

A female doctor with curly brown hair, wearing a white lab coat over a grey sweater, is sitting and talking to a patient. The patient is seen from the back, wearing a blue shirt. The doctor is holding a small white object in her hand. The background is a blurred clinical setting with a computer monitor and some charts on the wall.

Kidney and ureteral stones

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This information was last updated in March 2018.

This leaflet contains general information about kidney and ureteral stones. If you have any specific questions about your individual medical situation you should consult your doctor or other professional healthcare provider.

This information was produced by the European Association of Urology (EAU) in collaboration with the EAU Section of Urolithiasis (EULIS), the Urolithiasis Section of the EAU Young Academic Urologists Group, and the European Association of Urology Nurses (EAUN).

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Kidney and ureteral stones

Kidney and ureteral stones are very common, but it is difficult to get an accurate figure for the number of sufferers in Europe.

Kidney or ureter stones often pass without any discomfort but this disease can be amongst the most painful experiences known. In the past, this was seen as a “Cinderella disease”, a disease which was reasonably common but with little public visibility. Today, however, more people are likely to form stones because of the changes in the Western diet and lifestyle.

What is a stone?

A stone is a hard, solid mass that can form in the gallbladder, bladder, and kidneys. These types of stones have different causes and are treated in different ways.

Kidney and ureteral stones develop in the kidney and either stay there or move to the ureter (**Fig. 1**).

Kidney stones form when minerals or acid salts in your urine crystallise. Most stones leave your body while you urinate. However, sometimes stones get stuck in the ureter, block the normal flow of urine, and cause symptoms. Stones can also be too big to leave the kidney. In both cases you may need treatment to remove the stone.

Facts about kidney stones

- Stones are common: about 1-2 in 10 people will form a stone at some point
- You have a 5 to 10% chance of forming a stone during your life
- Men form stones more often than women. This difference is now becoming smaller, perhaps due to the changes in lifestyle and diet.
- You are most likely to form a stone between the age of 30 and 50
- Stone patients often form stones more than once in their life

What causes kidney stones?

Anyone may develop a kidney stone during his or her lifetime. Stones can form if there is an imbalance in the way your body produces urine. This may be connected to how much you drink and whether there are substances in your urine which trigger stone formation.

