

Kidney Stones Patient Guide



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Kim's Story: A Patient Story



Kim, a 75 year-old retired university professor, has lived with stones for over 25 years.

In 1989, Kim had his first stone surgery, shock wave lithotripsy (SWL). This was an old way to treat stones. It involved shock waves fired at his stones while he sat in a large tub of water. He says today's SWL treatment is easier and more effective.

Many years later, in 2007, Kim was diagnosed with another stone. This one was removed with ureteroscopy surgery (URS). In 2013, his stones returned. This time he needed a percutaneous nephrolithotomy (PCNL) surgery to treat a very large stone. It was almost the size of a baseball!

When Kim first heard about the surgery, he questioned how it would go. It involved making small cuts in his back, and inserting scopes into the center of his kidneys. Later, he said he was amazed at how smoothly the stones were removed.

Unfortunately, small pieces of stones still remain in Kim's left kidney. Kim is now very careful about what he eats and drinks. He wishes he had known all along about how much your diet and fluids affect the way stones form. "I am much better educated today about how to prevent kidney stones," says Kim. "I drink a lot of fluids and eat less salt and foods that form my type of stones. If I had some general education about stones and prevention 25 years ago, I would not have needed the care that I've had."

Kim hopes his story will help the more than 1 million people diagnosed with kidney stones each year.

Introduction

Kidney stone disease is one of the most common problems of the urinary system. The number of people in the U.S. with stones is rising. In 1980, about 3 in every 100 people got a stone at some point in their life. In 1994, that number rose to about 5 in every 100 people. At this time, about 1 in 10 Americans will have a kidney stone during his or her lifetime. Children getting kidney stones has also become more common in recent years.

Race, gender and ethnicity play a part in who may get kidney stones. Whites are more likely to get kidney stones than African-Americans or other races. Men get kidney stones more often than women. Still, the number of women getting kidney stones is rising.

Kidney stones are often very painful and can keep happening in some people. Kidney stone attacks lead to over 2 million visits to the doctor and over 600,000 visits to the ER each year. People tend to get stones in midlife.

Kidney stones can become a costly problem, in terms of time and money. The diagnosis, treatment and prevention of kidney stones, with lost time from work, costs almost \$5.3 billion each year.

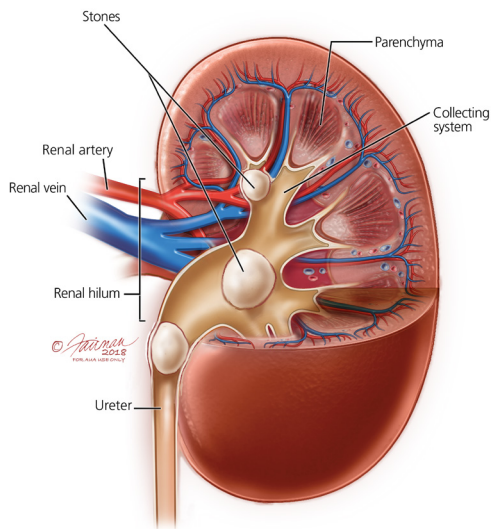
This guide covers how stones are diagnosed and treated. It also explains how to prevent them with diet and medicine. It is of great value to know that imaging tests to diagnose stones and minor surgery to treat stones are better than ever.

What are Kidney Stones?

Urine* has many dissolved minerals and salts. Stones may form when urine has high levels of some of these minerals and salts.

Kidney stones may start small and not cause any issues at first. However, kidney stones can grow larger in size, even filling the inner hollow structures of the **kidney**. Some stones stay in the kidney and will never cause any problems.

Kidney stones can travel down the **ureter** sometimes. (The ureter is the tube between the kidney and the **bladder**.) If the stone reaches your bladder, it can be passed out of the body through your urine. If the stone becomes lodged in the ureter, it blocks urine flow from that kidney. This may be painful.



How do the Kidneys and the Urinary Tract Work?

The kidneys are fist-size organs that handle the body's fluid and chemical levels. Most people have two kidneys, one on each side of the spine behind the liver, stomach, pancreas and intestines. Healthy kidneys clean waste from the blood and remove it in the urine.

When your kidneys are healthy, they properly control the levels of sodium, potassium and calcium in the blood.

