

VESICoureTERAL REFLUX

What is VESICoureTERAL REFLUX?

Under normal conditions, urine begins in the collecting system of each kidney and flows down the ureter into the bladder. The ureter is a funnel-shaped tube that is connected to each kidney at one end, and at the other end is connected to the bladder at a diagonal angle that has a special one-way valve system that normally prevents the backflow of urine. The urine is held in the bladder until the body passes it out.

Vesicoureteral reflux (VUR) occurs when the urine flows back from the bladder, in the wrong direction, into the ureter and sometimes up into the kidney. This results from the malfunction of that special one-way valve system. VUR may be present in either or both ureters.

Vesicoureteral reflux most commonly occurs by itself. It can also exist in association with many other abnormal conditions of the urinary tract. For example, it can be found in duplicated ureters, ureteroceles, ectopic ureter, posterior urethral valves, neurogenic bladder, cloaca, bladder exstrophy, and many others. Your urologist can explain these conditions to you in more detail if they relate to your child's condition.

Vesicoureteral reflux can result in kidney damage by increasing the risk of kidney infections and/or by causing high-pressure distension of the kidney.

What are the symptoms of vesicoureteral reflux?

VUR alone usually does not cause symptoms. Symptoms develop when there is a urinary tract infection, high-pressure backflow to the kidneys, or significant damage to the kidneys. Some of the symptoms that may present themselves when these happen include:

- Urinary burning, frequency, urgency, bleeding, fever, or other symptoms of a kidney infection
- Flank or abdominal pain
- High blood pressure
- Protein spillage in the urine

Each child may experience symptoms differently. Symptoms of VUR may resemble other medical conditions or problems. That is why you should consult your child's physician for a diagnosis.

How is vesicoureteral reflux diagnosed?

This condition is usually diagnosed in infancy or childhood following evaluation for urinary tract infection. In some cases, prenatal ultrasound of the fetus may show kidney abnormality and reflux is diagnosed during post-natal evaluations.

The radiology tests may include the following:

- **Renal ultrasound** – A non-invasive test that helps determine the size, shape, and location, of the kidneys. It can also identify swelling of the kidney (**hydronephrosis**) or other abnormalities. It does not tell us how well the kidneys function nor can it confirm if VUR is present.
- **Voiding cystourethrogram (VCUG)** – This is the standard test to diagnose VUR. A catheter is placed in the urethra and the bladder is filled with a liquid dye. X-ray images are taken as the bladder fills and empties to look for VUR and other abnormalities of the bladder or urethra. Severity of VUR is based on this study. For follow-up



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evaluation of VUR, a similar study that exposes the body to less radiation, **radionuclide cystogram**, can be done.

- **DMSA renal scan** – This test evaluates the function of the kidneys relative to each other and determines if there is significant scarring or damage to the kidneys.

What are the treatments for vesicoureteral reflux?

Treatment depends on the grade of VUR, frequency of kidney infections, presence of other abnormalities, and degree of kidney damage.

Regular monitoring and suppressive antibiotics

As lower grade VUR often resolves on its own, the typical treatment is to give the child a small daily dose of antibiotics to help prevent kidney infections. When VUR has caused multiple kidney infections or kidney damage, or when it is high grade and is not expected to resolve easily on its own, then surgical treatment should be considered.

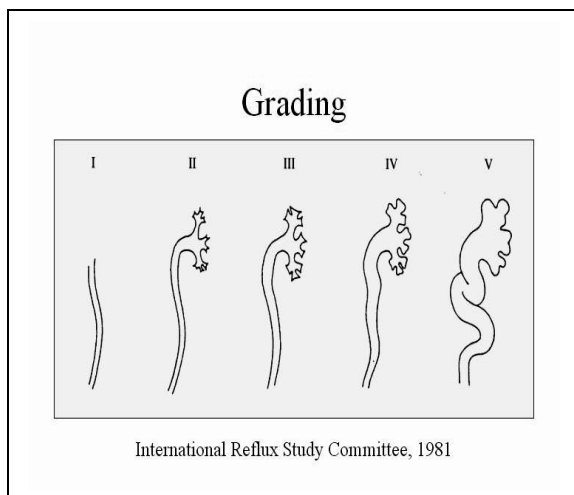
Surgery

Endoscopic (minimally invasive) surgery

This involves using a small telescope inserted into the bladder to inject a non-allergenic, FDA-approved bulking agent, Deflux, into the ureterovesical junction (UVJ). The child goes home the same day and may resume normal activity immediately. For low grade reflux, this treatment can be very effective (80-90% successful), but for higher grade or bilateral reflux, it is less successful (60-70%). Good candidates for this type of surgery are children with low to moderate grade VUR with very few kidney infections, no kidney damage, and no associated urinary tract abnormalities.

Open surgery

This is considered the gold-standard treatment for VUR as it has the highest success rate (95%+). Complications, such as blockage of ureter, bleeding, infection, bladder dysfunction, are reasonably low. It does require incisions on the skin and may need a brief stay in the hospital.



Group	T½ to reflux resolution	T½ to improve to Grade 1	Resolution rate at age 16 yrs
Grade 1	2.5 yrs	NA	NA
Grade 2	5 yrs	2.5 yrs	83%
Grade 3-5 (dilated)	8 yrs	4.5 yrs	73%

Wennerstrom M, Hansson S, Jodal U, Stokland E. Disappearance of vesicoureteral reflux in children. Arch Pediatr Adolesc Med 1998;152(9):879-83.

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