



York Teaching Hospital  
NHS Foundation Trust

# Dietary Treatment to Help Prevent Recurrence of Kidney Stones

Information for patients, relatives and carers

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Caring with pride

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## Introduction

Kidney stones form when waste products in the blood cause crystals to collect inside the kidneys. Over time the crystals may build up to form a hard stone-like lump.

Kidney stones can develop for a number of reasons. This is more likely to happen if you don't drink enough fluids, if you're taking some types of medication, if you are overweight, if your urine becomes more acidic or if you have a medical condition that raises the levels of certain substances in your urine.

If the urine becomes saturated with these substances over a long period of time the stones will slowly grow in size.

Your diet can affect the levels of these substances in the urine as well as the acidity of your urine. The dietary advice in this booklet outlines the general advice to help prevent the recurrence of the most common types of kidney stones, and gives specific advice relevant to particular types of stones.

## Types of kidney stones

### Calcium stones

Calcium stones, usually in the form of calcium oxalate, are the most common type of kidney stone and are caused by increased calcium in the urine. Diets low in calcium can increase the risk of stones so you should not restrict your calcium intake. Follow the guidance in this leaflet on how much calcium to include in your diet (See page 18).

### Uric acid stones

Uric acid is the waste product created when the body breaks down purines (a type of protein found in many foods and all of our cells). The body is not able to break down uric acid, so it can accumulate in the blood and urine. Uric acid can begin to form very small crystals in the urine, which eventually give rise to uric acid stones.

Factors that encourage uric acid stones to form are:

- Producing urine that is more acidic than normal.
- Producing a smaller volume of urine due to drinking less fluid.
- Having a higher level of uric acid due to eating more foods that are higher in purines, such as meat, liver, oily fish and seafood.

Having urine that is more acidic is thought to be the most important factor. This can be associated with:

- Diabetes.
- 'Pre-diabetes' or Insulin resistance.
- Eating a high protein diet.

## Current dietary guidelines

These dietary factors will help reduce the risk of recurrent kidney stones:

- A high fluid intake – aim for two and a half to three litres daily.
- Add fresh lemon juice to drinking water - add three fluid ounces/85ml to a one litre of water and drink throughout the day.
- Avoid fizzy ‘soft’ drinks.
- Eat a healthy diet and aim for weight loss if you are overweight.
- Reduce your salt intake.
- Moderate your protein intake (see page 17).

In addition, if your kidney stones are caused by too much calcium:

- Include some calcium rich foods on a daily basis (700-1200mg (milligrams) daily).
- Moderate your intake of oxalate rich foods (see page 20).

These specific dietary factors will be explained in detail in this booklet, and should be included within a balanced diet.

## A balanced diet

It is important to eat a wide variety of foods to ensure we get all the nutrients our body needs.

- Eat three regular meals per day.
- Base meals around breads, lower salt breakfast cereals, rice, pasta or potatoes. These foods give us carbohydrates. Choose the higher fibre options of these foods.
- Have a serving of meat, fish, egg, pulses or cheese at two meals. These foods give us protein which is needed every day for repair and replacement of body tissues.
- Eat five portions of fruit and vegetables per day. They give us fibre, and a range of vitamins and minerals.
- Milk and milk products give protein, calcium and some vitamins. Choose low fat options if you are trying to lose weight.

## A high fluid intake

Drinking enough fluid is the most important aspect of preventing stone formation. Keeping your urine diluted helps to stop waste products getting too concentrated and forming stones.

- You should aim to drink two and a half to three litres (five to six pints) of fluid per day.
- If you are overweight you should drink a minimum of three litres per day (six pints) or up to four litres (eight pints) in hot weather. Try to ensure that your fluid intake is spread out over the day, evening and during the night if possible.
- If you are drinking adequate amounts of fluid your urine should be pale in colour. If it begins to look dark and concentrated then you are not drinking enough.
- It is particularly important that fluid intake is high in the evening to prevent your urine becoming too concentrated overnight.



## Which fluids are best?

### Drink freely:

- Water (tap or bottled, ) (preferably with added fresh lemon juice).
- Fruit squashes (try lower sugar versions).
- Herbal and fruit teas.

### In moderation:

- Fresh fruit juices, 120 ml per day.
- Wines, beer & spirits, not more than the recommended units of alcohol per week.
- Tea and coffee.

### Avoid:

- Oxo and Bovril as these are very salty.
- Carbonated (fizzy) soft drinks.

## Alcohol

- Both men and women are advised to keep to no more than 14 units of alcohol per week due to associated health risks.
- If you do drink as much as 14 units per week, it is best to spread this evenly over three days or more.
- If you wish to cut down the amount you're drinking, a good way to help achieve this is to have several alcohol free days each week.

