THE UROLOGY FOUNDATION

What are kidney stones?

Kidney stones are hard deposits of minerals and salts that form inside your kidneys that form when certain mineral levels become too concentrated in your urine. After a stone forms, it either stays in the kidney or travels down the urinary tract into the ureter. If the stone is relatively small, it typically moves out of the body via the urine without causing any symptoms. However, large unmoving stones may cause a back-up of urine in the urinary system. This is what causes the painful symptoms of kidney stones. Generally, the larger the stone, the more noticeable the symptoms.

Symptoms of kidney stones

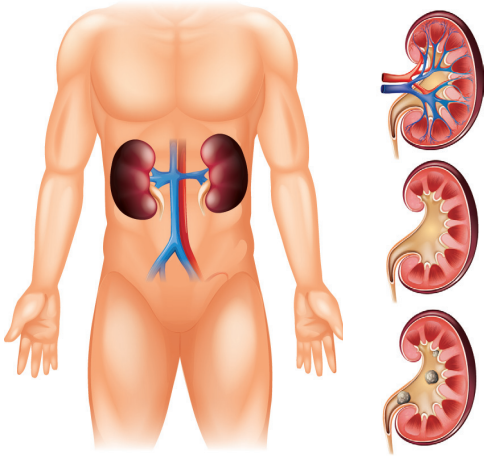
Ordinarily, kidney stones do not cause symptoms until they start to move around within the kidney or pass into one of the ureters (the tubes that carry urine from the kidneys to the bladder). If a kidney stone gets stuck in the ureters, it may cause a back-up of urine in the urinary system. This will cause the kidney to spam and the ureter to spasm, which is what makes kidney stones so painful. If this happens, you may experience the symptoms:

- Pain that comes and goes in waves and fluctuates in intensity (renal colic)
- Painful or burning sensation when urinating (dysuria)
- Severe pain below the ribs
- Pain around the lower abdomen and groin

Symptoms aside from this may vary:

- Pink, red or brown urine (hematuria)
- Cloudy or smelly urine

Where your kidneys are in your body



Size comparison of different kidney stones

- Feeling a constant need to urinate, urinating more frequently than usual or urinating in small amounts
- Nausea and vomiting
- Fever and chills (if you have an infection)

Pain caused by a kidney stone may fluctuate. For example, pain may change location or increase/ decrease in intensity as the kidney stone passes through your urinary tract.

Causes of kidney stones

Possible causes include dehydration, too much or too little exercise, stomach or intestine surgery (e.g. gastric bypass surgery), consuming food high in sodium or sugars, a diet high in protein and certain supplements and medications (such as Vitamin C, excessive laxative use, calcium-based antacids, certain medications for migraines, depression or seizures etc.). A family history of kidney stones may also be important in some individuals.

Certain health conditions can also put you at a higher risk for kidney stones. Some of these include cystic fibrosis, diabetes, high blood pressure, obesity, osteoporosis, inflammatory bowel disease (IBD) and kidney cysts.

Types of kidney stones

Knowing the type of your kidney stone can help understand why you have it and how to reduce the risk of further stones. If possible, try to give your kidney stone to your doctor (if you pass one) so that they can run tests on it.

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There are four types of kidney stones: calcium, uric acid, struvite, and cystine stones.

Calcium stones are the most common type of kidney stone caused by an excess of the essential mineral calcium. They can either occur in the form of calcium oxalate or calcium phosphate. If your calcium stone is made of calcium oxalate, your kidney stone is likely to be the result of your diet, high Vitamin D levels, intestinal bypass surgery or a metabolic disorder. If your calcium stone is made of calcium phosphate, your kidney stone is likely to be the result of a metabolic condition (like renal tubular acidosis) and may be linked to medications used to treat migraines or seizures (e.g. topiramate).

Struvite stones are the result of a UTI (urinary tract infection). They can grow exponentially and become relatively large, occasionally with few symptoms and little warning. Repeated infections can lead to a staghorn calculus, a very large kidney stone that can only be removed by surgery.

Uric acid stones can form in those who consume large amounts of protein (beef, poultry, pork, eggs and fish). Uric acid stones are also linked to certain genetic factors.

Cystine stones are the rarest type of kidney stone and are the result of the hereditary disorder cystinuria which is passed down in families.

How common are kidney stones?

Kidney stones are relatively common and are the most common health condition associated with the urinary system. It is estimated that one in ten people will experience a kidney stone at some point in their lives. Kidney stones are more likely to develop in men than women, specifically non-Hispanic white people.

I think I have a kidney stone? What should I do?

See a medical professional as soon as possible. The earlier you get treatment, the less likely you'll experience complications from kidney stones. Your doctor may ask you to drink extra fluid in an attempt to flush out the stone via the urine. You may be given pain medication in order to do so. In this instance, try to save your kidney stone for your doctor so that they can run tests on it. However, if your stone doesn't pass naturally, it may need to be removed by surgery or by sound waves.

My kidney stone has not passed. What should I do?

On average, kidney stones pass naturally within 31 days but may take up to 45 days. However, if your kidney stone hasn't passed within this timeframe, it's important to seek medical attention (which may lead to surgery/soundwaves to break up/remove the stone) as this could increase the risk of kidney damage or other complications. To help with this, a doctor may advise you to drink lots of fluids.

Can kidney stones damage my kidneys?

Serious complications from kidney stones are rare when addressed early but can be severe if left untreated. If left untreated, stones can cause the kidney to stop working. However, kidney stones in general do increase one's risk of developing chronic kidney disease as well as increasing one's risk of developing another kidney stone by 50% within the next 5 to 7 years. Kidney stones may also lead to frequent UTIs in the future.

How are kidney stones diagnosed?

Doctors use both imaging, blood and urine tests to diagnose kidney stones. Urine tests can be tested for blood, stone-forming crystals and signs of infection while imaging (e.g. X-rays, ultrasound etc.) can help your doctor get a rough idea of the stone's size, shape, location. Finally, blood tests can be used to check your kidney function, detect infections and identify high calcium levels (and other risk factors) that may lead to stone formation.

Why is it important that I follow up with my health-care provider regarding my kidney stone?

After you pass your kidney stone naturally or otherwise, you may be asked to do another 24-hour urine collection with your blood tested again to see if your urine test results are back to normal. You will also be asked if you are experiencing any side effects from your medication.

Your doctor may also recommend preventive treatment to reduce your risk of recurrent kidney stones if you're at increased risk of developing them again.

Can children get kidney stones?

Children of all ages can develop kidney stones, including infants but kidney stones are much more common in children. Children are treated for kidney stones in the same way adults are.

Serena Woodward
Fundraiser for The Urology Foundation

Urinary system of female & male: https://www.mayoclinic.org/diseases-conditions/kidney-stones/symptoms-causes/sy

THE UROLOGY FOUNDATION

The Urology Foundation is the UK's only charity representing all urological diseases and conditions including prostate, bladder and kidney cancers and non-malignant conditions including incontinence, urinary tract infections (UTIs), erectile dysfunction and kidney stones. We are committed to improving outcomes, quality of life and saving lives through investment in ground-breaking research, training and education programmes, campaigns and awareness. Working with the UK's leading urologists, scientists, nurses and allied health professionals, influencers and decision makers, patients and their families and those with an interest in urology, we are improving the nation's urology care.

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