The kidneys, ureters and bladder are part of your **urinary tract**. The urinary tract makes, moves, and stores urine in the body. The kidneys make urine from water and your

body's waste. The urine then travels down the ureters into the bladder, where it is stored. Urine leaves your body through your **urethra**.

Kidney stones form in the kidney. If a stone leaves the kidney and gets stuck in the ureter, it is called a ureteral stone.

What are the Symptoms of Kidney Stones?

Common symptoms of kidney stones include a sharp, cramping pain in the back and side. This feeling often moves to the lower abdomen or groin. The pain often starts suddenly and comes in waves. It can come and go as the body tries to get rid of the stone.

Other signs of kidney stones are:

- A feeling of intense need to pass urine.
- Passing urine more often or a burning feeling when you pass urine.
- Urine that is dark or red due to blood. (Sometimes urine has only small amounts of red blood cells that can't be seen with the naked eye.)
- Nausea and vomiting.
- A feeling of pain at the tip of the penis in men.

What are Kidney Stones Made of?

Kidney stones come in many types and colors. The way your kidney stones will be treated depends on the type of stone you have. The path to prevent new stones from forming will also depend on your stone type.

Calcium stones (80% of stones)



Calcium stones are the most common type. There are two types of calcium stones: **calcium oxalate** and **calcium phosphate**. Calcium oxalate is more common. Some people have too much calcium in their urine, raising their risk. Even with normal amounts of calcium in the urine, calcium stones may form for other reasons.

Uric acid stones (5–10% of stones)

Uric acid is a waste product that comes from chemical changes in the body. Uric acid crystals do not dissolve well in acidic urine. Instead it will form a **uric acid stone**.

Acidic urine may come from:

- Being overweight
- Chronic diarrhea
- Type 2 diabetes (high blood sugar)
- Gout
- A diet that is high in animal protein and low in fruits and vegetables

Struvite/infection stones (10% of stones)



Struvite stones are not a common type of stone. These stones are related to chronic **urinary tract infections**. People who get chronic UTIs, or people with poor bladder emptying due to **neurologic disorders** are at the highest risk for developing these stones.

Cystine stones (less than 1% of stones)



Cystine is an amino acid that is in certain foods. It is one of the building blocks of protein. **Cystinuria** (too much cystine in the urine) is a rare, inherited **metabolic disorder**. It is when the kidneys do not reabsorb cystine from the urine. When high amounts of cystine are in the urine, it causes stones to form.

Cystine stones often start to form in childhood.

What Causes Kidney Stones?

Low urine volume

Constantly having a low urine volume is a major risk factor for kidney stones. Low urine volume may come from

dehydration (loss of body fluids) from hard exercise, working or living in a hot place, or not drinking enough fluids.

When your urine volume is low, urine is concentrated and dark in color. Concentrated urine means there is less fluid to keep salts dissolved. Increasing fluid intake will water down the salts in your urine. By doing this, you may cut your risk of forming stones.

Adults who form stones should drink enough fluid to make at least 2.5 liters (2/3 gallon) of urine every day. On average, this means you should drink about 3 liters (100 ounces) of fluid per day. Water is generally the best fluid to drink for stone prevention.

Diet

What you eat matters when it comes to your risk of forming kidney stones. One of the more common causes of calcium kidney stones is high levels of calcium in the urine. High urine calcium levels may be due to the way your body handles calcium, but, remember, it is not always due to how much calcium you eat.

Lowering the amount of calcium in your diet rarely stops stones from forming. Studies have shown that limiting dietary calcium can be bad for bone health and may increase kidney stone risk.

Doctors often do not tell people to limit dietary calcium in order to lower urine calcium. Still, the amount of calcium you consume should not be too high. Instead of lowering dietary calcium intake, your doctor may try to reduce your urine calcium level by reducing your salt intake.

Having too much salt in your diet is a risk factor for calcium stones. This is because too much salt is passing into the urine, keeping calcium from being reabsorbed from the urine and into the blood. Reducing salt in the diet lowers urine calcium. This will make it less likely for you to form stones.

Because **oxalate** is a component of the most common type of kidney stone (calcium oxalate), eating foods rich in oxalate can raise your risk of forming these stones.

A diet high in animal protein, such as beef, fish, chicken and pork, can raise the acid levels in the body and in the urine. High acid levels make it easier for calcium oxalate and uric acid stones to form. The breakdown of meat into uric acid also raises the chance of forming a kidney stone.

