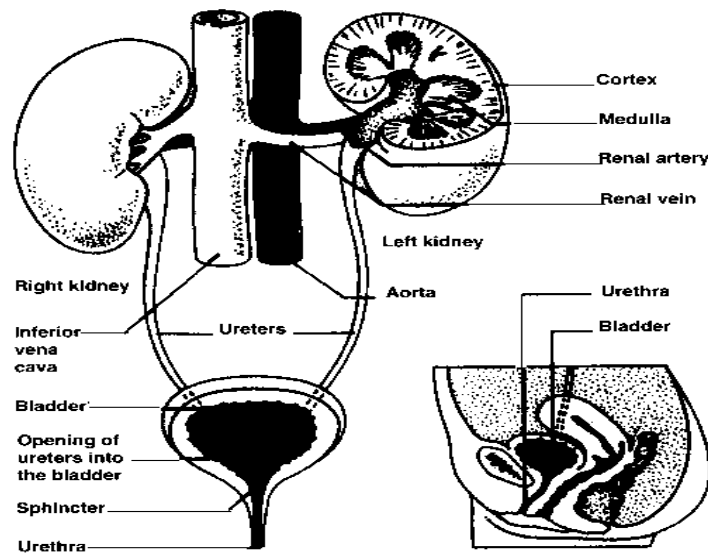


STUDENT HEALTH INFORMATION

URINARY TRACT INFECTIONS

What Is the Urinary Tract?

It helps to know a little about the urinary tract, so that you can understand how the disease is acquired.



The urinary tract consists of the kidneys, ureters, bladder and urethra. Your kidneys, purplish-brown organs that look like large kidney beans, are about 4 ½ inches long, and are located at the back of the abdominal cavity, one on each side of your spinal column. Their function is to remove liquid waste from the blood in the form of urine, and to help regulate water and electrolyte balance in the tissues. Kidneys work hard: in a 24-hour period, they filter more than 45 gallons of blood.

Urine passes from the kidneys through two ureters (narrow tubes about 12 to 14 inches long) into the bladder, a balloon-shaped, stretchable organ consisting of a thin layer of muscle around a smooth inner lining. Your bladder is located behind the pubic bone in the lower abdomen. Its job is to store the urine produced by the kidneys, normally about 1 ½ to 2 quarts a day, though output depends upon how much water and fluid foods you consume. You eliminate urine through your urethra, a narrow canal about two inches long in women, that funnels urine from the bladder to outside the body.

The urinary system has many safeguards. Valve-like structures at the lower ends of the ureters prevent urine from backing up (the medical term is vesicoureteral reflux) where it could damage the kidneys. When infection occurs, urination helps wash bacteria out of the bladder. That's why it's important to drink lots of water when you have a urinary tract infection.

What Is a Urinary Tract Infection?

A urinary tract infection or "UTI" can be a bacterial infection of any part of the urinary tract, but most often refers to a bladder (acute cystitis) or kidney (acute pyelonephritis) infection. Though urine contains fluids, salts and waste products from the blood, it is normally sterile. When bacteria enter the bladder or kidney, multiply in the urine and cause symptoms, you have a urinary tract infection.

What Causes Urinary Tract Infections?

The organism most often responsible for urinary tract infections is *Escherichia coli* (*E. coli*), bacteria normally found in the digestive tract and present on the skin around the rectal area. (Other types of bacteria can also be involved, such as *Staphylococcus saprophyticus*, and occasionally *Proteus mirabilis* or *Enterococcus faecalis*.) These bacteria can migrate across your perineum – the narrow band of flesh between the anus and the vagina- to the urethra. From there it's a short pathway to the bladder, where they may cause acute cystitis, the most common urinary tract infection. Rarely, only the urethra is inflamed, a condition called urethritis. (Men don't get nearly as many urinary tract infections as women, because their longer urethras and secretions from the prostate present a better barrier to this type of infection.) When bacteria from the bladder ascend to the kidneys via the ureters, they can cause a more serious infection called pyelonephritis. Urinary tract infections are not considered to be communicable, although there are a few reports of such infections being passed to another person.

How Did I Get a Urinary Tract Infection?

Cystitis in teenagers and young women often occurs when they first become sexually active. During sex, bacteria from the vaginal area may be pushed into the urethra. From there, bacteria may move upward, where they irritate the bladder lining. Tender tissues in the vaginal area may also become bruised during sex, further contributing to infection.

However, some women develop a UTI before they become sexually active. Furthermore, a UTI is not always clearly limited to sex even in women who are sexually active. In such cases, a UTI is probably a result of bacteria spontaneously ascending from the vagina to the bladder.

Pregnant women are at increased risk of both cystitis and pyelonephritis. If you are pregnant, the growing fetus presses on your bladder, which may cause the bladder not to empty completely. Any time urine is left to stagnate in the bladder, the chance of infection increases. Pregnant women who have bacteria in their urine but no symptoms, are at very high risk of developing symptomatic bladder and kidney infections can lead to premature delivery. Your physician will screen your urine at your first prenatal visit and at intervals thereafter to make sure you don't have such an infection. Your physician can prescribe antibiotics to eradicate asymptomatic infection, taking into account the drug's effectiveness, how far along in pregnancy you are, your state of health and any potential effects on the fetus. Treatment of asymptomatic (symptom-free) bladder infections greatly reduces your risk of later complications.

