Ureteroscopic Lithotripsy

Prior to Surgery

Surgery Scheduling
You will be contacted in the near future by one of the department's surgery schedulers with the date of the procedure. An appointment will also be made for you at the Preoperative Medicine Clinic (PMC). Shortly thereafter you will receive by mail an informational packet with instructions on where to go for your PMC visit and surgery. Three days prior to surgery you will be contacted by one of OHSU's OR schedulers with the final surgery time and when to check in the morning of surgery.

Preoperative Testing
During your PMC visit the items listed below will be ordered as deemed necessary based upon your age and medical history. You will have an opportunity to speak with the anesthesia staff regarding the types of anesthesia available and their relative risks and benefits.
- EKG (electrocardiogram)
- CBC (complete blood count)
- PT / PTT (blood coagulation profile)
- Comprehensive Metabolic Panel (blood chemistry profile)
- Urinalysis

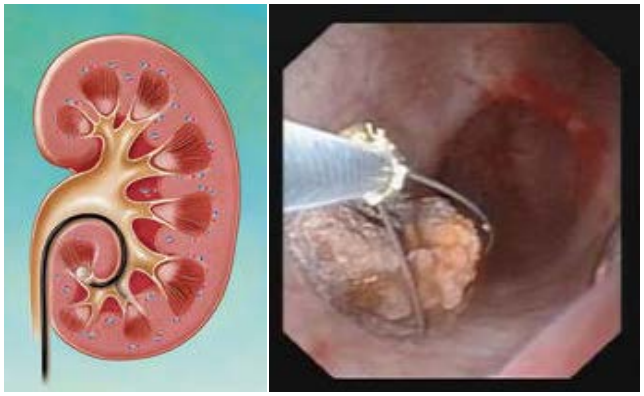
Medications to Discontinue
Ureteroscopy is the only type of stone surgery that can be performed while on anti-coagulation (blood thinning) medications. Nevertheless, if possible it is preferable to discontinue all blood thinning medications at least 5 days prior to surgery to prevent unwanted bleeding following the procedure. A list of medications that decrease your body's ability to clot are listed below. Do not stop any medication without contacting your prescribing doctor for approval.
- Vitamin E
- Aspirin
- Aspirin / dipyridamole (Aggrenox)
- Ibuprofen (Advil, Motrin)
- Naproxen (Aleve)
- Diclofenac (Voltaren)
- Celecoxi (Celebrex)
- Rofecoxib (Vioxx)
- Clopidogrel (Plavix)
- Ticlopidine (Ticlid)
- Warfarin (Coumadin)
- Enoxaparin (Lovenox)

Diet Day Before Surgery
You may eat a regular diet until midnight the night before surgery. After midnight please do not eat or drink anything. If instructed to do so, you may take your prescription medications with a sip of water.

Surgery

Procedure Description

Once asleep a small instrument (ureteroscope) is passed through the urethra (water channel) and bladder into the ureter (tube transporting urine from the kidney to the bladder). The ureteroscope contains a light and camera that projects an image onto a monitor next to the operating room table.



The scope is advanced until the stone is located. If the stone is small it may be grabbed with a basket device and removed intact. However, in most instances the stone will be too big to be safely removed whole. If so, a laser will be used to break the stone up into several small pieces (lithotripsy) that are grabbed and removed. Alternatively, the laser may be used to turn the stone into numerous small fragments that drain out of the kidney on their own following surgery.

In most cases a ureteral stent (piece of surgical plastic that goes from the kidney to the bladder through the ureter) will be placed at the end of the procedure. The stent keeps the ureter open following surgery. If a stent is not placed the ureter may temporarily swell shut or become occluded by blood clots or stone debris resulting in kidney pain following surgery.

In a small number of cases (less than 5%) the ureter is too narrow to safely permit passage of the ureteroscope into it. When this occurs a ureteral stent is placed and stone removal is delayed one to two weeks. The stent gently stretches the ureter allowing safe passage of the scope at a later date.

Potential Risks and Complications

Although uncommon, complications may occur following ureteroscopy. Potential risks include, but are not limited to the following:

Residual Stones within the Kidney or Ureter

It is often not possible to remove the stone intact. If the stone has to be broken up there is the possibility of a residual piece of stone causing pain following stent removal. Residual fragments may also grow in size over time necessitating future treatment. The larger the stone being treated the more likely this is to occur.

Urinary Tract Infection

Intravenous antibiotics will be given to you prior to surgery. However, it is always possible to develop a bladder infection (burning with urination, urinary frequency and urgency) or a kidney infection (back pain, fevers, nausea, fatigue) afterwards. The likelihood of getting a bladder infection is less than 5% and kidney infection is less than 1%. The risk may be slightly higher if you have a history of recurrent infections or an infection that was treated prior to surgery.

Urinary Retention

The inability to urinate following the procedure is uncommon. Older men who have a slow urinary stream prior to surgery are at greatest risk.

You will be required to urinate prior to being sent home. If you are unable to urinate a urethral catheter (Foley) will be placed by the nursing staff in the recovery room or short stay unit. The catheter usually stays in for a few days to allow the swelling to subside, pain to improve and anesthetic to wear off. Prior to going home arrangements will be made for the catheter to be removed in the office, at an alternate provider's office (if you live a long ways away), or by you.