### How many units do drinks contain?

- 125ml of 12% wine = 1.5 units
- 175ml of 12% wine = 2 units
- 250ml of 12% wine = 3 units
- Pint of lower strength lager/beer/cider (3.6%) = 2 units
- Pint of stronger lager/beer/cider (5.2%) = 3 units
- Can of lager/beer/cider (440ml 5%) = 2 units
- Single measure/25ml of spirit (40%) = 1 unit

Please note: drinks with higher percent (%) of alcohol will contain more units of alcohol.

## **Are you a healthy weight?**

It is not good for your health to be either overweight or underweight.

If you are underweight or if you are unintentionally losing weight you may not be getting enough of all the nutrients that your body requires. If this is the case, please ask your doctor to refer you to a Dietitian.

If you are overweight you are more likely to develop kidney stones. It would be beneficial for you to make changes to your lifestyle to help with weight loss.

## **If you are overweight**

Weight loss should be steady and slow – aiming for 0.5 to 1 kilogram (kg) (one to two pounds) per week.

Try to make the following changes to your diet:

- Avoid fried foods.
- Use semi-skimmed or skimmed milk.
- Cut down on cakes, pastries and biscuits.
- Cut down on sweets and chocolates.
- Use diet or no added sugar drinks.
- Don't add sugar to tea and coffee.
- Cut the fat off meat and take the skin off chicken.
- Have smaller portion sizes.
- Eat slowly and chew food well.
- Don't miss meals – avoid becoming too hungry and have fruit in between meals if necessary.
- Aim to have three meals per day.

## Salt

Most of us eat too much salt. Recent research suggests that people who have kidney stones are particularly “sensitive” to salt and a high salt intake can contribute to stone formation.

The healthy eating recommendation is that we consume no more than six grams of salt per day (one teaspoon).

### **Are there any types of salt that are better than other?**

All types of salts have the same effect on your health. Sea, rock, crystal, flaked, coloured, and flavoured salts are still sodium chloride.

## How can I reduce my intake of salt?

- Avoid adding salt to your food.
- Try not to use salt or reduce the amount used in cooking – flavour with pepper or herbs and spices.
- Reduce your intake of processed foods.
- Cut down on salted meats, e.g. bacon, ham and other processed meats.
- Cut down on salty snacks such as crisps and nuts.
- Stock cubes and meat extracts, e.g. Oxo, Bovril, or Marmite and gravy granules are very salty so use less or try making your own stocks, using herbs and spices for flavour.
- Where possible choose tinned foods in water rather than in brine.
- Canned, packet and instant soups are very high in salt so only have occasionally.
- Takeaways such as Chinese meals may be very high in salt so only have occasionally and avoid soy sauce.

## **Where does salt come from?**

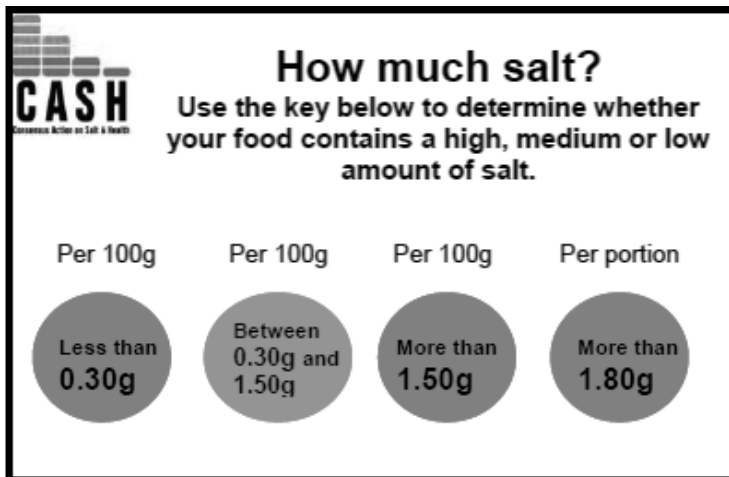
The salt that occurs naturally in fresh foods is enough to provide the small amount of salt that your body needs.

About three quarters of the salt we eat is hidden in processed foods. Manufacturers add salt to many foods as a preservative and flavour enhancer. These foods don't necessarily taste salty and it is therefore important to look at the food labels to help you make lower salt choices.

## Making sense of the labels?

Nutrition labels are usually found on the back or the side of food packaging. The full nutritional information is provided per 100g of the product. Sometimes they also tell you the information per serving or per pack.

Some products combine colour coding with the nutritional information. Colour coded labelling makes it easy to see at a glance if a product is high (red), medium (amber) or low (green) in certain nutrients including salt. Aim to mainly choose products where salt is coded green, have amber products occasionally and limit the number of red products.



