

Vesico-Ureteric Reflux (VUR)

What is it?

"Reflux" is backwards flow. Vesicoureteric reflux (VUR) is the abnormal backwash of urine from the bladder to the upper urinary tract.

Background

The kidneys filter the blood to make urine, which travels down the ureter to the bladder. The ureter should run through the bladder wall at an angle, to form a tunnel. This tunnel is compressed when the bladder is full, preventing urine from washing back up the urine to the kidney.

In VUR, urine may flow back (reflux) into one or both ureters and, in severe cases, to the kidneys.

What causes it?

VUR in young children is usually due to poor development of the tunnel through the bladder wall, which is too short or too wide to be compressed effectively. This is 'primary VUR'. Often it gets better with age as the tunnel grows.

In some cases, a high-pressure bladder stretches the tunnel and generates reflux. This is 'secondary VUR'.

Why is it a problem?

When a child with VUR has a urinary tract infection (UTI), bacteria can move from the bladder into the kidney. Kidney infections in young children can cause scarring. Kidney scarring can be associated with high blood pressure and kidney failure.

UTIs are most common in young children. Young children are most at risk of scars from infection.

Who gets it?

VUR is most common in infants and young children, but older children and even adults can be affected. About 10 percent of children have VUR. This is higher in siblings of an affected child (30%) and almost 100% in identical twins. These figures suggest that VUR is an inherited condition.

Not all children in the family will have the same associated problems, though, even if they have VUR.

How does it present?

In most cases, a child with VUR has no symptoms. This is 'asymptomatic VUR'. When symptoms are present, the most common are symptoms relating to an associated urinary tract infection (UTI). Symptoms include fever, lethargy and irritability.

VUR can contribute to infection risk, because urine that remains in the child's urinary tract provides a place for bacteria to grow. Studies estimate that 30 percent of children and up to 70 percent of infants with a UTI have VUR.

What tests are performed?

Not all children with UTIs need a diagnostic test for VUR (see UTI information). The common tests used to diagnose VUR, when indicated, are:

Micturating cystourethrogram (MCU)

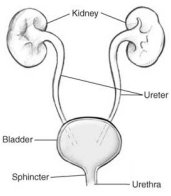
MCU is an x-ray image of the bladder and urethra taken during voiding (weeing). 'Contrast' fluid (which shows up on xray) is injected through a small tube placed in the child's urethra, to fill the bladder. Xray pictures are taken as the bladder fills and during voiding. This test can show VUR and abnormalities of the urethra and bladder (see MCU information sheet).

Radionuclide cystogram (RNC)

RNC is a nuclear scan, involving radioactive material placed into the bladder. It is not as useful as an MCU test in terms of detail, but may be more sensitive for low grade VUR.

Cystoscopy

Not strictly a diagnostic test, this is a procedure to pass a small telescope into the bladder to directly visualize the ureteric tunnels. Performed under anaesthesia, it can be combined with MCU for diagnosis of VUR in older children. Direct inspection can provide useful information as to the likelihood of spontaneous correction. In cases requiring surgical correction of VUR, this information can help the urologist decide on the most appropriate form of treatment. Sometimes, the treatment can even be carried out at the same time as the assessment.



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What other tests are needed?

Kidney function

VUR is associated with abnormalities of kidney development and function. Following diagnosis, children with VUR should have a general medical evaluation that includes blood pressure measurement, as high blood pressure is an indicator of kidney damage. The urine may be tested for the presence of protein and bacteria. Protein in the urine is another indication of damaged kidneys. Sometimes special nuclear tests to ascertain kidney damage are indicated, eg DMSA scan (See 'Radiation and Diagnosis' sheet)

Bladder / bowel dysfunction (BBD)

Older children with VUR should be assessed for bladder/bowel dysfunction (BBD), including:

- urge to void often or suddenly (>8 times /day)
- voiding infrequently (<4 times / day)
- daytime wetting
- constipation or faecal soiling

Children who have VUR along with BBD symptoms are at greater risk of kidney damage due to infection. They need their BBD treated in the first instance.

What are the treatment options?

There is no evidence that VUR without infection damages kidneys, when bladder function is normal. First-line 'treatment' for primary VUR involves reducing chance of UTIs. We know some VUR can correct with time, so long-term use of antibiotics to prevent UTIs (antibiotic prophylaxis) until VUR goes away has been common practice for a long time.

Several recent studies have raised questions about long-term use of antibiotics. The studies found little or no effect on prevention of kidney damage. Long-term use has also seen a rise in bacterial resistance to common antibiotics. For this reason we do not routinely screen for VUR in infants who have not had UTI. There is no evidence that antibiotic prophylaxis commenced before a child has had a UTI provides any benefit to the child, but does convey risk to community in terms of antibiotic resistance.

The greatest risk for febrile UTI (UTI with fever and presumed kidney involvement) is in the first year of life, as is the greatest vulnerability of the kidney to scarring. For this reason, antibiotic prophylaxis is currently recommended in infants under 1 year who have had a febrile UTI.

Surgical correction of VUR may be considered in children who have ongoing kidney infections despite prophylaxis, or have kidney damage and severe primary reflux. Two main approaches exist:

Cystoscopic injection

Bulking agents (eg. 'Deflux') can be injected beneath the floor of the existing incompetent ureteric tunnel to narrow and lengthen it. This technique works best for less severe grades of VUR, but these often need no active treatment, as they are the most likely to go away with time.

This is a day-stay, minimally invasive approach; less invasive than formal surgery, but less successful overall. Your urologist will be able to discuss the benefits and downsides of this technique in your child's particular case.

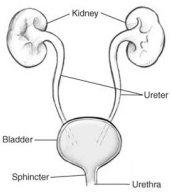
Ureteric reimplantation

This is an operation to make new tunnels with the properties of normal ones. This is the most successful form of reflux correction. It cannot reverse the damage to the kidneys, however, and does not prevent bladder infections from occurring afterwards. Its aim is to prevent further kidney infections and resultant damage and illness. (See "Ureteric Reimplantation" information sheet)

What are the outcomes?

The most important aim of management in VUR is infection prevention. Early recognition of signs and prompt treatment is the key to preventing kidney damage.

Children with kidney damage (scars) will need lifelong follow-up, first with a paediatrician and then a general practitioner, to monitor for high blood pressure or protein loss in the urine.



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Points to Remember

- Vesico-ureteric reflux (VUR) is backflow of urine from the bladder to the upper urinary tract
- In many cases, a child with VUR has no symptoms. When symptoms are present, the most common are those of an associated urinary tract infection.
- VUR without infection does not damage kidneys, if the bladder is normal.
- An xray test (MCU or nuclear cystogram) is required to diagnose VUR
- The goal of treatment is prevention of infection
- VUR correction with surgery may be considered if infections are recurrent and unable to be prevented by other means.
- Older children with VUR should also be assessed for bladder/bowel dysfunction (BBD). Children who have VUR along with BBD symptoms are at greater risk of kidney damage due to infection.