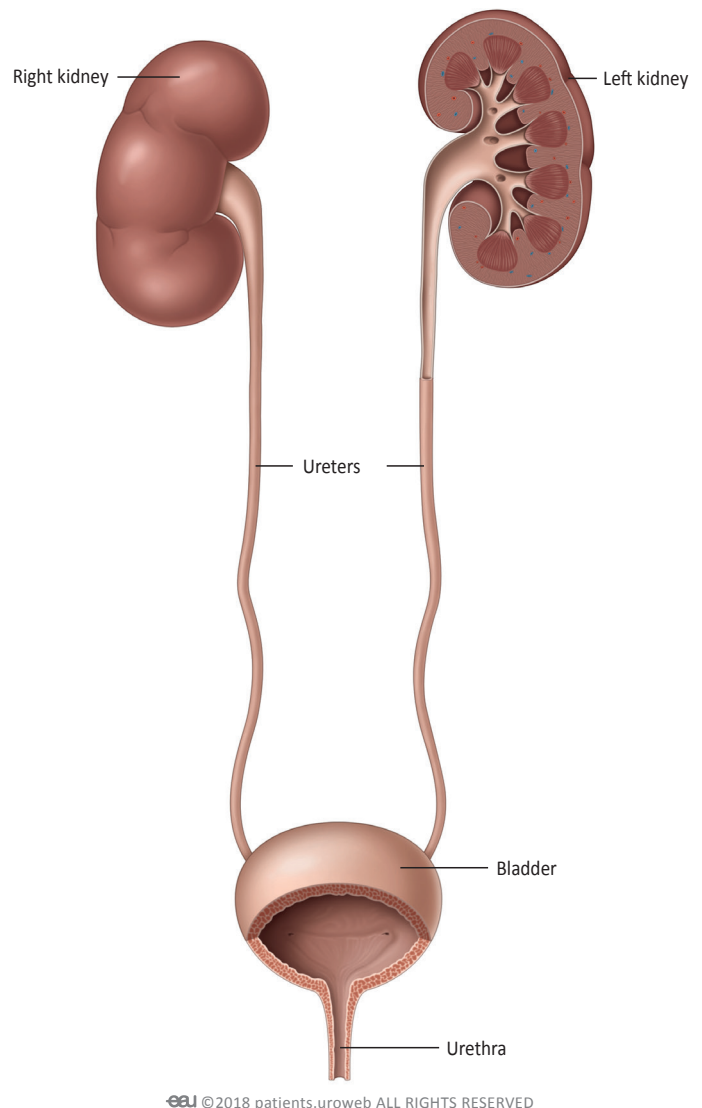


Fig. 1: The urinary tract.

Stones can have other causes as well. Some people are more likely to form stones than others.

You are at higher risk if you have:

- Early onset stone disease, especially in childhood or adolescence
- A family history of stone disease
- A stone which contains brushite, uric acid, or urate
- Stones caused by an infection in your urinary system
- A genetic condition which makes you prone to forming stones
- A narrowing of your ureters
- An obstruction at the junction where your ureter meets your kidney

Certain urological conditions may increase the risk of stone disease:

- Medullary sponge kidney (a birth defect)
- Uteropelvic junction obstruction
- A cyst or a condition called calyceal diverticulum
- Polycystic kidney disease
- Nephrocalcinosis (too much calcium in the kidneys)
- Vesicoureteric reflux (an abnormal movement of urine into the ureters or kidneys)
- Horseshoe kidney (a birth defect)
- Swelling in one of your ureters, called ureterocele

Some other conditions are also associated with stone disease. These include:

- Hyperparathyroidism (excessive production of the parathyroid hormone by the parathyroid glands)
- Gastrointestinal diseases (jejuno-ileal bypass, intestinal resection, Crohn's disease, malabsorptive conditions, and urinary diversion)
- Sarcoidosis (inflammation that causes tiny lumps of cells in various organs in your body)

Additionally, stone formation is associated with a number of drugs.

Please do not stop any prescribed medication unless your doctor advises you to.

The terms your doctor may use:

- Calculi: stones
- Renal calculi: stones in your kidney
- Ureteral calculi: stones in your ureter
- Urolithiasis: stone disease

Symptoms and diagnosis of kidney and ureteral stones

Symptoms

People often associate kidney and ureteral stones with pain. However, symptoms can vary from severe pain to no pain at all, depending on stone characteristics – such as the size, shape, and location of the stone in the urinary tract.

Severe pain (renal colic)

If the stone blocks the normal urine flow through the ureter you will experience severe pain, known as renal colic. This is a sharp pain in the loin and the flank (the side of your body, from the ribs to the hip) (**Fig. 2**). If the stone is not in your kidney but in your ureter, you may feel pain in the groin or thigh. Men can even have pain in their testicles.

Renal colic is caused by a sudden increase of pressure in the urinary tract and the ureteral wall. The pain comes in waves and does not decrease if you change positions. It is described as one of the most painful experiences, similar to giving birth.

Other symptoms that may accompany renal colic are:

- Nausea
- Vomiting
- Blood in the urine (urine appears pink)
- Painful urination
- Fever

Renal colic is an emergency situation and you should contact your family doctor or nearest hospital to relieve the pain. In case of high fever you must seek medical help immediately.

Dull pain

Stones that do not block the ureter can cause a recurrent, dull pain in the flank. This kind of pain may also point to other diseases, so you will need to take medical tests to find out if you have kidney or ureteral stones.

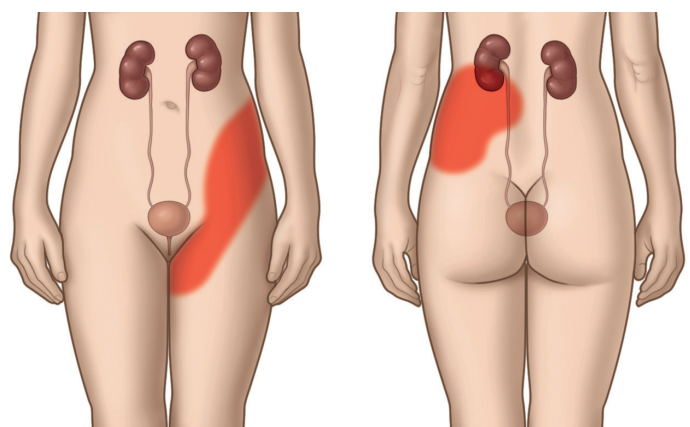
No symptoms

Some stones do not cause any discomfort. These are called asymptomatic stones and are usually small. They do not block the flow of urine. In general asymptomatic stones are found during x-ray or similar imaging procedures for other conditions.



