Kidney Stones

Each year, more than half a million people go to emergency rooms for kidney stone problems. It is estimated that one in ten people will have a kidney stone at some time in their lives.

The prevalence of kidney stones in the United States increased from 3.8% in the late 1970s to 8.8% in the late 2000s. The prevalence of kidney stones was 10% during 2013–2014. The risk of kidney stones is about 11% in men and 9% in women. Other diseases such as high blood pressure, diabetes, and obesity may increase the risk for kidney stones.

What is a kidney stone?

A kidney stone is a hard object that is made from chemicals in the urine. There are four types of kidney stones: calcium oxalate, uric acid, struvite, and cystine. A kidney stone may be treated with shockwave lithotripsy, uteroscopy, percutaneous nephrolithomy or nephrolithotripsy. Common symptoms include severe pain in lower back, blood in your urine, nausea, vomiting, fever and chills, or urine that smells bad or looks cloudy.

Urine has various wastes dissolved in it. When there is too much waste in too little liquid, crystals begin to form. The crystals attract other elements and join together to form a solid that will get larger unless it is passed out of the body with the urine. Usually, these chemicals are eliminated in the urine by the body's master chemist: the kidney. In most people, having enough liquid washes them out or other chemicals in urine stop a stone from forming. The stone-forming chemicals are calcium, oxalate, urate, cystine, xanthine, and phosphate.

After it is formed, the stone may stay in the kidney or travel down the urinary tract into the ureter. Sometimes, tiny stones move out of the body in the urine without causing too much pain. But stones that don't move may cause a back-up of urine in the kidney, ureter, the bladder, or the urethra. This is what causes the pain.

Symptoms

Some kidney stones are as small as a grain of sand. Others are as large as a pebble. A few are as large as a golf ball! As a general rule, the larger the stone, the more noticeable are the symptoms.

The symptoms could be one or more of the following:

severe pain on either side of your lower back

more vague pain or stomach ache that doesn't go away

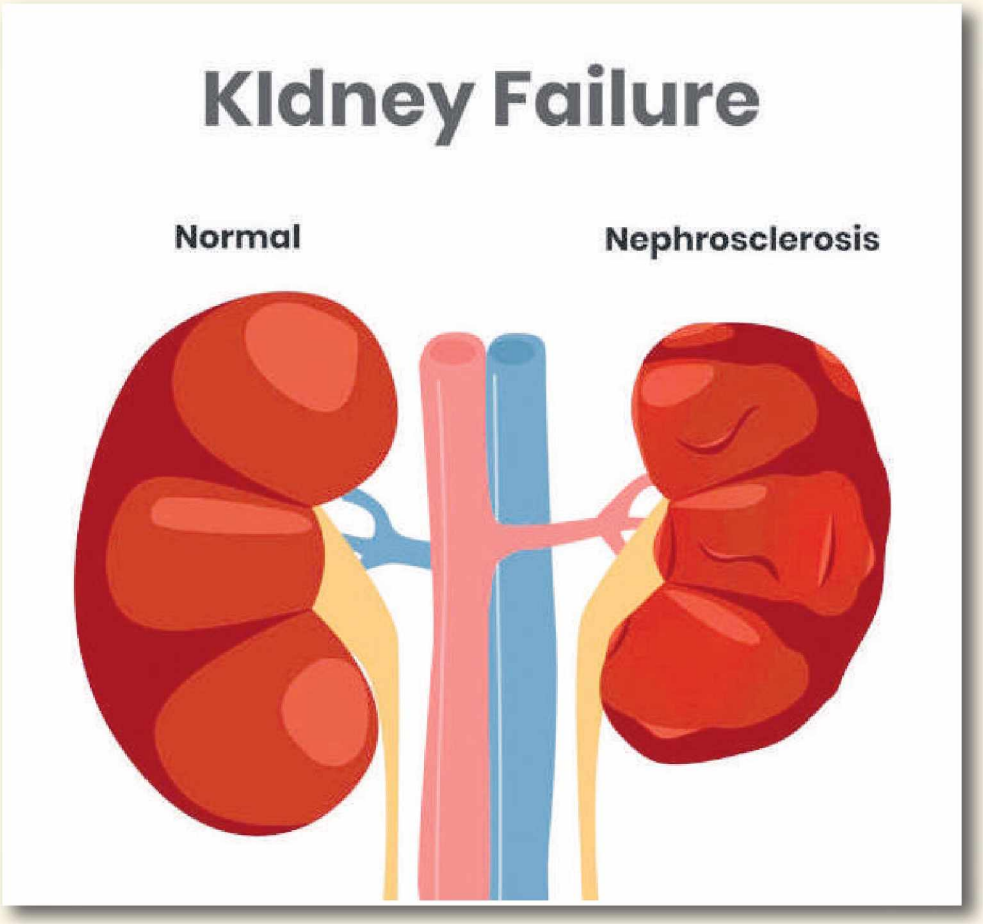
blood in the urine

nausea or vomiting

fever and chills

urine that smells bad or looks cloudy

The kidney stone starts to hurt when it causes irritation or blockage. This builds rapidly to extreme pain. In most cases, kidney stones pass without causing damage-but usually not without causing a lot of pain. Pain relievers may be the only treatment needed for small stones. Other treatment may be needed, especially for those stones that cause lasting symptoms or other complications. In severe cases, however, surgery may be required.



