

Duplex Kidneys

This infoKID topic is for parents and carers about children's kidney conditions. Visit www.infoKID.org.uk to find more topics about conditions, tests & diagnosis, treatments and supporting information.

Each topic starts with an overview followed by several sections with more information.

[Links to sections](#) in topic | [Other topics](#) available on website

Overview

We have two kidneys, which each have a single tube (called a ureter) that connects to the bladder. This tube drains urine from the kidneys into the bladder (see below).

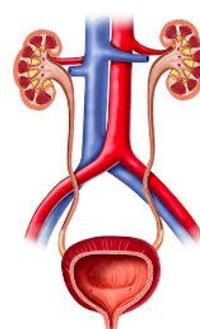
In some pregnancies, the kidneys and ureters do not develop normally. One such variation is known as a DUPLEX KIDNEY.

Duplex kidney(s) means having a double kidney on one or both sides of the body. If a child has a duplex kidney this means that the duplex kidney has two areas within it that collect urine (the renal pelvis). A duplex kidney can also mean a child has two ureters (tubes that drain the urine from the kidney to the bladder) instead of one.

You may be told that your baby has a possible duplex kidney during your pregnancy ultrasound scan or after your baby's birth. You may need to go back to the hospital for further scans during the pregnancy and after birth.

You may also be told your child has a duplex kidney if he /she has had a kidney ultrasound scan for urine infection.

Normal System



Duplex Kidney

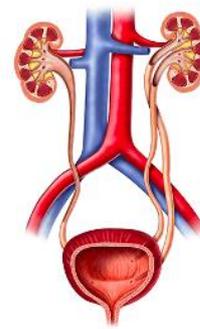


Image provided courtesy of Children's Hospital of Philadelphia. ©2011 The Children's Hospital of Philadelphia. All rights reserved. Visit <https://www.chop.edu/conditions-diseases> for more information.

About the urinary system

The kidneys are part of the **urinary system**, which gets rid of things that the body no longer needs so that we can grow and stay healthy.

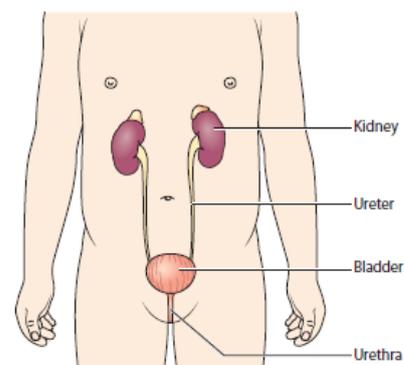
The **kidneys** are bean-shaped organs. They filter blood and remove extra water, salt and waste in **urine** (wee). Most of us have two kidneys, which are at the back on either side of our spine (backbone), near the bottom edge of our ribs.

Other parts of the urinary system are:

two **ureters**– long tubes that carry urine from the kidneys to the bladder

bladder– muscular bag that stores urine until we are ready to pass urine

urethra– tube that carries urine from the bladder out of the body.



[<More information about the urinary system and kidneys>](#)

Causes

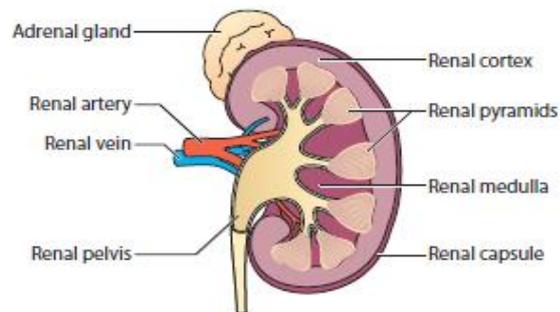
About duplex kidneys

Duplex kidneys are one type of **congenital renal anomaly**:

- congenital – the problem is present at birth
- renal – to do with the kidneys
- anomaly– different from normal.

How duplex kidneys happen

While a baby is growing in the **uterus** (womb), the ureters normally grow into the kidneys and become part of the kidney (the **renal pelvis**) that collects urine. Urine is drained from the kidney into the renal pelvis, through the ureters and into the bladder.



In duplex kidneys there is a variation in how the renal pelvis and ureters have developed when the baby was in the womb and how they connect to the bladder. Two main variations occur.

If there are two completely separate tubes (ureters) draining from the kidney into the bladder this is known as complete duplication (see picture). If there are initially two tubes (ureters) draining from the kidney that then join together to form one tube that connects to the bladder this is known as a partial duplication. Partial duplication is more common than complete duplication.

