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# Kidney Stones Patient Information

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Kidney stones can develop in one or both kidneys and can affect people of any age, most commonly between 30 and 80 years of age.

They are quite common, with around three in 20 men and up to two in 20 women developing them at some stage of their lives.

The medical term for kidney stones is nephrolithiasis, and if they cause severe pain it's known as renal colic.

## Symptoms of kidney stones

Small kidney stones may go undetected and be passed out painlessly in the urine but a stone can block part of the urinary system, such as the:

- ureter – the tube connecting the kidney to the bladder
- urethra – the tube urine passes through on its way out of the body

A blockage can cause severe pain in the abdomen or groin and sometimes causes a urinary tract infection (UTI).

## What causes kidney stones?

The waste products in the blood are filtered into the urine and can occasionally form crystals that collect inside water space in the kidneys. Over time, the crystals may build up to form a hard stone-like lump.

This is more likely to happen if you don't drink enough fluids, if you're taking some types of medication, or if you have a medical condition that raises the levels of certain substances in your urine.

After a kidney stone has formed, your body will try to pass it out when you go to the toilet (in the urine). This means it will often travel through the urinary system (the kidneys, kidney tubes (ureters), bladder & urethra).

# Treating and preventing kidney stones

Diet and Fluid intake: The important bit!

**Having plenty to drink is the best medicine!** Aim for a fluid intake of 3 litres because it reduces the chance of stone formation.

Have a mix of water, fruit juices (in moderation), soup, coconut water, decaffeinated teas, and mineral water.

\*Avoid fizzy drinks as they have lots of sugar, drinks with artificial sweeteners (as they make it difficult to rehydrate), and high quantities of caffeinated drinks.

Keeping your urine diluted helps to stop waste products becoming too concentrated and forming stones.

You can tell how diluted your urine is by looking at its colour. The darker your urine is, the more concentrated it is.

Your urine is usually a dark yellow colour in the morning because it contains a build-up of waste products that your body has produced overnight.

You should also make sure you drink more when it's hot or when you're exercising, to replenish fluids lost through sweating.

## Diet

Moderating salt intake is very important. Avoid adding salt to food, and avoid salty meals (ready made meals often contain a lot of salt) use herbs and spices for flavour instead. You can check the amount of salt on the food label.

Western diet increases the prevalence of kidney stones with high consumption of dairy, legumes, meat and grain, which can make urine high in acid

Other dietary modifications can help, dependant on the type of stone you produce. Please see individual sheets for types of stone. A dietician may be able to provide more information.

## Long term medication therapy:

Medication may be prescribed to alter the acid level (pH) of urine to try to prevent stone formation.

Other medication may include diuretic therapy that reduces the calcium levels in your urine

(Please see individual stone information)

## Medication for symptom control

You may also be given a prescription for painkillers, anti-sickness medicine, or both, for management of symptoms of kidney stones. The Doctor may prescribe alpha blockers to help stones pass.

## Surgical Intervention

Larger stones may need to be broken up using ultrasound or laser energy. Occasionally, keyhole surgery may be needed to remove very large kidney stones directly.

It's estimated that up to half of all people who have had kidney stones will experience them again within the following five years.

Symptoms usually occur if the kidney stone:

- starts to travel down the ureter (the tube that attaches each kidney to the bladder) – the ureter is narrow and kidney stones can cause pain as they try to pass through
- causes an infection
- Get stuck in the bladder or urethra

In these cases, the symptoms of kidney stones can include:

- a persistent ache in the loins (sides of the lower back), which is sometimes also felt in the groin – men may have pain in their testicles and scrotum
- periods of intense pain in the back or side of your abdomen, or occasionally in your groin, which may last for minutes or hours
- feeling restless and unable to lie still
- nausea (feeling sick)
- needing to urinate more often than normal
- pain when you urinate (dysuria)
- blood in your urine (haematuria)

## Complications

### Blocked ureter and kidney infection

A kidney stone that blocks the ureter can lead to a kidney infection. This is because waste products are unable to pass the blockage, which may cause a build-up of bacteria.

The symptoms of a kidney infection are similar to symptoms of kidney stones, but may also include:

- a high temperature (fever) of 38C (100.4F) or over
- chills and shivering
- feeling very weak or tired
- **diarrhoea**
- cloudy and bad-smelling urine
- unable to pass urine

## Types of kidney stones

**It is important to establish what type of kidney stone you have so appropriate treatment and dietary advice can be given. We can do this by analysis of any stones you have collected or sometimes from special laboratory urine tests.**

Kidney stones come in a variety of sizes, shapes and colours. Some are like grains of sand, while in rare cases others can grow to the size of a golf ball.

The main types of kidney stones are:

- **calcium containing stones**
- **struvite stones** – contain magnesium and ammonia; often horn-shaped and quite large
- **uric acid stones** – usually smooth, brown and softer than other types of kidney stones
- **cystine stones** – often yellow and resemble crystals rather than stones (cystinuria)

## Recurrent kidney stones

Some people are particularly likely to keep on developing kidney stones, including people who:

- eat a high-protein, low-fibre diet
- are inactive or bed-bound
- have a family history of kidney stones
- have had several kidney or urinary infections
- have had a kidney stone before, particularly if it was before you were 25
- have had an intestinal bypass (surgery on your digestive system), or a condition affecting the small intestine, such as Crohn's disease

## Imaging tests

If you're referred to hospital for an imaging test, a number of different techniques may be used. Imaging tests can help confirm the diagnosis, or identify precisely where a kidney stone is.

