

Kidney Stones

A patient guide

Kidney stone disease is one of the oldest and most common problems of the urinary system.

People often get stones in mid-life where family and work commitments are at their highest which makes stones costly.

Kidney stones are often very painful and can keep happening in some people.

More than 8,000

New Zealanders will get a kidney stone this year

Men get kidney stones more often than women but the number of **women** getting stones is rising.

Changing what you eat and using medication can be good ways to stop stones forming.

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Tim has lived with stones for over 7 years. In 1995 he had his first stone treatment, shockwave lithotripsy. He also had stones removed with ureteroscopy in 2000. Stones have been a part of his life for many years.

“The pain is the worst thing” says Tim

Tim has had help to prevent stones forming. He is now careful about how much he drinks and what he eats. He wishes he had known years ago how important drinking fluids was in reducing the risk of stones.

“I am much better educated today about how to prevent kidney stones” says Tim

“I drink a lot of fluids and have cut down on eating some foods that form my stones”
says Tim

Introduction

The problem of kidney stones has been described since ancient times, and today still remains an important cause of severe pain. More than 4000 people visit New Zealand hospitals each year with an acute stone episode. Many people need to have several procedures to get rid of stones. About 10% of the population in New Zealand will suffer from kidney stones at one time of their lives and some will have frequent episodes. There are different types of stones and a range of causes. Stone analysis when possible guides investigations and treatments.

Race, gender and underlying disease play a part in who may get kidney stones. Men get kidney stones more often than women. People with obesity and diabetes are more likely to suffer from Uric Acid stones. People of European origin are more likely to get kidney stones compared with Asian people, and those from the Middle East. have the highest frequency

Imaging procedures to diagnose the presence of stones are now more accurate. There is now a standardized approach to the testing of blood and urine and the good news is that significant progress has been, made in the identification of risk factors for stone production, which then guide nutrition care and medical management. These approaches can reduce the chances of suffering further stone episodes by more than 50% in most recurrent stone formers.

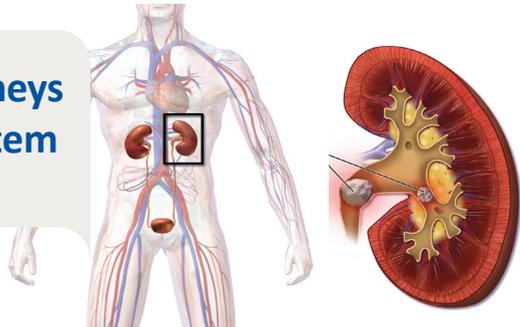
Get The Facts

What are kidney stones?

Urine contains many dissolved minerals and salts. When your urine has high levels of certain minerals and salts, you can form stones. Kidney stones can start small but can grow larger in size, even filling the inner hollow structures of the kidney. Some stones stay in the kidney, and do not cause any problems. Sometimes, a kidney stone can travel

down the ureter, the tube between the kidney and the bladder. If the stone reaches the bladder, it can be passed out of the body in urine. If the stone becomes lodged in the ureter, it blocks the urine flow from that kidney and causes pain.

How do the kidneys and urinary system work?



The kidneys are fist-size organs that handle the body's fluid and chemical levels. Most people have two kidneys, one on each side of the spine behind the liver, stomach, pancreas and intestines. Healthy kidneys clean waste from the blood and remove it in the urine.

The kidneys, ureters and bladder are part of your urinary tract. The urinary tract makes, transports and stores

urine in the body. The kidneys make urine from water and your body's waste. The urine then travels down the ureters into the bladder, where it is stored. Urine leaves your body through the urethra.

Kidney stones form in the kidney. Some stones move from the kidney into the ureter. The ureters are tubes leading from the kidneys to the bladder.

Blood and urine tests

Your healthcare provider may recommend blood and urine samples to be tested.

Blood tests can help find if a medical problem is causing your stones.

Your urine can be tested to see if you have a urinary tract infection or crystals that are typical of different stone types.