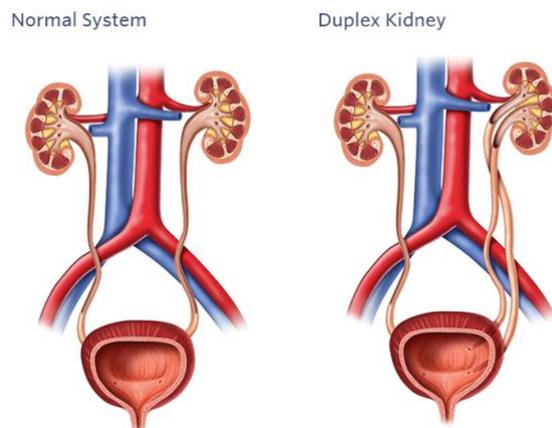


Image provided courtesy of Children's Hospital of Philadelphia. ©2011 The Children's Hospital of Philadelphia. All rights reserved. Visit <https://www.chop.edu/conditions-diseases> for more information.

How common are Duplex kidneys?

Duplex kidneys are the most common congenital abnormality of the urinary tract. It is thought that around 1% of people have duplex kidneys. This can often be an incidental finding on a scan (i.e., found out by accident).

Symptoms and complications

Most babies and children do *not* have any symptoms after birth, however, if duplex kidneys are associated with other abnormalities in the urinary tract (see below), there is a risk of **<urinary tract infections> (UTIs)**. Symptoms can include fever, vomiting, pain on passing urine, abdominal or back pain, needing to pass urine more frequently.

Other problems could include:

Vesicoureteral reflux

Urine travels back up the tubes from the bladder to the kidneys (it goes in the opposite direction it should do normally). This may be associated with symptoms of a urinary infection, bloody or cloudy urine.

<more about vesicoureteral reflux>

Ectopic Ureters

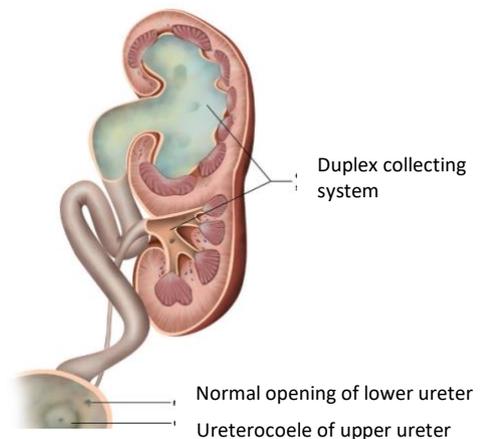
The tubes draining urine from the kidney connect to the bladder in an abnormal place or not to the bladder at all, which may cause urinary dribbling (incontinence).

Ureterocele

This is a swelling “ballooning” at the bottom of the ureter inside the bladder, as shown in the image on the right, where the ureter (tube) that drains the upper pole (part) of the kidney has ‘ballooned’ as it enters the bladder

Obstruction

One of the ureters (usually the ureter or tube that drains the upper pole (part) of the kidney) may be blocked, causing a dilatation of the drainage system of that part of the kidney, as shown in the image on the right, where the ureter draining the upper part of the kidney is blocked



Courtesy of Dr Matt Skalski, Radiopaedia.org

Tests and diagnosis

Duplex kidneys may be suspected before the child is born on a routine pregnancy **<ultrasound scan>** or identified in an older child as part of investigations for **<urinary tract infections>**.

Tests in pregnancy

Duplex kidneys can be found on a routine pregnancy **<ultrasound scan>**. The 20-week pregnancy ultrasound scan will look at the baby growing in the womb. If duplex kidneys or other findings are found then further antenatal (before the baby is born) ultrasound scans may be required during the pregnancy. The infant will also have another ultrasound scan after he / she is born.

Tests after birth

If duplex kidneys are found on antenatal ultrasound scans your baby will need further scans after he/she is born. How soon the child has an ultrasound scan after they are born will depend on what the antenatal ultrasound scan shows. It may be within the first week of life or at around 4-6 weeks of age. The timing of this will be discussed with you by your healthcare teams.

Tests may include (depending on the findings of the ultrasound scans):

DMSA Scan (Dimercaptosuccinic Acid)

This is a type of **radionucleotide scan**. This means that a substance that gives out a type of radiation called gamma rays is injected into the blood stream. This substance is taken up by the kidneys and a special camera takes some pictures. This allows us to see how well the kidneys are functioning.

[<More about DMSA scans >](#)

MAG3 Scan (mercaptoacetyltriglycine)

This is another type of **radionucleotide scan**. In this scan a substance called mercaptoacetyltriglycine is injected into the blood stream. It is also linked to a substance that gives out a type of radiation called gamma rays. It is taken up by the kidneys and then a special camera takes pictures. This type of scan gives us information on how well the kidneys are functioning, but also on how well urine is draining from the kidneys down into the bladder.

