

Diseases And Conditions



Question: Urological Disorders

Answer: *Kidney stones (Nephrolithiasis)* Kidney stones are hard, pebble-like pieces of material that form in one or both of your kidneys when high levels of certain minerals are in your urine. Kidney stones rarely cause permanent damage if treated by a health care professional. Kidney stones vary in size and shape. They may be as small as a grain of sand or as large as a pea. Rarely, some kidney stones are as big as golf balls. Kidney stones may be smooth or jagged and are usually yellow or brown. A small kidney stone may pass through your urinary tract on its own, causing little or no pain. A larger kidney stone may get stuck along the way. A kidney stone that gets stuck can block your flow of urine, causing severe pain or bleeding. Learn more about your urinary tract and how it works. If you have symptoms of kidney stones, including severe pain or bleeding, seek care right away. A doctor, such as a urologist, can treat any pain and prevent further problems, such as a urinary tract infection (UTI). **Types of Kidney Stones** You probably have one of four main types of kidney stones. Treatment for kidney stones usually depends on their size, location, and what they are made of.

- **Calcium stones** - Calcium stones, including calcium oxalate stones and calcium phosphate stones, are the most common types of kidney stones. Calcium oxalate stones are more common than calcium phosphate stones. Calcium from food does not increase your chance of having calcium oxalate stones. Normally, extra calcium that isn't used by your bones and

muscles goes to your kidneys and is flushed out with urine. When this doesn't happen, the calcium stays in the kidneys and joins with other waste products to form a kidney stone.

- **Uric acid stones** - A uric acid stone may form when your urine contains too much acid. Eating a lot of fish, shellfish, and meat—especially organ meat—may increase uric acid in urine.
- **Struvite stones** - Struvite stones may form after you have a UTI. They can develop suddenly and become large quickly.
- **Cystine stones** - Cystine stones result from a disorder called cystinuria that is passed down through families. Cystinuria causes the amino acid cystine to leak through your kidneys and into the urine.

How common are kidney stones? Kidney stones are common and are on the rise. About 11 percent of men and 6 percent of women in the United States have kidney stones at least once during their lifetime.¹ **Risks** Men are more likely to develop kidney stones than women. If you have a family history of kidney stones, you are more likely to develop them. You are also more likely to develop kidney stones again if you've had them once. You may also be more likely to develop a kidney stone if you don't drink enough liquids. **People with certain conditions** You are more likely to develop kidney stones if you have certain conditions, including

- a blockage of the urinary tract
- chronic, or long-lasting, inflammation of the bowel
- cystic kidney diseases, which are disorders that cause fluid-filled sacs to form on the kidneys
- cystinuria
- digestive problems or a history of gastrointestinal tract surgery
- gout, a disorder that causes painful swelling of the joints
- hypercalciuria, a condition that runs in families in which urine contains unusually large amounts of calcium; this is the most common condition found in people who form calcium stones
- hyperoxaluria, a condition in which urine contains unusually large amounts of oxalate
- hyperparathyroidism, a condition in which the parathyroid glands release too much parathyroid hormone, causing extra calcium in the blood
- hyperuricosuria, a disorder in which too much uric acid is in the urine
- obesity
- repeated, or recurrent, UTIs
- renal tubular acidosis, a disease that occurs when the kidneys fail to remove acids into the urine, which causes a person's blood to remain too acidic

People who take certain medicines You are more likely to develop kidney stones if you are taking one or more of the following medicines over a long period of time:

- diuretics, often called water pills, which help rid your body of water calcium-based antacids
- indinavir, a protease inhibitor used to treat HIV infection
- topiramate, an anti-seizure medication

Complications Complications of kidney stones are rare if you seek treatment from a health care professional before problems occur. If kidney stones are not treated, they can cause

- hematuria, or blood in the urine
- severe pain
- UTIs, including kidney infections
- loss of kidney function

Symptoms Symptoms of kidney stones include

- sharp pains in your back, side, lower abdomen, or groin
- pink, red, or brown blood in your urine, also called hematuria a constant need to urinate pain while urinating inability to urinate or can only urinate a small amount
- cloudy or bad-smelling urine

See a health care professional right away if you have any of these symptoms. These symptoms may mean you have a kidney stone or a more serious condition. Your pain may last for a short or long time or may come and go in waves. Along with pain, you may have

- nausea
- vomiting

Other symptoms include

- fever
- chills

Causes Kidney stones are caused by high levels of calcium, oxalate, and phosphorus in the urine. These minerals are normally found in urine and do not cause problems at low levels. Certain foods may increase the chances of having a kidney stone in people who are more likely to develop them. **Diagnosis** Health

care professionals use your medical history, a physical exam, and lab and imaging tests to diagnose kidney stones. A health care professional will ask if you have a history of health conditions that make you more likely to develop kidney stones. The health care professional also may ask if you have a family history of kidney stones and about what you typically eat. During a physical exam, the health care professional usually examines your body. The health care professional will ask you about your symptoms. **Lab tests** Urine tests can show whether your urine contains high levels of minerals that form kidney stones. Urine and blood tests can also help a health care professional find out what type of kidney stones you have.