If you are at high risk of getting stones in the future, up to three 24 hour urine collections for laboratory analysis may be recommended.

Imaging tests

X-rays can be done to see if there are any stones in your urinary tract.

They may also be repeated over time to check for stone growth.

Stone analysis

If you pass a stone or a stone is removed by surgery your stone should be tested to determine what type of stone it is.

This information helps your doctor decide the best way to prevent further stones.

What can help me from getting a stone again?

Once your healthcare provider finds out why you are forming stones, they will give you tips on how to prevent them.

This may include changing your diet and taking certain medications. There is no "one size fits all" diet for preventing kidney stones. Everyone is different. Your diet may not be causing your stones to form.

What are the symptoms of kidney stones?

Stones in the kidney often do not cause any symptoms and can go undiagnosed. When a stone leaves the kidney, it travels to the bladder through the ureter.

Often the stone can become lodged in the ureter. When the stone blocks the flow of urine out of the kidney, it can cause the kidney to swell (hydronephrosis), often causing a lot of pain.

Common symptoms of kidney stones are:

- A very severe sharp, cramping pain in the side of the lower back, often moving to the lower abdomen or groin.
- A feeling of intense need to urinate
- Urinating more often or a burning feeling during urination
- Urine that is dark or red due to blood
- Nausea and vomiting

What are kidney stones made of?

Kidney stones come in many different types and colours. How you treat them and stop new stones from forming depends on what type of stone you have.

Calcium stones (80 percent of stones)

Calcium stones are the most common type of kidney stone. There are two types of calcium stones: calcium oxalate and calcium phosphate. Calcium oxalate is by far the most common type of calcium stone.

Uric acid stones (5-10 percent of stones)

Uric acid is a waste product that comes from chemical changes in the body. Uric acid crystals do not dissolve well in acidic urine and instead will form a uric acid stone.

Struvite / infection stones (10 percent of stones)

Struvite stones are not a common type of stone. These stones are related to chronic urinary tract infections (UTIs).

Cystine stones (less than 1 percent of stones)

Cystine is an amino acid that is in certain foods; it is one of the building blocks of protein. Cystinuria (too much cystine in the urine) is a rare, inherited metabolic disorder.

What causes kidney stones?

Low urine volume

A major risk factor for kidney stones is constant low urine volume.

Low urine volume may come from dehydration (loss of body fluids) from hard exercise, working or living in a hot place or not drinking enough fluids.

When urine volume is low, urine is concentrated and dark in colour. Concentrated urine means there is less fluid to keep salts dissolved.

Increasing fluid intake will dilute salts in your urine. If you do this, you will reduce your risk of further stones. Adults who form stones should drink enough fluid to make at least 2.5 litres of urine every day. (Usually about 3 litres.)

Water is best to drink, but what matters most is getting enough fluid.

Diet

What you eat and drink can also affect the chance of forming a stone.

It is helpful to work with your healthcare provider to find out if you are drinking enough fluid and eating foods that may increase your risk of forming a stone or not eating enough of the foods that help prevent further stones.

Everyone is different and your diet may not be causing your stones to form.

Ureteroscopy (URS)

Ureteroscopy (URS) is used to treat stones in the kidney and ureter. URS involves passing a very thin telescope, called an ureteroscope, into the bladder, up the ureter and into the kidney. Rigid telescopes are used for stones in the lower part of the ureter near the bladder. Flexible telescopes are used to treat stones in the upper ureter and kidney.

The ureteroscope lets the urologist see the stone without making an incision (cut). General anaesthesia keeps you comfortable during the URS procedure. Once the urologist sees the stone with a ureteroscope, a small, basket-like device grabs smaller stones and removes them. If a stone is too large to remove in one piece, it can be broken into smaller pieces with a laser or other stone-breaking tools.

Once the stone has been removed whole or in pieces, the health care provider may place a temporary stent in the ureter. A stent is a tiny, rigid plastic tube that helps hold the ureter open so that urine can drain from the kidney into the bladder.

