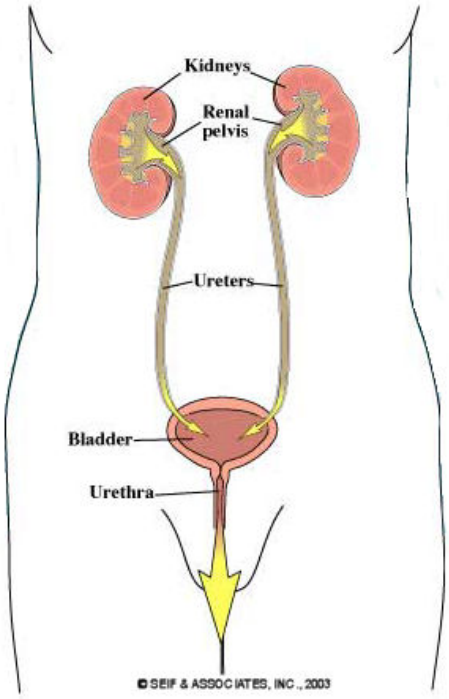
Neurogenic Bladder

Neurogenic bladder is a loss of normal control of bladder function caused by damaged nerves. The damage to the nerves can be caused by a variety of injuries and diseases.

The muscles and nerves of the urinary system work together to store urine and release urine at the right time. Nerves carry messages from the bladder to the brain and from the brain to the muscles of the bladder. In a neurogenic bladder, the nerves that are supposed to carry these messages do not work properly.



There are 2 types of neurogenic bladder:

- Overactive: inability to control when or how much to urinate. Even when only a small amount of urine is in the bladder, there may be an urge to urinate that cannot be controlled. This can result in wetting accidents (*urge incontinence*).
- Underactive: the bladder holds much more urine than normal. Because there is loss of sensation of the bladder being full, small amounts of urine leak out as bladder pressure builds. This can also result in wetting accidents.

CAUSES

Neurogenic bladder can be caused by many problems. These include:

- Stroke - causes a failure to store urine because of the bladder being overactive or spastic.
- Multiple Sclerosis
  - Can cause a failure to store urine because of the bladder being overactive or spastic.
  - Can cause a failure to store urine because of the bladder being underactive (*hypoactive*).
  - Can cause a sphincter that can block the bladder from emptying.
- Infection
  - Can cause a failure to store urine because of the bladder being overactive or spastic.
- Trauma and injuries to the spine, spinal cord, depending on the level in the back of the injury
  - Can cause a failure to store urine because of the bladder being overactive or spastic or a failure to empty because of an underactive bladder.
  - Can cause a failure to store empty urine because of the sphincter being overactive and contracting at the wrong time or contracting too much.
- Diabetes
  - Can cause a failure to empty urine because of the bladder being hypoactive or not contracting strong or long enough.
- Parkinson's Disease
  - Can cause a failure to store urine because of the bladder being overactive or spastic.
- Brain tumors
  - Can cause a failure to store urine because of the bladder being overactive or spastic.
- Spinal cord tumors
  - Depending on where in the back the tumor is it may cause a failure to store urine because of the bladder being overactive or spastic or a failure to empty because of an underactive bladder.
  - Depending on where in the back the tumor is it may cause failure to store empty urine because of the sphincter being overactive and contracting at the wrong time or contracting too much.
- Birth defects that affect the brain
  - Can cause a failure to store urine because of the bladder being overactive or spastic.
- Birth defects that affect the spinal cord

- Depending on where in the back the birth defect is it can cause a failure to store urine because of the bladder being overactive or spastic or a failure to empty because of an underactive bladder.
- Depending on where in the back the birth defect is it can cause a failure to store empty urine because of the sphincter being overactive and contracting at the wrong time or contracting too much.

- Guillain-Barré syndrome
  - Can cause overactive bladder and an underactive bladder.
  - Can cause overactive sphincter and an underactive sphincter.
  - Incontinence (wetness) or inability to empty bladder.
- Complications of surgery involving the spine, spinal cord or pelvis
  - Depending upon the spine level, any of the above abnormal functions can happen.
  - Pelvic trauma usually results in a bladder that does not squeeze down or a bladder that does not empty well. The sphincter also tends to be weak and not stop leaking.

SYMPTOMS

The following are the most common problems and symptoms of neurogenic bladder. However, each individual may experience symptoms differently.

- Urinary tract infection symptoms:
  - Pain or burning when urinating.
  - Back or flank pain.
  - Cloudy or bloody urine.
  - Fever.
- Kidney stone symptoms - these may be difficult to determine. You may not be able to feel pain related to kidney stones if you have spinal cord abnormalities. Symptoms of kidney stones include:
  - Chills.
  - Shivering.
  - Feeling sick to your stomach (*nausea*) and/or vomiting.
  - Fever.
- Loss of bladder control (*urinary incontinence*).
- Small urine volume when emptying bladder (*voiding*).
- Urinary frequency and urgency.
- Dribbling urine.
- Loss of sensation of bladder fullness.
- Kidney failure.
- Infection in the blood stream (*sepsis*).

