



**The Montreal Children's Hospital  
McGill University Health Centre**

# **DIVISION OF UROLOGY**

## **What you need to know about hydronephrosis**

**(booklet for parents)**



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*Dear parents,*

*The goal of this booklet is to answer some of your questions about hydronephrosis and its treatment. It does not replace information or instructions given to you by your doctor or nurse. Please consult your doctor for specific details concerning your child.*

*Please keep this booklet and read it carefully. You may wish to write down questions to ask the doctor or nurse at your next appointment.*

### **Important: Please Read**

Information provided by this booklet is for educational purposes. It is not intended to replace the advice or instruction of a professional healthcare practitioner, or to substitute medical care. Contact a qualified healthcare practitioner if you have any questions concerning your care.



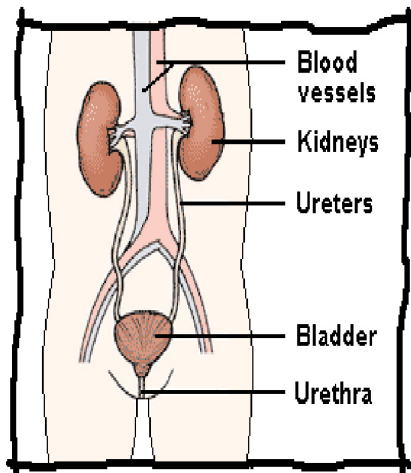
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**The Auxiliary of the Montreal Children's Hospital**  
**Les Membres auxiliaires de**  
**l'Hôpital de Montréal pour enfants**

# Hydronephrosis In Children

## The normal urinary system

The urinary system is made up of 2 kidneys, 2 ureters, a bladder and a urethra (Fig. 1).

The kidneys filter waste products from the blood, forming urine. Urine flows down thin tubes called ureters and is stored in the bladder. Muscles inside the ureters help push the urine toward the bladder. Urine leaves the bladder through another tube called the urethra.



**Figure 1.** The urinary system.

## Hydronephrosis

Hydronephrosis is the build up of urine in the kidney. As a result, the kidney becomes dilated (swollen). One or both kidneys may be affected.

Hydronephrosis is very common. Approximately 1 in 100 babies is born with this condition. In 50% of these babies, the hydronephrosis disappears before the child reaches 2 years of age.

## Before Birth

Hydronephrosis is often detected during a pre-natal ultrasound. This is called antenatal hydronephrosis. When this occurs, a series of ultrasounds is usually performed during pregnancy to monitor the baby's kidneys. Mild hydronephrosis can disappear after birth, however such disappearance is rare with more severe hydronephrosis.

## **After Birth**

Shortly after birth, a detailed ultrasound is done to look at the baby's kidneys, ureters and bladder. If the ultrasound shows that the hydronephrosis is gone, the ultrasound may be repeated in a few months. If the kidneys are normal at this point, no further follow-up is needed.

If the ultrasound shows that hydronephrosis is present, then it is graded. There are 4 grades of hydronephrosis: grade 1 is the mildest and grade 4 is the most severe. Depending on the grade of hydronephrosis and the results of the ultrasound, your child may need more tests. Based on these test results, you and your doctor can decide on the best care plan.

Your baby may need to take a small preventative dose of antibiotics each day. Give the antibiotic at the same time every evening. Let your doctor know if the antibiotic causes skin rash or diarrhea. Your doctor may advise you to temporarily increase the dose of antibiotic in preparation for a VCUg.

## **What is the cause of hydronephrosis?**

Possible causes of hydronephrosis include:

- Poorly developed muscles inside the ureters
- Reflux or backward flow of urine
- Blockage at the level of the kidney, bladder, or urethra
- An extra ureter (duplex kidney)
- Cysts in the kidney

## **What is the treatment for hydronephrosis?**

The treatment for hydronephrosis depends on the cause.

Babies with hydronephrosis caused by reflux or a blockage need close monitoring and proper medical treatment. Your doctor may recommend that your child be tested for reflux or a blockage of the kidneys. These tests are done on an outpatient basis with the child awake.

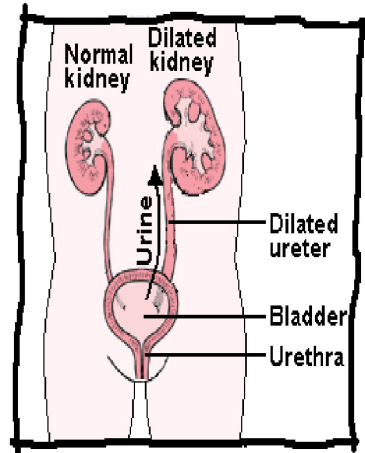
Babies with hydronephrosis without reflux or blockage are also followed with ultrasound to monitor the hydronephrosis and growth of the kidneys for several years.