Interesting Fact

Every year, around 1 or 2 people out of 1,000 suffer from acute renal colic.



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Fig. 2: Area of possible renal colic pain shown in red.

Diagnosis

The doctor does a series of tests to understand what causes your symptoms. This is called a diagnosis. First, the doctor or nurse will take your medical history and do a physical examination. Then, they will take images of your body and perform other tests if needed.

Imaging techniques

To locate your stone the doctor needs to take images of your internal organs. You will get an ultrasonography (also known as ultrasound), which uses high-frequency sounds to create an image.

The doctor can see whether the stone causes an obstruction by checking if the urinary collecting system is enlarged. In addition to ultrasonography, you may need an x-ray of the urinary tract.

Another common method of diagnosis is a CT-scan (computed tomography). For stone disease a non-contrast- enhanced computed tomography (NCCT) is done. This scan can clearly show the size, shape, and thickness of the stone.

In some situations your doctor may decide to do a contrast-enhanced CT-scan or an intravenous urography. These images give additional information about your kidney function and your anatomy.

Stone analysis and other tests

In case of renal colic, your urine and blood are tested to see if you have an infection or kidney failure.

If your stone is expected to pass with urine, your doctor may recommend that you filter your urine to collect the stone. The doctor will analyse it in order to understand what type of stone you have. This information is important because it helps to select the best options for treatment and prevention.

If you have a high risk of forming more stones, you will get additional tests known as metabolic evaluation.

Treatment of kidney and ureteral stones

You have been diagnosed with a kidney or ureteral stone. This chapter describes the different treatment options which you can discuss with your doctor. Together you can decide which approach is right for you.

Factors that influence the decision include:

- Your symptoms
- Stone characteristics
- Your medical history
- The kind of treatment available at your hospital and the expertise of your doctor
- Your personal preferences and values

Not all stones require treatment. You need treatment if your stone causes discomfort and does not pass naturally with urine. Your doctor may also advise treatment if you have pre-existing medical conditions. There are different treatment methods for emergency and non-emergency situations.

Treatment of emergency situations

Acute renal colic

Renal colic is an acute, painful situation caused by a stone that blocks the ureter. Go to the family doctor or the nearest emergency room as soon as possible to relieve the pain.

Pain is usually relieved with NSAIDs (non-steroidal anti-inflammatory drugs), which you can take as a tablet or a suppository. If this first step of treatment does not help, you will get stronger painkillers called opioids. Usually, they are injected directly into the vein. The disadvantage of opioids is that they can make you nauseous.

On a rare occasion, drugs do not work. In this case the doctor may need to drain urine from your kidney. This is called decompression.

There are two methods of decompression:

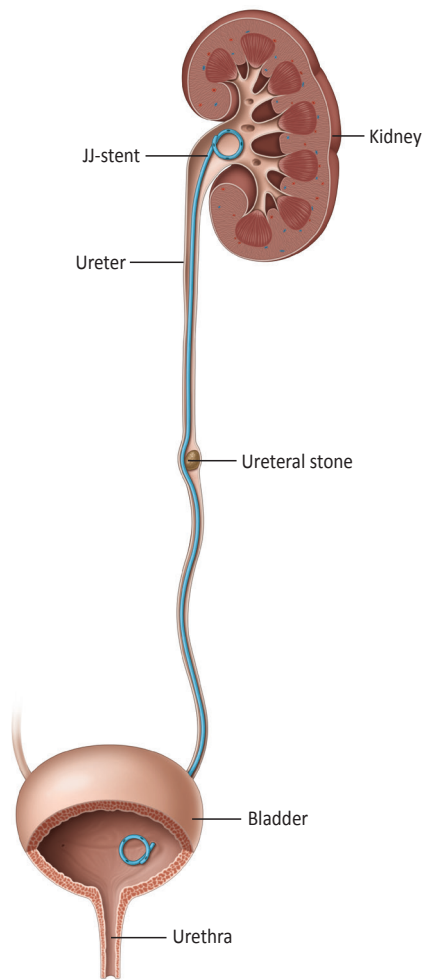
- By placing a ureteral JJ-stent in your ureter through your urethra (**Fig. 3**)
- By inserting a percutaneous nephrostomy tube into your kidney directly through the skin (**Fig. 4a and 4b**)