- Urinalysis involves a health care professional testing your urine sample. You will collect a urine sample at a doctor's office or at a lab, and a health care professional will test the sample. Urinalysis can show whether your urine has blood in it and minerals that can form kidney stones. White blood cells and bacteria in the urine mean you may have a urinary tract infection.
- Blood tests. A health care professional may take a blood sample from you and send the sample to a lab to test. The blood test can show if you have high levels of certain minerals in your blood that can lead to kidney stones.

Imaging tests Health care professionals use imaging tests to find kidney stones. The tests may also show problems that caused a kidney stone to form, such as a blockage in the urinary tract or a birth defect. You do not need anesthesia for these imaging tests.

- **Abdominal x-ray.** An abdominal x-ray is a picture of the abdomen that uses low levels of radiation and is recorded on film or on a computer. An x-ray technician takes an abdominal x-ray at a hospital or outpatient center, and a radiologist reads the images. During an abdominal x-ray, you will lie on a table or stand up. The x-ray technician will position the x-ray machine over or in front of your abdomen and ask you to hold your breath, so the picture won't be blurry. The x-ray technician then may ask you to change position for additional pictures. Abdominal x-rays can show the location of kidney stones in the urinary tract. Not all stones are visible on abdominal x-ray.
- **Computed tomography (CT) scans.** CT scans use a combination of x-rays and computer technology to create images of your urinary tract. Although a CT scan without contrast medium is most commonly used to view your urinary tract, a health care professional may give you an injection of contrast medium. Contrast medium is a dye or other substance that makes structures inside your body easier to see during imaging tests. You'll lie on a table that slides into a tunnel-shaped device that takes the x-rays. CT scans can show the size and location of a kidney stone, if the

stone is blocking the urinary tract, and conditions that may have caused the kidney stone to form.

Treatment Health care professionals usually treat kidney stones based on their size, location, and what type they are. Small kidney stones may pass through your urinary tract without treatment. If you're able to pass a kidney stone, a health care professional may ask you to catch the kidney stone in a special container. A health care professional will send the kidney stone to a lab to find out what type it is. A health care professional may advise you to drink plenty of liquids if you are able to help move a kidney stone along. The health care professional also may prescribe pain medicine. Larger kidney stones or kidney stones that block your urinary tract or cause great pain may need urgent treatment. If you are vomiting and dehydrated, you may need to go to the hospital and get fluids through an IV.

Kidney stone removal A urologist can remove the kidney stone or break it into small pieces with the following treatments:

- **Shock wave lithotripsy.** The doctor can use shock wave lithotripsy to blast the kidney stone into small pieces. The smaller pieces of the kidney stone then pass through your urinary tract. A doctor can give you anesthesia during this outpatient procedure.
- **Cystoscopy and ureteroscopy.** During cystoscopy, the doctor uses a cystoscope to look inside the urethra and bladder to find a stone in your urethra or bladder. During ureteroscopy, the doctor uses a ureteroscope, which is longer and thinner than a cystoscope, to see detailed images of the lining of the ureters and kidneys. The doctor inserts the cystoscope or ureteroscope through the urethra to see the rest of the urinary tract. Once the stone is found, the doctor can remove it or break it into smaller pieces. The doctor performs these procedures in the hospital with anesthesia. You can typically go home the same day.
- **Percutaneous nephrolithotomy.** The doctor uses a thin viewing tool, called a nephroscope, to locate and remove the kidney stone. The doctor inserts the tool directly into your kidney through a small cut made in your back. For larger kidney stones, the doctor also may use a laser to break the kidney stones into smaller pieces. The doctor performs percutaneous nephrolithotomy in a hospital with anesthesia. You may have to stay in the hospital for several days after the procedure.

After these procedures, sometimes the urologist may leave a thin flexible tube, called a ureteral stent, in your urinary tract to help urine flow or a stone to pass. Once the kidney stone is removed, your doctor sends the kidney stone or its pieces to a lab to find out what type it is. The health care professional also may ask you to collect your urine for 24 hours after the kidney stone has passed or been removed. The health care professional can then measure how much urine

you produce in a day, along with mineral levels in your urine. You are more likely to form stones if you don't make enough urine each day or have a problem with high mineral levels. **Prevention** To help prevent future kidney stones, you also need to know what caused your previous kidney stones. Once you know what type of kidney stone you had, a health care professional can help you make changes to your eating, diet, and nutrition to prevent future kidney stones.

