

# Diagnosing and Treating Kidney Stones

## Urology Care FOUNDATION™

*The Official Foundation of the  
American Urological Association*

ADULT  
PEDIATRIC UROLOGY &  
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## WHAT ARE KIDNEY STONES?

Urine contains many dissolved minerals and salts. When the urine has high levels of minerals and salts, it can help to form stones.

## WHAT ARE THE DIFFERENT TYPES OF KIDNEY STONES?

Kidney stones come in many different types and colors. There are four main types of stones:

### Calcium stones

Calcium stones are the most common type of kidney stone. There are two types of calcium stones: calcium oxalate and calcium phosphate. Calcium oxalate is by far the most common type of calcium stone. Some people have too much calcium in their urine, raising their risk of calcium stones.

### Uric acid 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 and instead will form a stone. Having acidic urine may come from being overweight, chronic diarrhea, type 2 diabetes, gout and a diet that is high in animal protein and low in fruits and vegetables. This is not a common type of stone.

### Struvite/infection stones

These stones are related to chronic urinary tract infections (UTIs). People who get chronic UTIs, such as those with long-term tubes in their kidneys or bladders, or with poor bladder emptying from neurologic disorders (paralysis, multiple sclerosis and spina bifida), are at highest risk for these stones. Struvite stones are not common.

### Cystine 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. These are a rare type of stone.

## WHAT ARE THE SYMPTOMS OF KIDNEY STONES?

Stones in the kidney often do not cause any symptoms and can go undiagnosed. When a stone leaves the kidney, it travels to the bladder through the ureter. Often the stone can become lodged in the ureter. When the stone blocks the flow of urine out of the kidney, it can cause the kidney to swell (hydronephrosis), often causing a lot of pain.

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Common symptoms of kidney stones are:

- A sharp, cramping pain in the back and side, often moving to the lower abdomen or groin. Some women say the pain is worse than childbirth labor pains. The pain often starts suddenly and comes in waves. It can come and go as the body tries to get rid of the stone.
- A feeling of intense need to urinate.
- Urinating more often or a burning feeling during urination.
- Urine that is dark or red due to blood. Sometimes the urine has only small amounts of red blood cells that can't be seen with the naked eye.
- Nausea and vomiting.
- For men, you may feel pain at the tip of the penis.

## HOW ARE KIDNEY STONES DIAGNOSED?

“Silent” kidney stones, those that cause no symptoms, are often found when an X-ray is taken during a health exam. Other people have their stones diagnosed when sudden pain occurs while the stone is passing, and medical attention is sought.

## HOW ARE KIDNEY STONES TREATED?

Treatment of your kidney stone depends on the type of stone you have, how bad it is and the length of time you have had symptoms. There are different treatments to choose from. It is important to talk with your health care provider about what is best for you.

### 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. You may need pain medication when there is discomfort.

**Most stones pass out of the body without treatment.**

## Medication

Certain medications have been shown to improve the chance that a stone will pass. The most common medication prescribed for this reason is tamsulosin. Tamsulosin (Flomax) relaxes the ureter, making it easier for the stone to pass.

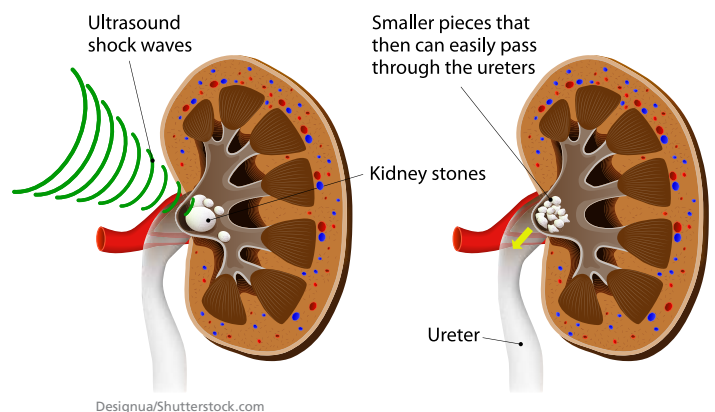
## Surgery

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 function.

