

Kidney stones

What are kidney stones?

Kidney stones are abnormal solid particles found within the urine in kidneys. Some are as small as a grain of sand; the rest range in diameter between a few millimetres (most) and a few centimetres. They come in a variety of colours from yellow, through brown, to almost black. Kidney stones are made of various different chemicals from the urine. They are not related to gallstones in any way.

Why do people form kidney stones?

Kidney stones are not your fault, but you can reduce your risk factors. Urine becomes concentrated when we do not drink enough, or when we lose an excess of fluid such as through sweating or diarrhoea. We all naturally concentrate our urine overnight, and so this is probably the time when most stones form and grow. Occasionally, abnormalities in the drainage of the kidney can be the cause of stone formation.

Who is most likely to form kidney stones?

Men are more likely to form stones than women. People who become dehydrated as a result of hot climates, their work, or other medical problems such as diarrhoea, are also at increased risk. Being overweight, putting on weight, doing a sedentary job, and having uncontrolled diabetes, all make stones more likely. Some families are at risk of precipitating certain stones.

How do doctors test for the presence of kidney stones?

The best way to demonstrate the presence of a kidney stone is with a form of CT scan. Once stones are known about, they can be followed up with plain x-rays of the abdomen. Ultrasound is useful for showing any obstruction to a kidney, and can reveal stones most of the time, but is not a reliable way for confirming or disproving the presence of stones. Blood tests can check on the kidney function, and shed some light on potential causes of stones. Sometimes a detailed urine test (where urine is collected for 24 hours) is used to find the cause of certain stones. If you do manage to pass a stone in your urine, do try to retrieve it. Your urologist can then send it off for analysis.



Why do kidney stones cause problems?

This perhaps has obvious answers. While many people with stones are unaware that they have them until they are found incidentally on x-ray images or scans, most people are also aware of the potential pain that stones can cause when they move. Often it is the smaller stones that give the most pain. Other problems are damage to kidney function, an association with infection, and blood in the urine.

The combination of infection and obstruction (called pyonephrosis) is a dangerous condition that needs emergency treatment and drainage in hospital, that day. Symptoms of this are pain in the side of the abdomen, along with a fever. If you fear this may be happening to you, go straight to your local hospital Emergency Department, tell them about any stones you may have and explain your current symptoms.

How are kidney stones treated?

Once formed, stones cannot generally be dissolved away. If they are not causing any bother, and are not likely to damage the kidney, they do not necessarily need treatment. They may either be monitored with occasional x-rays, or eventually completely left alone, if there has been no change after a period of time.

It is rare to have to offer an urgent surgical procedure the same day that severe pain (renal colic/ureteric colic) occurs from a stone. However, where immediate treatment is required (e.g. pyonephrosis), it nearly always involves either a nephrostomy (tube through the skin direct into the kidney) or a ureteric stent – both equally effective at draining an obstructed kidney (see below for explanations of ureter and stent).

Outside the emergency situation, there are various ways of treating kidney stones. Treatment will vary according to the size and position of the stone or stones, and the facilities available locally.

If the stone is small and in the lower ureter (one of the tubes from either kidney to bladder) the most common remedy is Medical Expulsive Therapy (MET). The patient takes tablets of alpha blockers (most commonly Tamsulosin once a day) or occasionally calcium antagonists.

Ureteroscopy is the most frequently used surgical treatment for stones in the ureter that have not passed, or are not likely to pass, by themselves. Under general anaesthetic, a fine telescope is passed through the urethra (water pipe). It can then be passed up the ureter to the stone, where it can be broken and/or removed by various techniques.

Often a stent is left in the ureter at the end of ureteroscopy, though this will be avoided if possible. Stents are temporary plastic tubes that keep the kidney draining. They can cause symptoms of cystitis, and sometimes discomfort in the kidney while you are passing urine. They need to be removed at a later stage, usually by using a fine telescope into the bladder (while you are awake) to grasp the stent and slide it out. Sometimes lithotripsy (ESWL see below) is used for ureteric stones.

When the stone is in the kidney, the options are ureteroscopy (usually for stones up to 1–2cm, but sometimes larger), and may include flexible ureteroscopy, keyhole surgery or lithotripsy (ESWL). Keyhole surgery – percutaneous nephrolithotomy (PCNL) tends to be reserved for larger or harder-to-reach stones.

ESWL works best for smaller stones that are sited in the upper parts of the kidney, though it can work for virtually any stone. The procedure is carried out while you are awake but with painkillers. A 'shock head' is placed on the side of your abdomen or back, next to the kidney. The stone is then hit by focused sound waves, usually once or twice a second for up to about 3,000 pulses per session. This breaks the stone into pieces that are small enough to be passed spontaneously with the urine. ESWL often needs to be repeated after a few days or weeks.

How can people make kidney stones less likely?

This is perhaps the most important part. By simple and palatable modifications to your diet, you should be able to reduce your risk of developing new stones, or growing any existing stones.

The biggest factor in all stone formation is the concentration of the urine. The easiest way to improve this is by drinking more fluids. In particular, drinking in the evening and taking a glass of water to bed will dilute the urine overnight and make stone formation and growth less likely.

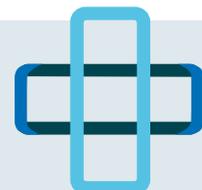
Most people will take water as the 'gold standard' for fluids, but people who drink more tea, coffee, beer and wine have been shown to be less likely to form kidney stones than people who drink the same amount of water. Conversely, fluids that increase the risk of stones are sugary drinks (especially cola), fruit juices including grapefruit, cranberry, orange and apple and spirits. Of course, if you do drink wine or beer, stay within safe limits, and remember that all alcoholic drinks can, in excess, damage the liver, brain and other organs. The current guideline for men is 21 units per week, and for women it is 14 units per week. There is no accepted safe amount of alcohol for women who are pregnant.

Most stones are formed from calcium oxalate. The important component is the oxalate. Although some 'stone diets' emphasise a need to avoid eating oxalate-containing foods, this is probably unnecessary. By including good calcium-containing foods (milk, cheese and yoghurt), the calcium will bind to any oxalate and effectively neutralise it so it cannot form stones.

Excess vitamin C is bad for stones, and is generally found in large amounts in vitamin tablets and fruit juice. Fruit itself is safe to eat, and fibre may help to prevent stones. Vitamin C, once absorbed into the body from the gut, is converted into oxalate that then leaves the body in urine and can increase the risk of stones.

Reducing salt intake

Table salt may also increase the risk of stones and should therefore be avoided. You do not need to add salt at the table or in cooking. Reducing the amount of salty foods is also a good idea. As well as making kidney stones less likely, lowered dietary salt even more importantly reduces the risk of a stroke.



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