

# UNDERSTANDING HYDRONEPHROSIS

CARMEN AND JOHN THAIN CENTER FOR PRENATAL PEDIATRICS

## What is hydronephrosis?

Hydronephrosis is a swelling or dilation within the kidney or the ureter, which is the tube that connects the kidney to the bladder and moves the urine the kidneys produce to the bladder. Hydronephrosis generally results from a blockage at the top of the ureter near the kidney (known as the ureteropelvic junction, or UPJ) that traps urine in the kidney, causing it to build up and stretch the kidney or ureter (see picture). Less commonly, urine backs up from the bladder and leads to hydronephrosis. Generally only one kidney is affected. The severity of the condition depends on the extent of the blockage and the degree the kidney is stretched, and can range from mild to severe. In the most severe cases, the UPJ obstruction can lead to abnormalities in the amount of amniotic fluid, and this in turn can impair fetal lung development.

## How common is hydronephrosis and what causes it?

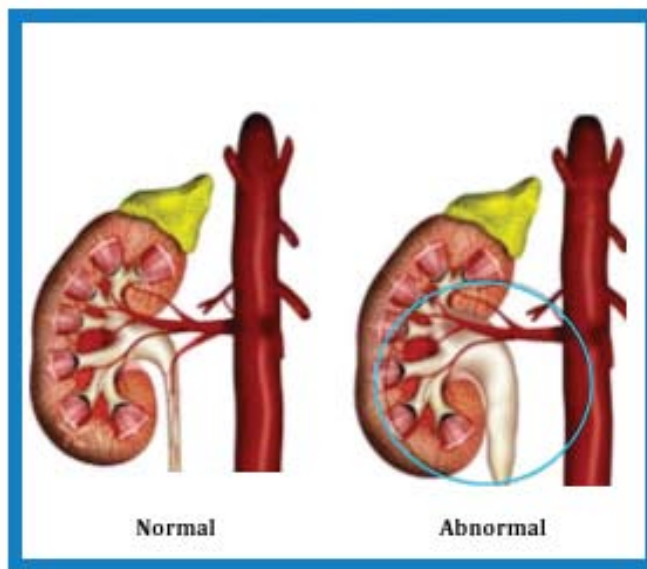
Some studies suggest that as many as 2% of all prenatal ultrasound examinations reveal some degree of hydronephrosis, making it one of the most commonly detected abnormalities in pregnancy. It is not clear why the ureter becomes blocked during development. It is more often seen in boys than girls. Babies with severe UPJ obstructions have an overall increased chance of having a chromosomal abnormality (like Trisomy 21, or Down syndrome).

## How is hydronephrosis detected during pregnancy?

Ultrasound can detect the fetal kidneys and bladder by 14 or 15 weeks gestation, though 20 weeks of pregnancy is the ideal time to detect hydronephrosis on ultrasound, since the fetus is larger and the kidneys can be visualized in detail. When a UPJ obstruction is identified, the kidneys are closely examined for other findings more common with UPJ, such as cysts (known as multicystic, dysplastic kidney) or an abnormal shape (commonly called a horseshoe kidney).

## How will my pregnancy be managed now that hydronephrosis has been detected?

Through the Carmen and John Thain Center for Prenatal Pediatrics, you will have an in-depth ultrasound study to confirm the diagnosis, evaluate the kidneys and bladder closely, and ensure no other abnormalities are present. The ultrasound will be performed by an obstetrician with expertise in prenatal ultrasound and high-risk pregnancy, a Maternal-Fetal



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Medicine (or MFM) specialist. Many times a Pediatric Urologist will also be present during the exam to review the findings with you and discuss the possible course of treatment after birth. Amniocentesis to rule out a chromosomal abnormality in the baby can also be performed if you like. You will have periodic sonograms to monitor the baby's kidneys and fluid; in cases of bilateral UPJ obstruction or when a kidney is missing or cystic in appearance, ultrasound may be repeated every 2-3 weeks to check the obstruction and level of amniotic fluid.

In addition to the Pediatric Urologist, you and your family will also meet with a few other specialists during your pregnancy who will be involved in caring for the baby after birth. If surgery is likely in the baby after birth, you may tour the Neonatal Intensive Care Unit (or NICU) and discuss how your baby will be cared for in the first few days after he or she is born. You may also meet with a Genetic counselor and a Geneticist to talk about your family history, review the causes of hydronephrosis, and understand what to do if and when you become pregnant again. If the hydronephrosis is minimal and the UPJ obstruction is only present in one kidney, you do not need to change your prenatal care, and a normal delivery can be expected. When the hydronephrosis is severe and the UPJ obstruction is found in both kidneys or one of the kidneys is missing or has a cystic appearance, your medical team may feel it best for you to deliver earlier than expected, and will discuss this with you in detail so you can make the best decision for you and your baby.

