



# Neurogenic Bladder

## What is a neurogenic bladder?

The bladder has two main functions: to store and then to empty urine when it is full. For this process to be successful, the nerves and the muscles of the urinary tract must work together. Nerves carry messages from bladder to the spine and brain, and then from the brain to muscles of bladder and sphincter (the “hold on” muscle between bladder and urethra). These messages tell the bladder and sphincter when to contract and when to relax. In a neurogenic bladder, the nerves that are supposed to carry these messages do not work properly so the bladder is not able to store or empty urine effectively.

## What are the causes of a neurogenic bladder?

In children, a neurogenic bladder may be related to a birth defect or may be acquired from a different problem. Common causes are:

- Spina Bifida/ myelodysplasia
- Spinal cord injury/trauma
- Tumors involving the spinal cord or brain
- Cerebral palsy
- Problems with bladder such as posterior urethral valves, Hinman’s syndrome or other neurologic problems.

## What are the symptoms of a neurogenic bladder?

Each child may experience symptoms differently. Some symptoms may include:

- Urinary leakage or inability to empty the bladder (urinary retention), inability to potty train, feeling urge to urinate frequently/urgently, dribbling urine or small voids during urination, loss of sensation of bladder fullness.
- Urinary tract infections due to holding urine too long or inability to empty bladder completely.
- Fluid on the kidney (hydronephrosis) due to urine refluxing onto the kidneys or high pressures in bladder.
- Stones in the kidneys or bladder: symptoms include blood in urine, pain in back or lower abdomen area, or signs of infection

## How is a neurogenic bladder diagnosed?

Your child may undergo a variety of tests to help us confirm the diagnosis and learn the extent of the condition.



- **Kidney/bladder ultrasound:** checks the size and shape of the bladder and monitors growth of the kidneys. Used to assess fluid on the kidney (hydronephrosis).
- **VCUG (voiding cystourethrogram):** This test is an x-ray that requires a catheter to be placed in the bladder. It evaluates the urethra, size and shape of the bladder and how well the bladder empties. It will also assess for urinary reflux, which is when urine flows backward from the bladder to the kidneys.
- **Renogram:** This test is done when your baby is older than 3 weeks of age. It is a test that requires an IV, and a catheter to be placed in the bladder. It is used to see how well each kidney is working and whether urine passes from the kidneys into the bladder without obstruction.
- **Urodynamic study:** Special study that shows how the bladder works. It requires a catheter in bladder and rectum, as well as patches on the bottom. It evaluates what pressure the bladder fills, stores and empties urine. It tells us the 4 Cs:
  - Capacity – how much the bladder can hold
  - Coordination – how well bladder and sphincter work together
  - Continence – if bladder can hold without leaking
  - Contractions – how often and how strong the bladder squeezes
- **MRI of the spine:** evaluates for any spinal anomalies contributing to the neurogenic bladder.
- **Urine and blood tests:** to assess urinary tract health, rule out infection, and evaluate kidney function. Tests include a urinalysis and urine culture, BUN, creatinine, and electrolytes.

### How is a neurogenic bladder treated?

Goals in treating children with a neurogenic bladder are to preserve kidney function, achieve social continence and promote a positive self-esteem as child gets older. Our team of physicians, nurse practitioners, and nurses work closely together with patient and family to ensure these health goals are met.

- **Medical management:** most kids will need help with bladder catheterizations or medications to help manage their neurogenic bladders.
  - **Timed voiding:** Urinating on a schedule every 3-4 hours during the day. Use a watch with an alarm to remind your child to void and encourage independence.
  - **Clean intermittent catheterization (CIC):** is a procedure for children who have trouble urinating the “normal” way. The CIC procedure, involves inserting a catheter, a thin, hollow tube, through the urethra and into the bladder to help empty the bladder. By routinely emptying the bladder, it



will decrease the risk of UTI's, prevent fluid on the kidney (hydronephrosis), and help achieve continence.

- **Overnight catheter drainage:** Some children require leaving a catheter in their bladder while they sleep to continuously drain their urine overnight. This can reduce the frequency of UTI's, decrease the amount of fluid on the kidneys and improve continence.
  - **Anticholinergic (bladder) medication:** This class of medications helps relax the smooth muscles of the bladder, prevent bladder contractions and helps increase bladder capacity.
  - **Preventative antibiotic therapy:** If there are concerns that the bladder does not empty completely, urine refluxes from the bladder back into the kidneys (vesicoureteral reflux) or any other condition that will put your child at a higher risk of developing urinary tract infections, a once daily low dose antibiotic may be recommended.
- **Surgical management:** a minority of kids may need surgery to help them keep their urinary tract healthy and manage their neurogenic bladder.
    - **Catheterizable channel/ Mitrofanoff:** Your doctor will use the appendix or a small piece of bowel to make a new passage for the urine to come out. The appendix is a tube about the size and length of a small finger. Your child's surgeon will create a tube using the appendix or a small piece of bowel that will be open on both ends. One end will be tunneled into the bladder and the other end is made into a small opening on the abdomen or in the belly button. This is called a stoma. To empty the bladder, a catheter is passed through the stoma and down into the bladder to drain the bladder. This procedure makes it possible for children and adolescence to gain age-appropriate independence.
    - **Bladder Augmentation:** Bladder augmentation is a surgical procedure to enlarge the bladder so that it can hold larger volumes of urine. The surgeon usually uses a portion of the bowel for this procedure. Intermittent catheterization and bladder irrigation is necessary after this procedure.
    - **Bladder neck reconstruction:** Procedure that can be done to treat involuntary urine leakage. Artificial sphincter, sling, or reconstructing anatomy.
    - **Vesicostomy:** A vesicostomy is an opening in the lower abdomen into the bladder which allows urine to continuously drain. The opening is created by a surgical procedure where a small incision is made through the skin and into the bladder. A small part of the bladder is sewn to the abdomen. It appears as a small slit surrounded by pink tissue. The vesicostomy is a temporary option and can be reversed in the future.



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## How can I help my child with a neurogenic bladder?

Living with neurogenic bladder can be hard. Urine leakage can cause embarrassment and can lead to self-esteem issues with your child. It is vital for your child's treatment and emotional development that you're supportive and patient. It takes work and time to learn how to best manage your child's condition. Encourage your child's success by seeing that he or she follows the treatment plan. In some cases, a psychotherapist can help the child and family follow the treatment plan.

*For any questions or concerns, please contact our clinic at 612-813-8000*

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