

# Ureteral Strictures

## What is ureteral stricture?

The ureter is a narrow tube in the body. It takes urine made in the kidney to the bladder. A **ureteral stricture** is any narrowing of this tube.

## What symptoms do people with ureteral strictures often have?

Ureteral strictures can lead to:

- Back (flank) pain
- Abdominal pain or cramping
- Nausea or vomiting
- Blood in the urine (hematuria)
  - You may see this in the toilet.
  - More commonly, it will only be seen with a microscope after giving a urine sample.
- Urinary tract infections (UTIs)
- Permanent harm to the kidney from a back-up of urine
  - This happens if you have your stricture for a long time.
  - Your kidney-specific blood tests will get higher (worse). Normal creatinine levels are less than 1.
- Some people do not have any signs other than abnormal x-rays or blood-tests.

## What causes ureteral strictures?

There are many causes.

- **Congenital development.** You can be born with it. It often happens as the ureter exits the kidney (ureteropelvic junction obstruction). It is found and treated when you are a child. It is less common to have congenital defects as an adult.

- **Scar tissue formation.** This can lead to narrowing if it forms in or around the ureter. Scar tissue can form because of:
  - An abdominal or pelvic surgery, such as:
    - A hysterectomy
    - Colon resection (for diverticulitis or cancer)
    - Surgery for prostate cancer
    - Surgeries on the large arteries (blood vessels) in the abdomen and pelvis (aorta, iliac and femoral arteries)
  - A kidney stone passing or after one is treated.
  - Radiation therapy for cancers of the pelvis. As cancer cells die, they turn into scar tissue. The scar can trap the ureter. This leads to obstruction.
- **External compression of the ureter.** This often happens because of:
  - Pelvic or abdominal tumor or cancer. Tumors and cancers that most often cause ureteral obstruction are:
    - Cervical
    - Ovarian
    - Endometrial
    - Lymphoma (Hodgkin's, non-Hodgkin's)
    - Rectal/Colon
    - Bladder
    - Large lymph nodes from other cancers
  - Enlargement of arteries. Arteries in the pelvis will sometimes get big. This is called an aneurysm. This can block the nearby ureters.
  - Retroperitoneal fibrosis. Rarely, people have a condition that causes thickening of the fatty tissue in the back of the abdomen. This is called idiopathic retroperitoneal fibrosis. It is often treated with steroids you take by mouth. Until the mass gets smaller, it can obstruct the ureter.

## How will my ureteral stricture be treated?

There are many ways to treat it. Most people have options. Talk with your doctor about what treatment is best for you. Options for treatment are:

- **Observation.** Sometimes no treatment is needed. This is if you:
  - Do **not** have any signs
  - Have normal kidney function
  - Do not have medical or surgical treatments scheduled where you need to treat it first

- **Retrograde ureteral stent placement.** This is the most common treatment. It is often tried first. A silicone tube is put into the ureter. It goes from the kidney to the bladder. You need to know:
  - Your **first** ureteral stent is often placed in the operating room under anesthesia. Later stents can be placed in the clinic or ambulatory surgery. It is done without or with only a little anesthesia.
  - Ureteral stents are not permanent. They **must** be replaced every 3 to 4 months. This is needed so stones do not form and stop drainage.
  - You may have side effects. These often get better with time, as you get used to having them. You may have:
    - **Frequency and urgency of urination.** Stents can irritate the inner lining of the bladder. This gives people the feeling of needing to use the restroom often and urgently. Medicines are prescribed to help with this. Most often oxybutynin (Ditropan).
    - **Blood in the urine.** Stents can irritate the inner lining of the bladder wall. This may cause bleeding. This happens most often after stent placement, strenuous activity, and in people who take blood thinners, such as coumadin or aspirin. Stay hydrated so your kidneys make more urine. This is the best way to help.
    - **UTIs.** Bacteria can grow on the ureteral stent and become infected. It is hard to get needed antibiotics to the stent to treat the infection because it does not have a blood supply. So, if infections are common more frequent stent changes are needed. This is often every 1 to 2 months. Your doctor may also talk with you about other treatments. Most often a percutaneous nephrostomy tube (see next page).

