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## Kidney stones

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### Summary

- The lifetime risk of developing kidney stones is one in 10 for men and one in 35 for women.
  - New techniques can remove kidney stones without the need for an operation.
  - A combination of drinking enough fluids, avoiding urinary infections, and specific treatment with medications will significantly reduce or stop new stone formation.
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### What are kidney stones?

Kidney stones are solid crystals formed from the salts in urine. They are sometimes called renal calculi. Kidney stones can block the flow of urine and cause infection, kidney damage or even kidney failure. They can vary in size and location.

The risk of kidney stones is about one in 10 for men and one in 35 for women. Between four and eight per cent of the Australian population suffer from kidney stones at any time.

After having one kidney stone, the chance of getting a second stone is between five and 10 per cent each year. Thirty to fifty per cent of people with a first kidney stone will get a second stone within five years. After five years, the risk declines. However, some people keep getting stones their whole lives.

### Types of kidney stones

There are four major types of kidney stones, including:

- stones formed from calcium not used by the bones and muscles, combined with oxalate or phosphate – these are the most common kidney stones
- stones containing magnesium and the waste product ammonia – these are called struvite stones and form after urine infections
- uric acid stones – these are often caused by eating very large amounts of protein foods
- cystine stones – these are rare and hereditary.

### Symptoms of kidney stones

Many people with kidney stones have no symptoms. However, some people do get symptoms, which may include:

- a gripping pain in the back (also known as 'renal colic') – usually just below the ribs on one side, radiating around to the front and sometimes towards the groin. The pain may be severe enough to cause nausea and vomiting
- blood in the urine
- cloudy or bad smelling urine
- shivers, sweating and fever – if the urine becomes infected
- small stones, like gravel, passing out in the urine, often caused by uric acid stones
- an urgent feeling of needing to urinate, due to a stone at the bladder outlet.

### Treatment for kidney stones

Most kidney stones can be treated without surgery. Ninety per cent of stones pass by themselves within three to six weeks. In this situation, the only treatment required is pain relief. However, pain can be so severe that hospital admission and very strong pain-relieving medication may be needed. Always seek immediate medical attention if you are suffering strong pain.

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Small stones in the kidney do not usually cause problems, so there is often no need to remove them. A doctor specialising in the treatment of kidney stones is the best person to advise you on treatment.

If a stone doesn't pass and blocks urine flow or causes bleeding or an infection, then it may need to be removed. New surgical techniques have reduced hospital stay time to as little as 48 hours. Treatments include:

- extracorporeal shock-wave lithotripsy (ESWL) – ultrasound waves are used to break the kidney stone into smaller pieces, which can pass out with the urine. ESWL is used for stones less than 2 cm in size
- percutaneous nephrolithotomy – for stones larger than 2cm. A small cut is made in your back, then a special instrument is used to remove the kidney stone
- endoscope removal – an instrument called an endoscope is inserted into the urethra, passed into the bladder and then to where the stone is located. It allows the doctor to remove the stone or break it up so you can pass it more easily
- surgery – if none of these methods is suitable, the stone may need to be removed using traditional surgery. This will require a cut in your back to access your kidney and ureter to remove the stone.

### **Medication for kidney stones**

For most people with recurrent calcium stones, a combination of drinking enough fluids, avoiding urinary infections, and specific treatment with medications will significantly reduce or stop new stone formation.

Certain medications such as thiazide diuretics or indapamide reduce calcium excretion and decrease the chance of another calcium stone. Potassium citrate (such as Hydralite, Pedialyte and Urocit-K) or citric juices are used to supplement thiazide treatment and are used by themselves for some conditions where the urine is too acidic.

For people who have a high level of uric acid in their urine, or who make uric acid stones, the medication allopurinol will usually stop the formation of new stones.

### **Causes of kidney stones**

A kidney stone can form when substances such as calcium, oxalate, cystine or uric acid are at high levels in the urine, although stones can form even if these chemicals are at normal levels.

Medications used for treating some medical conditions such as kidney disease, cancer or HIV can also increase your risk of developing kidney stones.

A small number of people get kidney stones because of certain medical conditions that lead to high levels of calcium, oxalate, cystine or uric acid in the body.

### **Diagnosis of kidney stones**

Many kidney stones are discovered by chance during examinations for other conditions. Urine and blood tests can help with finding out the cause of the stone. Further tests may include:

- ultrasound
- CT scans
- x-rays, including an intravenous pyelogram (IVP), where dye is injected into the bloodstream before the x-rays are taken.

### **Analysis of kidney stones**

If you pass a stone, collect it and take it to your doctor for analysis. Analysis of a stone can help to determine what type it is, what caused it to form, what treatment to provide, and how to prevent formation of further stones in the future.

### **Complications of kidney stones**

Kidney stones can range in size from a grain of sand to that of a pearl or even larger. They can be smooth or jagged, and are usually yellow or brown. A large stone may get stuck in the urinary system. This can block the flow of urine and may cause strong pain.

Kidney stones can cause permanent kidney damage. Stones also increase the risk of urinary and kidney infection, which can result in germs spreading into the bloodstream.

## Avoiding recurrence of kidney stones

If you have had one kidney stone, some tips that may help to prevent a second stone forming include:

- Talk to your doctor about the cause of the previous stone.
- Ask your doctor to check whether the medications you are on could be causing your stones. Do not stop your medications without talking to your doctor.
- Get quick and proper treatment of urinary infections.
- Avoid dehydration. Drink enough fluids to keep your urine volume at or above two litres a day. This can halve your risk of getting a second stone by lowering the concentration of stone-forming chemicals in your urine.
- Avoid drinking too much tea or coffee. Juices may reduce the risk of some stones, particularly orange, grapefruit and cranberry. Ask your doctor for advice.
- Reduce your salt intake to lower the risk of calcium-containing stones. Don't add salt while cooking and leave the saltshaker off the table. Choose low- or no-salt processed foods.
- Avoid drinking more than one litre per week of drinks that contain phosphoric acid, which is used to flavour carbonated drinks such as cola and beer.
- Always talk to your doctor before making changes to your diet.

Drinking mineral water is fine – it cannot cause kidney stones because it contains only trace elements of minerals.

### Dietary calcium and kidney stones

Only lower your calcium intake below that of a normal diet if instructed by your doctor. Decreased calcium intake is only necessary in some cases where absorption of calcium from the bowel is high.

A low-calcium diet has not been shown to be useful in preventing the recurrence of kidney stones and may worsen the problem of weak bones. People with calcium-containing stones may be at greater risk of developing weak bones and osteoporosis. Discuss this risk with your doctor.

### Where to get help

- In an emergency, always call triple zero (000)
- Your doctor
- Your local community health centre
- **Kidney Health Australia** helpline Tel: **1800 454 363**

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Kidney Health Australia

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