Bowel conditions

Certain bowel conditions that cause diarrhea (such as Crohn's Disease or ulcerative colitis) or surgeries on the intestines (such as gastric bypass surgery) can raise the risk of forming calcium oxalate kidney stones.

Diarrhea may result in loss of large amounts of fluid from the body, lowering urine volume. Your body may also absorb excessive oxalate from the intestine, resulting in

more oxalate in your urine. Both low urine volume and high levels of urine oxalate can help to cause calcium oxalate kidney stone formation.

Obesity

Obesity is a risk factor for stones. Obesity may change the acid levels in the urine, leading to stones.

Medical conditions

Some medical conditions can also cause an increased risk of kidney stones. Abnormal growth of one or more of the parathyroid glands, which control calcium metabolism, can cause high calcium levels in the blood and urine. This can lead to kidney stones. Another condition called distal renal tubular acidosis, in which there is acid build-up in the body, can raise the risk of calcium phosphate kidney stones.

Medication

Some medications, as well as calcium and vitamin C may increase your risk of forming stones. Be sure to tell your health care provider all the medications and supplements you take, as these could affect your risk of stone formation. Do not stop taking any of these unless your health care provider tells you to do so.

Family history

The chance of having kidney stones is much higher if you have a family history of stones, such as a parent or sibling.

GET DIAGNOSED

How are Kidney Stones Diagnosed?

“Silent” kidney stones, those that cause no symptoms, are often found with an **X-ray**. Other people have their stones diagnosed when sudden pain occurs while the stone is passing and they may need medical help.

When a person has blood in their urine (**hematuria**) or sudden abdominal or side pain, tests may be ordered. An **ultrasound** or a **CT scan** can clearly diagnose a stone. These imaging tests tell the health care provider how big the stone is and where it is located. A CT scan is often used in the ER. It is used because it can make a quick and exact diagnosis.

A **urinalysis** is also done to learn whether or not you have a kidney **infection**. If your kidney stone(s) is in a difficult location, other imaging tests may be used.

Blood and urine tests

After taking a complete history and doing a physical exam, your health care provider may take blood and urine samples for testing. Blood tests can help find if a medical problem is causing your stones. Your urine can be tested to see if you have a urinary tract infection or crystals that are typical of different stone types. If you are at high risk for getting stones in the future, a 24-hour urine collection can be done. This test will reveal the levels of different stone-forming matter in your urine. The results of this test can help your doctor help you prevent future stones through proper diet and medication.

Imaging tests

When a health care provider sees you for the first time and you have had stones before, he or she may want to see recent X-rays or order a new X-ray. They will do this to see if there are any stones in your urinary tract. Imaging tests may be repeated over time to check for stone growth. You may also need this test if you are having pain, hematuria (blood in your urine) or recurrent infections.

Stone analysis

If you pass a stone or a stone is removed by surgery, your health care provider may want to test it. Testing the stone will determine what type of stone it is. This information helps your health care provider decide the best way to prevent future stones.

GET TREATED

Treatment of kidney stones depends on the following:

- The type of stone you have
- Location of the stone
- How bad it is
- Length of time you have had symptoms

There are different treatment choices. It is of great value to talk to your health care provider about what is best for you.

Many stones pass out of the body without treatment.

Wait for the stone to pass by itself

Often you can simply wait for the stone to pass. Smaller stones are more likely than larger stones to pass on their own. The stones leave by the body passing urine in a normal way.

Waiting up to six weeks for the stone to pass is safe as long as the pain is bearable, there are no signs of infection, the kidney is not fully blocked and the stone is small enough that it is likely to pass. While waiting for the stone to pass, you should drink normal amounts of water. You may need medication when there is a lot of pain.

Medication

Certain medications have been shown to help stones pass. The most common medicine prescribed is tamsulosin. Tamsulosin relaxes the ureter, making it easier for the stone to pass. You may also need pain and anti-nausea medicine as you wait.