- **Drinking liquids** - In most cases, drinking enough liquids each day is the best way to help prevent most types of kidney stones. Drinking enough liquids keeps your urine diluted and helps flush away minerals that might form stones. Though water is best, other liquids such as citrus drinks may also help prevent kidney stones. Some studies show that citrus drinks, such as lemonade and orange juice, protect against kidney stones because they contain citrate, which stops crystals from turning into stones. Unless you have kidney failure, you should drink six to eight, 8-ounce glasses a day. If you previously had cystine stones, you may need to drink even more. Talk with a health care professional if you can't drink the recommended amount due to other health problems, such as urinary incontinence, urinary frequency, or kidney failure. The amount of liquid you need to drink depends on the weather and your activity level. If you live, work, or exercise in hot weather, you may need more liquid to replace the fluid you lose through sweat. A health care professional may ask you to collect your urine for 24 hours to determine the amount of urine you produce a day. If the amount of urine is too low, the health care professional may advise you to increase your liquid intake.
- **Medicines** - If you have had a kidney stone, a health care professional also may prescribe medicines to prevent future kidney stones. Depending on the type of kidney stone you had and what type of medicine the health care professional prescribes, you may have to take the medicine for a few weeks, several months, or longer. For example, if you had struvite stones, you may have to take an oral antibiotic for 1 to 6 weeks, or possibly longer. If you had another type of stone, you may have to take a potassium citrate tablet 1 to 3 times daily. You may have to take potassium citrate for months or even longer until a health care professional says you are no longer at risk for kidney stones. Talk with a health care professional about your health history prior to taking kidney stone medicines. Some kidney stone medicines have minor to serious side effects. Side effects are more likely to occur the longer you take the medicine and the higher the dose. Tell the health care professional about any side effects that occur when you take kidney stone medicine.
- **Hyperparathyroidism surgery** - People with hyperparathyroidism, a condition that results in too much calcium in the blood, sometimes develop calcium stones. Treatment for hyperparathyroidism may include surgery to

remove the abnormal parathyroid gland. Removing the parathyroid gland cures hyperparathyroidism and can prevent kidney stones. Surgery sometimes causes complications, including infection.

Source: <https://www.niddk.nih.gov/health-information/urologic-diseases/kidney-stones> Medullary Sponge Kidney (Nephrocalcinosis) Medullary sponge kidney, also known as Cacchi-Ricci disease, is a birth defect where changes occur in the tubules, or tiny tubes, inside a fetus' kidneys. In a normal kidney, urine flows through these tubules as the kidney is being formed during a fetus' growth. In medullary sponge kidney, tiny, fluid-filled sacs called cysts form in the tubules within the medulla—the inner part of the kidney—creating a sponge like appearance. The cysts keep urine from owing freely through the tubules. Symptoms of medullary sponge kidney do not usually appear until the teenage years or the 20s. Medullary sponge kidney can affect one or both kidneys. **Complications** Complications of medullary sponge kidney include:

- hematuria, or blood in the urine
- kidney stones
- urinary tract infections (UTIs)

Medullary sponge kidney rarely leads to more serious problems, such as chronic kidney disease or kidney failure. **Causes** Scientists do not fully understand the cause of medullary sponge kidney or why cysts form in the tubules during fetal development. Even though medullary sponge kidney is present at birth, most cases do not appear to be inherited. Medullary sponge kidney affects about one person per 5,000 people in the United States. Researchers have reported that 12 to 20 percent of people who develop calcium-based kidney stones have medullary sponge kidney.¹ **Risks** Medullary sponge kidney affects all races and geographic regions. Among people who are more likely to develop calcium-based kidney stones, women are more likely than men to have medullary sponge kidney.² **Symptoms** Many people with medullary sponge kidney have no symptoms. The first sign that a person has medullary sponge kidney is usually a UTI or a kidney stone. UTIs and kidney stones share many of the same signs and symptoms:

- burning or painful urination
- pain in the back, lower abdomen, or groin
- cloudy, dark, or bloody urine
- foul-smelling urine
- fever and chills
- vomiting

People who experience these symptoms should see or call a health care provider as soon as possible. **Diagnosis Medical and Family History** - Taking a medical

and family history can help diagnose medullary sponge kidney. A health care provider will suspect medullary sponge kidney when a person has repeated UTIs or kidney stones. **Physical Exam** - No physical signs are usually present in a patient with medullary sponge kidney, except for blood in the urine. Health care providers usually confirm a diagnosis of medullary sponge kidney with imaging studies. **Imaging Studies** - Imaging is the medical term for tests that use different methods to see bones, tissues, and organs inside the body. Health care providers commonly choose one or more of three imaging techniques to diagnose medullary sponge kidney:

- intravenous pyelogram
- computerized tomography (CT) scan
- ultrasound

A radiologist—a doctor who specializes in medical imaging—interprets the images from these studies, and patients do not need anesthesia.

