

University of Iowa Health Care

# Neurogenic Bladder

The bladder is an organ in your pelvis. The bladder stores urine (pee) until it is time to urinate (peeing).

**Neurogenic bladder** refers to bladder problems caused by brain, spinal cord, or nerve problems.

This guide explains:

- Causes and symptoms of neurogenic bladder
- What to expect when you are diagnosed
- What to expect when you are treated

You can also read this guide on the UI Health Care website. See the last page for instructions.

## What are the symptoms or problems caused by a neurogenic bladder?

**Symptoms** are signs of a disease or sickness.

**Medical problems** are health issues that can hurt the body. They can lead to other problems that you may not notice right away.

Symptoms and medical problems can change based on the person. Some people have no symptoms, while others have serious issues.

Neurogenic bladder can cause a range of **symptoms**, like:

- Weak urine stream
- Not able to urinate (urinary retention)
- Painful urination (dysuria)
- Straining to urinate or dribbling urine
- Urinating more than normal, often in small amounts (urinary frequency)
- Not able to control urine leakage (urinary incontinence)
- Not able to tell when the bladder is full

**Medical problems** may be:

- Urinary tract infections (UTIs)
- Bladder stones
- Damage to bladder and kidneys

The result of a neurogenic bladder is often a bladder that does not work well. Based on the cause, the bladder may become thickened, with less bladder volume. The bladder may also grow very large.

## What causes a neurogenic bladder?

Causes of neurogenic bladder are:

### Congenital development

Congenital development problems are problems with the body at birth, like:

- Neural tube defects (neural tube does not close all the way)
- Sacral agenesis (part or all of the sacrum is missing)
- Cerebral palsy (weakness in or problems using the muscles)

Neural tube defects are the most common problem. This can happen along the spinal cord and leads to damage to the nerves in that area.

### Medical conditions

Some health conditions lead to nerve damage in the small nerve fibers that are closest to the bladder. This can take years to happen. These conditions are:

- **Diabetes:** This is the most common condition that causes neurogenic bladder. It often happens when diabetes is not controlled well and hemoglobin A1c levels are high.
- **Heavy metal poisoning:** This can change the nervous system in many ways that may impact how the bladder works.

### Neurologic diseases

Conditions that affect the brain, spinal cord, or nerves that lead to the bladder can all cause neurogenic bladder. These are:

- Parkinson's disease
- Multiple sclerosis
- Brain or spinal cord tumors
- Dementia

### Strokes

Strokes can damage the brain or the nerves that lead into the bladder.

### Trauma

Damage to the spinal cord and nerves from trauma can cause neurogenic bladder. Trauma can happen during a medical procedure (called iatrogenic trauma), such as:

- Brain surgery
- Spinal surgery
- Abdominal surgery

Trauma may change how the bladder works if nerves leading to the bladder are injured.

## How will my neurogenic bladder be treated?

Neurogenic bladder can be managed but not fixed. Management is tailored to each person's symptoms and conditions. These conditions can change over time, so management of them can also change.

Our goal is for you to have a **safe bladder**. A safe bladder:

- Stores urine at low pressure
- Empties well when needed
- Has less symptoms that need as little treatment as possible

The most common management plans are:

### Observation

Some people with neurogenic bladder do not need active treatment. As the bladder changes over time, we check your symptoms and test your bladder pressures. This is called observation.

Observation is a good choice for you if you:

- Do not want treatment
- Have no or minor symptoms
- Do not have UTIs that keep coming back
- Do not have damage to your bladder or kidney

### Medicines

Medicines can help people with high bladder pressure or symptoms of overactive bladder. These medicines are taken by mouth and relax the bladder muscle. This improves symptoms or leakage.

There are 2 types of medicines:

1. **Anticholinergic drugs** block a chemical signal in your body called acetylcholine. These chemical signals cause your bladder to contract (squeeze). Blocking these signals can lessen bladder activity and may lower urine pressure in the bladder.

Some of these medicines are:

- Oxybutynin
- Tolterodine
- Trospium
- Solifenacin
- Fesoterodine

There are many choices for how often you take the medicine. These can range from 1 time each day to a few times each day based on how well it works and side effects.

Side effects can be:

- Dry mouth
- Constipation
- Impaired cognition (trouble with memory, learning new things, or making decisions)

2. **Beta-3 adrenergic drugs** help relax the bladder muscle. Mirebegron (Myrbetriq®) is most commonly prescribed. It is often taken 1 time each day.

