

Percutaneous Nephrolithotomy (PCNL)

Risks

Bleeding: Approximately 2% of people will require a blood transfusion after this procedure. The main risk of bleeding is at the time of the procedure, but there is a 1-2 % risk of delayed bleeding from a pseudoaneurysm or arterio-venous fistula.

Infection: My standard practice is to use two broad spectrum antibiotics to decrease the risk of infection with this procedure. If a preoperative urine culture demonstrates bacteria, I will specifically cover that bacteria with at least one of the two antibiotics. The risk of infection is highest in stones caused by infections which typically harbor large amounts of bacteria. Sepsis can result from any stone treatment modality of these stones.

Injury to adjacent organs:

- The chest cavity which contains the lung is the most commonly injured area during this procedure and can occur in up to 10% of PCNL cases in which an upper pole puncture is selected. Injury to this area can result in air in this space (pneumothorax), fluid or blood in this space (hydrothorax, hemothorax) and can require a chest tube be placed.
- Injury to the lung itself is much less common (~1%), and would require a chest tube be placed.
- Injury to the liver, spleen and colon are reported in the literature, but are rare (<1%), but may require additional surgery to correct.

Second procedures: -Approximately 10-20% of people will have small residual stone fragments, and about half of these will need a second procedure to remove residual fragments. This is typically done a week or so after the first procedure and may be a re-look through the existing site or an ureteroscopy depending on the residual stone sizes and locations. Rarely a new tube will need to be placed.

Risks of General Anesthesia: Heart Attack, DVT/PE (blood clots that form in the arms or legs and travel to the lungs), stroke, death. The frequency of these events is dependent on your individual health, but generally is low (1%)

Benefits

-PCNL is the preferred method of treatment of staghorn renal calculi as per the American Urologic Association guidelines.

-It has the highest stone free rates for stone burdens >2cm (3/4 inches) and is generally recognized as the preferred method of treatment for these large stone burdens.

-Stone burdens <2cm are also treated with PCNL when difficult renal anatomy/stone location, such as position in the lower pole or a calyceal diverticulum, would compromise success rates of ureteroscopy or shock wave lithotripsy. Stones likely associated with infection are typically treated with PCNL.

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Typical postoperative course

Hospital stay:

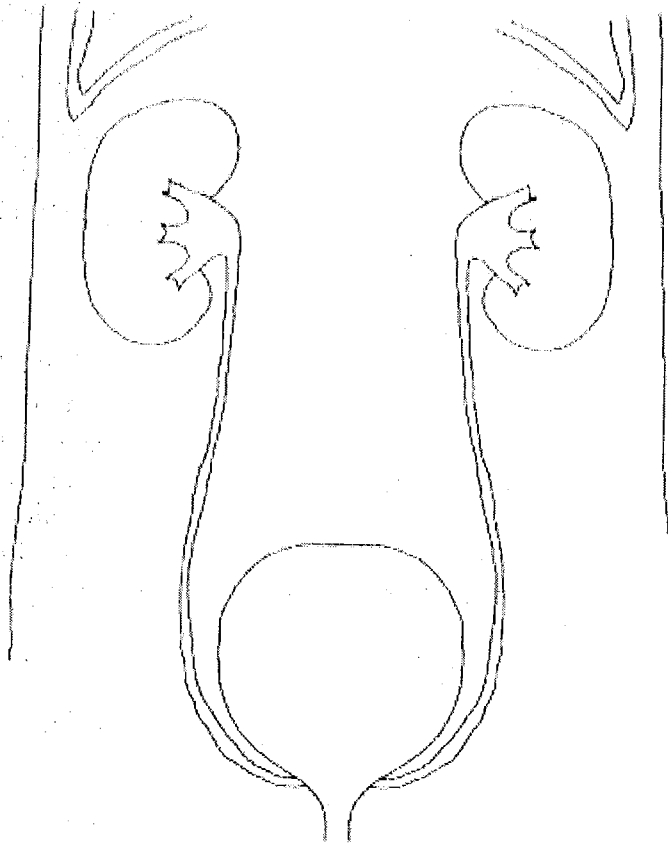
-A one night hospital stay is standard, with 80-90% of people going home the day following their procedure.

Postoperative imaging:

-A CT scan may be done the day following the procedure to determine if any residual stone fragments are present if there is any concern for stones caused by/related to infections.

Tubes/drains:

-Nephrostomy tube (in the back leading to the kidney). Only ~5% will require more than one tube for stone removal. Nephrostomy tubes are removed the day following the procedure as long as no residual stone is seen and the kidney drains well. Approximately 5% of people leave the hospital with a nephrostomy tube. If a stent is not left after surgery, then this increases to 30%.
-Foley catheter in the bladder. This is typically removed on the day after surgery.
-Stents typically left in as they improve drainage and allow a very high percent of people to have their nephrostomy tube removed on the day after surgery. These are typically left in for only 1 week.



ESWL

Ureteroscopy

PCNL



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Kidney Stone Surgery: Extracorporeal Shock Wave Lithotripsy (ESWL) and Ureteroscopy

Procedure

To treat your kidney stone, you may have either ESWL or ureteroscopy, often times both, to clear out the stone completely. Depending on the size and location of your stone, **this may take more than one procedure**. Extracorporeal Shock Wave Lithotripsy (ESWL) is where soundwaves are sent into the stone to break it up into smaller pieces. Ureteroscopy is when a scope is placed into your bladder and then advanced into the ureter (tube that connects the kidney and bladder). This allows the doctor to break the stone up with a laser as well as remove remaining stone fragments. After the stone is treated, a ureteral stent is typically placed.

What are the risks?

- Bleeding-there is a low risk for significant bleeding but it is very common to have intermittent **blood in the urine**. We stop blood thinning medications and aspirin prior to your procedure. Tylenol is okay to take prior to your procedure.
- Infection-An antibiotic will be administered to you at the hospital prior to surgery to help prevent infection
- Ureteral injury/scarring- Using a scope in the ureter can cause injury or scarring long term. Placement of the ureteral stent helps prevent this from happening.

Ureteral Stents

What is a ureteral stent?

A ureteral stent is a thin tube that is placed inside the ureter and stretches from the kidney to the bladder. It keeps the urine draining out of your kidney after the procedure. The stent prevents the kidney from becoming blocked and helps prevent scarring of the ureter. Stents are typically removed in our clinic 1-2 weeks after your stone(s) are treated.

What symptoms can I expect from the stent?

- Blood in the urine-this can be intermittent and often occurs after increased activity or long car rides.
- Urgent urination-the stent can irritate the bladder and cause you to go to the bathroom more frequently and urgently.
- Back or pelvic pain-this can occur particularly with urination or increased activity and is normal with a stent in place

How can I help manage my symptoms?

- Drink plenty of fluids to keep the kidneys flushed
- Use heat pads/baths/showers to help the muscles relax
- Alternate 1000 mg Tylenol every 6 hours with 600 mg Ibuprofen every 6 hours (as needed) so that you take something every 3 hours
- Take tamsulosin and oxybutynin as prescribed

Approved By: S. Schneider & C. Boehm 5/27/2020