



MANAGEMENT OF KIDNEY STONES

What are the choices in management of kidney stones?

The choices for surgical management in general remain the same for all types of stone disease. Recommended options depends on stone size, stone hardness, stone location in the kidney or the ureter, and on any symptoms and signs, particularly of obstruction.

Kidney stones can be managed by
Extracorporeal shock wave lithotripsy (ESWL),
Flexible urethro-rensoscopy (URS) and laser removal also known as retrograde intrarenal surgery (RIRS)
Percutaneous nephrolithotomy (PCNL).

According to Eau guidelines 2018

Management of kidney stones-

Less than 1cm - ESWL or RIRS.
1cm to 2cm - ESWL or RIRS or PCNL(lower calyx)
More than 2cm - PCNL

Many times due to long standing obstruction, the kidney may have lost its functioning capacity and may require surgery for removal of kidney.

What is Extracorporeal Shock Wave Lithotripsy (ESWL)?

Lithotripsy for kidney stones is a procedure that is performed with mild-to-moderate sedation. The patient is awake but in case he or she feels pain, it can be done under anaesthesia. Depending on the stone size, a Double J stent may need to be placed prior to ESWL to prevent complications of stones blocking the urine tube once they are broken.

What are the stones for which ESWL can be attempted?

A special machine that can break kidney and ureteral stones from outside the body is used. Lithotripsy is recommended for renal stones <10 mm(better for and ureteral stones < 10 mm in size, soft stones with a hounsfield unit (on CT scan) < 1000 and thin patients.

To break kidney and ureteral stones, focused shock waves (short pulses of high energy sound waves) are transmitted to the stone through the skin. The stone absorbs energy of the shock waves and fragments into smaller pieces. Stone fragments then pass with urine.

Who Should Not Have Lithotripsy?

Contraindications to lithotripsy are pregnancy; women of childbearing age can have



lithotripsy of kidney stones and upper ureteral stones but not lower ureteral stones. Patients cannot take blood thinners such as aspirin, warfarin and clopidogrel for a week before and up to 2 weeks after the procedure.

What are the complications of ESWL ?

Complications of lithotripsy are rare but can occur like blockage of broken fragments of stones in the ureter also called as Steinstrasse (German - street of stones)
Other complications are fever due to a urinary infection and bleeding.

What is the success rate of ESWL?

Success rate depends on the stone location and stone burden. Usually it is in the range of around 80 percent. Stones which are left behind can be removed with flexible ureteroscopy or percutaneously.

What is Flexible Ureteroscopy (fURS) with Laser Lithotripsy?

Renal stones that do not respond to lithotripsy (ESWL), that are very hard or located in areas where ESWL does not work well can be treated by flexible ureteroscopy. Many men and women who have contraindication to ESWL or for whom ESWL is unlikely to work (such as morbid obesity) may do well with ureteroscopy. Ureteroscopy is also effective for larger stones.

Flexible Ureteroscopy is also known as Retrograde Intrarenal Surgery (RIRS).

What is the advantage of RIRS?

No surgical scar- the procedure is completely endoscopically performed.

Can be performed in patients who are taking blood thinners like Aspirin, Clopidogrel or Warfarin.

Early recovery and short hospitalisation stay with fewer complications.

How is flexible Ureteroscopy / RIRS performed ?

Ureteroscopy is a procedure typically performed under general anesthesia (patient is asleep). An endoscope (small camera) is inserted through the urethra (pee-hole) without making an incision. The stone is then located, broken to pieces with Holmium laser and fragments can be pulled out using a special "basket". Alternatively the stone can be broken into tiny pieces of dust which will wash out from the kidney with normal urine flow. Usually patients are admitted for one or two days following the surgery.

A stent maybe placed in order to facilitate healing and will subsequently be removed.

What are the complications of RIRS?

Complications are fever due to an urinary infection , blood in urine and ureteric injury.

What is the success rate of RIRS?

Success rate depends on multiple factors like stone location and accessibility with the flexible scope. It is usually around 85 to 95 percent. Larger stones may require multiple



sessions in order to achieve complete clearance.

What is (PCNL): Percutaneous Nephrolithotomy?

Percutaneous Nephrolithotomy (PCNL) is most suitable for removal of larger kidney stones ($\geq 1-2$ cm) or stones that are difficult to reach and break using ESWL lithotripsy or ureteroscopy. It is a surgical procedure that is performed under general anaesthesia.

How is PCNL performed?

During PCNL, a needle is passed into the kidney via a 1 cm incision in the back. A guide wire is passed through the needle into the kidney. The needle is then withdrawn with the guide wire still inside the kidney. A nephroscope (a camera with a light source for viewing the inside of the kidney) is then passed inside the kidney; kidney stones are identified, broken and removed. This procedure can take anywhere from 1-2 hours depending on the size of the stones and complexity.

In case of complex renal calculi multiple punctures may be required in order to completely remove all stones in different corners of the kidney.

What is the post operative period after PCNL?

You will be cared for in hospital for 2 to 3 days following your operation. You will have a catheter in place for 24 to 48 hours to measure how much urine you're passing.

During surgery, your doctor will have inserted a nephrostomy tube. This acts as a safety tube to help collect stone debris and drain urine from the kidney. This tube will stay in for 24 to 48 hours. It'll be clamped for several hours or overnight and then removed if you do not develop pain, fever or leakage.

A stent may be placed in order to facilitate healing which will be subsequently removed.

What are the complications of PCNL?

PCNL is a technically challenging procedure performed by only a few urologists worldwide.

It is a blind procedure and access into the kidney may not be possible in some patients.

Other complications include bleeding and requirement of blood transfusion in case of severe bleeding.

Another complication is urinary infection which may require a longer hospitalisation.

Injury to surrounding organs like pleura and colon may occur rarely.

What is the success rate of PCNL?

Success rate depends on stone location and stone burden.

Overall success rate of PCNL for stone clearance is around 90 - 95 percent for simple calculi and 75 to 85 percent for complex and staghorn calculi.