This medicine can raise your blood pressure. Talk to your doctor or cardiologist (heart doctor) if you have high blood pressure.

### **Bladder Botox**

Bladder Botox (onabotulinumtoxinA) is an option if medicines taken by mouth do not lessen symptoms or have too many side effects.

When Botox is injected into the bladder, it limits the contraction (squeezing) of the bladder muscle. This can improve symptoms and lower high urine storage pressures.

Bladder Botox injection is often done in a doctor's office. A small telescope (cystoscope) is placed into the bladder. Botox is then injected into the bladder wall through a tiny needle. If it works, it can be repeated every 3 to 6 months.

Side effects can be:

- Blood in the urine
- Some pain in the pelvis
- UTIs
- Urinary retention (when you cannot urinate)

If you have urinary retention, you may need catheterization until the bladder is able to empty well.

### **Bladder catheterization**

Sometimes the safest choice is to drain urine straight from the bladder. This can be done with either a temporary catheter or an indwelling catheter (left in the bladder). An indwelling catheter is a longer-term choice. It is reserved for people whose treatments have failed in the past or who cannot or will not do more procedures.

Urinary catheters are foreign bodies. They raise the risk for bacteria in the urine and UTIs.

Bladder catheterization options are:

- **Clean intermittent catheterization:** A catheter is placed into the bladder for a short time and then removed. This is done every 3 to 4 hours each day.
- **Urethral Foley catheter:** This is an indwelling catheter that constantly drains urine into a collection bag. A small balloon inflated inside the bladder keeps it in place. When used long-term, the catheter is changed out each month. This catheter can cause break down of urethral tissue. In women, that can lead to urinary incontinence. In men, it can break down the tissue under the penis, causing splitting of the penis.
- **Suprapubic tube:** Like a Foley catheter, but the tube is placed right into the bladder through a small cut in the lower part of the belly. When used long-term, the catheter is changed out each month.

## Surgery

In some cases, surgery may be the best choice. Surgery options are:

- **Bladder augmentation:** We use part of the intestines to make the bladder larger. This increases how much urine it can hold.

Neurogenic conditions can cause the bladder to become thickened and small. A small bladder has less space to store urine. That raises the pressure in the bladder. Higher bladder pressure can hurt the bladder and the kidneys. Increasing the size of the bladder lowers bladder pressure. The bladder augmentation may also stretch over time, increasing bladder size even more.

The part of the intestines used may secrete mucous. Mucous can lead to infections and bladder stones if it is not cleared from the bladder.

- **Continent catheterizable channel:** We use a piece of the small intestine to create a channel (tube) from the bladder to an opening (stoma) on the belly. This lets you pass a catheter from the belly into the bladder to safely drain urine. A continent procedure means that urine does not leak when you do not have a catheter in place. This procedure may be a good choice for female patients, who may have a hard time passing a catheter through their urethra.

Your appendix, if you have one, can also be used to create the channel if it is the right size. A continent catheterizable channel can be done with a bladder augmentation to make the bladder bigger and create a channel for a catheter.

The stoma is often found on the lower belly. Sometimes it can be placed in the belly button. Before your surgery, a wound ostomy nurse will look at your belly to decide possible locations for the stoma.

The bowel used to create the channel may make mucous. That can raise the risk of UTI and bladder stones.

- **Cystectomy and creation of urinary conduit:** This takes out all or part of the bladder (cystectomy). This is a major surgery often reserved for those with severe neurogenic bladder that failed other treatments.

Urine passes through a piece of bowel called a conduit. The conduit drains urine from the ureters (tubes that normally carry the urine from the kidneys to the bladder) to a stoma on the belly, then into a small collection bag. The bag is emptied a few times each day. It can be worn underneath clothing. Before your surgery, a wound ostomy nurse will look at your belly to decide possible locations for the stoma.

Another conduit procedure, called **ileovesicostomy**, keeps the bladder in place. It uses a piece of bowel to increase the size of the bladder (cystoplasty) and create a conduit to drain urine.

