

Vesicoureteral Reflux (VUR) Patient Guide



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Urology Care Foundation Pediatric Health Committee

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Chair

Rosalia Misseri, MD

Panel Members

Eric Kurzrock MD

Glen A. Lau, MD

Robert A. Mevorach, MD

Amanda C. North, MD

Kelly A. Swords, MD, MPH, FACS, FAAP

Addison's Story



Addison was just 15 months old when she had her first urinary tract infection (UTI). Her doctor prescribed antibiotics. But two months later, Addison got a second UTI. That's when her doctor suggested her parents take her to a pediatric urologist. This doctor specializes in diseases of a child's urinary tract.

After having an x-ray of her bladder, Addison was diagnosed with vesicoureteral reflux (VUR). In normal kidney-bladder function, urine flows from the kidneys to the bladder. With VUR, urine flows backwards from the bladder up towards the kidneys. As a result, children with VUR develop urinary tract or kidney infections and have a higher chance for kidney damage.

About one out of 100 children may get VUR and are usually diagnosed around two or three years old. Luckily, many children outgrow VUR around age five or six, as their bladders and ureters develop. Three out of four children with VUR are girls, like Addison. VUR can be passed down from parent to child. If a mother had VUR, half of her children may also be born with the condition.

Addison's pediatric urologist said treating her VUR condition could mean more doctor visits, maybe medicines or even surgery. Her urologist said the goal of treatment is to treat current infections, prevent future urinary tract infections and avoid any possible kidney damage with the hope that Addison would outgrow the condition.

For now, Addison is taking daily, low-dose antibiotics. She gets bladder x-rays on a regular basis to check on her condition. "Every situation is a little different," says Sara, Addison's mother and a nurse. "As long as Addison's kidneys aren't damaged or hurt, and she remains relatively healthy, we'll keep re-evaluating her every six months." Sara says that they have learned to adjust to life with VUR. "Addison has no side effects. No one would ever know she had this condition unless we told them," she said.

Introduction

Many people have heard of acid reflux. It is when stomach acids move up, causing pain or a burning feeling in the chest area. This is not the only type of reflux the body can have. The bladder can also have reflux. Reflux of the bladder is when urine moves up, rather than down. It is called vesicoureteral reflux (VUR) when urine flows backwards from the bladder up towards the kidney. If urine flows the wrong way to reach the kidneys, it can give a free ride for bacteria in the bladder to cause infections. If kidney infections are left untreated, it can cause kidney injury, scarring and long-term kidney damage.

About one in 100 children have a diagnosis of VUR. Family history may be a factor. A parent who had VUR is more likely to have a child with it. About one in three siblings of a child with VUR can have it.

Signs of VUR can be seen before a child is born. But it's more commonly diagnosed when a young child develops a urinary tract infection. VUR is rare in older children and adults. About three out of every four children treated for VUR are girls.

Treatment for VUR depends on your child's symptoms. The good news is that most children will outgrow VUR and have no lasting problems. In mild cases, no treatment is an option. Sometimes mild antibiotics are used to control infections. But, when kids have repeat kidney infections and fevers from VUR, it can be a serious problem. In those cases, surgery may be a good choice.

This guide is here to help parents and caregivers manage their child's VUR diagnosis.

How Does the Urinary Tract Work?

The **urinary tract** is made up of two **kidneys**, two **ureters**, one **bladder** and one **urethra**.

- **The kidneys make urine.** Urine drains down through thin tubes called ureters into the bladder. The kidneys are two fist-sized, bean-shaped organs that sit on both sides of the lower back. The job of the kidneys is to clean our blood and remove waste (urine). They also serve as our body's filter to control electrolytes, fluid balance, pH and blood pressure.
- **The ureters move urine** from the kidneys to the bladder. The ureters and the bladder are joined with a **1-way valve**. The 1-way valve keeps urine flowing one-way (down the ureter and into the bladder).
- **The bladder stores urine.** Urine is prevented from flowing back up into the ureters by the 1-way valves.
- **The urethra is a tube for urine** to exit the body. The urethra is at the bottom of the bladder.

What is Vesicoureteral Reflux?