Surgery

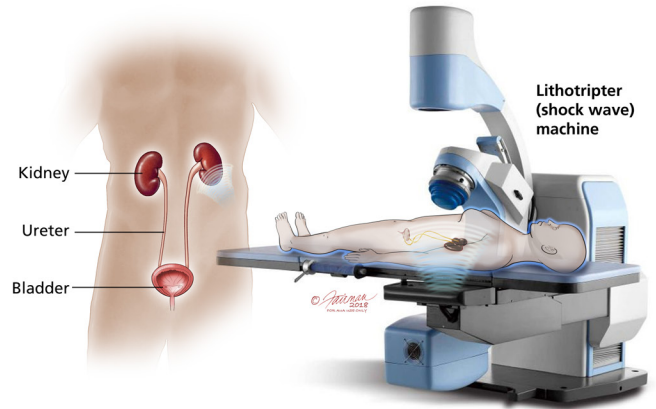
Surgery may be needed to remove a stone from the ureter or kidney if:

- The stone fails to pass.
- The pain is too great to wait for the stone to pass.
- The stone is affecting kidney work.

Small stones in the kidney may be left alone if they are not causing pain or infection. Some people choose to have their small stones removed. They do this because they are afraid the stone will start to pass and cause pain without warning.

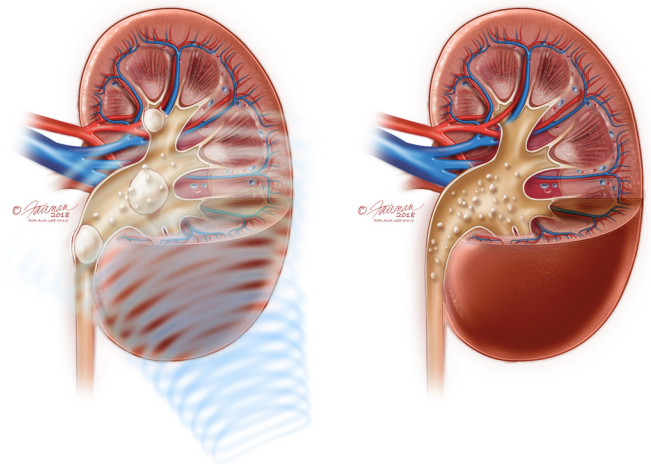
Kidney stones should be removed by surgery if they cause repeated infections in the urine or because they are blocking the flow of urine from the kidney. Today, surgery often

involves small or no **incisions** (cuts), minor pain and minimal time off work.



Focused shock waves

Kidney stones crushed



Surgeries to remove stones in the kidneys or ureters are:

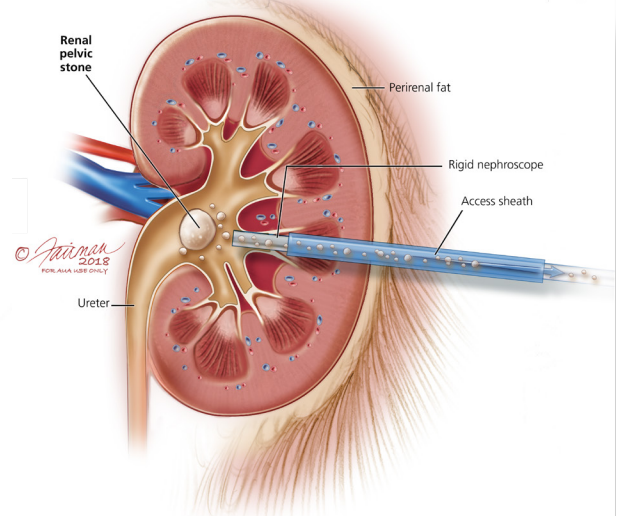
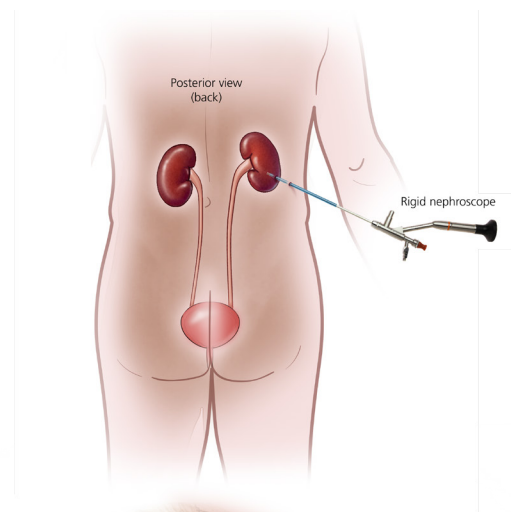
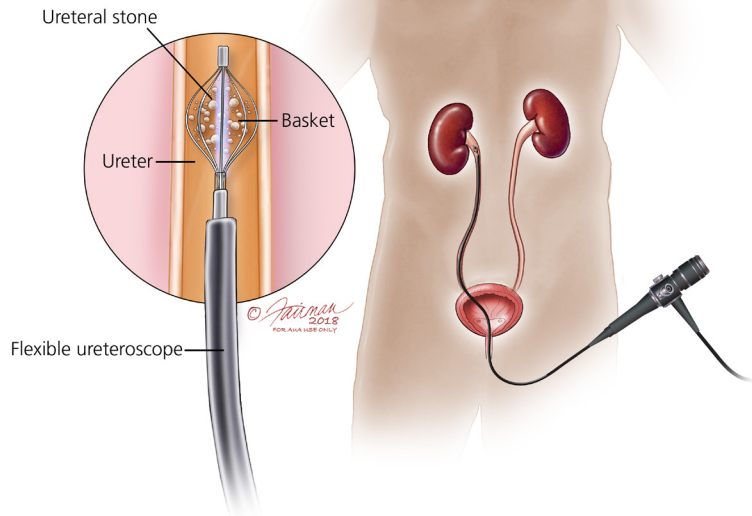
Shock Wave Lithotripsy (SWL)

