

Urinary tract infection, bladder and bowel dysfunction

Dr. Kourosh Afshar
Pediatric Urologist
Associate Professor, Department of Urologic Sciences, University of British Columbia
Vancouver, BC, Canada

Heidi Scott, RN
Nurse Clinician, Division of Urology, BC Children's Hospital
Vancouver, BC, Canada

1) What is a UTI?

The “urinary tract” is made up of the kidneys, ureters, bladder and urethra, and each plays a role in removing wastes from the body (Figure 1). The kidneys filter the blood and produce urine; the ureters carry the urine from the kidneys to the bladder; and the bladder stores the urine until it is eliminated from the body through the urethra. (Figure 1.)

UTI is fairly common in children. Every year, 1-3% of school age girls will have a UTI.

A UTI happens when bacteria from outside of the body travels up the urethra into the bladder and in some cases the kidneys causing inflammation. Normally urine contains no bacteria. When bacteria or other microorganisms enter the urethra, they cause irritation and inflammation. This inflammation can then back track to the bladder and, if left untreated, track even further back to the kidneys. The most common bacteria causing UTI is E.coli found normally in the stool.

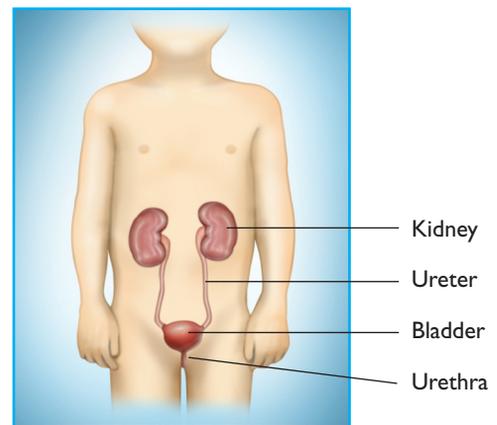


Figure 1.

2) Pyelonephritis versus Cystitis

- A bladder infection is called cystitis.
- A kidney infection is called pyelonephritis.
- A kidney infection is a more serious one.

3) Diagnosis

UTI is usually diagnosed based on symptoms and confirmed with urine tests.

Signs and symptoms:

These vary depending on the child's age and on which part of the urinary tract is infected.

In younger children and infants, the symptoms may be very general. Children may seem irritable, begin to feed poorly, or vomit, also:

- Cry more often
- Have a fever
- Not “acting themselves”
- Foul smelling urine
- Appear weak
- Weight loss

In older kids, symptoms can reveal which part of the urinary tract is infected. In a bladder infection, the child may have:

- Complaints of pain in the abdomen or in the back where the kidneys are
- Pain or crying on passing urine
- Needing to pass small amount of urine frequently
- Needing to wake up often in the night to go to the toilet
- Wetting clothes or the bed
- Smelly, cloudy or even blood-stained urine
- Fatigue

Urine culture and urinalysis:

- Urinalysis is a test that microscopically checks the urine evidence of infection such as pus and germs.
- Urine culture is done to see if bacteria are present in the urine. It typically requires a few days for the results to show. Knowing what bacteria are causing the infection can help your doctor choose the best medication to treat it.
- How a urine sample is taken depends on how old your child is. Older children may urinate in a cup to give the specimen. If the child is not toilet trained, the best way to obtain a clean specimen is by inserting a small plastic tube in the bladder (catheter).
- A plastic bag with adhesive tape may be placed over their genitals to catch the urine. However, urine that comes in contact with the skin may become contaminated, making the culture unreliable.

4) Risk Factors for UTI

There are many conditions that may predispose children to recurrent UTIs. These include gender, anatomical abnormalities, genetics and bladder and bowel dysfunction.

- UTIs are common in girls after the first year of life, partly because they have a shorter urethra compared to boys that allows bacteria from the rectum to reach the bladder.
- Uncircumcised boys have a higher incidence of UTIs.

