

Vesico-ureteric reflux and reflux nephropathy (1)

What is vesico-ureteric reflux?

When urine is passed, the bladder muscles contract and pressure in the bladder increases. As a result of this increased pressure the special valve-like structures situated between the bladder and the urethra relax, allowing urine to flow out.

Under normal circumstances, **vesico-ureteric valves (valves situated between the bladder and the ureters)** prevent urine from passing back up from the bladder towards the kidneys. In some people, these valve-like structures do not work properly or are absent, allowing the urine to flow constantly back up the ureters towards the kidneys.

This is known as **vesico-ureteric reflux**, and it happens particularly when the pressure in the bladder is greatest, such as when passing urine, when holding back from passing urine, or first thing in the morning when the bladder is full.

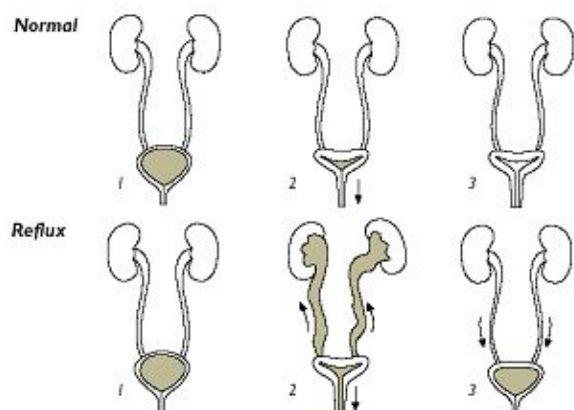
Vesico-ureteric reflux is termed “primary” when it is present at birth.

It affects both boys and girls and is present to some degree in approximately 5 of every 1000 newborn infants. In almost half of affected babies the problem corrects itself by the age of 2 years.

In those infants in whom the problem does not correct itself, the constant reflux of urine from the bladder back up towards the kidneys can result in progressive damage and scarring. Urinary tract infections are also more common and these infections, coupled with the constant reflux of urine can ultimately lead to slow progressive damage to the kidneys.

This damage takes the form of a loss of kidney function, a reduction in the size of the kidneys and ultimately scarring. It is generally agreed that scarring occurs early in childhood, and its development is related to both the severity of the reflux and the occurrence of infections.

Reflux of urine during micturition.



At the top, events in a normal person are shown. The valve between the bladder and the ureters do not leak, and the bladder empties completely (2). After passing urine (3) the bladder is empty.

In contrast, at the bottom of the picture, reflux is shown. During the passage of urine, urine also refluxes back into both kidneys (although in some individuals it may be on one side only).

After passing urine, the bladder relaxes and the urine in the expanded ureters falls immediately into the bladder which is never empty, except at the instant of finishing passing urine. Thus, there is always a reservoir of urine which, if it becomes infected, will result in persistence of the infection.

What tests may be necessary to confirm vesico-ureteric reflux?

As primary vesico-ureteric reflux is an inherited disorder, when it is suspected it is of value to investigate the children of the patient and their first degree relatives (parents, brothers and sisters). Special X-rays of the urinary tract are essential to confirm the diagnosis and assess the severity of the reflux. The most commonly performed X-rays include ultrasound scan of the urinary tract, voiding cysto-urethrogram, radionuclide renal scan and intravenous pyelogram (IVP).

Vesico-ureteric reflux and reflux nephropathy (2)

Severity of vesico-ureteric reflux

There are five grades of vesico-ureteric reflux, the three most severe of which are likely to be associated with renal damage. The majority of problems encountered in patients with vesico-ureteric reflux are related to scarring of the kidney.

The higher the 'grade' of the reflux, the more likely it is to result in scarring and the more likely it is to be associated with recurrent urinary tract infections.

Scarring may be already present at birth and is a risk factor for further infections, the development of high blood pressure and for kidney failure. Some patients develop a form of glomerulonephritis termed focal and segmental glomerulosclerosis (FSGS), which should be suspected when persistent proteinuria develops. This may accelerate the deterioration in kidney function.

What are the consequences of vesico-ureteric reflux?

As mentioned above, vesico-ureteric reflux is an important cause of chronic renal failure, and probably under-diagnosed in many countries. According to the Australian and New Zealand Dialysis and Transplantation Registry (ANZDATA), it is responsible for approximately 4% of cases of end-stage renal failure requiring dialysis. It is particularly common in young patients with renal failure, with an average age of 30 years.

What treatment is available for vesico-ureteric reflux?

Early detection of vesico-ureteric reflux is essential. The main aims of therapy are the detection and treatment of any urinary tract and prevention of progressive kidney scarring. The broad principles treatment are:

- prevention of scarring in children.
- treatment of confirmed urinary tract infections with appropriate antibiotics for an adequate length of time.
- prophylactic antibiotics (considered in Grade II -V vesico-ureteric reflux until puberty occurs or surgical correction is performed).
- investigation of offspring/first degree relatives of those with vesico-ureteric reflux.

General measures for dealing with vesico-ureteric reflux:

- Maintain a high fluid intake.
- Completely empty the bladder-relax when passing urine complete bladder emptying. Never strain or hurry passing urine.
- Practise double voiding - passing urine and then passing soon after, particularly before going to sleep, to ensure complete emptying of the bladder.
- Never hold on to the urge to pass urine.
- Treat hypertension carefully.
- Have frequent urine tests while pregnant.