- **Percutaneous nephrostomy tube.** This is the second most common way to get urine to drain from a blocked kidney. Unlike a ureteral stent, the nephrostomy tube drains urine into a **bag**, not the bladder. Some reasons a person or provider might choose this over a ureteral stent are:
  - **Failure of the ureteral stent to drain urine.** Sometimes urine will still back up in the kidney after a stent is placed. This causes pain, infection, and worsening kidney function. This happens most in people with narrowing from scar tissue.
  - **Side effects from the ureteral stent.** Most people tolerate stents with few to no side effects. Some people have severe urgency, frequency, or incontinence (leakage of urine). For these people, a nephrostomy tube may be better.
  - **Recurrent UTIs.** Some people with a ureteral stent get a lot of UTIs. It can be hard to prevent stents from also getting infected. Stent infections are hard to treat. They may need to be changed every 1 to 2 months.

**Important things to know** are:

- The **first** tube is often placed in Intervention Radiology under anesthesia. You lie on your stomach. The doctor uses x-ray (fluoroscopy) and ultrasound to place the tube.
- You spend the night in the hospital.
- You may have blood in the nephrostomy bag for weeks after placement.
- Nephrostomy tubes are not permanent. It will need to be replaced every 3 to 6 months. It depends how well they work. People often do not need anesthesia and to stay in the hospital. This depends on the person.
- You may have side effects. These often get better with time. Some are:
  - Pain at the nephrostomy tube site. A small incision is made in the skin to place the tube. This can be painful while it is healing. It will get better after the body forms a tract around the tube.
  - Blood in the drainage bag. This is most common after activity. It gets better if you drink a lot of fluid.
  - UTIs can happen. Keep the site clean and as dry as possible. Some people may need to flush their nephrostomy tubes daily with saline (salt-water). This keeps the tube free from bacteria and stone.

- **Endoscopic ureteral dilation/incision.** Your doctor may try to stretch or cut the ureter. This makes it larger if the stricture is on the inside of the ureter. This lets urine drain from the kidney. It should fix or cure the stricture. It is often needed if the stricture is caused by kidney stones or kidney stone procedures. **Important things to know are:**
  - This is done in the operating room under anesthesia. You should not need to stay in the hospital. You will only stay if your doctor thinks you may get a post-surgery infection/fever, or have bleeding or pain that needs closer monitoring.
  - A stent is often placed (or replaced) after the endoscopic procedure. The stent helps the ureter heal in an open fashion. It is often left in place for 1 month.
  - Your doctor will monitor you closely after the stent is removed. They often use ultrasound or CT scan. These show a large kidney (hydronephrosis). If the kidney is large it means the stricture formed again. Then, a temporary ureteral stent or percutaneous nephrostomy tube is often placed until a more permanent surgical repair can be done (see the next page).
- **Ureteroplasty/ureteral reconstruction.** You often need surgery if you and your doctor want a permanent fix. This is often only done after ureteral stents, percutaneous nephrostomy tubes, or ureteral dilation/incision have not worked. (Note: For some people that have ureteral stents placed because of obstruction from tumors, treatment of the tumor with surgery, radiation, or chemotherapy, can often have relief of the obstruction after the tumor shrinks.) **Important things to know are:**
  - More tests are often needed to decide **how** to fix a ureteral stricture:
    - **Exam under anesthesia (EUA):** Your doctor will take x-rays of your bladder, kidney, and ureter to decide the length and place of the stricture. They can also see the size and health of your bladder.
    - **Urodynamics:** This is done without anesthesia. You go home the same day. The bladder is filled with saline using a small catheter. The size and pressure in your bladder during filling are measured. The test will also show if urine that enters your bladder can go backwards into the kidney. This is known as vesicoureteral reflux.