Shock Wave Lithotripsy (SWL) is used to treat stones in the kidney and ureter. Shock waves are focused on the stone using X-rays or ultrasound to pinpoint the stone. Repeated firing of shock waves on the stone usually causes the stone to break into small pieces. These smaller pieces of stones pass out in the urine over a few weeks.

Because there will likely be pain caused by the shock waves, and the need to control breathing during the procedure, some form of **anesthesia** is often needed. SWL does not work well on all types of stones so be sure to ask your doctor about the best option for your stone.

With SWL, you may go home the same day as the procedure. You may be able to return to normal activities in two to three days. You may also be given a strainer to collect the stone pieces as they pass. These pieces will be sent to a lab to be tested.

Although SWL is widely used and safe, it can still cause side effects. You may have blood in your urine for a few days after treatment. Most stone pieces pass painlessly, but some may cause you more issues.



Ureteroscopy (URS)

Ureteroscopy (URS) is used to treat stones in the kidney and ureter. URS involves passing a very small telescope, called an **ureteroscope**, into the bladder, up the ureter and into the kidney. Rigid telescopes are used for stones in the lower part of the ureter near the bladder. Flexible telescopes are used to treat stones in the upper ureter and kidney.

The ureteroscope lets the **urologist** see the stone without making an incision (cut). General anesthesia keeps you at ease during the URS procedure. Once the urologist sees the stone with the ureteroscope, a small, basket-like device grabs smaller stones and removes them. If a stone is too large to remove in one piece, it can be broken into smaller pieces with a laser or other stone-breaking tools.

Once the stone has been removed in whole or in pieces, your health care provider may place a temporary **stent** in the ureter. A stent is a tiny, rigid plastic tube that helps hold the ureter open so urine can drain from the kidney into the bladder. Unlike a bladder **catheter** or kidney drainage tube, this tube is within the body and does not need a bag to collect urine.

You may go home the same day as the URS and can begin normal activities in 2 to 3 days. If your urologist places a

stent, he or she will remove it 4 to 10 days later. Sometimes a string is left on the end of the stent so you can remove it on your own. It is of great value to follow your doctor's advice about when to remove the stent. Leaving the stent in for long periods can cause an infection and loss of kidney function.

Percutaneous Nephrolithotomy (PCNL)

Percutaneous Nephrolithotomy (PCNL) is the best treatment for large stones in the kidney. General anesthesia is needed to do a PCNL. PCNL involves making a half-inch incision (cut) in the back or side, just large enough to allow a rigid telescope (**nephroscope**) to be passed into the hollow center part of the kidney where the stone is located.

An instrument passed through the nephroscope breaks up the stone and suctions out the pieces. The ability to suction pieces makes PCNL the best treatment choice for large stones.

After the PCNL, a tube may be left in the kidney to drain urine into a bag outside of the body. This will allow for drainage of urine and stop any bleeding. The tube is left in overnight or for a few days. You may have to stay in the hospital overnight after this surgery. Also, a temporary stent

may be left in place to manage recovery.

