

KIDNEY STONES
A Basic Guide For Patients

0861 LANCET(526 238)



What is a kidney stone?

A kidney stone is a solid mass made up of crystals that is formed in the kidney or ureter (the tube that connects the kidney to the bladder). Kidney stones are formed when certain minerals or other substances that are normally found in the urine stick together and form crystals. The crystals gradually increase in size to form kidney stones.

Kidney stones affect approximately 1 in 11 people, and men more than women.

What are the risk factors for developing kidney stones?

- Not drinking enough fluid
- A diet with low levels of calcium
- A diet with high levels of animal protein, sodium (salt) & sugars
- Certain medical conditions, for example diabetes mellitus, obesity, high blood pressure and gout
- Certain medications
- If you have had kidney stones before
- A family history of kidney stones
- Previous weight loss or intestinal bypass surgery
- Frequent kidney infections



What are the most common types of kidney stones?

There are four main types of kidney stones:

- *Calcium oxalate* stones are the most common type of kidney stones. Several metabolic, urinary and dietary factors can lead to increase levels of calcium and oxalate in the urine. Some people may also be genetically more susceptible to develop calcium stones.
- *Uric acid* stones form in people who do not drink enough fluids or lose too much fluid, have gout or eat a high-protein diet. Certain genetic factors may also increase the risk of uric acid stones.
- *Struvite* stones are the result of a kidney infection with certain microorganisms, and are more common in women than men. These stones can grow quickly and become very large. They can damage the kidney if they are not treated properly.
- *Cystine* stones are rare and are associated with an inherited kidney disease called cystinuria.



CALCIUM OXALATE



URIC ACID



STRUVITE



CYSTINE

What are the symptoms of kidney stones?

Kidney stones usually cause symptoms when they start to move down the urinary tract. They may even become stuck and block the flow of urine from the kidney to the bladder.

Symptoms include:

- Persistent pain is the most common symptom people have, and can range from very mild to extreme discomfort that requires treatment in the hospital. The pain can be felt in the back or side, and can move down into the groin as the stone travels down the ureter to the bladder.
- Blood in the urine
- Pain with urination
- An urgent need to urinate
- You may see "gravel" or "sand" (which are small stones) in your urine
- Nausea and vomiting
- Fever and chills



Some people do not have any symptoms at all when the stones remain in the kidney and do not obstruct the flow of urine. These stones can remain in the kidneys for several years without causing any problems, and will only be found accidentally when imaging studies are done for other reasons.

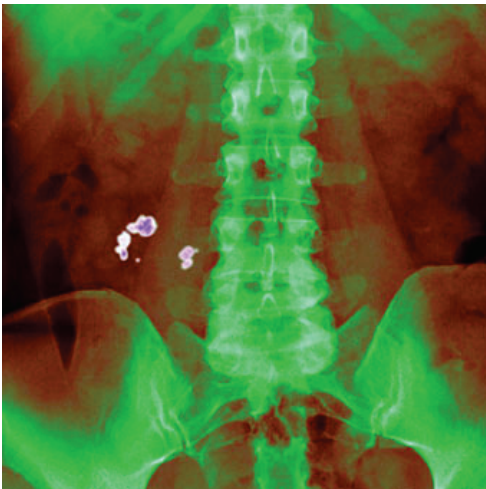
How are kidney stones diagnosed?

Kidney stones are usually diagnosed based on your symptoms, a physical examination, and imaging studies such as a CT scan or ultrasound. Kidney stones that are very small may be missed with an ultrasound, but it is preferred in people who should avoid the radiation associated with a CT scan.

How are kidney stones treated?

How a kidney stone will be treated depends on a number of factors, including the size and location of the stone, how severe your pain is, and if you are able to keep fluids down. If the stone is small enough (less than 5 mm) and likely to pass, your pain is tolerable, and you are able to eat and drink, then you can be treated at home. Most small kidney stones will be passed within 48 hours with adequate fluid (i.e. water) intake and pain relief. Your doctor may give you medication that relaxes the muscles in the ureter. This will help you to pass the stone more quickly and with less pain. They may also ask you to urinate through a strainer to catch the stones that you pass.

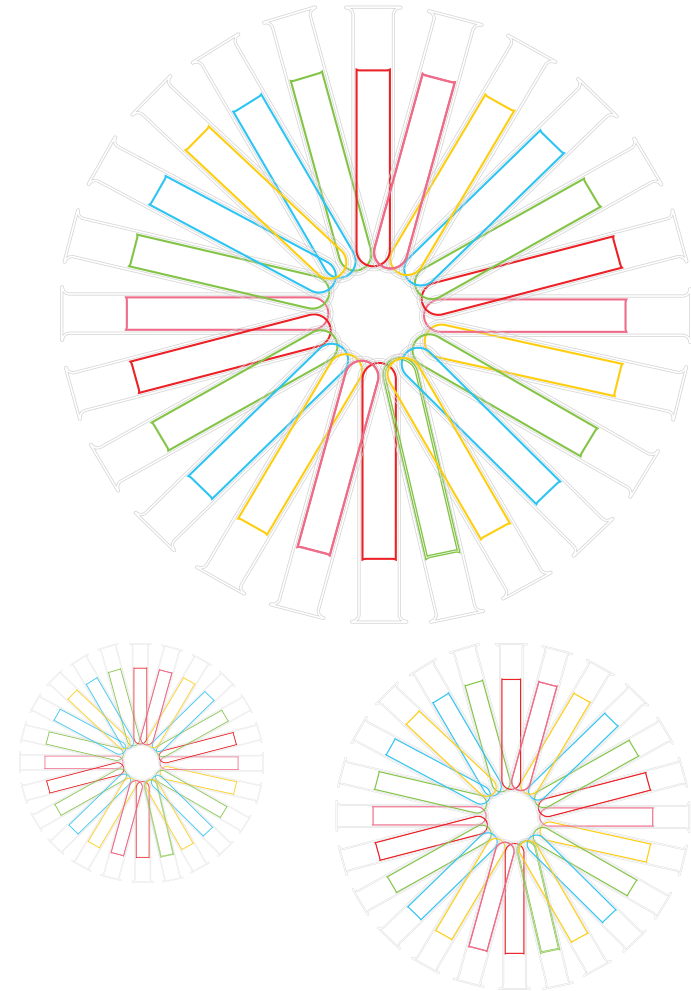
If you have severe pain, nausea and vomiting you may need to be admitted to hospital for treatment with a drip. If the stone is too large to pass on its own a procedure to remove or break up the stone is required.



How can further kidney stones be prevented?

If a kidney stone has been passed it is useful to have it analysed by the laboratory to determine what type of stone it is. Your doctor may also want to do other blood or urine tests to determine if you have any specific health problems or dietary issues that increase your risk of kidney stones. Specific prevention measures can then be considered, including changes in your diet, or sometimes certain medications can be prescribed.

One of the most important things you can do to decrease the risk of another kidney stone is to drink more fluids. This will increase the amount of urine that flows through your kidneys, thereby lowering the concentration of the minerals and other substances that promote stone formation. Your urine should appear clear to very light yellow if you are drinking enough water.



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