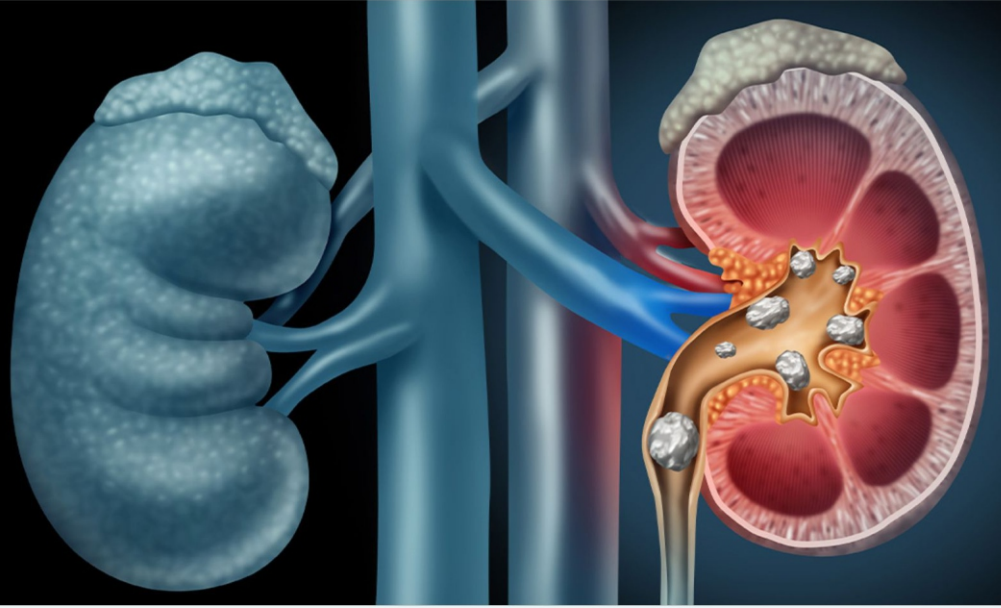


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# KIDNEY STONES

By Dr. ShyamVarma



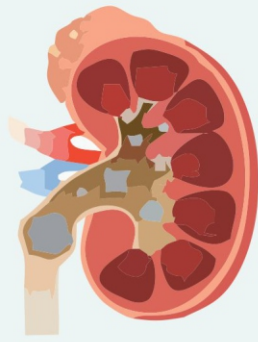
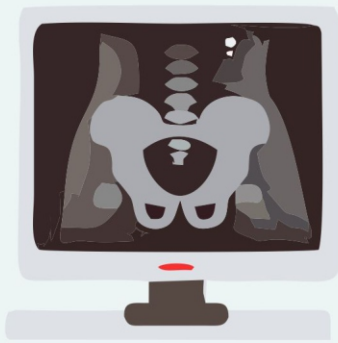
In this diet sheet we will give you general dietary advice to help prevent the formation of all types of kidney stones. This will be followed by advice specific to the most common stones: calcium oxalate, calcium phosphate and uric acid. Your doctor will discuss with you the type of stone that you have or, if it is not known, the most likely type. Most of the advice is applicable to all types of kidney stone.

We are speaking of the diet for treatment of idiopathic calcium stones. Stones from systemic diseases, like bowel disease, primary hyperparathyroidism, primary hyperoxaluria, are treated by treating those diseases, and that is a different matter altogether. Of the millions of Indian people with stones, majority are idiopathic.

## What is a kidney stone?

A kidney stone is a clump of crystals which, when formed together, create a hard lump in one or both kidneys. They can vary in size from a few millimetres to several centimetres. They can be present for long periods of time without causing problems or they may move, causing discomfort. If they drop into the ureter (pipe from kidney to bladder) they can get stuck and cause severe pain. The few of stones will pass out of the body in the urine without any help, but some will require intervention to remove them.

Your diet can affect the concentration of certain substances in your urine and can affect the acidity of your urine. You may be asked for a 24 hour urine collection looking for any abnormalities in your urine – if your urine shows any of the following properties, you will be at increased risk of forming a stone:



- High levels of calcium (hypercalciuria)
- High levels of oxalate (hyperoxaluria)
- High levels of uric acid (hyperuricaemia)
- Low levels of citrate (hypocitraturia)

## General advice for the prevention of kidney stones.



- Maintain adequate fluid intake to produce at least two litres of urine per day. To achieve this you will need to drink two to three litres of fluid per day (provided you have normal kidney function) and maybe more if exercising or in hot weather.
- Drink enough to make your urine clear or pale yellow.
- Limit salt intake to 6g/day.
- Reduce intake of animal protein (meat and dairy).
- Aim to achieve or maintain a healthy weight - BMI < 25.
- Maintain adequate dietary calcium intake (at least the recommended daily allowance) from food sources.
- Increase intake of fruit and vegetables (at least five portions per day).
- Eat fresh fruits or drink fresh fruit juices.
- Ensure adequate fibre intake.

## Tips and further advice

**Fluid:** Fluid intake reduces the risk of stone formation. When you are well hydrated your urine will be a pale colour rather than very yellow. Pale urine is less concentrated in waste products such as calcium, oxalate and uric acid and therefore less likely to lead to stone formation. You should aim to drink two to three litres per day or enough fluid to produce a



urine output of two litres per day. This reduces the risk of recurrence by 30-40%. You can easily monitor your daily urine output yourself at home.