- An abnormality in the structure of the urinary tract may lead to UTIs. Examples include blockage or vesico-ureteral reflux (VUR) (Figure 2). VUR is backward flow (reflux) of urine from the bladder up the ureters and toward the kidneys. This condition is usually present at birth, and about 30%-50% of children with a UTI are found to have it.
- Family history of UTIs is also important. Certain genetic traits increase the chances of bacterial infection.

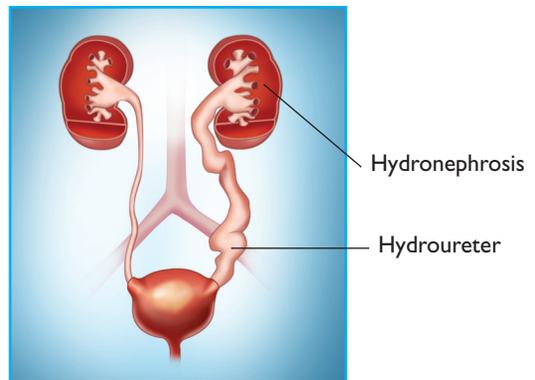


Figure 2.

Bladder and bowel dysfunction:

- One of the important risk factors of developing a UTI is abnormal urination or bowel habits.
- The pattern of abnormal voiding behaviour in children can be quite variable. Some children hold the urine for extensive periods, overstretching their bladders.
- Other children have difficulty relaxing their muscles during urination and urinate against a resistance.
- This may cause changes in the bladder, and could cause a UTI. All of these abnormal urinary patterns may be associated with bowel issues, such as constipation.
- VUR is also more common in children with bladder and bowel dysfunction.

5) Imaging

Children with a confirmed UTI may require further diagnostic testing with a renal and bladder **ultrasound**. This is an imaging technique that uses sound waves to image the urinary tract. The sound waves are considered harmless and do not cause pain. If the ultrasound suggests an abnormality further imaging may be required.

Voiding cystourethrogram (VCUG)

This is a specific X-ray that examines the urinary tract. It shows if there is any reverse flow of urine into the kidneys and how well the bladder empties. It is also used to determine if there is obstruction in the urethra. A catheter (a hollow, soft tube) inserted into the urethra is used to inject an opaque dye into the bladder. Insertion of the catheter may cause some temporary discomfort. Images are taken during bladder filling and urination. Experienced health care professionals will help prepare you and your child for the test.

Nuclear renal scan

Your doctor may suggest this test to further study the urinary tract. There are various types of renal scans. A small plastic tube is placed into a vein (IV) and a small amount of radioactive material is injected. This material then is secreted by the kidneys into the urine. By using special cameras, the shape of the kidneys and how well they function can be assessed. Other information such as damaged kidney tissue, and the flow of the urine can also be obtained. In most cases, the parent can stay with their child during the test.

A small amount of radiation is received in the study that leaves the body in the urine. This amount has not been shown to be harmful.

6) Treatment of infection

UTIs are treated with antibiotics. The type of antibiotic used and how long it must be taken will depend on the type of bacteria that is causing the infection and how severe it is. After several days of antibiotics, your doctor may repeat the urine tests to confirm that the infection is gone.

Kids with a UTI are usually treated at home with oral antibiotics. However, those with a more severe infection, unable to take oral antibiotics or severely dehydrated may need to be treated in a hospital to receive antibiotics intravenously.

7) Treatment of risk factors

Non-surgical option:

- **Bladder retraining:** Bladder retraining is a fitness program for the bladder. It combines exercises to strengthen the bladder muscles, learning to drink and urinate a lot, and eating foods that contain fibre.
- Retraining a child's bladder takes time, understanding and patience. It may take six months to a year to achieve desirable results.
- It is important for the child to drink more water during the day.

Water helps to flush the kidneys and bladder naturally. Drinking a large amount of fluid in the morning helps to ensure an adequate volume of urine in the bladder. If wetting at night is a problem for the child, he or she should stop drinking after dinner.