Your urologist may choose to do X-rays while you are still in the hospital to see if any stone pieces remain. If there are any, your urologist may want to remove them. You can begin normal activities after about one to two weeks.

Other Surgery

Other kidney surgery is rarely used to remove stones. Open, **laparoscopic surgery** or robotic surgery may be used only if all other less invasive procedures fail.

PREVENTION

Why am I Forming Stones?

Part of preventing stones is finding out why you get them. Your health care provider will perform tests to find out what is causing your stones. After finding out why you get stones, your health care provider may give you tips to help stop them from coming back. Some of the tests he or she may do are listed below.

Medical and dietary history

Your health care provider will ask questions about your personal and family medical history. He or she may ask:

- Have you had more than one kidney stone before?
- Has anyone in your family had stones?
- Do you have a medical condition that may increase your chance of having stones, like frequent diarrhea, gout or diabetes?

Knowing your eating habits is also helpful. You may be eating foods that are known to raise the risk of stone. You may also be eating too few foods that protect against stones or not drinking enough fluids.

Understanding your medical, family and dietary history helps your health care provider find out how likely you are to form more stones.

How Can I Prevent Kidney Stones?

Once your health care provider finds out why you are forming stones, he or she will give you tips on how to prevent them. This may include changing your diet and taking certain medications. There is no “one-size-fits-all” diet to prevent kidney stones. Everyone is different. But there are changes to your diet you can make to stop stones from continuing to form.

Diet Tips to Prevent Stones

Drink enough fluids each day.

If you are not making enough urine, your health care provider may suggest you drink at least 3 liters of liquid

each day. This is about 3 quarts or about ten 10-ounce glasses. This is a great way to lower your risk of forming new stones. Try to drink more to replace fluids lost when you sweat from exercise or in hot weather. All fluids count toward your fluid intake. But it's best to drink mostly no-calorie or low-calorie drinks. This may mean limiting sugar-sweetened or alcoholic drinks.

Knowing how much you drink during the day can help you know how much you need to drink to produce 2.5 liters of urine. Use a household measuring cup to measure how much liquid you drink for a day or two. Drink from bottles or cans with the fluid ounces listed on the label. Keep a log and add up the ounces at the end of the day or 24-hour period. Use this total to be sure you are reaching your daily target urine amount of at least 85 ounces (2.5 liters) of urine daily.

Reduce the amount of salt in your diet.

This tip is for people with high sodium intake and high urine calcium or cystine. Sodium can cause both urine calcium and cystine to be too high. Your health care provider may advise you to avoid foods that have a lot of salt. The Centers for Disease Control (CDC) and other health groups advise not eating more than 2,300 mg of salt per day. The following foods are high in salt and should be eaten in moderation:

- Cheese (all types)
- Most frozen foods and meats, including salty cured meats, deli meats (cold cuts), hot dogs, bratwurst and sausages
- Canned soups and vegetables
- Breads, bagels, rolls and baked goods
- Salty snacks, like chips and pretzels
- Bottled salad dressings and certain breakfast cereals
- Pickles and olives
- Casseroles, other “mixed” foods, pizza and lasagna
- Canned and bottled sauces
- Certain condiments, table salt and some spice blends

Eat plenty of fruits and vegetables.

Eating at least 5 servings of fruits and vegetables daily is recommended for all people who form kidney stones. Eating fruits and vegetables give you potassium, fiber, magnesium,

antioxidants, phytate and citrate, all of which may help keep stones from forming.

A serving means one piece of fruit or one cup of raw vegetables. For cooked vegetables, a serving is ½ cup. If you are worried you may not be eating the right amount of fruits and vegetables, talk to your health care provider about what will be best for you.

Eat foods with low oxalate levels.

This may be a good choice for patients with high urine oxalate. Eating calcium-rich foods with meals can often control the oxalate level in your urine. Urinary oxalate is controlled because eating calcium lowers the oxalate level in your body. But if doing that does not control your urine oxalate, you may be asked to eat less of certain high-oxalate foods. Nearly all plant foods have oxalate, but a few foods contain a lot of it. These foods include spinach, rhubarb and almonds. It is usually not necessary to completely stop eating foods that contain oxalate. This depends on why your oxalate levels are high in the first place.

Eat less meat.

If you make cystine or **calcium oxalate stones** and your urine uric acid is high, your health care provider may tell you to eat less animal protein.