These tests include:

a **computerised tomography (CT) scan** – where a series of X-rays at slightly different angles are taken and a computer is used to put the images together

**X-ray** – an imaging technique that uses high-energy radiation to highlight abnormalities in body tissue

an **ultrasound scan** – uses high-frequency sound waves to create an image of the inside of your body

**Most kidney stones are small enough (less than 4mm in diameter) to be passed out in your urine and can probably be treated at home.**

## Treating large kidney stones

If a kidney stone is too big to be passed naturally – 6-7mm (about 0.23 to 0.27in) in diameter or larger – you may need treatment to remove it another way.

This could include:

- extracorporeal shock wave lithotripsy (ESWL)
- ureteroscopy
- percutaneous nephrolithotomy (PCNL)
- open surgery

These procedures can be explained in more detail in other literature or during your consultation if required. The type of treatment you have will depend on the size and location of your stones.

## When to seek urgent medical attention

You should seek urgent medical attention if:

- you have a high temperature (fever) of 38C (100.4F) or over
- you have an episode of shivering or shaking
- the pain gets worse, particularly if it's a sudden, severe pain
- if you are unable to pass urine
- Contact your GP immediately if you experience any of the symptoms above. If this isn't possible, call NHS 111 or your local out-of-hours service

**The best way of preventing kidney stones is to make sure you drink plenty of water each day to avoid becoming dehydrated.**

# Uric Acid Stones- Treatment

**High fluid intake** – 3 litres per day

## **Making pH of urine more Alkaline:**

Uric acid stones are much softer than other types of kidney stone, and they can be made smaller if they're exposed to alkaline fluids.

Adding Lemon and Lime to water can help

## **Medication:**

Your doctor may prescribe you medication to help make your urine more alkaline such as potassium citrate BP or Effercitrate

You will be prescribed a medication called Allopurinol to reduce the amount of uric acid in your blood

## **Diet:**

- Moderate salt intake (<5g per day)
- Eat a healthy diet that contains foods that help alkalise urine – vegetables, fruits, herbs and spices
- Avoid a high protein diet (meat, fish, pulses, nuts). Stick to recommended 2-3 servings per day (a portion/serving of protein should be about the size of the palm of your hand)

# Calcium Oxalate

**High fluid intake** – 3 litres per day

## **Making pH of urine more Alkaline:**

Adding Lemon and Lime to water can help

## **Medication:**

Your doctor may prescribe you medication to help make your urine more alkaline such as potassium citrate or Effercitrate

You may be prescribed a medication called Allopurinol to alkalise urine

Your doctor may prescribe you a magnesium supplement

## **Diet:**

- Moderate salt intake (<5g per day)
- Eat a healthy diet that contains foods that help alkalise urine – vegetables, fruits, herbs and spices
- Avoid a high protein diet (meat, fish, pulses, nuts) Stick to recommended 2-3 servings per day (a portion/serving of protein should be about the size of the palm of your hand).
- Reduce oxalate content and calcium content in your diet (Dietetic advice)

# Cystine stones (Cystinuria)

**High fluid intake** – 3 litres per day

## **Making pH of urine more Alkaline:**

Alkalisating urine can help to reduce cystine stone formation.

Adding Lemon and Lime to water can help to make urine more alkaline, as well as drinking mineral water.

## **Medication:**

Your doctor may prescribe you medication to help make your urine more alkaline such as potassium citrate or effecitrate.

If the above are not successful, your doctor may suggest powerful medicines such as penicillamine or tiopronin

## **Diet:**

- Healthy diet
- Moderate salt content (<5g per day)
- Avoid food and drink with a high sulphur content  
(coconut milk/oil/juice, cruciferous vegetables such as broccoli, cabbage, mustard leaves, dried fruit, eggs, garlic, onion and wine)

# Calcium phosphate stones

Calcium phosphate stones mostly occur during pregnancy

**High fluid intake** – 3 litres per day

**To try to prevent stone formation, urine needs to be more acidic: aim for urine pH of 6.5**

**Adding food and drink that can increase urine acidity can help:**

- Almond Milk
- Cocoa, Coffee
- Cranberry Juice
- Orange Juice
- Rice Milk
- Soft Drinks
- Soy Milk

Most Nuts, beans, meat, fish and grains can cause urine to be more acidic so this can be helpful.

# Personal Management Plan

Patients Name: .....

Stone Type: .....

Fluid Intake Target: .....

Specific Gravity target: .....

Special dietary advice:

.....  
.....  
.....

Medication:

.....  
.....  
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## Specific Gravity/pH chart

<b>Date:</b>		
Morning 1		
Morning 2		
Morning 3		
Morning 4		
Morning 5		
Morning 6		
Morning 7		
Morning 8		
Morning 9		
Morning 10		
Morning 11		
Morning 12		

\*Recording a higher specific gravity than target – you need more fluids!

Either fill in the table to record pH and specific gravity or record it on your phone, in your calendar

Email me your results or bring them along to your next clinic appointment





The Trust provides free monthly health talks on a variety of medical conditions and treatments. For more information visit [www.uhb.nhs.uk/health-talks.htm](http://www.uhb.nhs.uk/health-talks.htm)

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