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### How will the hydronephrosis be treated after birth?

Every newborn with a prenatal diagnosis of hydronephrosis will undergo a detailed physical exam for signs of any consequences from the UPJ obstruction. Babies with severe cases of prenatal hydronephrosis will have an ultrasound of the kidneys and bladder a few days after birth; those with less serious cases may not need the exam for a few more days. If that ultrasound is normal, a repeat will be performed a few weeks later to confirm that result. Half of the babies with prenatal diagnosis of a UPJ obstruction and hydronephrosis will have a normal result on their newborn scan. Almost all babies with prenatal diagnosis of hydronephrosis may be given antibiotics to lower the chances for a urinary-tract infection, a common problem linked to hydronephrosis.

If a UPJ obstruction is seen on newborn ultrasound, treatment is determined by the severity of the obstruction. In cases where a mild or moderate obstruction is noted and the kidney has more than 35% normal function, your medical team may decide to just monitor the kidneys and repeat the ultrasound in a few months. That repeat scan will determine any changes in the kidney's ability to function normally. In severe cases, when the kidney shows 35% or less function, surgery known as pyeloplasty may be necessary to remove the obstruction and reconstruct the urinary tract. Surgery is generally performed after the baby has been fully evaluated and stable; emergency surgery is not necessary. The success rate for surgery is 90-95%.

If the prenatal ultrasounds show cysts in the kidney, an ultrasound of kidney and a special x-ray called a voiding cystourethrogram (VCUG) will be done to fully determine how the cystic kidney is affected and make sure the other kidney is normal.

### What is the long-term outlook for babies with hydronephrosis?

Many cases of hydronephrosis will resolve on their own before the baby's birth. Long-term follow-up studies suggest that most cases of hydronephrosis at birth will resolve over time, with the kidneys working normally. For those infants whose newborn testing shows a persistence of the condition, the long-term outlook depends on whether the obstruction is present in one or both kidneys and whether one or both kidneys is cystic in appearance. In the most severe cases, when hydronephrosis due to UPJ obstruction is seen in both kidneys, or when one UPJ obstruction is present but the opposite kidney is missing or is cystic in appearance, the prognosis may be more severe, eventually requiring kidney transplantation for normal kidney function.

### What are the chances I could have another baby with hydronephrosis?

Minimal hydronephrosis is not genetic and is not believed to run in families. However, given that hydronephrosis is so commonly detected in pregnancy, it may be coincidentally detected in future pregnancies. If UPJ obstruction is determined to be the cause of the hydronephrosis, the chances for future children with the same obstruction are believed to be as high as 50%. Certain genetic conditions can cause the kidneys to have cysts, and these generally carry a 25% for future children to have the same condition. Regardless of the cause, you should have a good prenatal ultrasound examination in the second trimester with all future pregnancies to check the developing kidneys and bladder.

### What can I expect from the specialists at Morgan Stanley Children's Hospital?

The well-being of you and your baby are extremely important to everyone involved in your care. NewYork-Presbyterian Morgan Stanley Children's Hospital/Columbia University Medical Center has consistently been ranked one of the best pediatric hospitals in the country: our pediatric urologists have extensive experience in caring for hydronephrosis, and our MFM team is among the largest and most experienced anywhere. Our NICU is one of the most advanced in the United States, and has been cited several times for its excellence and dedication to patient care.

The well-being of you and your baby are extremely important to everyone involved in your care. Together we are all dedicated to giving you the best pregnancy and healthiest outlook for your child.

### About the Carmen and John Thain Center for Prenatal Pediatrics

Complex pregnancies receive better care when specialists collaborate. The Carmen and John Thain Center for Prenatal Pediatrics is dedicated to helping pregnant women and their families when a birth defect or genetic syndrome is detected before the baby is born. The Center offers sensitive, complete, up-to-date information and testing, and an integrated approach to care that begins in the prenatal period and continues after birth with pediatric follow-up. A collaborative, coordinated program of care is created among specialists in perinatology, neonatology, genetics, pediatric cardiology, pediatric surgery and all pediatric subspecialties.