Both methods are equally effective.

Obstructed and infected kidney

If you have renal colic together with a fever or if you feel unusually tired, you should go to the closest urological department at once. You will get blood and urine tests to check if you have an infected, obstructed kidney. If you do, you need immediate decompression to relieve the pressure in your kidney.

After the decompression you will get antibiotics to clear the infection. You can only be treated to have your stone removed after the infection is gone.



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Fig. 3: A JJ-stent is inserted to make sure urine can flow through the urinary tract.

Treatment of non-emergency situations

If you have a kidney or ureteral stone which does not cause discomfort, you will generally not receive treatment. Your doctor will give you a time schedule for regular control visits to make sure your condition does not get worse.

If your stone is likely to pass with urine, your doctor can prescribe drugs to ease the process. This is called conservative treatment.

If your stone continues to grow or causes frequent and severe pain, you will get active treatment.

Conservative stone treatment

Most kidney or ureteral stones will leave your body while you urinate. However, depending on the size and location of the stone, it will take you some time to pass the stone. You may suffer from renal colic when the stone moves. If you have a very small stone there is a 95% chance of passing this stone within 6 weeks.

In general you can keep this in mind:

- The closer the stone is to the bladder, the higher the chance of passing it
- The bigger the stone, the smaller the chance of passing it

Medical Expulsive Therapy

Your doctor may prescribe drugs (so called alpha-blockers or nifedipine) to help you pass the stone faster and to limit pain while it moves. This is called Medical Expulsive Therapy (MET) and it is most effective for ureteral stones.

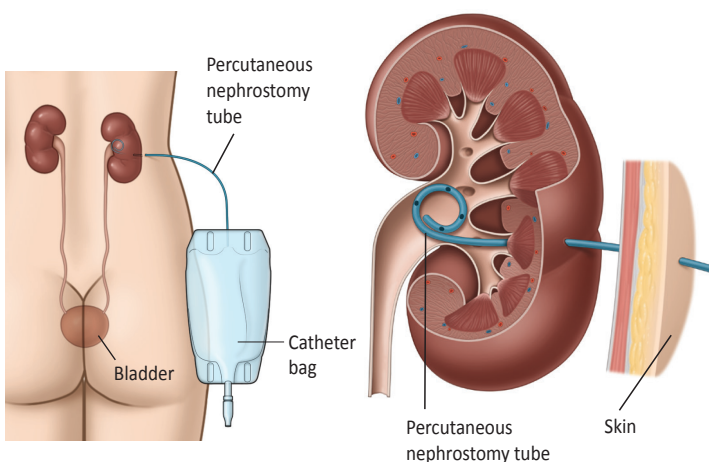
Alpha-blockers are not registered as drugs for stone removal (off-label), but they can be helpful when passing stones. If you want MET, your doctor will discuss the possible side-effects of the drugs with you.

During MET you should see your doctor regularly - how often depends on his or her recommendation. The doctor needs to check if the stone keeps moving and if your kidneys continue to function well.

If you are in a lot of pain, if you have an infection, or if your kidneys do not function well, MET is not an option. Your doctor will discuss other treatment options with you.

Dissolving your stone

If you suffer from uric acid stones, it may be possible to dissolve your stone. This is done by increasing the pH-value



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Fig. 4a: A percutaneous nephrostomy tube is used to drain urine directly from the kidney into the catheter bag.

Fig. 4b: A percutaneous nephrostomy tube inside the kidney.

of your urine to make it alkaline rather than acidic. Oral medication like alkaline citrate or sodium bicarbonate is generally prescribed. At a pH-level of 7.0-7.2, the stone will decrease in size and may even dissolve completely. You can easily check the pH-value of your urine at home by using a dipstick test.