Some children are just too busy to urinate and need to be reminded to use the washroom. Taking time to urinate allows the bladder to empty completely. Encourage your child to use a bathroom every two to three hours. Teach the child not to hold onto urine for long periods of time, this may stretch the bladder muscles. If the bladder muscles are stretched too much they will not work effectively.

Avoid constipation: Bowel and bladder functions are closely related. When a child is constipated (infrequent and hard stool), it is hard for him or her to empty the bladder completely. The contents of the bowel may push on the bladder causing a need to urinate. Eating foods that contain a higher amount of fibre can help to have a regular bowel routine. Examples of foods that are high in fibre are fruits, vegetables, whole grains and legumes. Drinking lots of water when eating high fibre foods is important as the water will help to push the stool through the intestine.

Surgical options:

Kids diagnosed with VUR are generally followed by a urologist. Most children will grow out of VUR and stay infection free. Few children have recurrent UTIs. Reflux should be surgically treated in this group to prevent kidney damage.

The surgical options are:

- Injection of a bulking substance under the ureter opening into the bladder. This is done under general anesthetic with a surgical camera (cystoscope). This will give the ureter more support and help eliminate VUR. This procedure is very short and safe (Figure 3).
- If the endoscopic method fails or the reflux is very severe, a ureteral reimplantation may be required. In this surgery one or both ureters are reattached to the bladder to decrease backflow of urine from the bladder to the ureters and kidneys. The success of ureteral reimplantation is greater than 90%, but is only used in a small number of patients.

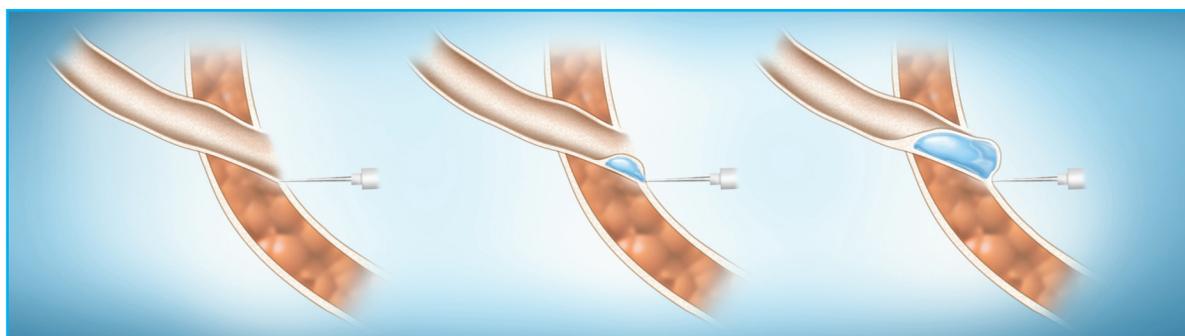


Figure 3.

8) Prevention

- Encourage your child to drink lots of fluids, mostly water.
- Have your child go to the bathroom to urinate six or seven times a day.
- In the bathroom, encourage your child to relax and take their time to empty his or her bladder completely.
- Prevent your child from getting constipated. Drinking fluids is important. Eating high fibre foods can also help. Foods with high fibre are fruits, vegetables and whole grain breads and cereals.
- If your child has a bubble bath or uses strong soap, ensure that the opening of the urethra is rinsed off completely. Once the irritation begins, it can become painful to urinate, causing the child to hold her urine.
- Keep your child's bottom clean and dry. Change diapers whenever they are wet or dirty. Change underpants daily and whenever wet or dirty.
- Clean the penis with water every day. If the boy is not circumcised, pull the foreskin back only if this is not causing pain and clean the under surface with water at least once a day.
- For girls, wipe the bottom from front to back each time she pees or has a bowel movement. Each day in the bath or shower, gently wash around the labia.