## Possible surgery complications

Complications can happen after any surgery. These may be:

- Bleeding
- Infection
- Damage to organs or tissue

Surgeries to treat neurogenic bladder have other possible complications, such as:

- **Urine leak:** Stitches (sutures) secure new connections between the bowel and ureters. If these stitches fail, urine can leak. You may need a temporary drain to move urine away from the leak or drain the kidney directly.
- **Ureteral stricture:** If the ureter and bowel connection does not heal well, scar tissue can form. This can lead to backup of urine into the kidney. You may need another surgery to dilate (widen) the ureter or fix the scar tissue.
- **Bowel leak:** Any surgery that makes a new connection between pieces of bowel has some risk of a leak. This is rare, but it may need to be fixed by another surgery.
- **Electrolyte abnormalities:** If the bowel piece touches the urine as it drains from the conduit, it could change your electrolytes. You may need to take more medicines.
- **Mucous production:** Your bowels make mucous. Any small bowel piece used for a conduit will keep making mucous. This can lead to infections and other issues.
- **Parastomal hernia:** Pieces of bowel or fat that are normally found on the inside of the belly can squeeze through the small hole in the connective tissue (fascia) where the conduit attaches. This can lead to a bulge or swelling around the conduit. If the bulge causes problems or backup of urine, you may need another surgery to fix it.
- **Fascia or stoma stenosis:** If your fascia or the stoma gets very small and tight, urine may not drain the right way. You may need dilation or surgery to fix the narrowing.
- **Stoma appliance issues:** The bowel stoma is found on the skin of the belly. The stoma appliance collects the urine from the stoma. It is attached to the skin with an adhesive. Some people may have a hard time keeping the appliance attached. This can cause urine to leak.

## What tests are needed for diagnosis and treatment?

To choose a treatment option, your surgeon will look at:

- Your personal goals
- Other medical issues you have
- Your bladder's condition

There are many tests that check the health of your bladder and your urinary system:

- **Urodynamics:** Your bladder is filled with fluid using a small catheter. This test tells us about:
  - The size of your bladder
  - Pressures in your bladder during filling and emptying

The test will also check if urine that enters your bladder can go "backwards" into the kidney (vesicoureteral reflux).

This is an outpatient procedure done without anesthesia.

- **Renal and bladder ultrasound:** This scan uses soundwaves to make images of your bladder and kidneys. It is safe and painless. We use the ultrasound images to check for swelling of the kidneys. This happens when urine cannot move down the ureters and empty from the bladder. We will also check the size and thickness of the bladder.
- **Bladder volume index:** This is a painless study that uses ultrasound to measure urine left in the bladder after urination.
- **Cystoscopy:** A small flexible telescope is used to view the inside of your bladder and urethra. This procedure can be done in the office without sedation.

## What tests are needed before surgery?

You will need testing of your health status before surgery, such as:

- **Electrocardiogram (ECG/EKG):** Makes sure that your heart is healthy enough for surgery.
- **Blood work:** Make sures that your supporting organs (such as the kidney, liver, and intestines) are working the right way and that your blood levels (hemoglobin, hematocrit) are high enough.
- **Chest X-ray:** Makes sure that your lungs are healthy enough for surgery.
- **Medicine review:** Makes sure that your blood pressure is under control and medicines that can lead to bleeding are stopped before surgery (such as Coumadin<sup>®</sup>, aspirin, and clopidogrel).

You will need to stop using all nicotine products (cigarettes, chewing tobacco, vaping products, nicotine gum) before surgery. You may need to do a urine test on the day of surgery to confirm this.

## What should I expect on the day of my surgery?

### Where and when do I check in?

We will tell you what to do on your day of surgery, such as where to park and where to check in.

### 2 days before surgery

We will call you 2 weekdays before your surgery date with the exact time that you should arrive at the hospital.

If you did not get a phone call and it is less than 2 weekdays from your procedure, call 319-384-8008.

### How long will surgery take?

This depends on the type of procedure:

- **Suprapubic tube placement:** This procedure often takes less than 1 hour.
- **Complex bladder augmentation, creation of catheterizable channels, and cystectomy surgeries:** These procedures can take 3 to 6 hours. It may take 1 more hour for anesthesia, surgical positioning, and waking up.

## What are the possible complications of my surgery?

All surgeries have a risk of complications. Based on the type of procedure, some complications may be:

- **Bleeding:** You may have some bleeding from the incisions. There may also be blood in your urine.
- **Infection:** You will get antibiotics before surgery. This lowers the risk of infection at the surgical site. Infections after urology procedures can happen in the incision or in the urine. You will often see infections 3 days after surgery. Symptoms can be:
  - Fever
  - Chills
  - Redness around the wound

Most infections are treated with antibiotics. Some infections may also need the incision to be opened and drained.

