dissection of the pelvis and ureter, and formation of a new joint.

Other variants of pyeloplasty

1. treatment of hydronephrosis of the doubled kidney
2. Pyeloplasty for hydronephrosis of the horseshoe kidney
3. Retroperitoneoscopic pyeloplasty for hydronephrosis

Suture material

PDS 5\0- 6\0 monofilament material was used in all cases.

Monofilament yarns have "fixed memory", and braided yarns will not retain their spatial configuration after knotting like monofilament yarns. Also braided threads tend to adhere to neighbouring anatomical structures and must be lifted more frequently as the operation progresses, capillary effect is also possible. Consequently, dyed monofilament sutures are more suitable for laparoscopic pyeloplasty. Sutures were placed mainly intracorporeally.

Drainage and stenting in pyeloplasty

In our practice we used both external and "catheter-stents" for internal drainage. The "stent" was placed both retrograde-preoperatively and antegrade-intraoperatively. In case of impossibility to install a "stent" intraoperatively, a pyelostoma was placed. The latter was placed on the skin extraperitoneally and fixed to the pelvis with corset sutures.

In the first experience, the use of "stents" is desirable for safety reasons.

The advantages of having a stent catheter after pyeloplasty are:

1. reduced risk of urinary retention
2. anatomical alignment and reduction of postoperative oedema and compression of the anastomosis line
3. shorter postoperative hospital stay (early rehabilitation).

Disadvantages:

1. Possibility of obstruction by a blood clot and development of kidney block
2. Infection during regurgitation of urine from the bladder.
3. Stent syndrome (dysuria, flank pain, haematuria).
4. necessity of removal under general anaesthesia.
5. Possibility of salt encrustation in case of prolonged standing of the stent.

Pyelostomy

Advantages

1. Control of the state of the collecting system of the kidney after surgery.
2. Prevention of anastomosis failure.
3. Determination of anastomosis patency recovery and gradual training of its urodynamics.

Disadvantages

1. Prolongation of the patient's stay in hospital
2. Possibility of infection of the PSC
3. Reduction of terms of social rehabilitation of the patient.
4. Probability of spontaneous prolapse after surgery?

The safety drainage was placed in the pelvic cavity and removed on the 2nd day if there was no discharge.

In 1 case there was urine leakage up to 5 days, it stopped independently.

The duration of the operation varied from 100 to 240 minutes.

Duration of surgical intervention with accumulation of experience decreases and ideally approaches to open pyeloplasty!

CONCLUSIONS: Thus, urethral catheter removal was performed on 2-3 days after surgery simultaneously with the termination of epidural anaesthesia. Endoscopic removal of ureteral stent was performed after 4-6 weeks. Pyelostomy drainage was removed



after positive indigo carmine test and the patient was discharged on 12-14 days. With the presence of catheter-stent children were discharged as soon as they started to feel comfortable. Usually it was 5-7 days after surgery.

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