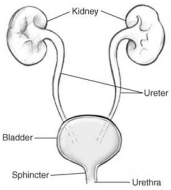


Renal Duplication Anomalies

Monash Children's Hospital

What is it?

A renal duplication anomaly occurs when a kidney forms in two parts.

Background

The urinary tract is normally made up of two kidneys, which filter the blood and create urine (the waste). The urine then flows through the collecting systems into the pelvis of each kidney. From there, it travels down the ureters, to the bladder. When the bladder is full, messages are sent to the brain and the bladder empties through the urethra.

One kidney is normally in the right flank and the other is in the left flank, mostly under the ribs.

In up to 1 in 100 people, the kidney develops in two parts with a separate blood supply and ureter for each part. The two ureters may travel separately to the bladder. More often, they join together to create a 'Y' shaped ureter and enter the bladder after they have joined together.

Nearly half of people who have a duplication of one kidney will also have duplication of the kidney on the other side.

How is it diagnosed? How does it present?

Duplication anomalies are often identified during antenatal ultrasound (before your child is born).

Other presentations may include:

- urinary tract infection
- urinary tract obstruction
- prolapsed tissue through the urethra (in a girl)
- constant dribbling urinary incontinence

What tests are performed?

External examination is usually normal in the patient with a renal duplication anomaly.

Ultrasound

An ultrasound identifies the size of the kidney (duplex kidneys are usually larger than normal), and may identify the two collecting systems or ureters. One or both of the two systems may be dilated, which can also be seen on ultrasound.

The ureters can be dilated if there is urinary reflux into the ureter (usually to lower part of kidney), or if there is blockage to the drainage of the ureter (usually to the upper part of the kidney). This can occur either due to a 'ureterocele' (seen as a bubble in the bladder), or ureteral ectopia (ureter ends in the wrong place).

Nuclear medicine

Nuclear scans can identify the function and drainage of the various parts of the kidney.

These may provide important information for planning treatment.

Micturating cystourethrogram

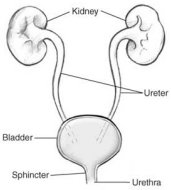
In this study, contrast is injected into the bladder. It can demonstrate urinary reflux into the ureters.

MRI

This is sometimes needed when there is a high clinical suspicion for a duplex kidney (such as continuous low-volume incontinence), but it is unable to be found with the other investigations.

Cystoscopy

This may be needed for internal assessment of anatomy. A retrograde pyelogram (contrast injected up the ureter into the kidney) can help plan treatment. Some treatments can also be carried out through the cystoscope.



Renal Duplication Anomalies

Monash Children's Hospital

What problems are associated with duplex kidneys?

Most duplex kidneys are uncomplicated and pose no problems.

Some duplex kidneys have problems with one or both parts of the kidney:

Obstruction

Function of the affected part of the kidney can be threatened by obstruction. Patterns of obstruction are quite predictable.

Upper pole

- Ureterocoele: causes lower end blockage of ureter, the upper pole function is usually poor. Biggest risk is infection. Can cause obstruction to bladder outlet and threaten other kidney.
- Ectopia: can cause dripping incontinence or risk urinary tract infection. Function of these upper poles are often preserved

Lower pole

- PUJ obstruction: blockage to the top end of the ureter draining this system

Urinary reflux

If there is back-wash of infected urine up to a kidney, the kidney can be involved in the infection. Reflux most commonly involves the lower pole of a duplex kidney.

There is a strong association between severe reflux (VUR) and a poorly developed kidney which works poorly (dysplasia). This pattern is seen in the lower pole of duplex kidneys too.

In a child with a duplex kidney and recurrent urinary tract infections, investigation for this condition may be warranted as sometimes it is necessary to stop the reflux in order to protect the kidney associated with the affected ureter.

What are the treatment options?

Most duplex kidneys are uncomplicated and require no treatment.

The treatment for renal duplication anomalies depends on the clinical problem. Options include:

To treat or relieve obstruction

Ureterocele

- early incision in newborn period
- later reconstruction for definitive treatment
- removal of the poorly-functioning part of kidney

Pelvi-ureteric junction obstruction (PUJO)

- pyeloplasty

If there is recurrent infection

- prophylactic antibiotics are often used
- treatment of vesicoureteric reflux, if present
- removal of part or all of an affected kidney

To treat incontinence due to ectopia

- implantation of ureter into bladder, if functions
- removal of poorly functioning part with ureter

What are the outcomes?

Outcomes for children with renal duplications will depend on their underlying kidney function and precise anomaly. The treatment is tailored to the particular clinical problem. Some children will need more than one operation to completely manage their urinary tract.

What is the follow-up?

This will depend on the precise anomaly your child has and any treatment undertaken.