PEDIATRIC UROLOGY

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Child and Family Information Material

Vesicoureteral Reflux Original

What is vesicoureteral reflux?
Vesicoureteral reflux is the abnormal backflow of urine from the bladder into the ureter and up to the kidney. It is the most common problem found in children with **urinary tract infections**. Reflux is found in 20-50% of children who have had a urinary tract infection. Reflux is dangerous because it allows bacteria that might be in the bladder to reach the kidney. This can cause a kidney infection (pyelonephritis) which potentially can lead to kidney scarring and/or damage.

How is reflux diagnosed?
Reflux is usually diagnosed in one of two ways.

1) Children who have a culture proven urinary tract infection should have a contrast x-ray evaluation called a voiding cystourethrogram (**VCUG**). This study gives important information regarding the shape and size of the bladder, the bladder neck (or opening), the urethra and the tubes that drain the urine from the kidneys into the bladder called ureters. If reflux is present, contrast instilled into the bladder will abnormally backflow into the ureter/kidneys.

2) An prenatal **ultrasound** (ultrasound during pregnancy) may reveal a fetus with dilated kidneys. If this occurs, a **VCUG** is done soon after the birth of the baby.

It is especially important to diagnose and treat reflux in infants and small children since most of them will develop another urinary tract infection. Waiting until a child has had two or more urinary tract infections before having him or her evaluated increases the risk of permanent kidney damage or scarring.

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What, if any, other test should be done?

Kidney/Bladder Sonogram (Ultrasound): Otherwise known as "jelly-on-the-belly." This test is routinely recommended prior to the VCUG. This test is done to outline the kidneys, ureters and bladder. It looks for additional less common urinary tract defects that can be the cause of the urinary tract infection or kidney dilation. The test does not require radiation and is painless.

Kidney (Renal) Scan: This test may be done if the above tests are abnormal or if repeated febrile infections have occurred. It is used to better demonstrate the actual function and/or drainage of the kidneys. A kidney scan can also show if there is kidney damage and/or scarring that may have resulted from a previous urinary tract infection.

Nuclear Cystogram: This test is very similar to the VCUG, however, it has less radiation and is very sensitive for reflux. The nuclear cystogram is performed in the Nuclear Medicine Department. The VCUG is the preferred initial test for diagnosing reflux because it provides a more clear picture of the lower urinary tract and therefore can rule out other less common anomalies, as well as grade the reflux for severity (see below for grading). The nuclear cystogram, however, is the recommended test for subsequent follow up in the medical management of reflux, after the diagnosis has been made by the VCUG. The nuclear cystogram is also used as a screening test for siblings of kids who have reflux (see section below).

How is reflux graded and why is this important?

Reflux is graded on a scale from one to five, with one being mild form and five being severe (as seen on the VCUG). The degree of reflux is used to assist in decision making with regard to treating the reflux and the ultimate prognosis of patients. Please see **Figure 1** below. More severe grades of reflux are associated with lower rates of spontaneous resolution and higher incidence of renal damage if not treated.