Active stone treatment

Kidney or ureteral stones should be treated if they cause symptoms. If you don't have symptoms you may still get treatment in case:

- The stone continues to grow
- You are at high risk of forming another stone (See Metabolic Evaluation for Kidney and Ureteral Stones)
- You have an infection
- Your stone is very large
- You prefer active treatment

Your doctor will recommend to remove a stone in the ureter if:

- It seems too big to pass with urine
- You continue to suffer from pain while you take medication
- Your kidneys have stopped or may stop to function properly

There are three common ways to remove stones:

1. shock-wave lithotripsy (SWL)
2. ureteroscopy (URS)
3. percutaneous nephrolithotomy (PNL)

Each of these procedures has advantages and disadvantages.

It is important to talk about your symptoms and test results with your doctor to find the most efficient treatment option for you.

Shock-wave lithotripsy (SWL)

SWL is done with a machine that can break stones from outside the body. To break the stone, focused shock waves (short pulses of high energy sound waves) are transmitted to the stone through the skin. The stone absorbs the energy of the shock waves and this breaks it into smaller pieces. The fragments then pass with urine.

Ureteroscopy (URS)

URS is a type of treatment which is done with a small-calibre endoscope. Stones can be located, disintegrated, and removed in a single procedure. URS is common, success rates are high, and the risk of complications is low.

Percutaneous Nephrolithotomy (PNL)

PNL is a surgery to remove large stones directly from the kidney. The advantage is that even very large stones are removed in a single operation. However, compared to SWL and URS it is more invasive and there is a higher risk of complications. The most common complications of PNL are bleeding and fever.

Prevention of Stone Recurrence

Some patients who have had kidney or ureteral stones may form more stones in the future. After your stone passes or is removed, your doctor will determine if you are at high risk of recurrence. To do so, he or she will need to analyse the stone. In addition, the doctor will consult the results of your blood and urine tests which were done before treatment.

If your risk of recurrence is low, general lifestyle changes will be enough to cut the risk of forming another stone.

If you have a high risk of recurrence, the doctor will run a series of specific blood and urine tests called metabolic evaluation (See Metabolic Evaluation for Kidney and Ureteral Stones). Depending on the test results, the doctor will recommend preventive measures or further tests.

General lifestyle advice to prevent stones

Even if you have a low risk of forming another stone, your doctor and nurse will advise you to make some lifestyle changes. These measures reduce the risk of you getting another stone and improve your health in general. The following advice is for adults.

Drink more

- Make sure you drink 2.5 to 3 litres every day
- Drink evenly throughout the day
- Choose pH-neutral drinks such as water or milk
- Monitor how much you urinate. It should be 2 to 2.5 litres every day
- Monitor the colour of your urine: it should be light
- Drink even more if you live in a hot climate or do a lot of physical exercise. This will help you to balance your fluid loss

Adapt your diet

Depending on your individual situation, your doctor may recommend that you adapt your diet. It is important to discuss this with the doctor first.

- Have a balanced and varied diet
- Avoid excessive consumption of vitamin supplements.
- Eat lots of vegetables, fibres, and fruits (especially citrus fruits)
- Try to eat more low-oxalate foods like eggs, lentils, white rice, peeled apples, grapes, cauliflower, squash, etc.
- Make sure your diet contains a sufficient amount of calcium (about 1,000 milligrams a day). However, be careful with calcium supplements and always ask your doctor or nurse for advice
- Reduce the amount of salt in your diet (no more than 3 to 5 grams a day)
- Do not eat too much animal protein (especially meat from young animals. Instead, eat more vegetable protein, found for example in avocado, cauliflower, or peas
- Maintain a healthy weight (your Body Mass Index should be between 18-25 kg/m²)

Healthy habits

Adopting a healthy lifestyle is always a good idea.

- Try to exercise 2 or 3 times a week
- Avoid stress



Go Online

Read more about how to adapt your diet in these Litholink brochures.

<http://www.litholink.com/en/DietInformation>

Metabolic evaluation for kidney and ureteral stones

If you have a high risk of forming more stones, your doctor will do a metabolic evaluation. This is a series of blood and urine tests to determine which additional treatment you may need.

