Percutaneous Nephrolithotripsy (PCNL)

PCNL involves making a small cut on the back of the body under general anaesthesia to pass an endoscope into the kidney. The stones are then broken up and fragments removed. PCNL is reserved for large stones in the kidney and gives excellent outcomes. It is also suitable for extremely large stones which occupy the entire collecting system of the kidney called staghorn stones. More than one session of PCNL may be required for such stones.

Bladder Stones

Small bladder stones can be crushed using endoscopic methods. Patients will be under general or spinal anaesthesia and a bladder scope (cystoscope) is inserted via the urethra. Stones are then fragmented and flushed out.

Large bladder stones however will require open surgery under anaesthesia. Post-operatively, patients will have to be on urinary catheters for approximately a week after open removal of bladder stones.

Extracorporeal Shockwave Lithotripsy (ESWL)

In ESWL, a shockwave generator outside the body sends shockwaves (acoustic energy) to the stone to break it into smaller pieces.

This procedure does not require general anaesthesia and is suitable for stones both in the kidney and ureter. After the shockwaves have fragmented the stone, the patient needs to drink plenty of fluids to help expel the particles out of the urinary system.

After the procedure, the patient may pass some blood-stained urine over the following few days. The patient may also experience colicky loin to groin pain when the fragments are being passed down the ureter. ESWL is a safe procedure with a reasonably good success rate. However, depending on the hardness and the location of the stone, 10-40% of patients may need repeat treatment or alternative procedures.

Ureterorenoscopy (URS) with laser lithotripsy

Endoscopic surgery is another option in the treatment of urinary stones. Under general anaesthesia, an endoscope known as ureterorenoscope is inserted into the upper urinary tract via the urethra. The scope is advanced towards the stone until it is seen. Using a laser fibre the stone is fragmented to tiny fragments. These are then flushed out or retrieved with the scope. Occasionally, a stent may be inserted into the ureter. The stent allows the urine to drain from the kidney to the bladder unobstructed. It also facilitates repeat or secondary procedures for remnant stones. The stent can easily be removed under local anaesthesia at a later date.

The information provided is meant for education purposes only and cannot substitute formal medical consultation provided by your own physician or other medical professionals. You should consult a urologist for specific advice if you have or suspect that you have urinary stones.
What are urinary stones?

Urinary stones are stone which are found in the kidney, ureters or bladder.

These stones are often composed of minerals such as calcium oxalate, magnesium and phosphate.

Why do people get urinary stones?

Many factors play a part in the formation of urinary stones.

One common factor is that stones are precipitated out from concentrated urine when a patient does not have sufficient fluid intake.

Another possible cause is repeated infection leading to formation of a special type of stone called struvite stones.

Some stones may form due to certain pre-existing medical conditions. Patients with gout are at higher risk of uric acid stones. Those with parathyroid disorders with high calcium in their blood or urine are predisposed to calcium stones.

Bladder stones may form when there is urinary retention as a result of obstruction from prostatic enlargement or from bladder dysfunction.

Signs and symptoms

The most common symptom of urinary stones is severe colicky pain over the flank, which may sometimes radiate down to the groin. Occasionally, patients may also experience passing blood in the urine or they may have urinary tract infections.

In some patients the stones are silent and only noted on radiological imaging done for other reasons. It is important to note that not all back pain or blood-stained urine are due to urinary stones and other causes may need to be ruled out.

Diagnostic Investigations

A simple X-ray called a KUB film is a good tool to screen for urinary stones. However, 10% of stones cannot be seen on KUB and hence, patients may have to undergo other forms of imaging. These include intravenous urogram (IVU) or CT scan of the kidneys, ureter and bladder (CT-KUB).

Urine tests and blood tests may also be needed to look for urine infection and assess the patient’s kidney function.

What are the risks of untreated stones?

Small stones in the kidney which are not causing any symptom may not need treatment and can be observed. However, when the stone grows bigger or when it obstructs the kidney, it will require treatment. The stone may also move out of the kidney and get lodged in the ureter. This is the cause of severe colicky pain many patients experience. If left untreated, prolonged obstruction may lead to infection and gradual damage to the kidney.

Stones in the bladder may cause irritating urinary symptoms and also lead to recurrent urinary tract infections.

Treatment Options

Prior to 1980s, removal of stones required that patients undergo open surgery. Over the last 30 years, technological advancement has now made open surgery uncommon. The following methods may be used for minimally invasive treatment of stones based on the nature, site and size of the stone.

Medical Expulsion Therapy (MET)

Ureteric stones less than 5mm may pass out spontaneously with the help of medication. The medicine does not dissolve the stone or make it smaller but helps by relaxing the ureter to allow the stone to pass out. The medicine is taken over a period of 3-4 weeks. However, MET does not work for kidney stones or large stones and is not suitable if there are complications such as infection, severe obstruction or worsening of kidney function.

What can you do to prevent the formation of urinary stones?

Plenty of fluid intake is the key to prevention of urinary stones formation. Patients who have history of kidney stones are recommended to drink enough fluids to be able to pass 2 litres of urine per day.

Citrate in the urine prevents stone formation. Patients should therefore increase intake of citrus fruit juices such as orange juice, lemon juice or lime juice.

Low sodium diet may also help reduce the incidence of stone formation.

Patients with calcium oxalate stones should avoid excessive intake of food with high oxalate content such as green leafy vegetables (e.g. spinach), peanuts, chocolate, beer, black tea, berries and beans.

Patient known to have gout should take low purine diet and decrease their intake of red meat, nuts, beer, shellfish and liver.