Normally, urine flows one way, down from the kidneys, through tubes called ureters, to the bladder. But what happens when urine flows from the bladder back into the ureters? This is called **vesicoureteral reflux (VUR)**.

With VUR, urine flows backward from the bladder, up the ureter to the kidney. It may happen in one or both ureters. There is a grading system for reflux that goes from one to five. Grade five is the most severe. When the "1-way valve" does not work and lets urine flow backward, bacteria from the bladder can enter the kidney. This may cause a **kidney infection** that can cause **kidney damage**.

When the reflux is more severe, the ureters and kidneys may become large and winding. More severe reflux is tied to a greater risk of kidney damage if there is an infection present. Some children born with reflux are also born with kidney disease.

VUR often does not have symptoms; it usually does not cause pain or make it hard to pass urine.

What Causes VUR?

The exact percentage of children with VUR is unknown. Estimates are that VUR occurs in about one of every 100 healthy children. It is not contagious. In most children, reflux is the result of a difference in how the bladder and ureters developed. There is a shorter than normal attachment between the ureter and bladder or "1-way valve" that does not work. While some children are born with reflux, some children may develop it because they do not pass urine properly.

In many cases, reflux appears to be passed down (inherited). About one in three sisters and brothers of children with reflux also have this health problem. Also, if a mother has been treated for reflux as many as half of her children may also have reflux.

VUR and Infections

VUR is most often found after a child has a **urinary tract infection (UTI)**. A UTI is a bacterial infection of the urinary tract. It may involve the kidney, the bladder or both. In fact, about one of every three children under the age of two with a UTI is found to have VUR (this number goes down with age, gender, race and diagnosis).

Signs of a kidney infection are:

- fever
- pain in the belly or lower back
- feeling ill in general
- feeling sick to the stomach
- throwing up

Signs of a **bladder infection** are:

- painful and frequent voiding
- an urgent need to pass urine
- wetting (lack of urinary control)

The signs of UTIs in babies may not be as clear, but may involve:

- fever
- fussiness
- throwing up diarrhea
- poor weight gain

Older children can also have UTIs without clear signs but this is not common.

The bacteria that cause UTIs are often from the child's feces or stool. Even with clean habits, bacteria may gather in the groin, then enter the urethra and bladder. If the child has VUR, the bacteria may travel to the kidney(s) and result in a kidney infection.

Though VUR is most often found after a child has been treated for a UTI, it is key to remember that VUR by itself does not cause UTI and UTI does not cause reflux.

GET DIAGNOSED

Sometimes signs of VUR are found on ultrasound or sonogram before birth. Most often, it is found in children after they have a UTI. But it may be seen at any age, even in babies or older children.

Reflux is found with a test called a voiding cystourethrogram (VCUG), which is an X-ray of the bladder. It takes about 15 to 20 minutes, and involves:

- Placing a catheter (a thin plastic tube) in the urethra
- Injecting fluid with an X-ray dye through the tube until the bladder is full
- Asking the child to pass urine
- Taking pictures of the bladder to see if the dye goes backward up to one or both kidneys

There are other techniques to do this test. One is adding a small amount of radioactive tracer in the fluid and using a special camera. Another is using a special dye made of bubbles and using an ultrasound. One risk of any test is an infection linked to using a catheter, so the **urologist** may suggest using antibiotics before and after the test.

Ways to ease worry and discomfort about using the catheter should be talked about with the doctor. Most hospitals that care for children have child life specialists that can help children through difficult or painful procedures. In some medical centers, the study can be done with light **sedation**. Using general anesthesia is not generally recommended because it may lead to incomplete test results as the doctor needs to see whether there is

reflux when the child is voiding.

If reflux is found, further imaging tests may be done to check how well the kidneys are working and to look for kidney damage. In some cases, ultrasound of the kidneys and bladder may be done to check the size and growth of the kidneys.

How is VUR Measured?

The doctor looks at an X-ray of the urinary tract to find out the reflux grade. This shows how much urine is flowing back into the ureters and kidneys, and helps the doctor decide what type of care is best.