As part of the metabolic evaluation your doctor will ask you to collect your urine in 2 separate periods of 24 hours. For the initial metabolic evaluation, you should keep to a self-determined diet. The evaluation is done some 3 weeks after your stone has passed or has been removed. The amount of urine is measured and so are the levels of different substances in the urine.

Depending on the test results, you may get medication. Generally, the medication will cause little or no side effects. In addition, it may be helpful to consider lifestyle changes (See Prevention of Stone Recurrence).

Two to three months after you start medication, the doctor will take another urine sample to check if the dosage should be adjusted. For a large part, treatment depends on the kind of stone you had. Below you can read about different types of stones and the measures used to prevent their recurrence.

Calcium-oxalate stones

If you had a calcium-oxalate stone you may have a high risk of forming more stones, but this is not always the case. After you have had a calcium-oxalate stone you should:

- Eat fewer oxalate-rich foods (for instance rhubarb, beet, okra, spinach, Swiss chard, sweet potatoes, tea, chocolate, and soy products)
- Reduce consumption of purine rich foods
- Don't take more than the daily recommended amount of vitamin C
- In all cases, check with your doctor for personal advice

If the metabolic evaluation shows that you have a high risk of forming more stones you will get medication to reduce the risk of recurrence.

Calcium-phosphate stones

If you had a calcium-phosphate stone you may have a high risk of forming more stones but this is not always the case. The type of treatment you get depends on the cause of the stone.

Uric acid stones

If you had a uric acid stone you have a high risk of forming more stones. Eating less purine rich foods can lower the chance of you forming another stone. High levels of purine are found in certain types of fish (like herring, mussels, smelt, sardines, anchovies), red meat and organs (heart, liver, kidney).

You will get medication to keep the pH-value of your urine between 6.2 and 6.8. You can check the pH-value of the urine easily at home with dipstick tests.

Ammonium urate stones

If you had an ammonium urate stone you have a high risk of recurrence and you may also have a urinary tract infection. You will get antibiotics to treat the infection and you will need to take medication to keep your pH-levels between 5.8 and 6.2.

Struvite and infection stones

If you had a struvite or an infection stone, you have a high risk of forming more stones. You may need to take antibiotics to make sure the infection does not come back. The main treatment in struvite and infection stones is to remove every

single piece of stone from the urinary tract, so your doctor might recommend another surgical intervention again, even for a very small stone. Your doctor may ask you to take medications to acidify your urine.

Cystine stones

If you had a cystine stone you have a high risk of forming more stones. You need to drink enough fluids to produce at least 3 litres of urine every day. Eating less salt will lower the level of cystine in your urine. You will get medication to increase the pH-value of your urine to 7.5 or higher. On top of that you may get medication to reduce the level of cystine.

Other stones

There are other types of stones that are very uncommon. Your doctor will discuss your individual situation and treatment options with you.



Go Online

Read more about how to adjust your diet for oxalate, purine, and salt in these Litholink brochures
<http://www.litholink.com/en/DietInformation>

FAQs (Frequently Asked Questions)

What are the reasons for having ureteroscopy?

Ureteroscopy is performed for the following reasons:

- stones typically in the ureter that are unlikely to pass spontaneously or are causing significant discomfort (removed by rigid ureteroscopy)
- stones in the kidney that are not treatable by ESWL (extracorporeal shock-wave lithotripsy)
- to determine the reason for blood in the urine

What are the advantages of ureteroscopy over other treatments?

The stone is usually seen directly, allowing the delivery of special instruments or lasers to break it up. The ureteroscope is passed through natural channels in the body and involves no skin incisions. If the stone can be seen, there is a very high chance that the stone will be broken up in one session.

Flexible ureteroscopy allows entry into all parts of the kidney so that all stones can be removed or broken up, provided they are of an appropriate size and accessible.

What are the success rates of ureteroscopy?

The success rate of ureteroscopy is higher than 90% for the majority of stones that are treated this way. Success depends on:

- whether one stone or more present
- how long the stone has been stuck
- the location of the stone (where in the kidney or ureter)
- the size of the stone
- whether you have had previous surgery in the kidney
- the experience of the urologist treating you

What are the risks of ureteroscopy?