- **MAG-3 Renal Scan:** When a ureteral stricture leads to kidney damage, sometimes it is too damaged to repair the ureter. This scan will show how well the kidney is working. If it shows the kidney is providing less than 20% of the needed function, your doctor may suggest the kidney be taken out instead of fixing the ureter.
- The length and place of your ureteral stricture, and health of your bladder, will help you and your doctor decide what type of repair is needed for a permanent fix.
- Testing of your overall health is needed too. You often need:
  - **Electrocardiogram (ECG/EKG):** To be sure your heart is healthy enough for surgery.
  - **Blood work:** To be sure supporting organs (kidney, liver, intestines) are working and blood levels (hemoglobin, hematocrit) are high enough.
  - **Chest X-ray:** To be sure your lungs are healthy enough for surgery.
  - **Medicine review:** To be sure your blood pressure is controlled and medicines that lead to bleeding (coumadin, aspirin, clopidogrel) are stopped before surgery.
- Stop using all tobacco (cigarettes, chewing tobacco, vaping products, nicotine gum) before surgery. A urine test is often done the day of surgery to be sure you have stopped.
- There are **many types of repairs**. All of them have advantages and disadvantages. Not all options are possible for all strictures.
  - **Ureteral reimplantation:** This is the most common type of ureteral reconstruction. The ureter is cut just above the narrowing. Then it is sewn into a new place in the bladder.
  - **Ureteral reimplantation with psoas hitch:** This is used for ureteral strictures close to the kidney. The muscular part of the bladder is sewn to a tendon in the back of the abdomen. This lessens the tension and helps the ureter heal in its new place in the bladder.
  - **Ureteral reimplantation with Boari Flap:** Part of the bladder is cut to work like a ureter. Strictures much higher in the pelvis can then be repaired. This can only be done in people with large enough bladders. The bladder often needs to measure more than 400 mL (about 12 ounces). It is not often done in people who have had pelvic radiation.

- **Ipsilateral uretero-ureterostomy (IUU):** This is done only for short (less than 3 cm) ureteral strictures that are higher up in the abdomen. This type of stricture is often caused by trauma or stones/stone procedures. It is common for your doctor to do the IUU using laparoscopic and/or robotic help.
- **Trans-ureteroureterostomy (TUU):** This is done for ureteral strictures higher up near the kidney that are too long for an IUU, too high up to use the bladder (boari flap), and with a healthy ureter. Strictures caused by stones or cancer are often not treated with TUU. The unhealthy ureter is cut just above the stricture and the healthy end is sewn to the side of the healthy ureter. The ureter often goes under the sigmoid colon.
- **Buccal mucosa/substitution ureteroplasty:** Tissue is moved from 1 place in the body (often the mouth) and is sewn to the unhealthy part of the ureter. This patches it and makes it larger. This is often done for strictures higher up in the abdomen (near the kidney) when IUU and TUU cannot be done.
- **Bowel substitution ureteroplasty:** A ureteral stricture may be too long for the other techniques or the bladder may be too small or unhealthy to be used. Part of the bowel can be used to bridge the gap between the kidney and bladder. The small intestine (ileum) or appendix is often used for strictures in the right ureter. This is used when long strictures involve both ureters.
- **Ureteral clipping:** When repair of the ureteral stricture cannot be done, but routing of urine from the bladder or pelvis is needed (with vesicovaginal fistulas, severe urinary incontinence), your doctor may permanently clip or suture your ureter. If this is done, a percutaneous nephrostomy tube is needed for life or until you are healthy and/or stable enough for reconstruction.
- **Nephrectomy:** If ureteral reconstruction might cause a person more harm than good, or if the MAG-3 renal scan shows the kidney is not working well, you and your doctor may decide to remove the kidney. The other kidney must be healthy before this is done.

## What should I expect the day of and after my surgery?

- **When should I check-in?** You will get a phone call with the check-in time 1 to 3 business days before your surgery. Call 319-384-8008 if you do not get a call or if you have questions.
- **How long will surgery last?** Most ureteral reconstruction surgeries last 3 to 5 hours. During this time, you will:
  1. Get anesthesia
  2. Be positioned
  3. Have the procedure
  4. Wake up/recover
- **What are possible complications?** Major complications are rare, but you could have:
  - **Vascular injury:** Injuries to the major vessels, such as the iliac and femoral arteries and veins, and smaller arteries and veins can cause bleeding. You may need a transfusion and repair of the vessels if this happens. This may be done with the help of the vascular surgery doctors.
  - **Bowel injury:** Injuries to the small and large intestines can happen when getting to the ureter. This is often found and repaired during the surgery. Then no other care is needed. Larger injuries or those found later, may lead to removal of part of the bowel or bowel diversion (colostomy or ileostomy). This is often done with the general surgery doctors.
  - **Neurologic positioning injury:** When positioning people for surgery, doctors and nurses pad pressure points on the body. Arms and legs are placed in a way that does not lead to nerve injury. Neurologic injuries can still happen. Most of them get better in days to weeks after surgery. Some may need rehabilitation. Almost all of them get better with time and rehab. Some are more common with surgeries that last more than 6 hours.
  - **Infection:** Antibiotics are given before surgery. This lowers the risk of surgical-site infection. Infections can happen in the incision or urine. They often happen days after surgery. Signs are fever, chills, and redness around the wound. Most infections get better with antibiotics. Some need the incision to be opened and drained.



