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Social Care Trust

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Hydronephrosis

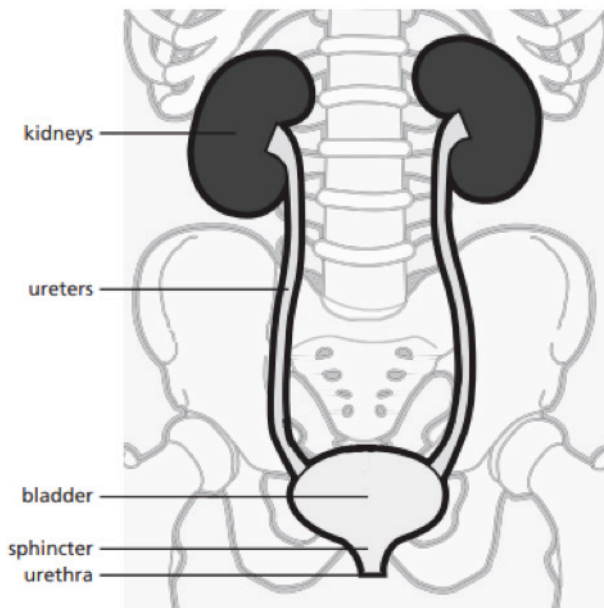


Hydronephrosis is a condition that can occur in the womb, where a baby's kidneys fill up with urine and become larger. We can measure this before birth by looking at the renal pelvic diameter (RPD) – a measurement of kidney dilation or ballooning. This can happen for various reasons. Hydronephrosis can also occur in adults, but this usually develops for completely different reasons and is treated in a different way.

About one in every 300 people has one kidney affected by hydronephrosis. About one in every 600 people have both kidneys affected by hydronephrosis.

What causes hydronephrosis?

The “waterworks” is made up of two kidneys, their ureters, the bladder and the urethra (see picture below). The kidneys filter the blood to remove waste products and form urine. The urine flows from the kidneys down through the ureters to the bladder. From here it passes through another tube called the urethra to the outside when urinating.



The ureters tunnel through the wall of the bladder at an angle to form a flap that acts as a valve. There is also a ring of muscle (sphincter) at the junction of the bladder and the urethra that stops urine leaking out in between pees. When peeing, the muscles of the bladder wall squeeze the urine out of the bladder, at the same time as the muscles in the sphincter need to relax to let the urine flow down the urethra.

The valves between the ureters and the bladder prevent urine flowing backwards into the ureters, so that all the urine in the bladder is passed in one go, as the urine cannot travel anywhere else. As the urine leaves the bladder at a high pressure, the valves are meant to stop this high pressure being passed on to the kidneys.

There are many causes of hydronephrosis, including:

- A blockage, which can occur between the kidney and the ureter (pelvi-ureteric junction or PUJ), between the bladder and the ureter (vesico-ureteric junction or VUJ) or in the urethra (posterior urethral valves).
- Vesico-ureteric reflux (VUR) occurs when the valve between the ureter and the bladder does not work properly and urine can travel back up to the kidney.
- Ureteric duplication, which affects about one in a hundred of all people. Children with ureteric duplication have 'two ureters, instead of one, leading from a kidney to the bladder. Occasionally, they also have a blockage at the lower end of one of the two ureters called an ureterocoele.

A multi-cystic dysplastic kidney (MCDK) is a kidney that doesn't develop properly inside the womb, so that it is just made up of cysts rather than any kidney tissue, and so it doesn't work at all. Usually these shrivel up and disappear, but occasionally some need to be removed at a later stage.

What are the signs and symptoms of hydronephrosis?

Even if hydronephrosis is diagnosed before birth, this should not cause any symptoms in the mother and should not affect her antenatal care, other than possibly having a few more scans. Hydronephrosis does not usually cause a baby any problems before birth, but they may need close monitoring and assessment after birth to discover what is causing the hydronephrosis and keep an eye on the condition.

How is hydronephrosis normally diagnosed?

It is often diagnosed before a baby is born, as the enlarged kidney(s) can be seen on an ultrasound scan.

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

- Ultrasound scans: Repeat ultrasound scans look at if only one kidney, or both, is swollen, if the hydronephrosis is getting more or less severe with time, and if the ureter(s) is also stretched. The ultrasound will also look at the bladder. Changes over time can be monitored. Ultrasound scans have the advantage that no needles or tubes are needed, and there is no radiation (which otherwise could have health side-effects in the future).

- Renal scan (MAG 3): This is a test which helps find the function of each kidney, and the speed of drainage of urine from each kidney. 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.
- Micturating cystourethrogram (MCUG): This test is performed with a small tube called a catheter, inserted through the urethra into the bladder. X-ray dye 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 coming out from the bladder.

How is hydronephrosis normally treated?

If the hydronephrosis is diagnosed during pregnancy, early treatment will consist of monitoring with ultrasound, to check that the baby is growing normally, and the kidneys are not getting too large. The baby will usually be born by a routine delivery. If the hydronephrosis is causing problems for your baby, the fluid may need to be drawn off while the baby is in the womb. This is very unusual.

After the baby is born, the hydronephrosis will be monitored using ultrasound scans and other tests. The overall treatment for hydronephrosis depends on what is causing it:

- If the cause is VUR, the child will probably be treated using 'a preventative antibiotic. Surgery for reflux is only needed for a small number of children who continue to have serious urine infections even when they are taking a preventative antibiotic.
- If the cause is a narrowing the child may need an operation to remove it (for example an operation called a pyeloplasty)
- If the cause is a multi-cystic kidney, the affected kidney will usually shrivel up and disappear and therefore does not need



What happens next?

In half the patients the hydronephrosis settles down on its own. In a quarter of patients, the hydronephrosis is stable (doesn't get any worse, but no better either) and doesn't require further treatment. In a quarter of patients, there is a cause that needs treatment.

If the cause of the hydronephrosis is a narrowing and this is corrected, the child's kidneys will be able to work as well as they are able to (that is, they shouldn't get any worse) but unfortunately no treatment is yet able to undo any damage that has already happened (often before the baby was born).

If the cause of the hydronephrosis is VUR that is not too severe, the child's kidneys are also likely to work properly. If the cause of the hydronephrosis is severe VUR, the kidney(s) may already have been damaged (often before they were born) and may continue to become damaged. This is usually only serious for the child's health in the future if both kidneys are badly damaged.

The child may need an operation to correct the reflux if they continue to have serious urine infections even when they are taking a preventative antibiotic, or if they have serious kidney damage.

1. Image from GOSH Hydronephrosis leaflet
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