

Urologic Surgical Associates of Delaware

Specializing in Robotic Surgery

Extracorporeal Shock Wave Lithotripsy (ESWL)

A common surgical treatment of kidney stones is ESWL (Extracorporeal Shock Wave Lithotripsy). ESWL involves a special machine that can direct ultrasonic energy toward the stone without placing any instruments inside the body. The stone(s) are fragmented into tiny pieces to allow them to pass down the ureter and into the bladder more easily. No instrumentation of your urinary tract is usually necessary. When treating very large stones with ESWL you may need a plastic tube in the ureter. This tube is called a ureteral stent and protects the ureter and kidney while the ureter is healing. Generally, this stent remains in place for seven or more days.

There is a lot of uncertainty with renal stone management. Many factors impact the outcome of any management course you elect to take. You could choose to do nothing. Stones up to 10 mm (1cm) can pass on their own. Roughly, the chance of a stone passing spontaneously is inversely related to the stone size in millimeters. A 1mm stone passes 90% of the time, a 5 mm stone 50% of the time, a 9 mm stone 10% of the time and so on. The chance of passing stone fragments (including fragments remaining after a successful stone therapy) also depends on the kidney and ureter anatomy that you were born with. A dilated ureter after stent removal (a ureteral stent can cause the ureter to widen or dilate over time) is usually more able to accommodate larger stone fragments.

Any of the common stone therapies, Extracorporeal Shock Wave Lithotripsy (ESWL), ureteroscopy (URS), and Percutaneous Nephrolithotomy (PCNL) will leave behind some stone fragments that the patient must pass post-operatively. It is not uncommon to have to return to the operating room a second or third time to remove all the stone fragments. However, in most cases, stones can be successfully eradicated with one trip to the operating room.

ESWL is least likely to make you stone-free in one trip to the operating room and usually does not require any stents or tubes. ESWL is most appropriate for small stones in the kidney or upper ureter. ESWL involves a special machine that can direct ultrasonic energy toward the stone without placing any instruments inside the body. The key to successful ESWL is being able to accurately focus the shock wave energy at the stone. For this reason, stones less than 5mm size, stones that are not visible on plain x-rays, and stones hidden by the pelvic bones (lower ureteral stones) are difficult to treat with ESWL.

Of these three stone therapies (ESWL, URS, and PCNL) PCNL is the most aggressive and has the greatest chance of making you stone-free with one trip to the operating room. It is the treatment of choice for large complex stones in the kidney. This treatment requires a tube through your back into your kidney called a nephrostomy tube. In most cases the nephrostomy tube can be converted to an internal ureteral stent (a plastic tube positioned in the kidney, ureter and bladder). This may be done at the time of PCNL or sometime after surgery by a radiologist. Usually after the internal stent is placed the nephrostomy tube can be removed. PCNL usually requires 1-5 days in the hospital.

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Some large stones treated with ESWL will require stent placement. Routine ESWL can be performed as an outpatient surgery.

URS (ureteroscopy) is the most versatile form of stone therapy. URS involves placing a small telescope (ureteroscope) into the tube that connects the kidney to the bladder (the ureter). Virtually any stone can be reached using URS. Special laser fibers can be deployed through the ureteroscope to fragment the stone. Special baskets can be deployed through the ureteroscope to retrieve any stone fragments. URS is usually the technology of choice for stones in the ureter, especially the lower ureter. Large renal stones can be treated with URS, ESWL, and/or PCNL. Some complex stones may require a combination of two or more treatment modalities. Routine URS can be performed as an outpatient surgery.

In some cases cystoscopy and placement of a ureteral stent can be used as treatment of a kidney stone. The stent dilates the ureter and makes the ureter wider (temporarily) and therefore, more likely to allow stone passage. Sometimes the stone or stone fragments are passed when the stent is removed and sometimes stone passage occurs a short time after stent removal. Commonly, stent placement is used during an acute stone episode to relieve obstruction of the ureter. In these cases URS, ESWL, or PCNL may be scheduled electively after stent placement.

Terms:

Ureter:

The duct that transports urine from the kidney to the bladder.

Stent:

A plastic hollow tube that is placed into the ureter, from the kidney to the bladder to prevent the ureter from swelling shut.

