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DIAGNOSIS OF OBSTRUCTIVE URETEROHYDRONEPHROSIS IN CHILDREN

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Abstract:obstructive ureterohydronephrosis in children is a condition characterized by enlargement of the renal pelvis and ureter due to obstruction of the flow of urine. Timely diagnosis is very important to prevent kidney damage and preserve kidney function. The diagnostic process can be complicated by symptoms such as abdominal pain, flank pain, urinary tract infections, or problems with urination. begins with a thorough clinical history and physical examination, focusing on symptoms.

Key words: ureterohydronephrosis, obstruction, pediatric urology, hydronephrosis, ureteral obstruction, anatomical anomalies, vesicoureteral reflux, diagnosis, visual studies, ultrasound.

Endoscopic management of obstructive uropathies in paediatric population is a challenging field for paediatric surgeons. The surgical approach of ureterohydronephrosis is an established technique which seeks many operating difficulties, especially in children aged under 1-year-old, because of both the disproportion between the size of the dilated ureter and the size of the bladder, the operated bladder exposure to dysfunction and the many other possible postoperative complications. In 2012 and after many controversies in the literature, the British Association of Paediatric Urologists (BAPU) was asked to determine the diameter at which a ureter should be considered as dilated and came into consensus that retrovesical ureteric diameter ≥ 7mm from 30 weeks´ gestation onwards is abnormal. In 1980, King, after Stephens, classified the megaureter into four categories which were then subclassified in primary and secondary reflux megaureter, obstructive megaureter, refluxing megaureter with obstruction and nonrefluxing-nonobstructive megaureter.In 1999, Shenoy and Rance first described the insertion of a temporary Double J (DJ) stent through surgical cystotomy, for the management of two infants who suffered from primary obstructive megaureter (POM).A year before, in 1998, Angulo et al. had described as a definite, less invasive and safe approach the treatment of POM with endoscopic balloon dilatation. Since those first descriptions of endoscopic techniques available, there are few publications in the literature that have reported short series of endoscopically managed paediatric cases with obstructive uropathies of the distal ureter, which seem to result in promising both short-term and long-term outcomes. Here, we present the cases of four paediatric patients who underwent endoscopic treatment for ureterohydronephrosis in our department and their medium-term follow up revealed no recurrence. In our paediatric surgery department, we managed the four previously described cases of obstructive uropathies causing ureterohydronephrosis which etiology was the most frequent encountered in paediatric patients. In our knowledge and besides the many categorizations in the literature, the stenosis of the vesicoureteral junction, the primary obstructive megaureter and the post-operative stenosis of the vesicoureteral junction due to strictures formation represent the three main causes of ureterohydronephrosis in children. Herein, our team reports and describes

the acquired knowledge that resulted from endoscopic treatment of obstructive uropathies in our department and can contribute to the differentiation between organic and functional obstruction cystoscopically. To our knowledge, while the catheterization of the pathologic orifice is always easy and demands no special maneuvers in the cases of POM, the same procedure in the vesicoureteral junction stenosis is mainly difficult, demands special maneuvers and almost in all cases the insertion of a 0.014 inch diameter hydrophilic guide wire before the insertion of the DJ. We propose the cystoscopy and orifice catheterization as a both diagnostic and therapeutic procedure in obstructive uropathies in cases of organic and functional obstruction. Endoscopic management of paediatric obstructive uropathies that cause megaureter is an upcoming field, since the first description of Shenoy and Rance in 1999 [4]. This promising technique gives the opportunity to the paediatric surgeon to postpone or even avoid an open surgical intervention especially in children under 1-year-old, at whom the open bladder operation for ureteral reimplantation, with or without ureteral remodeling, is both challenging and potentially harmful because of the disproportion of the bladder-ureteral sizeHydronephrosis symptoms aren't usually obvious, so the condition is usually detected during investigations that are being done for other reasons. When hydronephrosis occurs in the womb, it is often detected during the routine anomaly scan that is performed at around 20 weeks. Hydronephrosis symptoms can also be detected in babies after the birth if doctors are performing scans to investigate the causes of urinary symptoms. Most children do not present with any signs or symptoms for unilateral hydronephrosis. Historically the most common symptom for hydronephrosis is in fact a urinary tract infection. The symptoms of urinary tract infection in the older child can consist of high temperature, pyrexia and dysuria (pain when voiding). There could be cloudy urine, blood in the urine and pain in the child's side or their back. Younger babies will not necessarily present with clear symptoms and when they develop a urinary tract infection they can have high temperature, irritability and failure to thrive. The hydronephrosis can then be detected when an ultrasound scan is performed to investigate the causes of the urinary tract infections. Hydronephrosis is very common. It affects about 1 in 100 babies. It may be caused by something blocking the urine flow somewhere along the urinary drainage tubes or due to urine back-flowing from the urinary bladder into the ureter (the tube that drains the kidney) and kidney.Hydronephrosis can vary in severity. Typically, your doctor will describe your child's hydronephrosis as mild, moderate or severe. Sometimes hydronephrosis is given a grade of 1, 2, 3 or 4, with 1 representing very minimal dilation and 4 representing severe dilation. Hydronephrosis may be present in one kidney (unilateral) or both kidneys. Infants and young babies with hydronephrosis have no symptoms. Older children may or may not have symptoms, depending on the cause of the hydronephrosis.If your child has symptoms, these may include pain in the abdomen or side (flank pain). They may or may not have blood in the urine (hematuria). Sometime they may have nausea or vomiting in addition to the pain.Children with hydronephrosis may develop a UTI. The risk of urinary infection increases the severity of hydronephrosis. Symptoms of a urinary tract infection can include strong urge to use the bathroom, pain with urination, cloudy or smelly urine, back pain, and fever. If you child has hydronephrosis and experiences these symptoms, especially with a fever, please see your pediatrician. Hydronephrosis is usually detected with an ultrasound but there is a different approach between pre- and post-natal diagnosis.Prenatal hydronephrosis: Hydronephrosis is often found on routine prenatal ultrasounds. It is the most common urinary tract abnormality found on prenatal ultrasound imaging. If the hydronephrosis is mild and your fetus is doing well, your doctor may not send you for a pediatric urology consultation. However, if the hydronephrosis is moderate-severe/grade 3-4, if your doctor is concerned, or if you would like to discuss your child's condition, we are happy to see you in our office setting.Postnatal hydronephrosis: hydronephrosis is often diagnosed after a child has symptoms, such as abdominal or flank pain or blood in the urine (hematuria). If a child develops a urinary tract infection, an ultrasound is often performed. If hydronephrosis is present, it can be detected by ultrasound. Presently a vast majority of children are diagnosed with hydronephrosis on fetal scans. At present, the 20 weeks scan can be useful for detecting hydronephrosis and this frequently means there may be further ultrasound scans required in pregnancy. This can occur at approximately 1 – 2% of all pregnancies. Hydronephrosis won't usually cause any problems for the baby or the mother during pregnancy. However, additional monitoring may be recommended and treatment may be required after the baby is born.In the occasion of unilateral hydronephrosis, the baby will require an ultrasound scan after the child is born. In certain situations, preventative antibiotics which will decrease the severity of infections will potentially be

