Vesicoureteral Reflux

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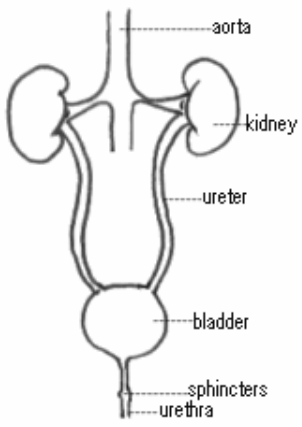

Urine normally flows in one direction—down from the kidneys, through tubes called ureters, to the bladder. the hollow, muscular organ that stores urine before urination occurs. The bladder has three small openings: two connect the ureters where urine is drained down from the kidneys, and one connects the bladder to the urethra where urine exits the body.

The ureters are the tubes that carry urine from the kidneys. Ureters have a special one-way valve system where they enter the bladder that normally prevents urine from flowing back up the ureters in the direction of the kidneys when the bladder contracts.

When a child has vesicoureteral reflux (VCR), the mechanism that prevents the back-flow of urine does not work, allowing urine to flow in both directions. A child who has vesicoureteral reflux is at risk for developing recurrent kidney infections, which, over time, can cause damage and scarring to the kidneys.

There are two types of VUR. Primary VUR occurs when a child is born with an impaired valve where the ureter joins the bladder. The valve does not close properly, so urine backs up (refluxes) from the bladder to the ureters, and eventually to the kidneys. This type of VUR can get better or disappear as the child gets older. The ureter gets longer as the child grows, and the function of the valve improves.

Secondary VUR occurs when there is a blockage anywhere in the urinary system. The blockage may be caused by an infection in the bladder that leads to swelling of the ureter. This also causes a reflux of urine to the kidneys.

The following are the most common symptoms of vesicoureteral reflux. However, each child may experience symptoms differently. Symptoms may include:

- urinary tract infection (urinary tract infections are uncommon in children younger than 5 years and unlikely in boys at any age, unless VUR is present)
- trouble with urination including:
    - urgency
    - dribbling
    - wetting pants
- an abdominal mass may be detected from a swollen kidney
- poor weight gain
- high blood pressure
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VUR is most commonly diagnosed in infancy and childhood after the child has a urinary tract infection (UTI). About one-third of children with UTI are found to have VUR. VUR can lead to infection because urine that remains in the child's urinary tract provides a place for bacteria to grow. But sometimes the infection itself is the cause of VUR.

Infection is the most common symptom of VUR. As the child gets older, other symptoms, such as bedwetting, high blood pressure, protein in the urine, and kidney failure, may appear.

Common tests to show the presence of urinary tract infection include urine tests and cultures.

Because no single test can tell everything about the urinary tract that might be important to know, more than one of the following imaging tests may be needed:

- **Kidney and bladder ultrasound:** A test that uses sound waves to examine the kidney and bladder. This test shows shadows of the kidney and bladder that may point out certain abnormalities. The test cannot reveal all important urinary abnormalities or measure how well a kidney works.

- **Voiding cystourethrogram (VCUG):** A test that examines the urethra and bladder while the bladder fills and empties. A liquid that can be seen on x rays is placed in the bladder through a catheter. Pictures are taken when the bladder is filled and when the child urinates. This test can reveal abnormalities of the inside of the urethra and bladder. The test can also determine whether the flow of urine is normal when the bladder empties.

- **Nuclear scans:** A number of tests using radioactive materials that are usually injected into a vein to show how well the kidneys work, their shape, and whether urine empties from the kidneys normally. Each kind of nuclear scan gives different information about the kidneys and bladder. Nuclear scans expose a child to about the same amount of radiation as a conventional x ray. At times, it can be even less.

The goal for treatment of VUR is to prevent any kidney damage from occurring. Infections should be treated at once with antibiotics to prevent the infection from moving into the kidneys. Antibiotic therapy usually corrects reflux caused by infection. Sometimes surgery is needed to correct primary VUR.

The child's physician may assign a grading system (ranging from 1 to 5) to indicate the degree of reflux your child has. The higher the grade, the more severe the reflux. Most children who have grade 1 through 3 VUR do not need any type of intense therapy. The reflux resolves on its own over time, usually within five years. Children who develop frequent fevers or infections may require ongoing preventative antibiotic therapy and periodic urine tests. Children who have grade 4 and 5 reflux may require surgical intervention. During the procedure, the surgeon will create a flap-valve apparatus for the ureter that will prevent reverse flow of urine into the kidney. In more severe cases, the scarred kidney and ureter may need to be surgically removed.