## WHAT ARE THE DIFFERENT TYPES OF SURGERIES I COULD HAVE TO REMOVE MY STONE?

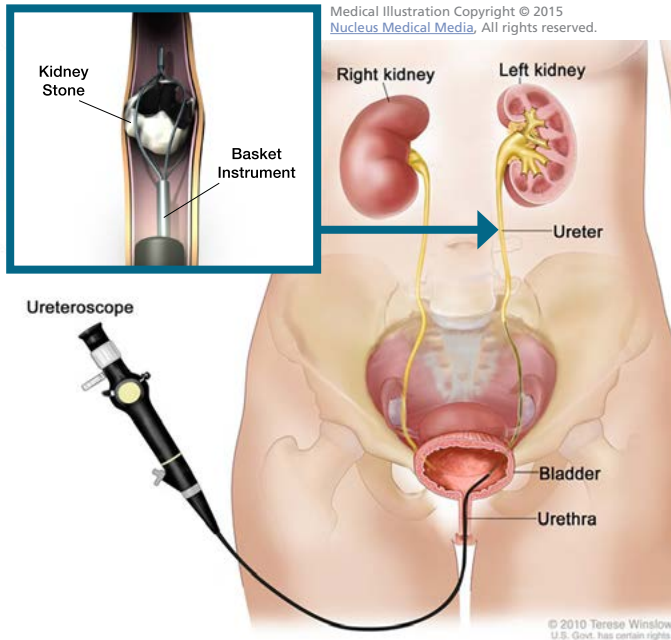
### Shock wave lithotripsy (SWL)



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.

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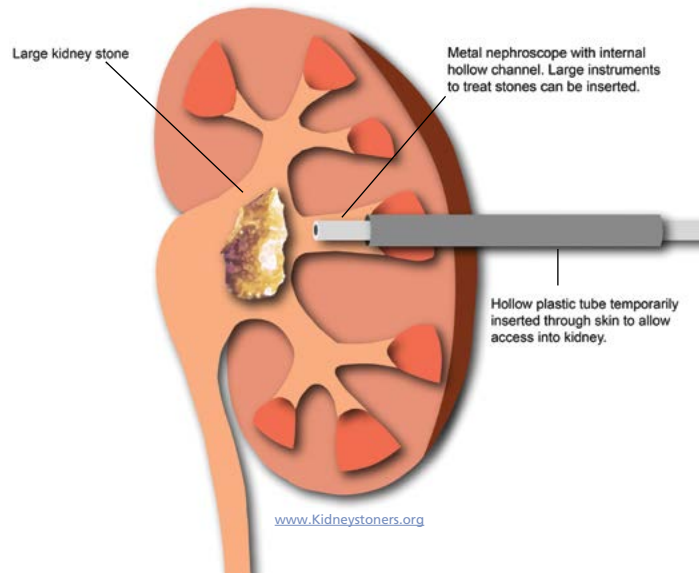
## Ureteroscopy (URS)



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.

**Kidney stones rarely damage your kidneys. But, if the stone causes an infection or is left untreated, it can cause the kidney to stop working.**

## 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.

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.

## Other surgery

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

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## RESOURCES

### *Academy of Nutrition and Dietetics: "Nutrition Care Manual"*

Review evidence-based diet manuals from registered dietitians, dietetic technicians and allied health professionals.

<http://www.nutritioncaremanual.org/>

### *National Library of Medicine*

In English:

<http://www.nlm.nih.gov/medlineplus/kidneystones.html>

In Spanish:

<http://www.nlm.nih.gov/medlineplus/spanish/kidneystones.html>

### *National Kidney and Urologic Disorders Information Clearinghouse (NKUDIC)*

Kidney Stones in Adults:

<http://kidney.niddk.nih.gov/kudisorders/pubs/stonesadults/>

### *Urology Care Foundation*

**UrologyHealth.org**

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