of benefit. In this situation your child will need some further investigations to see what is going on.It is important for hydronephrosis symptoms to be investigated carefully in order to identify the cause of the problem. Untreated hydronephrosis could increase the risk of urinary tract infections and it might affect the functioning of the kidneys. The kidneys could be damaged if the problem is left untreated. This can be more serious if the body is not able to eliminate waste by producing urine efficiently enough.The most likely causes of hydronephrosis in babies are:blockages in the urinary tract. The blockage could be between the kidney and ureter, between the bladder and the ureter or in the urethra that leads out of the bladder.Ureteric duplication, which happens when there are two ureters connecting one of the kidneys to the bladder. The lower end of one of these ureters is then likely to be blocked. This condition happens in about 1% of babies. Multicystic dysplastic kidney (MCDK), which occurs when one of the kidneys fails to form correctly. The non-functioning kidney contains large numbers of cysts. Vesico-ureteric reflux (VUR), which occurs when the valve where the ureter connects to the bladder doesn't work properly. It isn't able to stop urine from moving back up the ureter towards the kidney. Hydronephrosis can be diagnosed using ultrasound scans to check for kidney enlargement and MAG3 scans to get more detailed pictures of the kidneys. MAG3 scans use a special isotope to check on the kidney's structure and function. The isotope can be traced as it passes through the kidneys. Depending on the ultrasound scan and MAG3 findings and their symptoms, some children will require surgery to improve drainage of their kidney. Usually procedure which is preformed is a pyeloplasty. This is an operation to remove the small narrowed area between the pelvis of the kidney and the ureter which is called the pelvi ureteric junction (PUJ). Once this is removed, two tubes are joined back together and a small stent is left internally. This is removed a number of months later.If the hydronephrosis symptoms are caused by something other than a blockage in the ureter, then other approaches to treatment may be recommended. For example, if the condition is linked to a multicystic kidney, it may be sufficient to monitor the kidney to see if it shrinks by itself. However, if the kidney grows too large or starts raising the blood pressure, it may need to be removed. As long as the other kidney is functional, this should not cause any problems for the child's health and wellbeing. Diagnosing this condition in children involves a combination of clinical, laboratory, and imaging approaches The clinical presentation can vary significantly, but common symptoms include:

- Flank pain
- Abdominal distension
- Hematuria
- Nausea and vomiting
- Urinary symptoms such as frequency or urgency.Laboratory tests are useful to evaluate renal function and detect complications:
- Urinalysis: to check for hematuria, infection, or crystals.
- Blood tests: Assess kidney function (BUN, creatinine levels).

Common causes of obstruction in children include:

- Congenital abnormalities (e.g., ureteropelvic junction obstruction)
- Ureteral stones
- Tumors or masses compressing the ureter
- Infections

Once diagnosed, the approach to management may include:

- Surgical intervention to relieve the obstruction
- Endoscopic procedures if stones are present
- Continuous monitoring to prevent complications and assess kidney function.Ongoing follow-up is essential to monitor for recurrence of symptoms and to ensure renal function remains stable. Regular imaging may be warranted based on the underlying cause.In conclusion, the diagnosis of obstructive ureterohydronephrosis in children requires a systematic approach encompassing clinical assessment, imaging, and laboratory tests to guide appropriate management strategies.

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