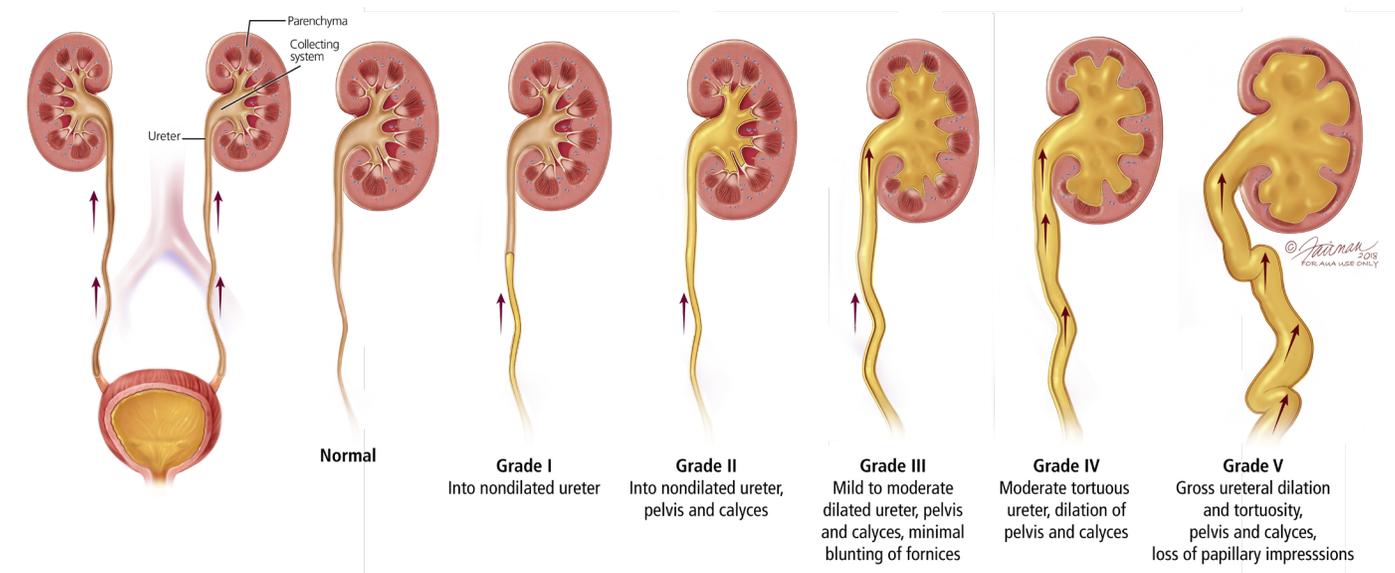
In children with reflux and UTI, kidney damage may occur. Higher grades of reflux are linked to a greater risk of kidney damage.

The most common system of grading reflux, the **International Study Classification System**, includes five grades:

VUR Grading Stages

Grade I: urine reflux into the ureter only

Grade II: urine reflux into the ureter and the renal pelvis (where the ureter meets the kidney), without distention (swelling with fluid or **hydronephrosis**)



Grade III: reflux into the ureter and the renal pelvis, causing mild swelling

Grade IV: results in moderate swelling

Grade V: results in severe swelling and winding of the ureter

What is the Risk for Kidney Damage?

Some children with reflux are born with kidney damage. Some children may develop damage due to kidney infections. Children with reflux undergo a careful urological history and physical exam to find out the level of risk for kidney damage. This helps in the decision about the type of treatment.

The doctor will ask about important information, such as:

- Whether the child is passing urine regularly
- Whether the child has normal bladder control during the day
- Whether the child empties his or her bladder fully
- Whether the child has **constipation**

Some children with reflux develop it because they have "**dysfunctional elimination syndrome**" or "**bowel-bladder dysfunction.**" This happens when the child does not void often or fully. These children have a greater risk of kidney infection with reflux. On the other hand, in children with normal bladder control, normal kidneys and lower grades of reflux the risk of kidney infection seems lower.

GET TREATED

Non-Surgical Treatment

Often reflux will go away with time. The lower the grade of reflux the more likely it is to go away. The average age for this to happen is five to six years. The goal of medical or non-surgical treatment is to prevent UTI and kidney damage while the child grows. Reflux improves in many children because the junction between the bladder and the ureter gets longer with age. In children who have "dysfunctional elimination syndrome" or "bowel-bladder dysfunction" the treatment below is very important.