Ureteral Injury

Perforation (making a hole in the side of the ureter) happens less than 1% of the time. If a perforation occurs the procedure will be stopped and a ureteral stent will be placed. Leaving a stent in place for 2 to 4 weeks allows almost all of these injuries to heal without stricture formation. A stricture is a band of scar tissue within the ureter that causes it to be narrowed. If severe, a stricture may eventually cause the kidney to stop functioning if untreated.

The most severe ureteral injury is a ureteral avulsion, where the ureter is completely torn away from itself, kidney, or bladder. Fortunately, this type of injury is very rare with a rate of 0.2%. Ureteral stent placement is often not possible. As a result, a percutaneous nephrostomy tube (small tube going through the back directly into the kidney) would need to be placed by interventional radiology. Repair of the injury requires a more complex reconstructive procedure done at a later date.

Following Surgery

Postoperative Symptoms
The vast majority of patients do well after the procedure and are able to go home the same day. The following symptoms can be expected.

Pain
Most patients experience mild to moderate pain in the kidney and/or bladder area following surgery. Burning with urination typically lasts 24 hours. This is generally well controlled with oral narcotic pain medication. If not provided prior to surgery, you will be sent home with a prescription for either Percocet or Vicodin. These medications can impair judgment and reaction time. As a result, ***you must not drive or operate dangerous equipment while on these medications***. You should transition to Acetaminophen (Tylenol) and/or Ibuprofen within a day or two of surgery if possible.

Hematuria
Hematuria (blood in the urine) will always be present following the procedure and usually lasts until a few days after the ureteral stent is removed. The amount of blood in the urine is typically heaviest over the first one to two days. Rarely is the bleeding significant enough to cause a drop in one's blood count or make it difficult to urinate (clot retention). It is common for the blood in the urine to go completely away and then come back intermittently while the stent remains in place. This is nothing to worry about and is usually due to the stent rubbing up against the inner lining of the kidney, ureter and bladder.

Stent Related Symptoms
Nearly all patients will experience symptoms related to the ureteral stent. It is common to feel like you have to urinate more frequently and urgently due to the stent irritating the bladder. You may also feel a dull ache in your kidney when you urinate due to urine backing up the stent into the kidney. Lastly, you may also experience some discomfort in the urethra or tip of the penis at the end of urination. These symptoms are usually mild and can be controlled with oral medications. A small number of patients will have severe symptoms related entirely to the stent, which resolve following removal.

Constipation
Narcotic pain medications such as Percocet and Vicodin cause constipation. Over the counter stool softeners such as Colace and Senna are invaluable while taking narcotic pain medications. Laxatives such as Miralax may also be used if you have not had a bowel movement in several days. Drinking plenty of fluids and transitioning to over the counter pain medications will help minimize constipation.

Postoperative Instructions
Showering and Baths
Occasionally a string will be left attached to the ureteral stent, which comes out of the urethral opening and gets taped to your skin (inner thigh, penis, or suprapubic region) at the end of the procedure. The string facilitates stent removal. If present, you may shower immediately after discharge but please no baths until the stent is removed. If the stent is placed without a string

you may take a bath after being discharged. Prior to discharge from the hospital you will be told if the stent has a string attached to it.

Activity

- Driving: you may begin driving once you are off narcotic pain medications.

- Lifting / Exercise: There are no lifting or exercise restrictions. However, if you notice an increase in your pain, urinary symptoms, or blood in the urine following an activity, then it is best to limit this activity until your symptoms resolve.

- Intercourse: If you have a string attached to your ureteral stent then please refrain from sexual activity until the stent is removed. Otherwise, you may resume sexual activity as tolerated.

Diet

Most patients only desire clear liquids for the first 24 hours following ureteroscopy, as your intestinal function may be sluggish due to the effects of surgery and general anesthesia. However, there are no dietary restrictions. You may resume a regular diet as tolerated.

Returning to Work

Most patients go back to work two to three days after surgery. Occasionally patients may need to take more time off. Our office can provide you with documentation as needed.

Postoperative Appointment

Please call the clinic the day after surgery to arrange a postoperative visit (503-346-1500). The timing of that visit will be told to you prior to discharge and will be included in your discharge paperwork.

Stent Removal

If you are sent home with a ureteral stent, it must be removed. Failure to remove the stent will result in stone formation on the sent with eventual obstruction and infection, which over time can damage the kidney and make removal very difficult.

Preparation

Unless you have abnormal kidney function or an allergy to Ibuprofen, ***please take 600 mg of Ibuprofen 1 hour before stent removal***. Ibuprofen helps prevent ureteral spasms after stent removal. Nevertheless, it is not uncommon to have some pain in the kidney following stent removal. This is usually mild and lasts only a few hours. If you develop pain that is not controlled with oral medications or a fever greater than 101.5 degrees then please contact the clinic or go to the emergency department.

Technique

The stent can be removed in one of two ways…

- Stent with a String: Pulling on the string will remove the stent. This only takes a matter of seconds.

- Stent without a String: A small scope (cystoscope) will be inserted through the urethra into the bladder. The stent will be grasped with a small instrument and removed. The procedure usually takes about a minute and is very well tolerated. You may drive home following the procedure.

Things to Watch For After Surgery

Although uncommon, there are a number of things to watch out for after discharge. These include…

- Pain that is not controlled by oral pain medications
- Severe nausea with the inability to keep any fluids or medications down
- Fever greater than 101.5 degrees Fahrenheit

If you develop any of these conditions during normal business hours (Monday through Friday from 8 am to 5 pm) please call the clinic (503-346-1500) to speak with one of the nurses. If after hours, then go to the OHSU emergency department if you live locally or the nearest ER if you live further away.