

Prenatal Hydronephrosis

What is hydronephrosis?

Hydronephrosis is dilation of the kidney, specifically the renal pelvis (place where urine is stored after its production). This can be the result of an anatomic abnormality in the urinary tract or can be a variant of normal. Hydronephrosis secondary to obstruction is typically at the level of the kidney (uretero-pelvic junction obstruction, or UPJ) or the bladder (uretero-vesical junction obstruction or megaureter). Please see Figure 1. Rarely, hydronephrosis is caused by a blockage in the urethra below the bladder from a condition called posterior urethral valves.

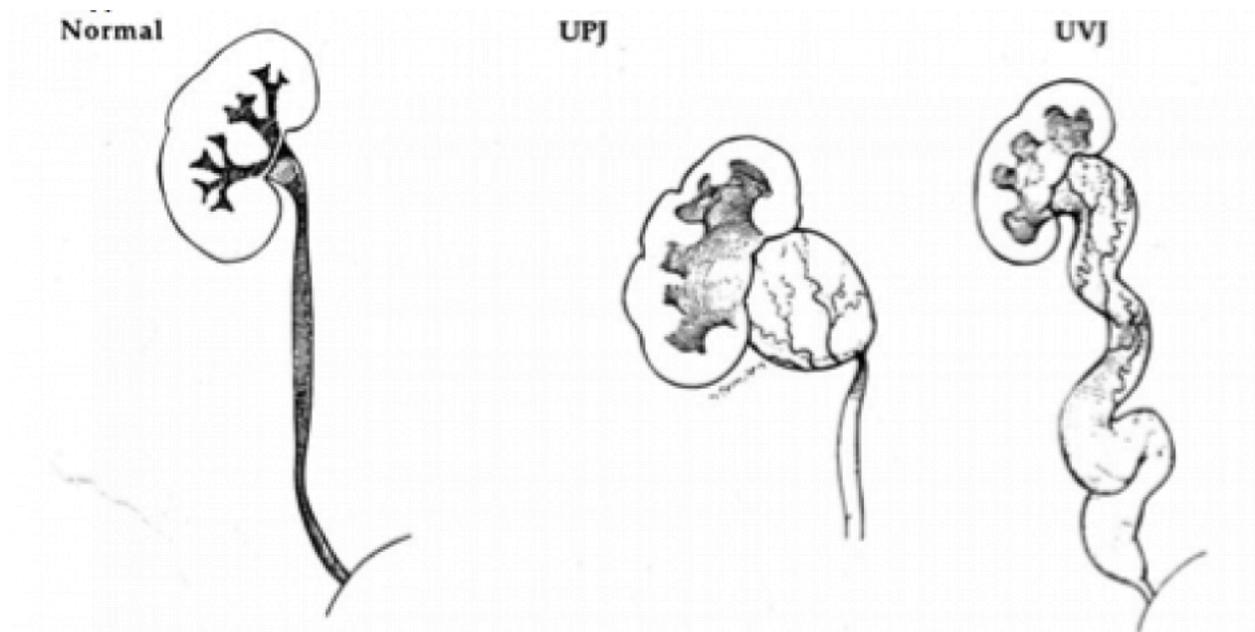


Figure 1

How is hydronephrosis diagnosed?

Hydronephrosis is usually diagnosed in one of two ways.

1) A prenatal ultrasound (ultrasound during pregnancy) may reveal a fetus with dilated kidneys. This occurs in 1 per 100 pregnancies.

2) An ultrasound done as a routine evaluation for another medical problem, such as a urinary tract infection or incontinence, may also reveal hydronephrosis. Once hydronephrosis is noted, whether it is during pregnancy or later, additional tests are often required in order to find out the significance of the hydronephrosis. These tests are important because children with hydronephrosis may have an anatomic abnormality or urinary tract blockage. Early diagnosis and treatment of a potential urologic abnormality can prevent urinary tract infections and permanent kidney damage or scarring.

What, if any, other test should be done?

- VCUG (voiding cystourethrogram): This study gives us important information regarding the shape and size of the bladder, the bladder neck (or opening) and the tubes that drain the urine from the kidneys into the bladder, called ureters. It allows us to diagnose reflux (the abnormal back-flow of urine from the bladder into the ureter and up to the kidney). It also gives us additional anatomic information about the urethra (urine tube which takes urine from the bladder outside the body) to make sure no blockage is present (posterior urethral valves).

- Kidney (Renal) Scan: This test may be done depending on the history of urinary tract infection(s), result of VCUG, and/or the severity of the hydronephrosis. It is used to better demonstrate the actual function and/or drainage of the kidneys. A kidney scan can also show if there is kidney damage and/or scarring that may have resulted from a previous urinary tract infection or long-standing hydronephrosis. Two types of renal scans are typically performed depending on the diagnosis.