Bladder spasms:

The stent is a foreign body which will further irritate the bladder, ureter, and kidney. This irritation is manifested by increased frequency of urination, both day and night, and also an increase in the urge to urinate. In some, the urge to urinate is present almost always. Sometimes the urge is strong enough that you may not be able to stop yourself from urinating. Sudden pain in the bladder with the urge to urinate is a bladder spasm. Bladder spasms are the bladder's natural reaction to a foreign body such as a stent. Bladder spasms can be controlled by anticholinergic medications such as Ditropan.

Anticholinergic Medications:

The bladder wall is composed of smooth muscle and connective tissue. The smooth muscles in your body (in the bladder, the digestive tract, and the salivary glands) are controlled by cholinergic nerve receptors. Medications that block these receptors (Ditropan and Detrol for example) slow down the smooth muscle contraction in these muscles. In this way, Ditropan can prevent or minimize bladder spasms (sudden muscular contractions of the bladder wall). The anticholinergic medications can also slow down the digestive tract and salivary glands so these medications can cause side effects such as dry

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mouth and constipation. Patients with narrow angle glaucoma should not take anticholinergics (most glaucoma is not narrow angle glaucoma).

If your treatment required stent placement you may be given Ditropan (oxybutynin) 5mg tablets or some other anticholinergic medication. Initially with Ditropan (the first day or two after the procedure) you should take 1 tablet every 6-8 hours. 1-2 days after the procedure you can simply take the tablets when you feel that you need it (when you are having bladder spasms). In time many patients stop having bladder spasms and can stop taking this medication.

ESWL post-op instructions:

You may see some blood in your urine while the stone fragments are passing and a few days afterward. Do not be alarmed, even if the urine was clear for a while. Push fluids and refrain from strenuous activity until clearing occurs. If you have difficulty passing clots or don't improve, call us. You can also try sitting in a warm tub of water to help to urinate if needed. Avoid medications such as Aspirin, Advil, Motrin, Plavix, or Coumadin, which thin the blood and cause bleeding

Diet:

You may return to your normal diet immediately. Alcohol, spicy foods, acidic foods and drinks with caffeine may cause irritation or frequency and should be used in moderation. To keep your urine flowing freely and to avoid constipation, drink plenty of fluids during the day (8-10 glasses).

Activity:

While the kidney is healing do not engage in strenuous activity. If you are active, you may see more blood in the urine. We would suggest cutting down your activity under these circumstances until the bleeding has stopped, perhaps two weeks.

Bowels:

It is important to keep your bowels regular during the postoperative period. Straining with bowel movements can cause bleeding. A bowel movement every other day is reasonable. Use a mild over-the-counter laxative if needed, such as Milk of Magnesia 2-3 tablespoons, or 1-2 Dulcolax tablets. Call if you continue to have problems. Narcotics can worsen constipation; if you had been taking narcotics for pain, before, during or after your surgery, you may be constipated. Ditropan for bladder spasms may also cause constipation.

Problems you should report to us:

1. Fevers over 101.5 degrees Fahrenheit.
2. Inability to urinate.
3. Drug reactions (hives, rash, nausea, vomiting, diarrhea)
4. Severe burning or pain with urination that is not improving.

You will also have some burning with urination. This is normal after stone therapy and is also expected while the stent is in place. This burning should be mild or moderate and

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should improve over time. Severe burning, especially when it is not improving, can be a sign of infection.

Follow-up

After the stone has been fragmented you will likely need an x-ray in 1-3 months to follow-up. Call 302-836-5500 to arrange this x-ray.

If you have a stent, you will need a follow-up appointment to remove your stent. Call for this appointment at 302-836-5500. Stent removal is easy when the string is left attached to the stent (our usual procedure) with the string emanating from the urethra. You will lie down on an exam table so we can use the string to pull the stent out. This procedure takes just seconds and feels funny but does not usually cause pain. In some select cases it is important to not leave the string on the stent. In these cases you will not see the string coming out of the urethra. Also, in these cases it will be necessary to remove the stent with cystoscopy (usually in the operating under IV sedation). The stent is usually removed 1-2 weeks after treatment.

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