DIAGNOSIS

When neurogenic bladder is suspected, both the nervous system and the bladder are examined. In addition to reviewing your complete medical history and having a physical exam, diagnostic procedures for neurogenic bladder may include:

- **X-rays of the spine** - A test which uses invisible electromagnetic energy beams to produce images of internal tissues, bones, and organs onto film.
- **Imaging tests** of the kidneys, ureters, and bladder, such as:
  - X-rays - Usually used with contrast material injected into a vein.
  - Ultrasound - A test that uses sound waves to examine areas stated above.
  - CT scan - Use of x-rays and computers to make detailed images of areas stated above.
- **MRI** - A test that uses magnetic imaging of the brain, spine, and/or pelvis.
- **Urodynamics or Cystometrogram** (CMG) - Tests the nerves and muscles of the bladder. For example, these tests can show how much the bladder can hold and if it empties completely.
- **EMG of the sphincter** -- this is measure of the electrical activity of the sphincter muscle and this helps determine when the sphincter is contracting or squeezing down.
- **Video studies** of the bladder and sphincter while you are urinating.
- **Cystoscopy** - Doctor looks inside the bladder with a telescope like instrument.

TREATMENT

Specific treatment for neurogenic bladder will be determined by your caregiver based on:

- Your age, overall health and medical history.
- Severity of symptoms.
- Cause of the nerve damage.
- Type of bladder problem present.
- Your tolerance for specific medications, procedures or therapies.
- Expectations for the course of the condition.
- Your opinion or preference.

Treatment may include:

- **Antibiotics** - Help control bladder infections.
- **Medications** - Help control symptoms. These will differ depending upon the exact type of neurogenic bladder (overactive or underactive) found. Make sure that prescribed medications do not interfere and cause problems with other medications you may be taking. This is especially important for patients with eye problems such as glaucoma as well as patients who are taking antidepressants.
- **Insertion of a thin tube (*catheter*)** to empty the bladder. There are 3 types:
  - Intermittent catheterization - A small rubber catheter may be inserted 4 to 6 times a day to empty the bladder. The patient is taught how to do this.
  - Continuous catheterization (*indwelling catheters*) - This type of catheter empties the bladder continuously into a collection bag.
  - Suprapubic tube - This catheter is surgically placed through a cut (incision) in the lower abdominal wall directly into the bladder. It drains at all times.
- **Surgery to create an artificial sphincter** - An artificial sphincter cuff is placed around the neck of the bladder. This cuff can be made large (*inflated*) to prevent urinary leakage and made small (deflated) when it is time to empty the bladder. There is still a need for intermittent catheterization to completely empty the bladder.
- **Sacral nerve stimulation** (SNS) - A small wire is inserted through the skin in the area around the tailbone. The wire stimulates the nerves in order to empty the bladder. It can also help patients whose nerves are very active so that the bladder will empty more effectively.
- **Sling surgery** - Creates a new support system to hold the neck of the bladder and urethra in the proper position to prevent leakage. This support system is made by either your own tissues or synthetic materials. This is the treatment of choice for patients with stress urinary incontinence.
- **Bladder Augmentation** - At times, damage to the bladder and how it functions is so severe that it needs to be improved by making the bladder larger. This procedure increases bladder size with tissue taken from another part of the body.
- **Ileal loop surgery** - a section of intestine can be connected to the kidney tubes (*ureters*) and brought out to a separate opening on the abdomen. Urine comes out and can be collected into a plastic bag.
- **Perineal pads** - can catch urine.

HOME CARE INSTRUCTIONS

The goals at home are to maintain as much bladder control as possible and to avoid problems. Problems would include infection and damage to kidneys as a result of urine getting backed up.

- Take medications as prescribed by your caregiver.
- Review your medications (both prescription and non-prescription) with your caregiver to make sure medications you are presently taking will not be harmful.
- Periodic blood, urine, and imaging tests may be required. Follow your caregiver's advice regarding the timing of these.
- If you use a catheter, carefully follow catheter care instructions.
- Do not be afraid to use diaper-like products if you have problems with dribbling.

SEEK MEDICAL CARE IF:

- You have increasing fatigue or weakness.
- You find there is less and less control of the urine stream despite treatment.
- You develop loss of appetite or are feeling sick to your stomach (*nausea*).
- You develop a fever of 100.5° F (38.1° C) or higher.
- If doing intermittent catheterization, you begin to have trouble inserting the catheter or if there is a lot of blood.
- Urine that passes appears somewhat dark, cloudy or has an unusual odor.

SEEK IMMEDIATE MEDICAL CARE IF:

- You develop worsening abdominal and/or back pain.
- You cannot pass any urine.
- The urine becomes dark, bloody, very cloudy or foul smelling.
- You experience a lot of burning while urinating.
- An oral temperature of 102° F (38.9° C) or above develops.
- You develop repeated vomiting.
- If doing intermittent catheterization, you begin to have trouble inserting the catheter or if there is a lot of blood.

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