This treatment involves:

- Encouraging the child to use the restroom regularly
- Ensuring the child has regular stools
- Using low doses of antibiotics to avoid UTIs
- Trying other drugs if the child is having trouble with bladder control

The child is seen in the office from time to time for a physical exam and urine is checked to look for infection and protein that may be a sign of kidney damage. **Ultrasounds** of the bladder and/or kidneys and VCUG are done to check the status of the reflux and growth of the kidneys.

Surgical Treatment

The goal of surgery is to cure reflux and avoid the risks of continued reflux. Surgery is most often done using general anesthesia. In open surgery, the surgeon makes a cut in the lower belly and fixes the 1-way valve attachment of the ureter to the bladder. This may also be done using **robotic surgery** or **laparoscopically**. This prevents reflux from occurring. No artificial material is used and many techniques work well.

In **endoscopic injection surgery**, the surgeon inserts a tool called a **cystoscope** into the urethral opening to see inside the bladder. A substance is then injected into the area where the ureter enters the bladder. This requires the use of general anesthesia. In most cases it can be done on an outpatient basis and requires no cutting. The rate of success compared to regular surgery depends on the particular case.

If surgery is necessary, the urologist will discuss the different options with the family along with risks and benefits of each option.

OTHER CONSIDERATIONS

After surgery, the patient is generally in the hospital for one to two nights. A catheter is often used to drain the bladder during this time.

Several months after the operation, an ultrasound and/or a VCUG is done to make sure that the operation was successful. Once the reflux is corrected, it is not likely to come back.

Prevention

After VUR treatment, your child should feel much better. You may be asked to see your urologist for follow-up exams to make sure all is well.

To keep healthy, it is of great value to prevent or quickly treat future UTIs. Treating infections quickly will lower the risk of kidney scarring. Some urologists may recommend that infant boys become circumcised to prevent infections.

During the *“Watch and Wait”* period, some providers suggest a long-term, low-dose antibiotic to prevent UTIs.

This recommendation is often based on the child’s history of infections and bladder health. The other choice is to take a high-dose antibiotic when an infection is found. Some studies say antibiotics may lead to higher risks of health problems in adulthood. Antibiotics could also lead to a loss of good-bacteria needed for a healthy body. Parents should talk with their children’s doctor to choose the best preventative option for their child.

Frequently Asked Questions

How much water or other fluids should my child usually drink?

Most children drink when they are thirsty. If your child often gets UTIs, then they should drink more water. It is important that children keep their urine diluted and to regularly empty their bladder. A good strategy is to have your child drink one or one-and-a-half cups of water at each meal. Children should also drink between meals.

Do bubble baths cause UTIs?

No, bubble baths do not cause UTIs. Bubble baths can cause skin issues in the female vaginal area. These skin issues can affect urination and increase the risk for a UTI.

If your child likes bubble baths, then just make sure all of the soap is washed off at the end of the bath.

What can I do to prevent my child from getting a UTI?

To avoid UTIs, ensure your child:

- Drinks a lot of water
- Goes to the bathroom often
- Maintains a good diet with a lot of vegetables and food with fiber to lower the risk of constipation (not being able to have a bowel movement)
- Limit the amount of processed sugars eaten

Should my child take antibiotics to prevent future UTIs?

This is a question you should ask your child’s urologist. Some children do very well when they take a small dose of antibiotics every day to prevent infections. This is known as Continuous Antibiotic Prophylaxis or (CAP).

What are my child’s risks vs. benefits of long-term antibiotic use?

The benefits of long-term antibiotic use are:

- Preventing infections
- Avoiding possible kidney damage

The risks of long-term antibiotic use are:

- Allergic reactions to antibiotics
- The bacteria causing the infections may resist antibiotic treatment. This means the drugs will no longer get rid of the infection or have an effect. Your child will not become *immune* to antibiotics. Bacteria can change and become resistant to antibiotics over time.

Questions to Ask Your Doctor

- How did my child develop VUR?
- What treatment do you suggest?
- Is there anything I can do to help my child feel better?
- How will I know if my child is getting better or worse?
- How soon should my child feel better?
- If surgery is best: why and what type?
- What will recovery from surgery be like?
- How long do you recommend annual visits?