### Tips to help you increase your fluid intake:

- Drink a large glass of water at specific times during the day, for example, when you get up in the morning, when you arrive at work, after using the toilet, and so on.
- Drink one glass of water each hour on the hour.
- Keep a large bottle or mug of water at your desk and sip from it throughout the day.
- Enjoy a glass of fruit juice with your breakfast.
- When you have a craving for a snack, drink a glass of water, buttermilk instead.
- Add slices of lemon, lime or oranges to cool water. This gives it a pleasant flavour and helps to alkalinise your urine.  
Drink two full glasses of fluid at each meal – one before eating and one after eating.
- Carry a refillable water bottle everywhere walking, shopping, driving, watching television or exercising.
- Eat more fruits and vegetables as they contain a high amount of water.
- Include liquid and moist foods, such as soups, cucumber, lettuce green leafy vegetables in your diet.
- Alcohol is generally bad for stone formation because it dehydrates you later on. Alcohol intake should therefore be avoided and if consumed should be within the advised weekly limits.
- Of the fizzy drinks, the colas (diet coke, coke zero, diet pepsi) have little alkalinising effect on the urine and are therefore not good for stone formers.

## Salt

A high salt (sodium chloride) intake is directly associated with high calcium and low citrate levels in the urine, leading to increased risk of stone formation.

Limit salt intake to no more than 6g per day. Seventy five per cent of our salt intake is from processed foods, so in addition to limiting/avoiding the amount of salt you add to your food, you should also check the labels on food packaging.

Quick guide to checking salt content on food labels

**Low      Medium      High**

**Sodium (per 100g):** Less than 0.12g   0.12g – 0.6g   More than 0.6g

**Salt (per 100g):**      Less than 0.12g   0.12g – 0.6g   More than 0.6g



## Animal protein

Protein is an important nutrient in the body. One of its functions in the body is growth and repair. It is important that you eat enough protein to meet your body's needs. There are both animal and vegetable sources of protein available to us in our diets (see table below). Some people at risk of kidney stone formation have an excessive amount of animal protein in their diet, for example, servings of meat greater than 100g per meal.

### Animal protein foods

Meat  
Poultry  
Fish  
Cheese  
Yougurt

### Vegetable protein foods

Lentiles  
Chickpeas  
Beans, such as  
kidney beans, butter beans,  
baked beans & eggs  
Nuts --almonds,cashew  
nuts, pista, peanuts,  
hazelnuts etc.



A reduction of animal protein decreases calcium and uric acid in the urine and increases citrate, therefore decreasing the overall risk of stone formation.

Protein build-up drinks should be avoided.

## Healthy weight

A healthy weight can be defined as having a body mass index (BMI) between 19 – 25 kg/m<sup>2</sup>. This can be calculated by dividing your weight (in kg) by your height (in metres) squared (wt/h<sup>2</sup>).



For example, if you are 80kg and 170cm tall then your BMI is  $80/(1.7*1.7) = 27.7$

There are a number of online calculators that can do this for you. A higher BMI has been linked to high uric acid levels. Urine pH tends to be acidic in overweight people and there is an increased risk of most stone types.

## Calcium

Calcium in the diet can be helpful because it binds oxalate in the gut, which prevents it from being absorbed. Therefore low-calcium diets are not recommended as they result in increased oxalate absorption to the body, higher levels in the urine and increased risk of stone formation.

It is important that you have normal levels of calcium in your diet, but you should not have excessive amounts (more than 1200mg/day) unless you are a woman who is breastfeeding.



Here are some examples of the calcium content of foods:

- 1 glass of semi-skimmed milk – 355mg of calcium
- 150g pot of fruit yoghurt – 240mg of calcium
- 50g of cheese – 360mg of calcium
- 80g of dried figs – 200mg of calcium

#### Recommended daily amounts of calcium

Men 11–18 years	:	1000mg
19+ years	:	700mg
Women 11–18 years	:	800mg
19+ years	:	700mg
Pregnant	:	700mg
Breastfeeding	:	1250mg

## Fruit juice

Drinking fruit juices (orange, lemon, apple) appears to decrease oxalate and increase citrate levels in the urine. However, these can be also high in sugars which can have a detrimental effect on weight, general health and stone formation. There is mixed evidence for cranberry juice and grapefruit juice. Overall, while there is some evidence that fruit juices may help, increasing your intake is generally not recommended. They may be detrimental if you have calcium phosphate stones.



## Fruit and vegetables:

Fruit and vegetables have an alkalinising effect on the urine. They often also contain fluid, which helps with your daily intake. Oxalate stone formers should limit their intake of oxalate-rich fruit and vegetables (see below).



## Fibre:

A wide variety of high-fibre plant foods contain a compound called phytate. It has been demonstrated in experimental studies that patients with a low phytate intake had an increased risk of calcium oxalate stone formation and so increasing your fibre intake may be beneficial.

It is recommended that the average intake of fibre for adults should be 18g/day (individual range 12–24g/day). Please see the table below for the fibre content of some common foods.



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Dr Shyam Varma is a Consultant Laparoscopic/ Robotic Urologist & Renal Transplant Surgeon. He has over 15 years of experience in successfully treating complex urological diseases. His expertise includes diagnosing & treating Kidney stones, prostate enlargement, prostate cancer, kidney cancer, bladder cancer & incontinence, male infertility & erectile dysfunction.

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