You may go home the same day as the URS and can begin normal activities in two to three days. If your urologist places a stent, he or she will remove it four to ten days later.

Percutaneous Nephrolithotomy (PCNL)

Percutaneous Nephrolithotomy (PCNL) is the best treatment for large stones in the kidney. General anaesthesia is needed to do a PCNL. PCNL involves making a 1 cm incision (cut in the back or side, just large enough to allow a rigid telescope (nephroscope) to be passed into the hollow centre part of the kidney where the stone is located.

An instrument passed through the nephroscope breaks up the stone and suction out the pieces. The ability to suction pieces makes PCNL the best treatment choice for large stones.

After the PCNL, a tube is usually left in the kidney to drain urine into a bag outside the body. This will also help stop any bleeding. The tube is left in overnight or for a few days. You may have to stay in the hospital overnight after this operation.

Bowel conditions

Certain bowel conditions that cause diarrhoea (such as Crohn's Disease or ulcerative colitis) or surgeries (such as gastric bypass surgery) can raise the risk of forming calcium oxalate stones.

Diarrhoea may result in loss of large amounts of fluid from the body, lowering urine volume. Your body may also absorb excessive oxalate from the intestine, resulting in more oxalate in your urine.

Both low urine volume and high levels of urine oxalate can cause calcium oxalate kidney stone formation.

Obesity

Obesity is a risk factor for stones. Obesity may change the acid levels in the urine, leading to stone formation.

Medication

Some medications and calcium and vitamin C supplements, may increase your risk of forming stones.

Be sure to tell your health care provider all the medications and supplements you take as these could affect your risk of stones.

Family history

The chance of having stones is higher if you have a family history of stones, such as a parent or sibling.

Get diagnosed

How are kidney stones diagnosed?

“Silent” kidney stones, those that cause no symptoms, are often found when an X-ray is taken during a health examination. Other people have their stones diagnosed when sudden pain occurs while the stone is passing, and medical attention is needed.

When a person has blood in the urine (hematuria) or sudden abdominal or side pain tests like an ultrasound or a CT scan may diagnose a stone. These imaging tests tell the health care provider how big the stone is and where it is located.

A CT scan is often used in the Emergency Department when a stone is suspected. It is used because it can make a quick and exact diagnosis.

Get treated

How are kidney stones treated?

Treatment depends on the type of stone, how much trouble it is causing and the length of time you have had symptoms. There are different treatments depending on the situation. It is important to talk to your health care provider about what is best for you.

Wait for the stone to pass by itself

Often you can simply wait for the stone to pass. Smaller stones are more likely than larger stones to pass on their own.

Waiting four to six weeks for the stone to pass is safe as long as the pain is bearable, there are no signs of infection, the kidney is not completely blocked and the stone is small enough that it is likely to pass. While waiting for the stone to pass, you should drink normal amounts of water. You may need pain medication when there is discomfort.

Medication

Certain medications have been shown to improve the chance that a stone will pass. Medication may be prescribed to relax the ureter, making it easier for the stone to pass. You may also need pain and anti-nausea medicine as you wait to pass the stone.

Interventions

Surgery or other interventions may be needed to remove a stone from the ureter or kidney if:

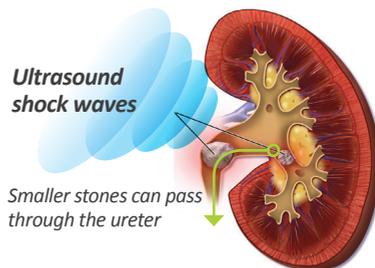
- The stone fails to pass
- The pain is too great to wait for the stone to pass
- The stone is affecting kidney function. Small stones in the kidney may be left alone if they are not causing pain or infection.

Kidney stones should be removed by surgery if they cause repeated infections in the urine or because they are blocking the flow of urine from the kidney. Today, surgery usually involves small or no incisions (cuts), minor pain and minimal time off work.