Bladder

The hollow balloon-shaped organ in which urine is stored before it moves through the urethra. Urine is prevented from flowing back up into the ureters by the 1-way valves.

Bladder infection

Most bladder infections are caused by strains of e. Coli, bacteria that live in the gut. When the bladder becomes infected, it can be painful to pass urine (along with other symptoms) and treatment is often required.

Bowel-bladder Dysfunction

A condition involving problems with urinating and passing stool. This includes a loss of control with urine or bowel movements.

Constipation

A problem with emptying the bowels of waste.

Cystoscope

A long, thin lighted tube with a lens that is placed through the urethra to see into the bladder for diagnosis and treatment.

Dysfunctional Elimination Syndrome

A condition occurring when children wet themselves often because of an odd pattern of urination, or when parts of the urinary tract do not work together.

Endoscopic Injection Surgery

A surgical option for VUR involving a special gel to be injected into the bladder through a catheter. The gel, placed near the valve at the opening of the ureter, prevents urine from going back into the ureter and helps the valve close.

Hydronephrosis

Swelling with fluid.

1-Way Valve

The valve that joins the ureters and the bladder to help keep urine flowing one way (down the ureter and into the bladder).

Immune

To be resistant to something — when your body is not affected by a drug and/or an infection.

International Study Classification System

A system that measures the severity of VUR, used for diagnosis and treatment. It includes five grades, ranging from grade I (lowest risk for kidney damage) to grade V (highest risk for kidney damage).

Kidneys

Two large, bean-shaped structures that remove waste from the blood. The kidneys also control electrolytes, fluid balance, pH levels and blood pressure.

Kidney Damage

Harmful waste builds up in the body and cause the kidneys to no longer work. This can lead to high blood pressure, fluid buildup (edema), off balance salts and acids in the blood, fewer red blood cells and weak bones. Kidney damage can be very harmful, even deadly.

Kidney Infection

An infection in the kidneys caused by bacteria or a virus. It can cause people to feel very sick, and it requires treatment.

Laparoscopic Surgery

Surgery done with thin, tube-like instruments that allow several small cuts to be made, rather than one large cut.

Robotic Surgery

Surgery done with the surgeon controlling a robot used to perform laparoscopic surgery with additional precision.

Sedation

When medicine is used to relax you.

Ultrasound

A procedure that uses frequency waves to diagnose problems. It can also be used for therapeutic purposes.

Ureters

Two thin tubes that carry urine downward from the kidneys to the bladder.

Urethra

A thin tube that carries urine from the bladder out of the body. In men, it also carries semen.

Urinary Tract

The organs (two kidneys, two ureters, bladder and urethra) that take waste from the blood and carry it out of the body in urine.

Urinary Tract Infection (UTI)

An illness caused by harmful bacteria, viruses or yeast growing in the urinary tract.

Urologist

A doctor who specializes in the study, diagnosis and treatment of urinary tract problems.

Vesicoureteral Reflux (VUR)

A condition where the ureter flap valve does not close properly in the bladder. This causes urine to flow back up to the kidneys. It can cause kidney damage if left untreated.

Watch and Wait

A form of medical treatment where children regularly visit their doctors and are monitored for changes in health. This method is often used to see if the child will grow out of VUR.

About the Urology Care Foundation

The Urology Care Foundation is the world's leading urologic foundation – and the official foundation of the American Urological Association. We provide information for those actively managing their urologic health and those ready to make health changes. Our information is based on the American Urological Association resources and is reviewed by medical experts. To learn more, visit the Urology Care Foundation's website, **UrologyHealth.org/UrologicConditions** or go to **UrologyHealth.org/FindAUrologist** to find a doctor near you.

Disclaimer

This information is not a tool for self-diagnosis or a substitute for professional medical advice. It is not to be used or relied on for that purpose. Please talk to your urologist or healthcare provider about your health concerns. Always consult a health care provider before you start or stop any treatments, including medications. For more information, visit **UrologyHealth.org/Download** or call 800-828-7866.



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American
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Association

National Headquarters: 1000 Corporate Boulevard, Linthicum, MD 21090
Phone: 410-689-3990 • 1-800-828-7866 • info@UrologyCareFoundation.org • UrologyHealth.org

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