If your health care provider thinks your diet is raising your risk for stones, he or she may tell you to eat less meat, fish, seafood, poultry, pork, lamb, mutton and game meat than you eat now. This might mean eating these foods 1 or 2 rather than 2 or 3 times a day, fewer times during the week, or eating smaller portions when you do eat them. The amount to limit depends on how much you eat now and how much your diet is affecting your uric acid levels.

Eat the recommended amount of calcium.

If you take calcium supplements, make sure you aren't getting too much calcium. On the other hand make sure you aren't getting too little calcium either. Talk with your health care provider or dietitian about whether you need supplements. Good sources of calcium to choose from often are those low in salt. Eating calcium-rich foods or beverages with meals every day is a good habit. There are many non-dairy sources of calcium found in food and in calcium-fortified non-dairy milks.

You can often get enough calcium from your diet without supplements if you eat 3 to 4 servings of calcium-rich food. Many foods and beverages have calcium in them.

Some foods and beverages that might be easy to include on a daily basis with meals are:

FOODS RICH IN CALCIUM	AMOUNT	CALCIUM (MG)
Calcium-fortified non-dairy milks, juices	1 cup	400-450
Milk, buttermilk (lower fat is best)	1 cup	300
Kefir	1 cup	300
Yogurt from cow's milk; soy yogurt	3/4 cup	150-300

Medications to Prevent Stones

Changing your diet and increasing fluids may not be enough to prevent stones from forming. Your health care provider may give you medications to take to help with this. The type of stone and urine tests will help your health care provider decide if you need medicine and which medicine is best. Some medications your health care provider may suggest are:

Thiazide diuretics are for patients who have calcium stones and high levels of calcium in their urine. Thiazides lower urine calcium by helping the kidney take calcium out of the urine and put it back in the blood stream. When taking thiazides, you need to limit how much salt you eat, as these medications work best when urine sodium is low.

Potassium citrate is for patients with calcium stones and low urinary citrate, and for those with uric acid and cystine stones. Potassium citrate makes the urine less acidic or more alkaline (basic). This helps prevent cystine and uric acid stones. It also raises the citrate level in the urine, helping to prevent calcium stones.

Allopurinol is frequently prescribed for gout, which is caused by high uric acid in the blood. Allopurinol not only lowers the level of uric acid in the blood but also in the urine, so it may also be prescribed to help prevent calcium and uric acid stones.

Acetohydroxamic acid (AHA) is for patients who produce struvite or infection stones. These stones form because of repeated urinary tract infections (UTI). AHA makes the urine hard for struvite stones to form. The best way to prevent struvite stones is to prevent repeated UTIs caused by specific types of bacteria and to completely remove the stones with

Half of people who get a stone will get another one.

surgery.

Cystine-binding thiol drugs are used only for patients who form cystine stones. These medications (d-penicillamine or tiopronin) bind to cystine in the urine and form a compound that is less likely than cystine to crystallize in the urine. This drug is used when other measures fail, such as raising fluid

intake, reducing salt intake or using potassium citrate.

Vitamin supplements should be used carefully as some can increase your risk of forming kidney stones. Your health care provider and a dietitian may be good sources of information about over-the-counter nutritional supplements.

FREQUENTLY ASKED QUESTIONS

What is a staghorn stone?

These stones get their name from the shape they take as they grow inside the kidney. Staghorn stones often form because of repeated urinary tract infections (UTIs) with certain bacteria. Even though they can grow to a large size, you may have no idea you have them. They cause little or no pain. A staghorn stone can lead to poor kidney function, even without blocking the flow of urine. Most often, staghorn shaped stones are the struvite/infection type of stone.

Will my children get kidney stones?

Kidney stones are most common in people who have a family member with them. Some conditions that cause stones are inherited. But sometimes, kidney stones form simply because of the way we eat as a family. Similar habits and lifestyles can cause kidney stones among family members.

Can kidney stones damage my kidneys?

Yes, but rarely. Kidney stones can cause damage if they cause repeated or serious infections. Or, they can damage kidneys if there is a blockage for a long time. Some stones, if left untreated, can cause the kidney to stop working.

How do I manage my kidney stone along with my other health problems, such as diabetes and/or a heart disorder?