1. Lasix Renogram or MAG-III diuretic renogram to test for significant blockage in the urinary tract, OR

2. DMSA renal scan to test for scarring or damage to the renal tissue (more common in patients with vesico-ureteral reflux).

When should these tests be performed if a prenatal ultrasound showed hydronephrosis?

The decision to perform these tests depends on several factors including the severity of the hydronephrosis. If the hydronephrosis is mild and only on one side, a repeat renal ultrasound can be performed in the first month of two of life and a VCUG or renal scan may not be needed at all. If the hydronephrosis is severe and/or on both sides, a renal ultrasound is generally performed after the first 24-48 hours of life but within the first week of life. It is normal for a newborn to be dehydrated, and make less urine, on the first day of life, so it may falsely appear that hydronephrosis has gone if done too early. For severe hydronephrosis; a VCUG will be performed next, within the next several weeks of life. A renal scan will be performed if necessary.

Certain conditions seen on the ultrasound may warrant a more expeditious work-up and we will let you know if this is necessary (for example, in the event of severe hydronephrosis in both kidneys or a dilated bladder).

How is hydronephrosis graded and why is this important?

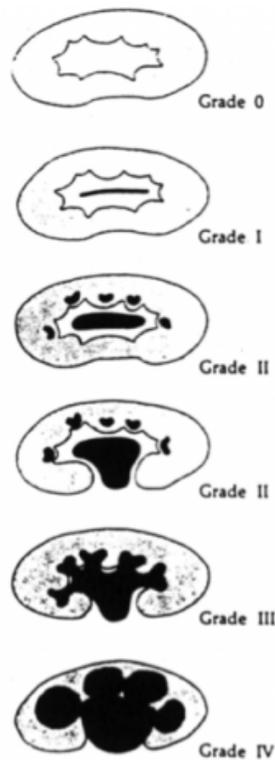


Figure 2

Hydronephrosis is graded on a scale from zero to four, with zero being no hydronephrosis and four being severe. Please see Figure 2. The degree of hydronephrosis is used to assist in decision making with regard to treating the underlying cause of the hydronephrosis and the ultimate prognosis of patients. More severe grades of hydronephrosis are associated with closer pediatric urology follow-up. For example, grade III and IV hydronephrosis (not due to vesicoureteral reflux) typically require a renal scan.

Why does hydronephrosis occur?

There are numerous reasons why hydronephrosis occurs. Please see the list of potential diagnoses below:

- 1) Vesicoureteral reflux
- 2) Non-obstructive hydronephrosis
- 3) Ureteropelvic junction (UPJ) obstruction
- 4) Ureterocele
- 5) Posterior urethral valves
- 6) Ureterovesical junction (UVJ) obstruction
- 7) Megaureter
- 8) Multicystic Dysplastic Kidney
- 9) Ectopic ureter
- 10) Neurogenic/nonneurogenic bladder

This list is quite extensive, but most often the cause of the hydronephrosis is from one of the first three (in bold) diagnoses.

The special x-ray tests mentioned previously will help us to find the cause of the hydronephrosis.

Will my child require any medication to assist in treating the hydronephrosis?

The decision to treat children with hydronephrosis with prophylactic antibiotics is affected by several factors but mainly the severity of the hydronephrosis. If prophylactic antibiotics are used, your child will receive antibiotics in a low dose and on a daily basis. The types of antibiotics are very specific for the urinary tract and have very few, if any, side effects. The specific type of antibiotics will depend upon your child's age, weight and allergies. The goal of antibiotics is to prevent kidney infections that may occur as a result of the hydronephrosis. Often times, once the special x-ray tests have been completed, we will be able to estimate the total time of antibiotic treatment.

Will the hydronephrosis go away or will my child require surgery?

Typically, non-obstructive hydronephrosis (ie, hydronephrosis secondary to dilation at the ureterovesical junction, the place where the ureter meets the bladder; please see Figure 1) and grade 1 to 3 hydronephrosis secondary to uretero-pelvic junction type hydronephrosis do not need surgical intervention and resolve over time. The timing of resolution depends on the severity of the hydronephrosis and is different for each child. Children diagnosed with dilation from ureterovesical junction abnormalities called megaureters rarely need surgical repair. Patients with grade IV hydronephrosis (severe) are the most likely to require surgery to prevent renal damage and recurrent infection.

The vast majority of children with hydronephrosis grow up healthy and lead normal lives even if they require surgery to fix an abnormality.

See the next page for contact information.

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