If you have diabetes, you must be careful to have a urinary tract infection treated right away. It is not clear whether diabetes in itself predisposes to UTIs, but when urinary infections occur in diabetic women, they tend to be more serious, especially those that involve the kidneys.

You can also get complicated UTIs during a hospital stay, when the use of an indwelling catheter, a long, thin tube that is inserted into the bladder to drain off urine, is required. Medical personnel must use strict antiseptic techniques when inserting and maintaining the catheter to reduce your risk of contracting a urinary infection. Catheters should be used only when necessary and for the shortest time possible.

If you use a diaphragm, you should be aware that cystitis has been linked with the use of this contraceptive device. By pressing on the bladder neck, a diaphragm may partially obstruct the flow of urine. You should also take care when using spermicides, especially when used with a diaphragm. Spermicides have been shown to change the bacteria in the vagina and allow *E. coli* to grow better, and thus, predispose to UTIs. Excessive amounts of spermicide may also irritate vaginal and urethral tissues. The use of diaphragm and spermicide greatly increases your chances of getting a urinary tract infection, but there is no need to be concerned unless you have recurrent infections.

Spermicide-coated condoms also increase the risk of a UTI. According to a recent study, researchers found that the use of the spermicide nonoxynol-9 on condoms more often than once a week increased a woman's chances of UTI by more than three times.

What are the Symptoms of Urinary Tract Infections?

The symptoms of urinary tract infections are quite specific and rarely attributable to another cause. Typically, women experience 'burning, frequency and urgency,' that is, burning with urination, frequency of urination and an intense urge to urinate, even if only a few drops of urine are passed. Some women notice that they need to get up at night to urinate and some experience back and lower abdominal pain. The urine may look different (cloudy or thicker than usual), may smell different and may be tinged with blood. If the infection is in the kidneys, fever, nausea, chills, and back pain in common.

Not everyone with a UTI gets all of these symptoms, but most women get some of them. Some UTIs are asymptomatic; that is, they don't produce any symptoms. This type of infection is often discovered by chance when the urine is examined for another reason.

How is it Diagnosed?

To diagnose a UTI, your physician will usually test a sample of your urine for the presence of white blood cells ("pus") and/or blood. To get the most accurate results possible, your physician will tell you how to take a "clean catch" specimen. You will be asked to wash your genital area and collect a "mid-stream" specimen in a sterile container, although some physicians prefer to collect the urine specimen directly from the bladder using a catheter. (this is rarely necessary.) When your physician examines your urine by using a dipstick or under a microscope, the presence of white blood cells suggests that you have an infection. The urinalysis is merely a screening test, however. To get a definitive diagnosis, it will be necessary for your urine specimen to be cultured in a lab to identify whether bacteria are present. However, urine cultures are generally not necessary for your physician to make the diagnosis and to prescribe antibiotic treatment. A urine culture is indicated if your symptoms do not improve, and before a different antibiotic is prescribed.

If you get another bladder infection shortly after treatment, it is almost always a new infection. But sometimes the UTI returns because you did not take the whole prescription and your original infection was not cured. Discontinuing your medication early because you feel better is not a good idea. If you took all your pills and now you have cystitis again, it is important to identify the bacteria causing the infection (by obtaining a culture and to try to identify a reason for the recurrence. Possible explanations are: resistance of the bacteria to the antibiotic used, infected kidney(s), urinary stones, a urethral stricture (narrowing) or some other structural abnormality in your urinary tract.

In women who fail therapy or who have many recurrences of UTI, in addition to a blood test and complete urinalysis, your physician may order kidney x-rays called an intravenous pyelogram (IVP). In this procedure, a radiologist injects an iodine-containing liquid dye into a vein. As the dye concentrates in the kidneys and urine and flows through the ureters and bladder, x-ray pictures are taken. The pictures outline the urinary tract to reveal possible abnormalities, such as obstructions in the urinary tract, tumors or stones.

If an IVP is not advisable because you're pregnant or allergic to the dye, an alternative is an ultrasound examination, a noninvasive and painless test that gives pictures from the echo patterns of sound waves bounced back from internal organs. The kidneys and the urine-filled bladder can be effectively outlined by ultrasonography. In some cases you may need a referral to a urologist to have cystoscopy. In this test, the physician inserts a long, thin device with several lenses and a light source into your urethra. A topical urethral anesthetic is used in most cases. The cystoscope enables the urologist to look into the bladder for tumors, stones, ulcers, signs of irritation or other problems.

However, most recurrent urinary tract infections are new infections and are easily diagnosed and treated. An extensive evaluation as described here is rarely indicated in the healthy individual and is usually negative. On the other hand, in the very young or older individual or in the woman who has many recurrences, such an evaluation may be necessary.

How is it Treated?