- **Intravenous Pyelogram** - In an intravenous pyelogram, a health care provider injects a special dye, called contrast medium, into a vein in the patient's arm. The contrast medium travels through the body to the kidneys. The kidneys excrete the contrast medium into urine, which makes the urine visible on an x ray. An x-ray technician performs this procedure at a health care provider's office, an outpatient center, or a hospital. An intravenous pyelogram can show any blockage in the urinary tract, and the cysts show up as clusters of light.
- **Computerized Tomography Scans** - Computerized tomography scans use a combination of x rays and computer technology to create images. For a CT scan, a health care provider may give the patient a solution to drink and an injection of contrast medium. CT scans require the patient to lie on a table that slides into a tunnel-shaped device where the x rays are taken. An x-ray technician performs the procedure in an outpatient center or a hospital. CT scans can show expanded or stretched tubules.
- **Ultrasound** - Ultrasound uses a device, called a transducer, that bounces safe, painless sound waves off organs to create an image of their structure. A specially trained technician performs the procedure in a health care provider's office, an outpatient center, or a hospital. Ultrasound can show kidney stones and calcium deposits within the kidney.

Treatment Scientists have not discovered a way to reverse medullary sponge kidney. Once a health care provider is sure a person has medullary sponge kidney, treatment focuses on **Curing an Existing Urinary Tract Infection** - To treat a UTI, the health care provider may prescribe a medication called an antibiotic that kills bacteria. The choice of medication and length of treatment

depend on the person's medical history and the type of bacteria causing the infection. Read more in Urinary Tract Infections in Adults at www.urologic.niddk.nih.gov. **Removing Kidney Stones** - Treatment for kidney stones usually depends on their size and what they are made of, as well as whether they are causing pain or obstructing the urinary tract. Kidney stones may be treated by a general practitioner or by a urologist—a doctor who specializes in the urinary tract. Small stones usually pass through the urinary tract without treatment. Still, the person may need pain medication and should drink lots of liquids to help move the stone along. Pain control may consist of oral or intravenous (IV) medication, depending on the duration and severity of the pain. People may need IV fluids if they become dehydrated from vomiting or an inability to drink. A person with a larger stone, or one that blocks urine flow and causes great pain, may need more urgent treatment, such as:

- **shock wave lithotripsy.** A machine called a lithotripter is used to break up the kidney stone into smaller pieces to pass more easily through the urinary tract. The patient may need local or general anesthesia.
- A ureteroscope—a long, tube like instrument with an eyepiece— is used to and retrieve the stone with a small basket or to break the stone up with laser energy. Local or general anesthesia may be required.
- **percutaneous nephrolithotomy.** In this procedure, a wire-thin viewing instrument, called a nephroscope, is used to locate and remove the stones. During the procedure, which requires general anesthesia, a tube is inserted directly into the kidney through a small incision in the patient's back.

Read more in Kidney Stones in Adults at www.kidney.niddk.nih.gov. **Prevention** Scientists have not yet found a way to prevent medullary sponge kidney. However, health care providers can recommend medications and dietary changes to prevent future UTIs and kidney stones. **Medications to Prevent Future Urinary Tract Infections and Kidney Stones** Health care providers may prescribe certain medications to prevent UTIs and kidney stones:

- A person with medullary sponge kidney may need to continue taking a low- dose antibiotic to prevent recurrent infections.
- Medications that reduce calcium in the urine may help prevent calcium kidney stones. These medications may include
 - potassium citrate
 - thiazide

Eating, Diet, and Nutrition The following changes in diet may help prevent UTIs and kidney stone formation:

- Drinking plenty of water and other liquids can help push bacteria from the urinary tract and dilute urine so kidney stones cannot form. A person should drink enough liquid to produce about 2 to 2.5 quarts of urine every day.³
- Reducing sodium intake, mostly from salt, may help prevent kidney stones. Diets high in sodium can increase the excretion of calcium into the urine and thus increase the chance of calcium- containing kidney stones forming.
- Foods rich in animal proteins such as meat, eggs, and shellfish can increase the chance of uric acid stones and calcium stones forming. People who form stones should limit their meat consumption to 6 to 8 ounces a day.⁴
- People who are more likely to develop calcium oxalate stones should include 1,000 milligrams of calcium in their diet every day. Adults older than 50 years should consume 1,200 milligrams of calcium daily.³ Calcium in the digestive tract binds to oxalate from food and keeps it from entering the blood and the urinary tract, where it can form stones.

People with medullary sponge kidney should talk with their health care provider or a dietitian before making any dietary changes. A dietitian can help a person plan healthy meals. Source:

<https://www.niddk.nih.gov/health-information/kidney-disease/children/medullary-sponge-kidney>