The risks include:

- urine infection: this usually requires antibiotics only
- bleeding: this usually settles quickly
- damage to the ureter resulting in narrowing of the ureter ('stricture') or perforation: this is rare and may require stretching by a balloon and insertion of a double-J stent
- failure to break and retrieve the stone: an alternative procedure may be necessary
- perforation of the ureter: usually a double-J stent is required for a few weeks after such an injury
- detachment ('avulsion') of the ureter from the kidney: this is very rare and sometimes unavoidable but may require open surgery to repair
- abdominal or back discomfort
- side effects due to a double-J stent

What are the alternatives to ureteroscopy?

Other treatment options include:

- ESWL: this treatment is suitable mostly for stones in the upper ureter and the kidney limited to a certain size. It can be used for stones in the lower ureter near the bladder, although ureteroscopy tends to be chosen by many urologists
- PCNL (percutaneous nephrolithotomy): this procedure is very good at removing stones in the kidney and upper ureter but involves making a small incision in the back and passing a tube through the kidney. For the latter reason, it is more invasive than ureteroscopy.
- Laparoscopic or open surgery: this is more successful than ureteroscopy but involves making several incisions and requires a longer hospital stay. There is greater risk of infection as a result, although the absolute risk is still quite small. This approach is usually tried after all other therapies have failed.

How often does ureteroscopy need to be repeated?

It may not be possible to reach the stone on the first attempt with the ureteroscope, because of severe swelling that occurs when a stone is present in the ureter. In that situation, a

double-J stent may be placed in the ureter. With a double-J stent in place, urine can drain from the kidney to the bladder and the ureter expands in size. As it becomes wider, it is easier to pass the ureteroscope up to the stone and remove it.

Sometimes if the stone is very large, it may not be possible to remove the stone in one session and a second procedure may be necessary. On other occasions, small stone fragments or the whole stone may pass up into the kidney. If a flexible ureteroscope is available, it can be passed up into the kidney and the fragments removed or broken with a laser.

What is the difference between rigid and flexible ureteroscopy?

The difference is in the use of a rigid or flexible ureteroscope. Rigid ureteroscopy is performed, literally, with a rigid telescope. As such, it sees only in a straight line. Flexible ureteroscopy is performed with a very thin and flexible telescope that can perform an almost 270° turn and look back on itself. Using a laser, stones can be vaporised and removed. Flexible ureteroscopy tends to be used for stones in the kidney and near the kidney in the upper ureter. Rigid ureteroscopy is used mainly for stones in the lower and midureter closer to the bladder. Flexible ureteroscopy is more gentle than rigid ureteroscopy.

What reduces the risk of more stones in the future?

The following steps can reduce the chance of having significant stones in the future:

- Drink more fluid (especially 2 hours after meals and at night)
- Adopt a diet appropriate to the type of stone (see calcium stone diet)
- Periodic x-rays or ultrasound to determine if more stones are being formed
- Follow-up by a stone clinic

Will I have stitches from the surgery?

There will be no stitches from the surgery. The ureteroscope is passed through natural channels in the body and involves no skin incisions.

How soon after the procedure can I shower or bathe?

The day after the surgery.

What is the purpose of the catheter?

Sometimes there is blood or kidney stone residual in your urine because of the surgery. If necessary, the bladder can be flushed through the catheter. When no blood is visible in the urine, the catheter can be removed. This is usually on the first day after the surgery.

When will the urine catheter be removed after the procedure?

This is usually on the first day after the surgery.

What is the purpose of the stent?

The stent makes the flow of urine from the kidney to the bladder easier, and it prevents attacks of colic pain (severe pain caused by cramping in the urinary tract).

When will the inserted stent be removed after the procedure?

An x-ray will be taken several weeks after the surgery. If no stones are visible, the stent will be removed.

How much experience does a urologist need with this procedure?

A surgeon's experience in doing a procedure may influence the results. For example, when complications arise during a procedure, a skilled surgeon is more likely to better control them.

Although there is no magic number of operations that makes a surgeon proficient, it might give you a good indication to ask:

- How many ureteroscopies do you do each year?
- How long have you been doing this surgery?

