

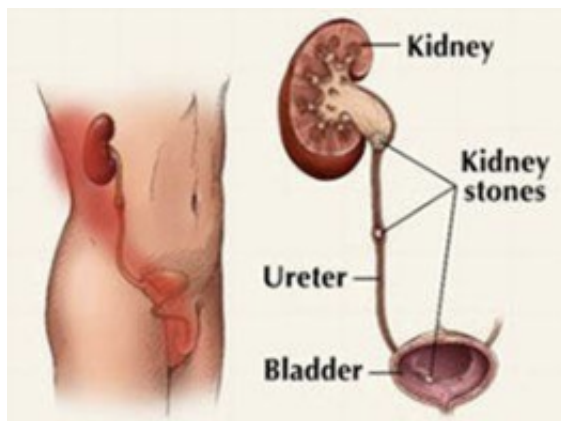
## Medicine for Managers

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# Kidney Stones and Lithotripsy

Kidney stones are hard deposits of minerals and salts which may form inside the kidneys. A stone normally causes no symptoms until it moves within the kidney or passes into one of the ureters. Those of you who have suffered renal colic, the pain which some experience as the stone passes down the ureter or becomes lodged, will concur with me that it can be very severe and is often described as the worst pain a person can suffer.



Stones may form as a result of obesity, some medical conditions and some medications and can affect any part of the renal tract, as shown in the illustration. When they move, they may be passed without complication or may lodge, commonly in the ureter, causing pain, urinary obstruction, infection and sometimes kidney swelling. They require surgical intervention to remove them.

**Renal colic** is commonly severe, comes in waves and fluctuates in intensity, is felt in the side and the back, below the ribs and often becomes

more severe when passing urine. Other features may be the passage of pink or red urine, which may have an offensive smell. The sufferer may experience repeated urges to pass urine with the passage of only small volumes. There may be a fever and nausea and vomiting.

The symptoms normally subside when the stone passes into the bladder.

Stones are removed to treat or prevent:

- Bleeding
- Damage to the kidney as a result of obstruction
- Pain, which may be very severe
- Urinary Tract Infections

Historical medical literature contains many references to renal colic and its causes. Initially, the only method of removing stones that were too large to pass spontaneously was by surgery. There is a famous picture in the Wellcome

collection of "The Extraction of the Excruciating Bladder Stones".



In 1832, the French urologist Jean Civiale invented the **lithotrite**, an instrument to crush stones inside the bladder. The instrument was developed and became a principal method of removing stones without surgery. The

instrument was passed up the urethra to catch and fragment the stone which could then be



removed or passed naturally.

The use of surgery or lithotrites was largely progressively replaced from the beginning of the 1980s by the use of **lithotripsy**. The first NHS hospital to receive a **shock wave lithotripter** in the UK was at St Thomas' Hospital in 1984, which revolutionised treatment and the hospital played a crucial role in its adoption.

**Lithotripsy** is a technique and procedure that uses shock waves to break up stones in the kidney and within the ureter. Following the use of the procedure, the remnants of the stone (gravel) pass down the ureter into the bladder and from thence out in the urine.



Extracorporeal Shock Wave Lithotripsy (ESWL) is the most common form of this type of treatment. The term 'extracorporeal' indicates that it is applied from outwith the body.

The procedure is undertaken as follows:

- It is usually performed as an outpatient
- Commonly patients receive a sedative, or sometimes general anaesthesia.
- Patients are positioned on a table, on a water-filled cushion (to ensure the shock waves can be focused accurately)
- X-rays or ultrasound are used to pinpoint the stone(s) to inform targeting
- The lithotripter is positioned near the side of the abdomen



- Shock waves directed at the stone(s) breaks it or them into minute fragments.
- The result may be checked with X-ray
- On occasion a small tube (stent) may be placed in the ureter to help fragments to pass to prevent obstruction

Recovery is normally rapid. Some pain relief may be required. It is important to drink plenty of fluids to flush out fragments of stone.

Not all kidney stones are removed by lithotripsy

**Ureteroscopy** involves the use of an endoscope, which has a light, and which is passed into the bladder and up into the ureters. The stone may be removed with retrieval instruments.

#### ***Percutaneous nephrolithotomy***

This technique involves a lit tube called a **nephroscope**. Percutaneous means that it passes through the skin. A small cut is made in the back and the nephroscope is passed through the skin and into the kidney. It is normally performed under general anaesthetic. Various types of instrument or technique may be used to remove the stone.

Although patients will usually be advised to have the stones removed if they are causing symptoms or complications, the treatment of large kidney stones may also, of itself, cause complications. These may include:

- Post-operative pain
- Bleeding during or after surgery
- Blockage of the ureter by a stone fragment, requiring a further procedure.

- Urinary tract infection
- Generalised sepsis

Sometimes medication is employed to manage stones.

If they are formed of

**calcium**, a doctor may

prescribe a thiazide diuretic to prevent their formation. If formed of **uric acid**, allopurinol (Zyloric) may be used to reduce blood uric acid levels and help keep the urine alkaline. **Struvite stones** are composed of **phosphate** and **calcium apatite** and are associated with the presence of recurrent urinary infections.