Diet changes for heart conditions also often help prevent stones. A healthy diet with lots of fresh fruits and vegetables

and less animal protein and salt can help avoid stones as well as other conditions. You can learn more from your health care provider or dietician. Keeping a normal weight can also help avoid diabetes and stones.

My stone has not passed. Do I need surgery?

If a stone in the ureter does not pass in a reasonable time or is causing pain or infection, you may need surgery to remove it.

What happens if I keep forming stones?

You may get another stone even if you've had surgery, changed your diet or are taking medications. With the right diet and medical treatment, you may be less likely to get stones over and over again.

Why should I follow up with my health care provider?

During treatment, your health care provider may ask you to do another 24-hour urine collection or have your blood checked to see if your urine test results have improved. Your health care provider may also check to see if you are having any side effects from your medications.

If you form stones often, you may need monitoring with X-rays and urine studies to be sure no new stones are forming. Your health care provider may track you to make sure your medications and diet changes are working.

GLOSSARY

Anesthesia

Induced loss of sensitivity to pain in all or part of the body for medical reasons.

Bladder

The hollow, balloon-shaped organ in which urine is stored before it moves through the urethra.

Calcium Oxalate Stone

Most common kidney stone, made up of hard crystals, often mixed with calcium phosphate.

Catheter

A thin tube that is inserted through the urethra into the bladder to allow urine to drain or for performance of a procedure or test, such as insertion of a substance during a bladder X-ray.

CT scan

A diagnostic imaging procedure. It uses both X-rays and computer technology to produce detailed images of the body. Also called computerized axial tomography.

Cystine Stone

A rare form of kidney stone made up of the amino acid cystine.

Cystinuria

A rare disorder where stones form because too much cystine is in the urine.

Dehydration

A dangerous lack of water in the body.

Hematuria

A condition in which there are red blood cells in the urine.

Incision

A cut.

Infection

A condition resulting from bacteria or other germs.

Kidneys

Two large, bean-shaped structures that remove waste from the blood.

Laparoscopic Surgery

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

Metabolic disorder

An inherited problem in how the body breaks down and uses certain foods.

Nephroscope

A rigid telescope used during Percutaneous Nephrolithotomy (PCNL) to remove a stone in the kidney.

Neurologic (neurological) Disorders

Medical problems having to do with the nervous system (brain, spinal cord and nerves).

Oxalate

A component of the most common type of kidney stone (calcium oxalate). Foods high in oxalate include almonds, spinach, beets and rhubarb.

Percutaneous Nephrolithotomy (PCNL)

A surgical procedure used to treat large kidney stones.

Shock Wave Lithotripsy (SWL)

A procedure that uses shock waves to break kidney stones into tiny pieces.

Stent

A tube inserted through the urethra and bladder and into the ureter. It is used to prevent stone fragments from blocking the flow of urine.

Struvite Stones

Kidney stones associated with bacterial urinary infections.

Ultrasound

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

Ureteroscope

A very small telescope that is passed into the bladder, up the ureter and into the kidney.

Ureteroscopy (URS)

A procedure that uses a very small telescope to find and remove a stone in the kidney or ureter.

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, and it exits through the end of the penis).

Uric Acid Stone

Kidney stones that develop when urine contains too much uric acid.

Urinalysis

A test of a urine sample that can reveal many problems of the urinary tract and some other body systems.

Urinary Tract

The organs that take waste from the blood and carry it out of the body as urine.

Urinary Tract Infection (UTI)

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

Urine

A liquid, usually yellow in color, made by the kidneys and containing waste and water. Also known as pee.

Urologist

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

UTI

See Urinary tract infection.

X-ray

A test that uses radiation to make pictures of the tissues, bones and organs inside your body.

About the Urology Care Foundation

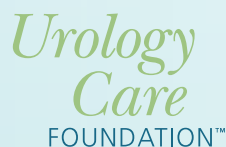
The Urology Care Foundation is the world's leading urologic Foundation—and the official Foundation of the American Urological Association. We provide information for those actively managing their urologic health and those ready to make healthy changes in their lives. Our information is based on the American Urological Association resources and is reviewed by medical experts.

To learn more about different urologic issues, visit UrologyHealth.org/UrologicConditions. Go to UrologyHealth.org/FindAUrologist to find a doctor near you.

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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 health care provider about your health concerns. Always consult a health care provider before you start or stop any treatments, including medications.



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