

## What do the words mean?

When doctors use these words to describe the ultrasound findings in babies' kidneys, they usually just mean that there is extra urine ("wee") in the kidney. We shouldn't really use the words in that way, because the words have very specific meanings. It's important to understand exactly what the words mean. Before that, we need to understand how urine ("wee") gets from the kidney to the bladder.

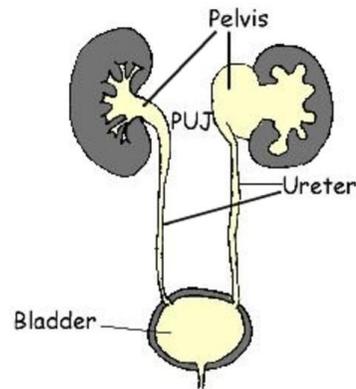
After the urine is made in the kidney, it passes through small, then bigger and bigger channels within the kidney. Finally, it empties into a structure shaped like a funnel - we call this the "pelvis" (not the bone!!!!). From here, the urine passes down a tube (called the ureter) into the bladder. The PUJ is the site where the Pelvis of the kidney and the Ureter join (Junction).

**Hydronephrosis** simply means there is extra urine in the kidney. It doesn't give any idea why it's big and it doesn't mean something needs to be fixed. It can be normal.

**PUJ obstruction** is one of the causes of hydronephrosis. It means there is a blockage (obstruction) at the PUJ (see above). In the diagram, the left kidney is normal but the right ureter has a kink at the PUJ and there is extra wee in the pelvis, causing it to be bigger. Blockages usually need to be fixed because they cause high pressure inside the kidney and kidneys get damaged by high pressure. They don't get damaged just by having extra wee inside them.

## So which one does my child have?

This is a very important question because, if there's a significant blockage, we should fix it. But, *finding extra wee in a kidney doesn't necessarily mean it's blocked!* It's easier to understand this if you think of an example from life. Imagine a river that has a dam put across it. Now it's blocked! After a while a lake builds up behind the dam, the water level rises and the water starts to flow over the dam wall. The water level behind the dam won't change as long



as the amount of water flowing in from the river is the same amount flowing over the dam wall. Now, it's not blocked - even though it once was!! Getting back to kidneys, they can have lots of wee inside without being blocked. So, as urologists, we want to know "Is the pressure inside the kidney high (ie a partially blocked kidney) or is it normal (just lots of wee)?" To help us sort things out better, we do tests.

## Tests

The most useful test would be one that tells us what the pressure is inside the kidney. Unfortunately no such test yet exists. These days, we mostly do a "renogram" (MAG3 or DMSA). In these tests, the radiologist injects an intravenous "tracer". It's cleared from the blood by the kidney tissue and excreted into the urine - the kidney treats it like any other waste that it needs to clean from the blood. We are interested in 2 main things with this test:

### 1) The time it takes for the "tracer" to pass through the kidney

The longer the tracer takes to pass through, the more likely the system is to be at least partially blocked. BUT, although we have guidelines for these things, there is no actual time that we say is a "blocked kidney". Part of the problem goes back to the example of the dam. In fact, the problem is called the "reservoir effect"! Imagine putting some dye into the river. It will slowly spread through the lake and will take a long time to pass over the dam wall and even longer for it to disappear from the lake. In urology, we call this the "half-clearance time" - the time it takes for half the dye to leave the system. In a non-blocked, but large system, the "half-clearance time" will be very long.

### 2) The function of one kidney compared to the other

This is definitely the most important thing. If a kidney is under pressure, its function will drop. This usually happens slowly, over months or years. If surgery is performed, recovery can be expected in most cases. The only way of monitoring function is to repeat tests on a regular basis. Your child will show no signs that anything is wrong. The frequency of the tests and the exact type, will depend on how bad the problem is and what each test shows. We will have discussed the exact details for your child.

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