

# Neurogenic bladder

## What is it?

A 'neurogenic' (or 'neuropathic') bladder develops due to abnormal nerve supply to the bladder.

The abnormality of nerve supply may be something the child was born with (congenital) or something that has developed since birth (acquired).

## Background

The urinary tract consists of two kidneys, which filter the blood to make urine. The urine drains from each kidney, by way of a small tube (ureter) into the bladder. The bladder is a muscular pouch, which expands to fill with urine. Around the neck of this pouch is a 'sphincter': a ring of muscle that opens and closes the outlet, preventing leakage.

When the bladder is full, it sends messages via nerves to the brain. After toilet-training, the normal bladder is able to empty 'on command', by contracting the muscle in the 'pouch' at the same time the sphincter muscle relaxes. This allows complete, low-pressure emptying.

## What about in a 'neurogenic' bladder?

When the nerve signals are abnormal, things can go wrong at both the bladder muscle (detrusor) and sphincter muscle levels.

- the bladder may not stretch as it fills, or it may overstretch without sending a 'full' message
- the sphincter may be tightly closed all the time, generating to high pressure in the bladder, or it may be too weak and leak, leading to wetting

High pressure in the bladder can cause back-pressure on the kidneys, leading to kidney damage and kidney failure.

Failure of the bladder to empty regularly and completely can put the patient at risk of recurrent urinary tract infections.

## What are the causes?

### *Congenital*

- myelomeningocele (spina bifida)
- sacral agenesis

### *Acquired*

- spinal cord injury (trauma, aortic surgery)
- tethered cord syndrome
- tumours: sacrococcygeal teratoma, lipoma
- infection: transverse myelitis

## How is it diagnosed? How does it present?

Your child may be diagnosed with an abnormality before birth, if an abnormality of the spine is seen on antenatal ultrasound. Your child's management for neurogenic bladder will start from birth.

In some babies, the problem is not found before birth, but a spinal abnormality is seen at birth.

Your child may be found to have a neurogenic bladder if they have other nerve symptoms, or on investigation for wetting or urinary infections.

## What tests are performed?

### *Ultrasound*

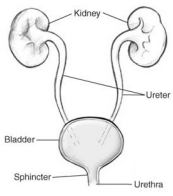
This shows the appearance of the kidneys, ureter and bladder. It can assess bladder wall thickness. After potty-training, it can assess emptying. Repeat ultrasounds are often used in follow-up.

### *Nuclear medicine*

These tests assess kidney function. They can show areas of damage or scarring in the kidneys.

### *Urodynamic study*

This is a dynamic study, assessing bladder and sphincter function (see "Urodynamics" sheet).



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## What are the treatment options?

For patients with congenital neurogenic bladder, the kidneys are usually normal at birth. If the bladder is not managed well, kidney function can deteriorate rapidly and silently. This can occur if the urine storage pressures are too high, or if there is infection. At worst, this can progress to kidney failure requiring dialysis or transplantation.

The goals of treatment for the infant and child with a neurogenic bladder are:

1. preservation of kidney function – *top* priority
2. prevention of urinary tract infections
3. prevention of high-pressure bladder
4. achievement of social continence (being dry)

To protect kidney function it is important to:

- manage the bladder pressure
- avoid urinary tract infection

### *Intermittent catheterisation*

Soon after diagnosis, a programme to help empty the bladder safely and efficiently needs to be started. This is most often managed by teaching a parent (or older child) to insert a tube or 'catheter' into the bladder several times a day. This is called 'clean intermittent catheterisation' (CIC).

Your child may also be started on low dose antibiotic prophylaxis to help avoid infection, whilst the process is being learnt.

### *Urinary diversion*

If catheterisation is not possible, urinary tract diversion may be considered, to take the pressure off the bladder. This is usually a short-term (several months) management tool. It usually takes the form of a small stoma (join) directly from bladder to skin, so the sphincter is bypassed.

### *Medication*

Sometimes, anticholinergic medication is used to further reduce the pressure in the bladder, if this remains a problem once regular and complete bladder emptying with CIC has been established.

## Ongoing care

The urinary tract state is monitored regularly with ultrasound to assess kidney growth, dilatation (sign of back-pressure), and bladder emptying with and without catheterisation.

As your child becomes older, their bladder function changes and other treatments may be required. This can include adding or changing medications. Botox injections into the bladder can take the place of anticholinergic medication in some cases.

Sometimes surgery becomes necessary to expand the volume of the bladder or other procedures to achieve dryness. Full assessment of the child and their bladder is essential before planning this type of surgery.

## What are the outcomes?

A neurogenic bladder is something that your child will have for their whole life. It will need lifelong attention to protect kidney function. This is most dependent on effective bladder management.

## What is the follow-up?

Your child will need lifelong management by a multidisciplinary team, to identify and treat any problems that they may develop.

For further information, see information sheets on:

- Botox
- Intermittent Catheterisation
- Bladder augmentation

Information is also available at:

<http://www.urologyhealth.org/urology/index.cfm?article=9>