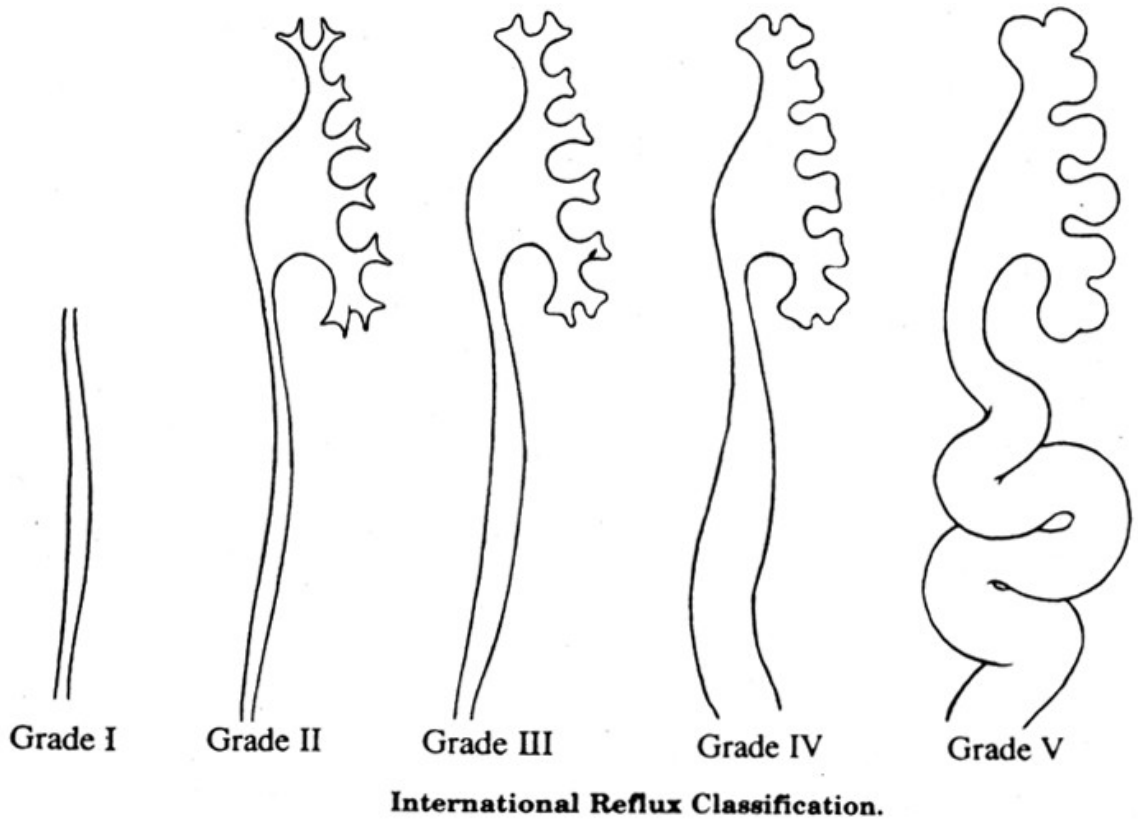

Figure 1

Why does reflux occur?

Normally, the ureter enters the bladder (the bladder is made out of muscle) in such a way that urine is allowed to enter the bladder but not allowed to back up to the kidney. Reflux occurs when the ureter enters the bladder abnormally. As a result, the muscle backing of the bladder does not completely cover the ureter and urine inappropriately is allowed back towards the kidney.

Reflux can also occur due to non-anatomical reasons like dysfunctional voiding, neurogenic bladders or other secondary causes. If this is the case, we will discuss the treatment options with you as the treatment may be different, and further evaluation may be needed.

How is reflux treated?

There are two different management plans (medical vs surgical) for reflux. These are based upon the degree of reflux, the age of the child at the time of diagnosis, the number and severity of urinary tract infections, and the amount of damage to the kidneys seen on X-ray studies. In both management plans, your child will receive antibiotics in a low dose and on a daily basis. The types of antibiotics are very specific for the urinary tract and have very few side effects. The specific type of antibiotics will depend upon your child's age and allergies. The goal of both management options is to prevent kidney infections until the reflux resolves or is corrected.

Medical Therapy?

Medical therapy is based on the knowledge that most reflux will resolve on its own as the child grows. It requires low dose daily antibiotics taken by mouth. An ultrasound and cystogram will be done on a yearly basis to assess the kidneys and to assess if the reflux has resolved. If the reflux persists for several years without change in the grade then surgery may be considered. If your child continues to have febrile urinary tract infections despite being on antibiotics, then surgery should also be considered. Again, the goal is to prevent potential scarring and/or damage from each pyelonephritis episode.

Surgical Therapy?

Surgical management is reserved for children with higher grades of reflux, febrile urinary tract infections despite being on antibiotics, and signs of renal damage on renal scans due to repeated infections. Surgery may also be discussed in cases when, after repeated VCUG's and allowing for the growth of the child, the reflux does not appear improving. The original refluxing ureter is surgically re-positioned (re-implanted) in the bladder wall. The end of the ureter is surrounded by bladder muscle in this new position in the bladder, which prevents urine from "backing-up" (refluxing) toward the bladder. Your child will be in the hospital for three to four days. He or she will still need to take daily antiobiotics following the surgery until the bladder and ureter are healed. An ultrasound will be performed approximately one month following surgery and depending on each case, a VCUG will be performed six months following surgery.

Are there any risk factors for reflux?

Specific modes of transmission are not known, but there is a very high incidence of reflux among siblings. Approximately 40% of siblings of those who have reflux will also have reflux. Younger siblings are at a much greater risk than older siblings. In many of these affected siblings, there is no documented history of symptomatic urinary tract infections. We would recommend that young siblings of refluxers be screened either with a VCUG or nuclear cystogram.

See the next page for contact information.

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