## Reflux

Reflux is the backflow of urine from the bladder to the kidney (Fig. 2). About 25% of children with hydronephrosis have reflux. Reflux is diagnosed by a test called:

### VCUG (voiding cytourethrogram):

This x-ray test looks at the bladder and urethra. For this test, a small tube is placed into your child's urethra. The bladder is then filled with a special dye. If the dye goes back up to the kidney, then your child has reflux.

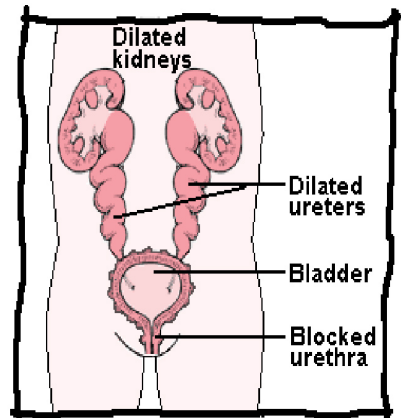


**Figure 2.** Reflux causing hydronephrosis.

**Treatment:** If your child has reflux, he/she may need to take a small amount of antibiotic daily to prevent urine infection until the reflux improves or is corrected. About 75% of children with reflux will outgrow it.

### Blockage in Urethra

In boys, the VCUG also shows if there is a blockage in the urethra (Fig 3). If the urethra is blocked, your son will need a small operation to remove the blockage.



**Figure 3.** Blockage in urethra.

## Blockage (Obstruction)

Children with severe (Grade 3 and Grade 4) hydronephrosis need to be tested to see if there is a blockage (obstruction) in the urinary system. Blockage is diagnosed by a test called:

**Mag 3 with Lasix Renal Scan:** This scan is a kidney function test. It measures the kidney's ability to make and drain urine. A small amount of tracer is injected into the child's vein (like a blood test). The test follows the tracer as it enters and flows out the kidney. A small tube may also be placed in the bladder to drain urine.

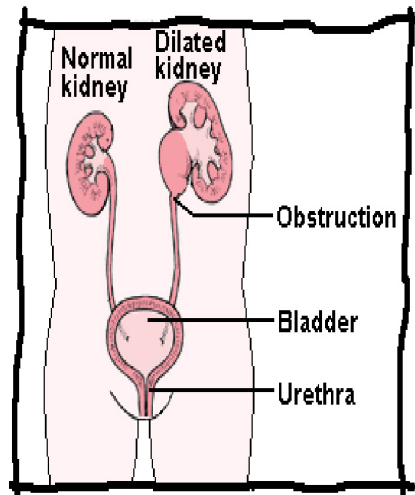
**Treatment:** If your child has a blockage, treatment will depend on four factors:

- the location of the blockage
- the degree of blockage
- how well the kidney works
- possible urine infection

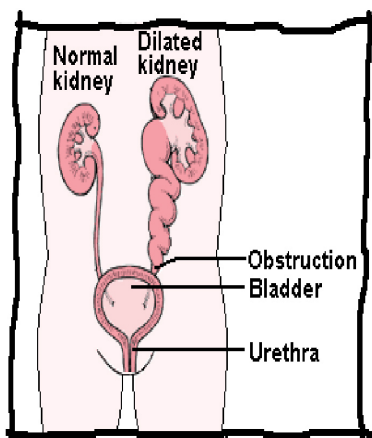
**Location:** The most common area of blockage in the infant or older child is where the kidney joins to the ureter (**ureteropelvic junction (UPJ)**, Fig. 4).

Here the ureter may have a narrowed, kinked or weak area which prevents urine from draining quickly out of the kidney.

Less common is a blockage where the ureter joins to the bladder (**ureterovesical**)



**Figure 4.** Ureteropelvic (UPJ) blockage.



**Figure 5.** Ureterovesical (UVJ) blockage.

**junction (UVJ)**, Fig. 5). Here the ureter may have a narrowed or scarred area which prevents urine from flowing quickly into the bladder.

A **ureterocoele** is a membrane that covers the lower end of the ureter and blocks the flow of urine into the bladder.

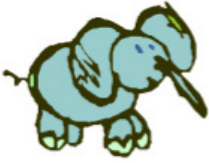
**Mild blockage:** If the urine drainage is slow and the kidneys are working well, then the blockage is considered mild. A child with a mild blockage will need to have his/her kidneys monitored regularly by ultrasound and other tests for several years.

**Severe blockage:** If the drainage is poor and kidney function is affected, then the blockage is severe. A child with a severe blockage will probably need surgery. Surgery to unblock the kidney is very safe and has a high rate of success. The goal of surgery is to preserve kidney tissue and kidney function.

**Urine Infection:** A child with reflux or a blocked kidney may be prone to urine infection. Infection can further damage the kidney as well as cause pain and bleeding. Consequently, your child may need to take a small amount of antibiotic daily to help prevent urine infection.

Signs of a urine infection in a baby **include fever, extreme irritability, vomiting, lethargy, and blood in the urine.**

An older child with a urine infection **can have fever, abdominal pain, pain when urinating, smelly or blood in the urine.**



**Your questions:**

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