Vesicoureteral Reflux

What is Vesicoureteral Reflux?

Vesicoureteral reflux (VUR) is when urine (pee) flows backwards (refluxes) from the bladder into the kidney. It is one of the most common urologic conditions treated by pediatric urologists and it occurs in about 1 percent of newborns. It is often associated with other conditions such as hydronephrosis (extra urine or pee seen in the kidney) or febrile urinary tract infections (UTI with fever).

What causes reflux?

Urine is made by the kidneys and usually travels down through two tubes called ureters into the hollow, balloon-like muscle called the bladder. The ureters normally enter the bladder by tunneling through the wall of the bladder. When the bladder empties, the muscles surrounding the ureters compress and prevent urine from flowing backwards up to the kidneys. Often with VUR the tunnel is too short or the angle the ureter enters the bladder is not normal so the ureter isn't compressed well and urine is able to flow (reflux) up to the kidneys. It is not a condition that is caused by any specific exposure during pregnancy.

Genetics can play a role in VUR with it being more common in certain families. Siblings can have up to a 30% chance of also having reflux. Typically, it is not necessary to screen siblings unless they are having problems with febrile urinary tract infections.

Depending on the grading of reflux (how severe it is), many children will outgrow this condition. Not all will require treatment.

Some children may have reflux because of another condition like urethral valve obstruction, neurologic problems, or abnormal bladder functioning. Your doctor will speak with you about any specific conditions your child may have.

How do doctors grade reflux?

The severity of reflux is graded on a scale ranging from 1 to 5. One is the mildest and five is the most severe. Reflux can be on one side (unilateral) or both sides (bilateral).

How is reflux diagnosed?

Reflux is often present at birth but may not be discovered until a urinary tract infection occurs. The first sign of a UTI in an infant is a high fever (usually >101) with no other signs or symptoms. Reflux alone does not cause urinary tract infections or hurt the kidneys. However, if someone does have bacteria in his or her bladder, the backflow of urine gives the bacteria “a free ride” up to the kidney and cause an infection there. Multiple kidney infections may put patients at risk for kidney damage and high blood pressure later in life. A child may have reflux but have no symptoms of UTIs or kidney damage and the reflux resolves without any intervention.

Sometimes babies who have hydronephrosis found on prenatal ultrasound can have reflux picked up during the workup.

What testing is available for reflux?

Tests are performed in the radiology suite.

- Renal and bladder ultrasound
    - If hydronephrosis is found on prenatal ultrasound and isn’t improving, or if a patient has a febrile UTI the first imaging (picture) test performed is usually an ultrasound. During an ultrasound, sound waves are used to take pictures of the kidney and bladder. It is all done outside of the body and there is no radiation exposure. The size of the kidneys and bladder are measured. The radiologist is able to see if there is any hydronephrosis (extra urine or pee in the kidney.)
- Voiding cystourethrogram (VCUG)
    - A VCUG may be recommended to see if there is VUR. A catheter is inserted into the bladder. A special dye that can be seen by x-ray is injected through the catheter to fill the bladder. Once the bladder is filled and the child pees, pictures are taken to see if the dye stays in the bladder or refluxes up to the kidney. The test takes about 20-30 minutes and is usually done when the child is awake.

How is reflux treated?

Reflux can be managed medically or surgically. Medical management involves careful observation or medication. Surgical management involves a procedure to correct the reflux. The best choice for your child depends on your child's age, medical history, and severity of the reflux.

- Medical management:
  - The goal is to prevent kidney infections by prompt treatment of UTIs or taking a low dose daily antibiotic.
  - Your child might be chosen for "watchful waiting". This involves parents being very responsible and bringing in their child if they have an unexplained fever or symptoms of a UTI for treatment to begin immediately. The family needs to be aware that risk of renal scarring is higher with every febrile UTI.
    - The best patient for this option is someone with low-grade reflux (Grade I-II) and who are toilet trained and able to clearly express symptoms of UTIs.
  - A different option for medical management is a daily low dose antibiotic. The antibiotic keeps the urine sterile (no bacteria), so if sterile urine refluxes up to the kidneys it won't cause kidney damage. If this option is chosen your child, he or she will have regular follow up visits with imaging (ultrasound or VCUG). It will be continued until the child outgrows the reflux or the reflux is surgically corrected. The low dose of antibiotic does not change your child's risk of other infections. If your child develops another infection requiring antibiotics, you should stop the daily low dose antibiotic until the infection has cleared.
    - This is best option if the child is not potty trained, there is bowel and bladder dysfunction, and all patients with high-grade reflux (Grade III-IV).
- Surgical management:
  - The gold standard for surgical correction of reflux is called ureteral reimplantation. This surgery rebuilds the tunnel that the ureter travels through to prevent reflux. It can be done in an open surgery or a robotic surgery. Most children spend 1-2 nights in the hospital after this surgery.
  - Some children may also be candidates for a Deflux injection. This option allows a material to be injected in the ureter as "speed bumps" to keep urine from going the wrong way. It can be done as a same day surgery using a small camera in the bladder with no incisions.