

Bladder Function in

Neurological Patients



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Bladder Function In Neurological Patients

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Neurological Diseases and their Effect on the Bladder

Disturbance of bladder function is often a part of neurological disease. In health the bladder is controlled by neural input from many different levels of the nervous system but some parts, such as the spinal cord, are particularly critical. This means that diseases that affect the spinal cord are highly likely to be associated with problems of continence; about 75% of patients with Multiple Sclerosis experience urinary complaints and patients with other causes of spinal cord damage are similarly affected. However, incontinence may also affect patients with cerebral disease such as strokes or brain injury and various progressive neurodegenerative diseases including Parkinson's Disease and parkinsonian like illnesses typically involve the bladder. Damage to the sacral roots will affect pelvic organ function including bladder control, and disease or injury to the peripheral innervation is likely to result in disorders of both storage and emptying the bladder. In all these conditions, there is usually much that can be done to lessen symptoms and critical to patient management is measurement of the post micturition residual volume.

Neurological Control of Storage and Voiding

The centre which controls the bladder is situated in the pons - a part of the brain stem close to the cerebellum (Figure 1). It is known that the process of voiding is controlled by the "pontine micturition centre" (PMC) and stimulation of this site in experimental animals results in a relaxation of the pelvic floor and sphincter followed by contraction of the detrusor muscle. Current thinking is that for most of life when urine is being stored, neural processes keep the striated urethral sphincter contracted and the detrusor relaxed. At an appropriate moment, determined by a perception of the appropriateness of social circumstances and a sensation of fullness arising from the bladder, higher centres "switch on" activity in the PMC. With this there is inhibition of the striated urethral sphincter and some seconds later a contraction of the detrusor muscle. To effect these processes there must be intact connections between the pontine region and the most caudal part of the spinal cord, the sacral region.