Source: Consensus Action on Salt and Health



## Have a moderate protein intake

It is important that you eat enough protein to meet your body's needs. However research has shown that a high protein diet can:

- Increase the amount of calcium in the urine.
- Cause the urine to become more acidic.
- Increase the risk of kidney stone formation in some people.

The main protein sources in the diet are:

Meat, fish, eggs, cheese, pulses and dairy foods.

Have a serving of meat, fish, egg, pulses or cheese at two meals each day.

Sensible portion sizes for protein foods are:

- Half a pint of milk a day for drinks and cereals.
- 120g pot of yoghurt.
- 2oz (ounces) or 50g of meat, fish, chicken, or one egg at a small meal.
- 4-5oz or 100-125g of meat, fish or chicken, or two eggs at a main meal.

Be aware that cooked breakfasts contain a lot of protein and may be high in salt.

Avoid snacking on salted nuts, which are high in protein and salt.

## Calcium

In the past the main treatment for calcium stones was a strict calcium restriction, e.g. avoidance of all dairy products. However, we now know that this is not necessary and may even be harmful.

A low calcium diet can cause stone formation by increasing absorption of oxalate in the gut. This results in higher oxalate levels in the urine and an increased risk of stone formation.

Try to include calcium rich foods, aiming for 700-1200mg (milligrams) daily.

If you find it difficult to eat calcium rich foods a calcium supplement can be taken at mealtimes to help lower the risk of stone formation.

## Sources of Calcium table

Sources of calcium	Quantity	Calcium (mg)
Milk (all types)	200ml	240
Calcium enriched milk alternatives e.g. rice, soya, oat, nut and coconut	200ml	240
Cheese*	30g (matchbox size)	220
Yoghurt	120g	200
Soya bean curd/tofu (Only if set with calcium chloride (E509) or calcium sulphate (E516), not nigari)	60g	200
Calcium fortified cereals	30g	130-150
Hot chocolate (try to choose 'light' options)	25g serving in 200ml water	200
Sardines (with bones)	half tin or 60g	260
Pilchards (with bones)	60g	150

\*NB – this is a high salt food

## Oxalate containing foods

If your kidney stone is caused by too much calcium in the urine, you may be advised to reduce the amount of oxalate in your diet. Only a small amount of urinary oxalate comes from the diet which means it is not necessary to avoid oxalate containing foods. Having an adequate calcium intake will limit oxalate absorption.

These are high in oxalate and would not be recommended in large quantities:

- Beetroot
- Almonds
- Rhubarb
- Spinach

The foods listed below contain some oxalate and would not be recommended in large quantities:

- Berries
- Cocoa and chocolate
- Nuts
- Peanut butter
- Parsley
- Soy products, including soy milk, cheese and tofu.
- Tea and coffee contain a moderate amount of oxalate; aim to have no more than two to three cups per day. Adding milk to tea and coffee decreases the oxalate absorption.

## **What if you have a poor appetite?**

It is always important to maintain an adequate nutritional intake and to stay well nourished. If you have been asked to make specific changes to your diet and fluid intake but you have a poor appetite, then you could find it difficult to make any changes.

Please ask your doctor to refer you to a Dietitian for more help and information.

## Useful websites

### **NHS website – For information on Healthy eating and NHS weight loss plan**

<https://www.nhs.uk/live-well/eat-well/>  
[Accessed July 2019]

### **Consensus Action Salt and Health**

<http://www.actiononsalt.org.uk>  
[Accessed July 2019]

### **Consensus Action Salt and Health - international low salt recipes**

<http://www.actiononsalt.org.uk/resources/how-to-eat-less-salt/recipes/>  
[Accessed July 2019]

### **NHS website– Salt: the facts**

<http://www.nhs.uk/Livewell/Goodfood/Pages/salt.aspx>  
[Accessed July 2019]

## **Tell us what you think of this leaflet**

We hope that you found this leaflet helpful. If you would like to tell us what you think, please contact:  
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## **Teaching, training and research**

Our Trust is committed to teaching, training and research to support the development of health and healthcare in our community. Healthcare students may observe consultations for this purpose. You can opt out if you do not want students to observe. We may also ask you if you would like to be involved in our research.

## **Patient Advice and Liaison Service (PALS)**

PALS offers impartial advice and assistance to patients, their relatives, friends and carers. We can listen to feedback (positive or negative), answer questions and help resolve any concerns about Trust services.

PALS can be contacted on 01904 726262, or email [pals@york.nhs.uk](mailto:pals@york.nhs.uk).

An answer phone is available out of hours.

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