- **Urine leak:** There is a risk for urine leak with any surgery with a new connection to the urinary system. These connections are held together using stitches that dissolve. If a stitch does not hold, or the healing does not happen fast enough, urine can leak outside of the urethra. Most urine leaks will heal on their own over time. Sometimes you may need drainage tubes to help the healing.
- **Neurologic or positioning injury:** The care team makes sure that pressure points on your body are padded for surgery. Your arms and legs are placed in a way that prevents nerve injury. Neurologic injuries can still happen and are more common with longer surgeries and in people with obesity. Most injuries will get better in days to weeks after surgery. Some may need treatment.



## How many nights will I spend in the hospital?

This depends on the type of surgery you have:

- For **minor procedures**, such as a suprapubic catheter, you can go home the same day.
- For **larger surgeries**, you may need to stay in the hospital 3 to 6 days. People are often discharged (sent home) when they can:
  - Eat solid food
  - Have a bowel function (poop, pass gas)
  - Walk without help (if none was needed before surgery)
  - Control pain with medicine (and epidural, if it was needed, is removed)

## What will my incision look like?

- For **open bladder neck repair** or **urinary diversion surgery**, you will have a vertical midline incision along the lower part of the belly.
- For **other procedures**, you will have 1 incision above or below the scrotum based on the stricture length and location. All sutures will dissolve on their own as your body heals.

## Will I have any tubes coming out of me after surgery?

This depends on the surgery you have:

- **Bladder augmentation**
  - Foley catheter in your bladder
  - Surgical drain (also known as a Jackson-Pratt or JP drain)
- **Continent catheterizable channel**
  - Catheter through the stoma into the bladder
  - Surgical drain (JP drain)
- **Cystectomy/conduit diversion**
  - Surgical drain (JP drain)
  - Ureteral stents (thin flexible tubes) from each kidney through the conduit out of the stoma
- **Suprapubic catheter**
  - No other surgical drains

## What medicines will I go home with?

- **Pain medicines:** Most people only need a few days of narcotic (morphine-based) medicines after discharge.
- **Stool softeners:** Surgical anesthesia, pain, and pain medicine can lead to a slowing of the small and large intestines. Stool softeners help make your poop softer and easier to pass.

- **Bladder spasm medicine:** Foley catheters can irritate the bladder, causing it to contract and spasm. Bladder spasm medicines can help with this pain, but may also cause constipation, blurry vision, dry mouth, and mental cloudiness.

Stop taking this medicine 24 hours before your 1st follow-up visit. This lets your bladder empty well after the catheter is taken out.

- **Antibiotics:** Most people only need antibiotics at the time of surgery. They will not have more antibiotics prescribed at discharge.

## After I leave the hospital, when will I need to see my urologist?

- **1st follow-up visit:** Based on the type of procedure you had, you will likely go back to the clinic 1 to 3 weeks after your surgery. At this visit, we will take out your Foley catheter or ureteral stent catheter. If you had a catheterizable channel procedure, you will start catheterization.
- **2nd follow-up visit:** You will come back for an evaluation about 6 weeks after surgery. We may draw blood to check your how well your kidneys are working, blood counts, more. We may also do a renal ultrasound to check for swelling or backing up of fluid (hydronephrosis).
- **3rd follow-up visit:** Based on the type of procedure you had, you may come back for a visit 3 to 4 months after your procedure. We will do an evaluation like at your 2nd follow-up visit.

## How will I know if I'm having a problem with my surgery?

You should contact us between visits if you have new or worsening symptoms, such as:

- Not able to catheterize (if needed)
- Problems with your appliance
- UTIs
- Fever
- Chills

If you had major bladder surgery, you may have dehydration and weakness. Let us know if you have these symptoms, as you may need to go back to the hospital. It is very important to stay hydrated as you heal.

## Is there a cure for neurogenic bladder?

No, neurogenic bladder is a life-long condition that needs to be watched by a care team. Our mission is to give you excellent care while we reach your goals for lifestyle and bladder health.

## 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:

<https://uihc.org/educational-resources/neurogenic-bladder>