[<More about MAG 3 scans >](#)

MCUG (micturating cysourethrogram)

This is usually for babies and children who are suspected of having [<vesicoureteric reflux>](#) (urine travelling back up the tubes from the bladder to the kidneys). A special X-ray machine takes a series of images of the bladder while your baby is passing urine.

[<More about MCUG>](#)

Urine Tests

You, or a nurse, would need to collect some of your child's urine in a small, clean container for a urine test. A dipstick will be dipped into the urine – this is a strip with chemical pads that change colour depending on what substances are in the urine. The sample may also be sent to a laboratory for more accurate tests.

[<More about urine tests>](#)

Blood Tests

As well as various scans, your child may have some blood tests. This gives an idea of how well the kidneys are working.

[<More about blood tests>](#)

Treatment

If you are told during your pregnancy that your baby may have duplex kidneys you may have further ultrasound scans during the pregnancy and after he/she is born.

If these scans show no other abnormalities, and your child is well, no further intervention or follow-up is needed. However, it is important to monitor your child for symptoms of urinary tract infections (temperature, unsettled, vomiting, poor feeding, pain on passing urine, blood in urine) and seek medical advice should these occur.

If these scans show abnormalities, what happens next will depend on what these abnormalities are. If there is dilatation (enlargement) of the drainage system (hydronephrosis) of the duplex kidney (hydronephrosis), your child may be started on an antibiotic to reduce the chances of getting a [<urinary tract infection>](#). This is called a prophylactic antibiotic. The precise type and dose of antibiotic will be discussed with you by your doctor.

If your child continues to have hydronephrosis or it is getting worse on follow-up ultrasound scans you may be referred to an Urologist for a review. A Urologist is a surgeon who specialises in the urinary tract system.

Surgery

Occasionally, surgical procedures are required due to complications such as recurrent urinary tract infections or because of problems with urine drainage caused by ectopic ureters, ureteroceles, or **<vesicoureteric reflux>**.

Surgical interventions, if required, will be discussed with you by your Urologist. The type of surgery will depend on how the duplex kidney is affecting your child.

Examples of surgical interventions are:

Endoscopic (key hole) anti-reflux procedure

If there is vesicoureteric reflux, sometimes surgeons do operations to reduce the amount of urine going back up to the kidneys. This can sometimes be done as an injection next to the ureter opening to make it less wide open by an endoscopic (key hole) procedure.

Ureteric re-implantation.

If there is an ectopic ureteric opening (opening in the wrong place) below the sphincter (valve that holds the wee in), sometimes surgeons have to join the two drainage tubes together and/or take out the one that opens in the wrong place. Re-attaching the ureter to the bladder in a different position can sometime be needed. This is called a ureteric re-implantation

Puncture or excision of ureterocele

If the ureterocele is causing problems with urine drainage from either kidney, or interfering with bladder emptying it is sometimes advisable to puncture it by keyhole (endoscopic) surgery or remove it completely.

Partial nephrectomy (where part of the kidney is removed – sometimes called a ‘heminephrectomy’)

If there is an abnormal part of the duplex kidney and it is causing problems, sometimes it is advisable to remove the problem part.

About the future

In most cases, duplex kidneys do not cause any problems for the pregnancy or childbirth, and the baby and mother will not have any long-term problems.

Your child will be able to do all of the things that other children their age do. He or she can go to nursery and school, and can play with other children and stay active.

Your healthcare team will speak with you and your family about any long-term effects.

Follow up

Some babies and children with duplex kidneys need follow-up. Your child may need to go back to the clinic or hospital for more tests and to see the doctor.

Further support

This may be a difficult and stressful experience for you and your family. **If you have any concerns or need additional support, speak with your doctor or nurse.**

Further information

This is the end of the information about duplex kidneys. If you would like to read more about other kidney conditions, tests and diagnosis, treatment or supporting information, you can find a list of topics covered on the infoKID website at www.infoKID.org.uk.

Your notes and contact information

www.infoKID.org.uk



Version 3, January 2021. © Kidney Care UK and British Association for Paediatric Nephrology, all rights reserved. Review by: January 2025. For details on any sources of information used in this topic, please contact us through the [contact us form](#) on our website www.infoKID.org.uk.

We take great care to make sure that the information in this leaflet is correct and up-to-date. However, it is important that you ask the advice of your child's doctor or nurse if you are not sure about something. This information is intended for use in the United Kingdom, and may not apply to other countries. Royal College of Paediatrics and Child Health (RCPCH), British Association of Paediatric Nephrology (BAPN), British Kidney Patient Association (BKPA) and the contributors and editors cannot be held responsible for the accuracy of information, omissions of information, or any actions that may be taken as a consequence of reading this information.