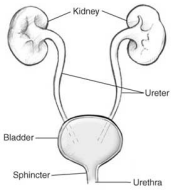


Hydronephrosis

Monash Children's Hospital

What is it?

"Hydronephrosis" is a descriptive term for the appearance of a kidney containing more than normal amounts of urine in the collecting system

- Hydro = water (urine)
- Nephro = kidney

It may be seen in one kidney (unilateral), or both (bilateral).

It may be associated with ureteric dilatation - hydroureter; or hydroureteronephrosis.

Background

Foetal kidneys begin to make urine from 10 weeks gestation. At this stage, the drainage system and the kidney are still developing. By 20 weeks, the entire drainage system of collecting ducts, calyces, pelvis and ureters is complete. Kidney formation continues until 36 weeks, and undergoes maturation and growth throughout childhood.

Hydronephrosis occurs as a result of the interaction between the flow of urine and the stretchability of drainage system. It may be physiological (caused by high flow of urine), due to obstruction (blockage) of urine flow, or due to back flow of urine to the kidney from the bladder. The appearance may be transient (come and go).

Who?

Hydronephrosis is a relatively common condition affecting up to 2% of pregnancies. Males are affected more often than females.

Hydronephrosis is not always congenital (occurring at birth) and may also develop as a result of injury or illness. Even when congenital, it may not be apparent before birth.

How is it diagnosed?

Hydronephrosis is found on ultrasound scan.

The most common time at which hydronephrosis is found is at the antenatal scans during the second trimester of pregnancy. At the 18 - 20 week antenatal scan, hydronephrosis is the most common abnormality to be found accounting for nearly half of all abnormalities.

If hydronephrosis is identified at this stage, your doctor will make a detailed assessment of the kidneys and rest of the baby. Further investigations may be recommended depending on the findings.

Some children may present with a urinary tract infection or with pain in their back. An ultrasound is performed which identifies the hydronephrosis.

Some children are found to have hydronephrosis on investigations performed for other reasons.

What other tests are performed?

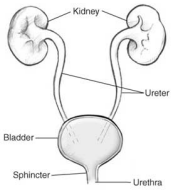
Some or all of the following tests may be done to help determine the cause and severity of the hydronephrosis.

Repeat ultrasounds

Serial ultrasounds look at the severity of the hydronephrosis, the shape of the kidney, ureteric involvement, and whether it is uni or bilateral. The ultrasound will also look at the bladder. Changes over time can be monitored. Ultrasound is non-invasive and has no radiation.

Renal scan (MAG 3 or DTPA)

This is a nuclear study which helps determine the relative function of each kidney, and the rate of drainage from each system. A small amount of radioactive material is injected via a needle. A special camera takes pictures to show the amount and speed of the material passing through and draining from the kidneys.



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Micturating cystourethrogram (MCU)

This test is performed with a small tube called a catheter, inserted through the urethra into the bladder. Contrast material is injected into the bladder through the catheter. X-rays are then taken to show the shape of the bladder, whether there is any reflux (backwash of urine from bladder to ureters), and whether there is any obstruction to flow of urine from the bladder.

What are the treatment options?

Hydronephrosis has many causes and the appropriate treatment depends on its cause.

If hydronephrosis is found during pregnancy, your baby may be prescribed low dose preventative antibiotics whilst waiting for further testing. An ultrasound is the first investigation.

Up to half of all cases diagnosed in pregnancy are found to have resolved after birth. In the rest, up to half have no serious cause is found.

Of the quarter with an underlying abnormality, many are found to have an impairment of urine flow at the junction between the pelvis and the ureter (pelviureteric junction obstruction or PUJO). The severity is assessed with ultrasound, and the effect on kidney function and drainage with the nuclear medicine study. You will need consultation with a paediatric urologist who may recommend further monitoring or surgery to relieve the obstruction. Surgery is usually recommended when the obstruction is high grade and/or affecting the function of the kidney. The surgery performed is called a pyeloplasty (refer to "Pyeloplasty" information sheet).

Hydronephrosis that does not resolve may have several other causes, including vesicoureteric reflux, VUJ stenosis, or posterior urethral valves. You may need consultation with a paediatric urologist to recommend further management.

What are the outcomes?

- In half the patients the hydronephrosis resolves
- In a quarter of patients, the hydronephrosis is stable and inconsequential
- In a quarter of patients, an underlying pathology needs treatment

The principal goal of treatment is to preserve kidney function. It is also important to avoid unnecessary surgery and unhelpful tests.

Kidneys with more severe hydronephrosis have higher likelihood of needing surgery and may benefit from early surgery

Kidneys with a less severe hydronephrosis can often be safely followed up by ultrasound.

Surgery is generally recommended when there is a loss of relative function or worsening dilatation on ultrasound.

Infections may cause rapid deterioration of kidney function. These need to be diagnosed and treated quickly.

What is the follow-up?

If the hydronephrosis has resolved on ultrasound after birth, no further treatment is required.

If there is mild hydronephrosis on ultrasound after birth, the child may benefit from seeing a paediatrician. Depending on the degree of hydronephrosis, ultrasound follow-up may be continued periodically.

If the hydronephrosis becomes more significant or symptomatic, then referral to paediatric urology specialist is indicated for further management.

Persistence of stable hydronephrosis without symptoms or underlying obstruction may not require active treatment.