Do I need to go to the nutritionist to check on my eating behaviour to prevent more stones?

The development of kidney stones can have different causes. Most kidney stones are 'calcium oxalate' stones. Oxalates are made within our own bodies. Oxalates are also naturally found in fruits, vegetables, legumes, coffee, tea, and nuts and protect the plant from being eaten by pests. Most high-oxalate foods taste bitter when eaten raw. When consumed in high amounts, oxalates and calcium bind together to form crystals, and these crystals eventually form a stone.

General rules:

- Eat fewer foods with oxalate—these foods include leafy greens like spinach and root vegetables like beets, soybeans and soybean meal.
- Moderate animal protein—animal protein is found in meat, meat products, and dairy products
- Drink enough fluid (1.5-2 litres per 24 hours)
- Limit the consumption of strong black tea, iced tea, chocolate, and chocolate products

This does not mean you can never eat or drinks these products! They just need to be taken in moderation.

Are kidney stones hereditary?

Kidney stones can be hereditary. We know that patients with kidney stones often have relatives who also once had kidney stones.

Glossary of terms

Active treatment

Procedures to remove a kidney or ureteral stone

Asymptomatic stones

Stones that do not cause any symptoms. They are usually found during imaging tests done for another condition.

Bladder

Organ that collects urine from the kidneys (see also Kidneys)

Computed tomography (CT)

Imaging technique that makes a series of x-ray images of the body

Conservative treatment

Monitoring the progress of the stone disease or treatment with medication to ease the natural passing of stones

Decompression

Relieving pressure in the kidneys. A nephrostomy tube is placed directly in the kidney through the skin so that urine can leave the body (see also Nephrostomy tube).

Endoscope

A tube-like instrument to examine the inside of the body. Can be flexible or rigid.

Fragments

Pieces of the stone broken during a procedure

Intravenous urography

An imaging technique where x-ray contrast agent is injected into the vein, usually in the arm

JJ-stent

A tube that is temporarily placed in the ureter to make sure urine can flow from the kidney to the bladder

Kidneys

Two bean-shaped organs in the back of the abdomen that filter the blood and produce urine

Medical Expulsive Therapy (MET)

Medication that makes the natural passing of stones easier and less painful

Metabolic evaluation

Series of blood and urine tests for patients who have a high risk of forming stones

Nephrostomy tube

A tube placed directly into the kidney through the skin. This allows the urine to leave the body (see also Decompression)

NSAIDs

A group of medicines used to relieve pain. It is often used to relieve renal colic.

Oxalate

A component found in many kinds of food which may be related to forming kidney or ureteral stones

Percutaneous

Through the skin

Percutaneous nephrolithotomy (PNL)

Treatment option to remove stones directly from the kidney by placing a tube through the skin

pH-value

A measure between 0.0 and 14.0 to describe if a fluid is acidic or alkaline. pH-values close to 7.0 are neutral, anything above is alkaline, anything below is acidic.

Renal colic

Severe pain in flank, loin, groin, or thigh caused by a stone blocking the normal flow of urine

Shock-wave lithotripsy (SWL)

Treatment option to break stones into smaller pieces using high energy sound waves. Stone fragments pass with urine after the procedure.

Ultrasonography

Imaging technique that uses high-frequency sounds to make an image of the inside of the body

Ultrasound

see Ultrasonography

Ureter

One of the two tubes through which urine flows from the kidneys to the bladder

Glossary of terms

Ureteroscope (rigid or flexible)

An endoscope used for the urinary tract. It is inserted into the urethra and can move through the bladder, up the ureter, and even into the kidney.

Ureteroscopy (URS)

Treatment option to remove kidney or ureteral stones. A ureteroscope is inserted into the urinary tract via the urethra to pull out the stone (see also Ureteroscope).

Urethra

The tube that carries urine from the bladder and out of the body.

Uric acid

A chemical that is created when the body breaks down substances called purines

Urinary system

see urinary tract

Urinary tract

The organ system that produces and transports urine through and out of the body. It includes two kidneys, two ureters, the bladder and the urethra. The urinary tract is similar in men and women, only men have a longer urethra.

Urologist

A doctor specialised in health and diseases of the urinary tract and the genitals

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