Other than drinking lots of water at the first sign of a bladder infection, it's not wise to attempt self-treatment. While waiting to see your physician, you can achieve some relief from your symptoms with over-the-counter preparations containing phenazopyridine (Uristat and Azo-Standard), bladder analgesics. Don't expect medications for vaginal yeast infections to treat your bladder infection. UTIs are bacterial, not yeast infections. Medications for vaginal infections are not antibiotics and will have no effect on a bladder infection.

If you have an uncomplicated UTI, your physician may prescribe a single dose of an antibacterial drug, a three-day course of drugs, or drugs taken for a longer time. The choice of drug and how long you have to take it depends on your history and if, a culture has been done, the bacteria causing your infection.

A single dose or three-day course of drug therapy is effective in treating uncomplicated bacterial cystitis and asymptomatic bacterial infections in sexually active women and girls with normal urinary tracts. A three-day course with agents such as trimethoprim/sulfamethoxazole may be more effective than a single dose of the same drug, but drug treatment lasting longer than three days, though effective, may cause more side effects. The newer agent, fosfomycin tromethamine, is designed for a one-time dose. Patients like short-course (single-dose or three-day)

therapy because it is easy to take. Also, since it's taken for a short time, there are fewer side-effects. (And if you're pregnant, another advantage to short-course therapy is that it presents less danger to the fetus.)

A short-course therapy is not recommended for some patients, including those with diabetes or with kidney infection, or for complicated UTIs.

If you have recurrent cystitis – three or more episodes a year – your physician may prescribe low doses of an antimicrobial drug, such as trimethoprim/sulfamethoxazole or nitrofurantoin, for six months or longer as a preventative measure. When taken at bedtime, the medication stays in the bladder the whole night and is more effective. Sometimes, the medication may be taken on alternate nights or three times a week. If your physician thinks you are responsible, he or she may allow you to self-treat by giving you a prescription to be taken at the first signs of urinary distress. If symptoms are still present when a course of medication is finished, or if the UTI recurs within two weeks, a urine culture should be obtained to identify the causative bacteria and antibiotic sensitivity. If it is determined that cystitis typically follows sexual intercourse, one dose of an antibiotic taken after sex will usually prevent infection.

Drugs used to treat uncomplicated UTIs include trimethoprim/sulfamethoxazole, trimethoprim, nitrofurantoin, amoxicillin, ampicillin, cephalosporins, fosfomycin, tromethamine, and the fluoroquinolones. Many strains of bacteria currently causing cystitis are resistant to sulfonamides, amoxicillin, ampicillin and first-generation cephalosporins, and these agents should be reserved for the treatment of infections caused by susceptible pathogens.

How to Prevent UTIs

The factors that have been clearly shown in scientific studies to increase the risk of UTIs are sexual intercourse, diaphragm-spermicide use, and spermicide-coated condom use. Other than avoiding sex altogether, you can take many common-sense measures, which may reduce your risk of UTI.

- Drink at least eight 8 oz glasses of water a day, in addition to the coffee, tea, soft drinks, etc., that you normally drink. Drinking lots of water dilutes the urine, flushes bacteria out of the bladder and eases urinary symptoms. Cranberry juice does contain a substance that prevents E. coli bacteria from adhering to the bladder lining, so drink it if you like it and if calories don't matter. However, cranberry juice has not been shown to prevent urinary tract infections or found to be effective once you get a urinary infection.
- Be careful how you wipe yourself after urinating or moving your bowels. Wipe from front to back so that bacteria from your anal area are not pushed into the urethra or the vagina.
- Try to urinate soon after sex. Drink plenty of water either before or after sex, so that you'll have a good stream of urine to wash any bacteria from the bladder afterwards.
- Wash your genital area liberally with warm water before sex to minimize the chance that bacteria from the vagina, anus and perineum can be introduced into the urethra during sex.
- If you use a diaphragm and spermicide for birth control, check with your gynecologist to see if your diaphragm is the correct size and is properly fitted. Be sure you know how to insert it properly. Insert with clean hands. The diaphragm is not so much a barrier as a receptacle for spermicidal cream or gel. Do not use more than the recommended amount of spermicidal cream or gel. If you suspect your diaphragm is contributing to your urinary problems, you may need a smaller size, or perhaps another method of birth control.
- Use some sort of water-soluble lubricant, such as a vaginal jelly (not petroleum jelly), if your vagina feels dry and uncomfortable during sex. Bruised tissues may become irritated or even infected.
- Avoid using feminine hygiene products, such as sprays, deodorants and douches, which may irritate the urethra.
- Change sanitary pads and tampons frequently during menstruation.
- Don't use perfumed toilet paper, heavily scented soap or powders in the vaginal area. Some bubble bath products warn that they can cause urinary tract irritation. However, there are no studies that show they increase the risk of UTIs. Some laundry detergents, bleaches and fabric softeners leave residues that can be irritating or cause allergic reactions. Try unscented laundry detergents or soaps if you are sensitive.
- If you have frequent, recurrent UTIs in spite of these precautions, your physician may want to prescribe a medication on a daily basis to *prevent* infection of the urinary tract. See your physician to discuss if you may be a candidate for this approach.

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