



ESWL

We recommend that you read this carefully in order to prepare yourself or family members for the proposed procedure. If you still have any questions or concerns, we strongly encourage you to contact our office prior to your procedure. We may clarify any pertinent issues. "An educated patient is the best patient."

Definition

Extracorporeal = "outside the body"

Shock Wave = "using waves of a specific type of energy"

Litho = "stone"

Tripsy = "breakage or fragmentation"

Urinary tract stones are either located in the kidney, the ureter (tube that attaches the kidney to the bladder), or in the bladder itself. **SWL** may be used to fragment stones that are in the kidney or in certain parts of the ureter. The success of breakage depends on the size of the stone, the location within the kidney or ureter, the composition or makeup of your particular stone, and the number and energy level of the shocks employed. The second part of success is whether or not the fragments pass out of your system. This will depend on the original location of the stone, the size of the fragments, and on the particular anatomy of your urinary tract.

There are different types of SWL machines throughout the world. They use different types of energy and have different power settings. Regardless, they all have the same goal of fragmenting a stone by employing non invasive technology.

Preparation

As with any procedure in which anesthesia is administered, you will be asked not to eat or drink anything after midnight on the evening prior to your surgery. You may brush your teeth in the

morning, but do not swallow the water. If you are on medications that must be taken, you will have discussed this with us and/or the anesthesiologist. Instructions will have been given to you. The procedure will not be performed if you are currently taking or have recently taken any medications that may interfere with your ability to clot your blood (blood thinners, aspirin, plavix, Coumadin, anti-inflammatory medications, etc.) The most common of these medications are aspirin and all related pain relievers or anti-inflammatory compounds (whether prescription or over the counter). Please refer to the attached list and tell us if you took any of the medications within the last 7 days. We will have reviewed all of your current medications with you during the pre-operative consultation. You are obligated to inform us if anything has changed since your previous visit.

If you are a patient with high blood pressure, and your pressure has been poorly controlled recently, please let us know as it is important that your primary care physician get your pressure back to normal prior to this procedure.

Patients who are being treated for abnormal heart rhythms (i.e. atrial fibrillation or patients with pacemakers) can have this procedure, but it is important that we know so that we may communicate with your cardiologist and make special arrangements with the SWL machine and with the anesthesiologist.

Procedure

You will be placed lying on your back and the stone will be localized with real-time x-rays (fluoroscopy). Some machines necessitate that you be partially submerged in a water bath and others do not. Once we are satisfied that your stone can be accurately targeted with the shock waves, you will be given light sedation by the anesthesiologist. Shock waves are aimed precisely at the stone. The maximum energy level and the number of shock waves administered will depend on how your stone responds to the shocks. There is however, a maximum level at which point we will terminate the procedure. In addition, for safety reasons, your heart rate and rhythm may dictate the way in which we administer the shocks. At the end of the procedure, we often have an idea as to its success, but we too, are sometimes fooled. A stone that appears well-fragmented during the procedure can often be found to be unchanged on the follow up CT Scan weeks later. Alternatively, a stone that appeared to be unchanged during the procedure is sometimes not seen at all on follow up x-rays due to successful fragmentation and passage. At the termination of the shock waves, you are easily awakened and observed in the recovery room until the sedation has completely worn off. Almost all SWL procedures are done on an outpatient basis, and it is quite rare to admit the patient to the hospital.

Post Procedure

After the procedure, you will be in the recovery room until you are discharged. It is uncommon for a patient to be admitted to the hospital following this procedure. It is common to have some discomfort in your back on the treated side. Over the next day or two, your urine may appear dark or amber which represents the presence of blood. You may have no blood in the urine, mild blood, or even what appears to be a significant amount of blood or small clots. It is rare for the blood to not disappear within a day or two. You may also notice stone fragments passing in the urine, and this is the desired result. Because they are small, a patient typically does not feel them as they pass into the urine. The fragments can be visible as sand or very small pebbles.

Expectations of Outcome

The intent of SWL is to completely fragment the stone and have all pieces pass out in the urine. Unfortunately, this is not always the case. Sometimes, the stone does not break at all, or there is incomplete fragmentation and only part of the stone breaks. In this regard, we may suggest another SWL at a later date. Sometimes the stone fragments quite well, but the pieces never leave the kidney. This is most common with stones that are in the lower half of the kidney. The combination of the sharp angle and gravity holding them in the lower half make it less likely that they will move into the ureter. Occasionally, and more common to large stones, a large fragment can get caught in the ureter and temporarily block the kidney. In this situation, we may elect to observe (if you are comfortable and the fragment is of a size that may permit spontaneous passage) or we may recommend placement of a stent. If necessary, we might recommend a ureteroscopy (putting a small telescope into the ureter) procedure to further fragment and or removal the large pieces.

Possible Complications

All surgical procedures, regardless of complexity or time, can be associated with unforeseen problems. They may be immediate or even quite delayed in presentation. While we have discussed these and possibly others in your consultation, we would like you to have a list so that you may ask questions if you are still concerned. Aside from the anesthesia complications, it is important that every patient be made aware of all possible outcomes which may include, but are not limited to:

- **Urinary Tract Infection or UroSepsis:** Not all SWL procedures require antibiotics, however, we often administer a preoperative antibiotic prior to the procedure. It is, however, possible for you to get an infection. It may be a simple bladder infection that presents with symptoms of burning with urination, urinary frequency, and a strong urge to urinate. This will usually resolve within a few days of antibiotic administration. Pyelonephritis represents a kidney infection and is also possible following a SWL and is more likely to cause symptoms of severe back pain, fevers, chills, nausea and vomiting. If the infection enters the bloodstream, you might feel very ill. This type of infection can

present with both urinary symptoms and any combination of the following: fever, shaking chills, weakness, dizziness, nausea and vomiting. You may require a short hospitalization for intravenous antibiotics, IV fluids, and observation. This problem is more common in diabetics, patients on steroids, or patients with a weakened immune system. If you have symptoms suggesting any of the above after your discharge from the hospital or surgery center, you must contact us immediately and go to the nearest emergency room.

- Ureteral Blood Clots: Rarely, small blood vessels in the kidney can rupture and cause bleeding in the urine. If clots form, they can block the urine flow down the ureter. Treatment is usually observation or placement of a ureteral stent.
- Hematoma: Occasionally, small blood vessels can rupture and cause significant bleeding around the kidney. The majority of time, the treatment is observation because the bleeding stops itself and is eventually reabsorbed by surround tissue. In some circumstances, a minimally invasive procedure (angiography) is done by a radiologist to stop the blood vessel from bleeding. A need for open surgery with possible removal of the kidney due to bleeding is possible but EXTREMELY rare. Hematomas and bleeding are far more common in patients with poorly controlled high blood pressures or in patients on blood thinners who neglected to tell their physician that they were on such medications.
- Loss of Kidney Function: There is bruising to the kidney from this procedure. Like other organs in the body, the kidney heals itself with time. It is possible for a part or even the entire kidney to lose function following SWL. This can result from the shocks to the kidney or from bleeding after the SWL.
- Chronic Pain: While quite unusual, any patient can develop chronic pain in an area that was subject to surgery. The cause is not always apparent.

We provide this information for the patients and family members. It is intended to be an educational supplement that highlights some of the important points of what we have previously discussed in the office. Alternative treatments, the purpose of the procedure, and the points on this page have been covered in face-to-face consultation.