Interventions to remove stones in the kidneys or ureters are:

Shock wave lithotripsy (SWL)

Shock wave lithotripsy (SWL) is used to treat stones in the kidney and ureter. Shock waves are focused on the stone using X-rays or ultrasound to pinpoint the stone. Repeated firing of shock waves on the stone usually causes the stone to break into small pieces. These smaller pieces pass out in the urine over a few weeks.



With SWL, you may go home the same day as the procedure. You may be able to resume normal activities in two to three days. You may also be given a strainer to collect the stone pieces as they pass. These pieces will be sent to the laboratory to be tested.

Prevention of stones

What can be done to find out why I am developing stones?

Part of preventing stone is finding out why you get them. Certain tests can help find out what is causing your stones.

After finding out why you get stones, your healthcare provider will give you tips to help them from coming back.

Some of the tests are:

Medical history

Your healthcare provider will ask questions about your personal and family medical history:

- Have you had more than one stone?
- Has anyone in your family had stones?
- Do you have a medical condition that may increase your chance of having stones like diarrhoea, gout or diabetes?

Fluid intake history and diet

Know your eating habits is also helpful. You may be eating foods that are known to increase the risk of stones or too few foods that protect against stones.

You will be asked questions about how much fluid you drink to check if you are drinking enough.

Diet tips to prevent stones

► Drink enough fluids each day

- Pass more than 2 litres of urine each 24 hours
- Drink at least 3 litres of fluids (more than this if you exercise heavily or are in hot weather)
- Spread your fluid intake throughout the day and night (all drinks count – water, coffee, tea, milk)
- Drink more low sugar, sugar-free beverages
- Drink beer, wine, spirits in moderation

► Make good choices about what you eat and drink

General guidelines from the Ministry of Health “Eating and Activity Guidelines for New Zealand Adults” will benefit most stone formers.

Enjoy a variety of nutritious foods every day including:

- Plenty of fruits and vegetables
- Grain foods, mostly wholegrains
- Some milk and milk products
- Some legumes, nuts, fish, eggs, poultry, red meat
- Choose and prepare foods that are low in salt with little or no added sugar

www.health.govt.nz/publication/eating-and-activity-guidelines-new-zealand-adults

► Achieve a healthy body weight

Make good choices about what you eat and drink and be physically active to achieve and maintain a healthy body weight

► Referral to a dietitian may be required

Some people may require more specific nutrition care. A dietitian experienced in kidney stone management can provide targeted nutrition therapy based on your type of stone, specific needs and stone risk factors.



Information based on Urology Care Foundation™
“Kidney Stones: A Patient Guide”, Developed in 2015

Glossary

CT scan (or CAT scan or computerised axial tomography)

A diagnostic imaging procedure that uses both X-rays and computer technology to produce detailed images of the body.

Dietitian

A dietitian is a registered health practitioner who is trained to provide individualised targeted nutrition therapy involving assessing nutrition needs, diagnosing and treating nutrition problems.

Nephrologist (or Renal Physician)

A physician who specialises in the study, diagnosis and treatment of diseases of the kidneys.

Percutaneous Nephrolithotomy (PCNL)

A surgical procedure used to treat large kidney stones.

Shock Wave Lithotripsy

A procedure that uses shock waves to break kidney stones into tiny pieces.

Ultrasound

A procedure that uses sound waves to diagnose kidney problems and is also used for therapeutic purposes.

Ureteroscopy (URS)

A procedure that uses a very thin telescope to find and remove a stone in the kidney or ureter.

Urologist

A surgeon who specializes in the study, diagnosis and treatment of problems of the kidneys and urinary tract.

X-ray

A test that uses radiation to make pictures of the tissues, bones and organs inside your body.

Acknowledgements:

This information booklet is based on the Urology Care Foundation Guide titled “Kidney Stones a Patient Guide”. The Urology Care Foundation is the official foundation of the American Urological Association (AUA).

www.urologyhealth.org/stones. 2015.