- **Urine leak:** When the ureter is reimplanted into the bladder, stitches are used to hold it in place while the body heals. Urine can leak outside of the urinary tract (bladder/ureter) if a stitch does not hold or healing does not happen fast enough. Most leaks will heal on their own over time. Some will need drains be placed. Few will need a second surgery.
- **How many nights will I spend in the hospital?** Most people stay 2 nights. People having surgeries that use the bowel or intestine stay 4 to 6 days. People often go home after they:
  - Eat solid food
  - Pass gas and have a bowel movement
  - Walk without help (if they do not need help to walk before surgery)
  - Have pain controlled with medicines they take by mouth and their epidural is removed
- **What will my incision(s) look like?** Most people have one 6 to 8 cm vertical incision below their belly-button. There are 3 to 5 smaller incisions if a robotic or laparoscopic surgery is done.
- **Will I have any tubes after surgery?** You will have 3 tubes:
  - **Foley catheter:** This drains your bladder. It will stay in place for 1 week. Most people return to clinic to have it removed.
  - **Jackson-Pratt (JP) drain:** This drains any fluid or blood that built up around the repair site after surgery. It will also show any urine leak. Most JP drains are removed before going home.
  - **Ureteral stent:** All repairs are done over a ureteral stent. Stents let the new connection heal and lowers the chance of a urine leak outside of the repair. Stents are often removed 1 month after surgery. This is done in clinic using a cystoscope (camera that goes into the bladder).
- **What medicines will I go home with?** You will get:
  - **Pain medicines:** Most people need only a few days of narcotic medicines.
  - **Stool softeners:** Anesthesia, pain, and pain medicines all lead to a slowing of the intestinal tract. Stool softeners help people have regular bowel movements. These are likely needed while taking pain medicines.

- **Antibiotics:** Most people only need antibiotics at the time of surgery. People with an UTI at the time of surgery or who had a segment of intestine used may need to go home with antibiotics. This will be specific to each person.
- **After I go home, when will I need to see my doctor again?**
  - **1<sup>st</sup> visit:** You will likely need to see your doctor 1 week after you go home if you have a foley catheter. You will have a cystogram (x-ray of the bladder) to make sure the bladder has healed. If your incision was closed with staples, these are often removed at this visit too.
  - **2<sup>nd</sup> visit:** You will have a cystoscopy and the stent removed about 1 month after surgery. A small camera is placed through the urethra into your bladder. It has a grasper that can remove the stent.
  - **3<sup>rd</sup> visit:** About 3 months after surgery, you will have an ultrasound of your kidneys to make sure it worked well. It looks for hydronephrosis (dilation of the kidney). Any concerns found will be addressed with your doctor at this time.
- **How will I know if I am having a problem with my surgery?** You will have some discomfort. You might have a problem and need to call 1-800-322-8442 or get help right away if you:
  - Have abdominal, flank, or back pain that gets worse after you go home
  - Have a fever
  - Cannot drink fluids or are vomiting
  - Have UTIs
  - Have other new symptoms

If you have a nephrostomy tube or indwelling ureteral stent, it might need to be changed.

- **When will I know if I am cured?** Your doctor will see you in the months after your surgery. If you had ureteral stent or percutaneous nephrostomy tube, these are changed every 3 to 4 months. If you had a surgical repair, your doctor will have a good idea in the first year if it was a success.

**Read this guide on the UI Health Care website**

You can find a web version of this guide by pointing your phone's camera at the code at right.

Or you can type this URL into a web browser:

[uihc.org/educational-resources/preparing-ureteral-stricture-treatment](http://uihc.org/educational-resources/preparing-ureteral-stricture-treatment)