Kidney Stones

causes

Possible causes include drinking too little water, exercise (too much or too little), obesity, weight loss surgery, or eating food with too much salt or sugar. Infections and family history might be important in some people. Eating too much fructose correlates with increasing risk of developing a kidney stone. Fructose can be found in table sugar and high fructose corn syrup.

Types

There are four main types of stones:

1. *Calcium oxalate:* The most common type of kidney stone which is created when calcium combines with oxalate in the urine. Inadequate calcium and fluid intake, as well other conditions, may contribute to their formation.

2. *Uric acid:* This is another common type of kidney stone. Foods such as organ meats and shellfish have high concentrations of a natural chemical compound known as purines. High purine intake leads to a higher production of monosodium urate, which, under the right conditions, may form stones in the kidneys. The formation of these types of stones tends to run in families.

3. *Struvite:* These stones are less common and are caused by infections in the upper urinary tract.

4. *Cystine:* These stones are rare and tend to run in families.

Diagnosis

Diagnosis of a kidney stone starts with a medical history, physical examination, and imaging tests. Your doctors will want to know the exact size and shape of the kidney stones. This can be done with a high resolution CT scan from the kidneys down to the bladder or an x-ray called a "KUB x-ray" (kidney-ureter-bladder x-ray) which will show the size of the stone and its position. The KUB x-ray is often obtained by the surgeons to determine if the stone is suitable for shock wave treatment. The KUB test may be used to monitor your stone before and after treatment, but the CT scan is usually preferred for diagnosis. In some people, doctors will also order an intravenous pyelogram or IVP, a special type of X- ray of the urinary system that is taken after injecting a dye.

Second,the doctors will decide how to treat the stone. The health of kidneys will be evaluated by blood tests and urine tests. Your overall health, and the size and location of your stone will be considered.

Later, your doctor will want to find the cause of the stone. The stone will be analyzed after it comes out of your body, and your doctor will test your blood for calcium, phosphorus and uric acid. The doctor may also ask that you collect your urine for 24 hours to test for calcium and uric acid.

Treatment

The treatment for kidney stones is similar in children and adults. You may be asked to drink a lot of water. Doctors try to let the stone pass without surgery. You may also get medication to help make your urine less acid. But if it is too large, or if it blocks the flow of urine, or if there is a sign of infection, it is removed with surgery.

Shock-wave lithotripsy is a noninvasive procedure that uses high-energy sound waves to blast the stones into fragments that are then more easily passed out in the urine.

In ureteroscopy, an endoscope is inserted through the ureter to retrieve or obliterate the stone. Rarely, for very large or complicated stones, doctors will use percutaneous nephrolithotomy/nephrolithotripsy.

Prevention

Drinking enough fluid will help keep your urine less concentrated with waste products. Darker urine is more concentrated, so your urine should appear very light yellow to clear if you are well hydrated. Most of the fluid you drink should be water. Most people should drink more than 12 glasses of water a day. Speak with a healthcare professional about the right amount of water that's best for you. Water is better than soda, sports drinks or coffee/tea. If you exercise or if it is hot outside, you should drink more. Sugar and high-fructose corn syrup should be limited to small quantities.

Eat more fruits and vegetables, which make the urine less acid. When the urine is less acid, then stones may be less able to form. Animal protein produces urine that has more acid, which can then increase your risk for kidney stones.

You can reduce excess salt in your diet. What foods are high in salt? Everyone thinks of salty potato chips and French fries. Those should be rarely eaten. There are other products that are salty: sandwich meats, canned soups, packaged meals, and even some sports drinks.

You want to try to get to a normal weight if you are overweight. But, high-protein weight loss diets that include high amounts of animal-based protein, as well as crash diets can add to the risk of stone formation. You need adequate protein, but it needs to be part of a balanced diet. Seek guidance from a registered dietitian when embarking on a weight loss diet or any dietary interventions to reduce the risk of kidney stones.

Don't be confused about having a "calcium" stone. Dairy products have calcium, but they actually help prevent stones, because calcium binds with oxalate before it gets into the kidneys. People with the lowest dietary calcium intake have an increased risk of kidney stones. A stone can form from salt, the waste products of protein, and potassium. The most common type of kidney stone is a calcium oxalate stone. Most kidney stones are formed when oxalate, a by product of certain foods, binds to calcium as urine is being made by the kidneys. Both oxalate and calcium are increased when the body doesn't have enough fluids and also has too much salt. Based on blood and urine tests, your doctor will determine which types of dietary changes are needed in your particular case.

Some herbal substances are promoted as helping prevent stones. You should know that there is insufficient published medical evidence to support the use of any herb or supplement in preventing stones.

See your doctor and/or a registered dietitian about making diet changes if you have had a stone or think you could be at increased risk for getting a kidney stone. To guide you, they need to know your medical history and the food you eat. Here are some questions you might ask:

What food may cause a kidney stone?

Should l take vitamin and mineral supplements?

What beverages are good choices for me?

Can children get kidney stones?

Kidney stones are found in children as young as 5 years. In fact, this problem is so common in children that some hospitals conduct 'stone' clinics for pediatric patients. The increase in the United States has been attributed to several factors, mostly related to food choices. The two most important reasons are not drinking enough fluids and eating foods that are high in salt. Kids should eat less salty potato chips and French fries. There are other salty foods: sandwich meats, canned soups, packaged meals, and even some sports drinks. Sodas and other sweetened beverages can also increase the risk of stones if they contain high fructose corn syrup. ***(New Scientist)***