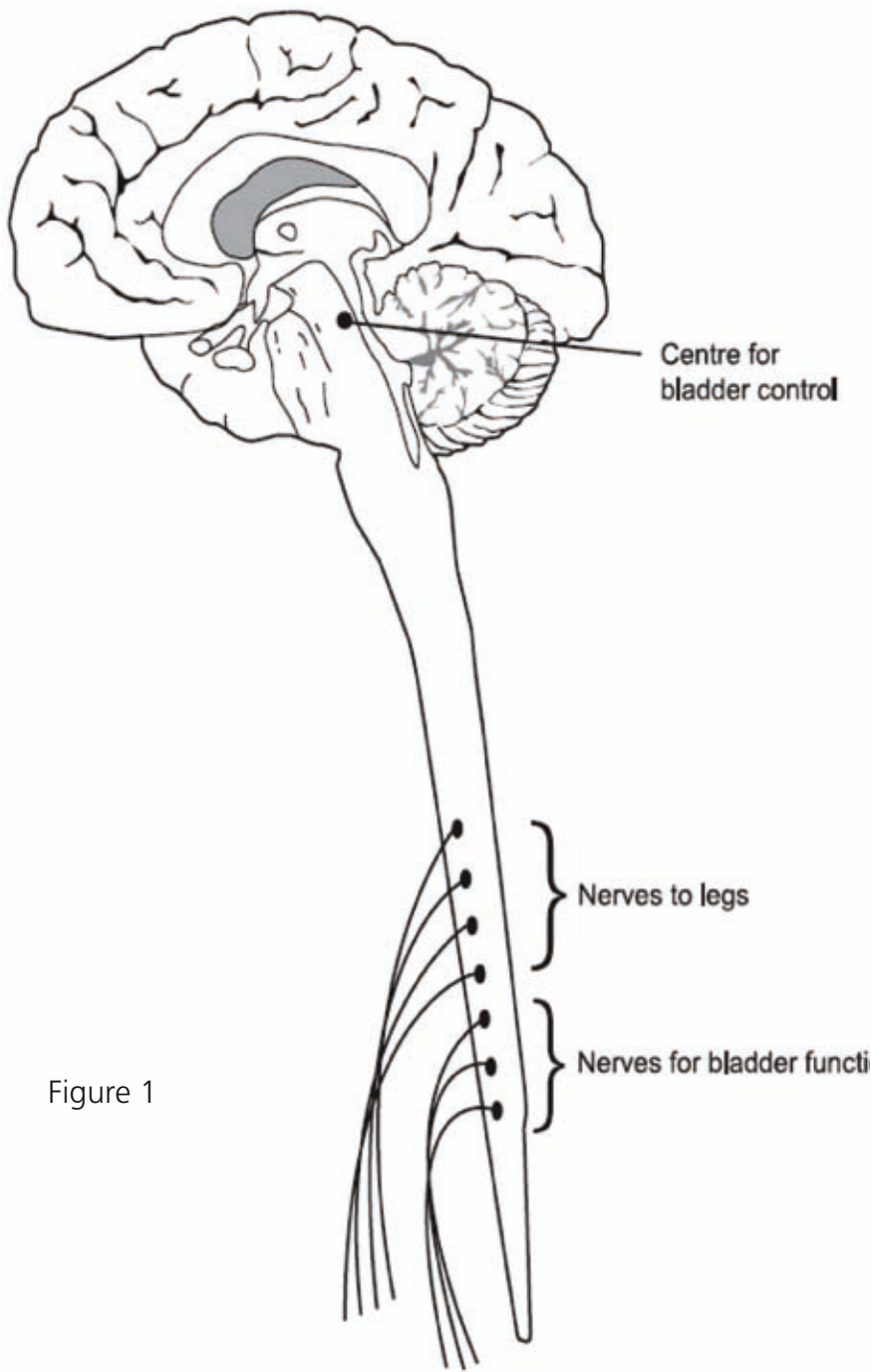


Figure 1

What goes Wrong

From the foregoing description of the physiological control of bladder mechanisms and Figure 1 it will be immediately clear that the spinal cord connects the controlling centre in the pons to the sacral region from where the nerves to the bladder exit. Any form of spinal cord disease be it traumatic, viral inflammation or vascular damage to demyelination as occurs in multiple sclerosis, will result in a failure of transmission of the inhibitory impulses to the detrusor muscle as well as a failure of transmission of the co-ordinated process of voiding. Characteristically patients with spinal cord lesions complain of urge incontinence due to activity that can be demonstrated on urodynamics, called “detrusor overactivity” (formerly known as “detrusor hyperreflexia” if there was known to be a neurological disorder). However because the process of voiding is also disrupted, incomplete bladder emptying may be a compounding problem in such patients. Various cerebral diseases and neuro-degenerative processes can affect the control of the bladder by failing to inhibit the activity of the PMC, so that these patients also complain of urge incontinence but are more likely to empty their bladders completely.

Importance of Residual Volume

Figure 2 shows the importance of measuring the post micturition residual volume in a patient with neurogenic urge incontinence. If the process of bladder emptying has been affected by neurological disease, the residual urine in the bladder acts as a constant stimulus causing repeated hyperreflexic contractions. It is important to realise that patients may not get any sensation of incomplete emptying - indeed some only deduce that they have this problem because they find they need to pass urine soon after previously voiding but they lack any positive sensation of continuous fullness. Therefore, when a patient with a known neurological disease presents with complaints of urgency and frequency, full urodynamics are not indicated in the first instance but rather measurement of the post micturition residual volume.



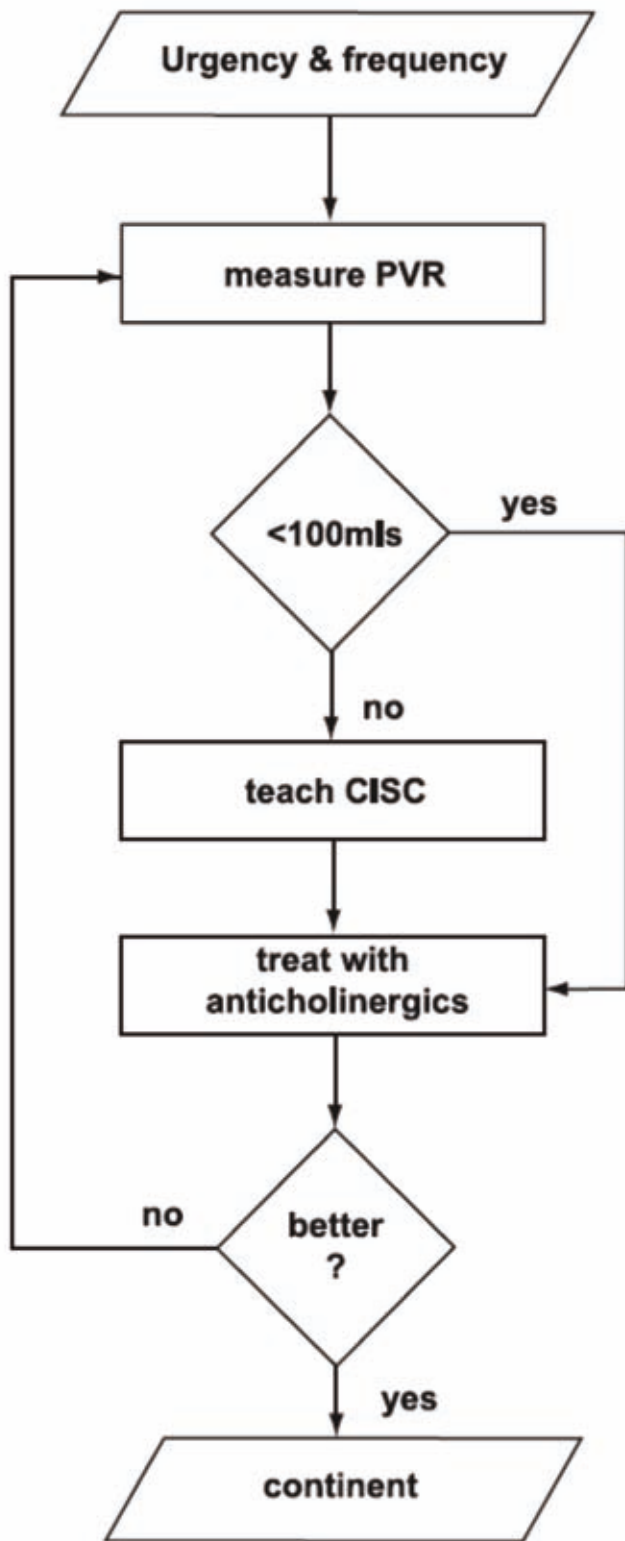


Figure 2

Use of ultrasound is preferable to catheterisation for this, since it is non-invasive. If raised, and more than 100ml is usually considered to be significant, some means of improving bladder emptying by intermittent catheterisation, either by the patient themselves or by a carer is going to be necessary, before anti-cholinergics can hope to be effective in reducing urge incontinence.



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