Management options for bladder dysfunction in patients with multiple sclerosis

An outline of the management options for patients with MS who experience bladder symptoms, which usually arise due to spinal cord involvement

Patients with MS may present with bladder problems relating to storage or voiding, including urinary urgency, increased daytime frequency, urge urinary incontinence, nocturnal enuresis, hesitancy, interrupted stream and incomplete bladder emptying (Box 1).

The most common urodynamic bladder disorder associated with spinal cord disease in MS is neurogenic detrusor overactivity. This is due to reflexes causing contractions of the detrusor in an irregular involuntary manner when only a small amount of urine is present in the bladder. Those affected may have a sensation of urgency to micturate and, if the bladder pressure exceeds that of the external sphincter, urge incontinence may result.

The interruption of the spinal pathways may also result in incomplete bladder emptying, owing to an inadequately sustained detrusor contraction, detrusor sphincter dyssynergia (DSD) or a combination of both. In DSD, the external sphincter contracts involuntarily simultaneously with the detrusor; patients may present with hesitancy of micturation, an interrupted stream and sometimes a sensation of incomplete emptying of their bladder.

**ASSESSMENT AND INVESTIGATION**

It is recommended that patients with MS who have lower urinary tract symptoms should be seen by a suitably trained healthcare professional who understands the condition and its ensuing effect on the bladder.

The assessment should be appropriate to patients’ current symptoms and level of disability and should be reviewed in relation to new or changing symptoms (Fowler et al, 2009).

A detailed medical, surgical and obstetric history should also be noted and medication reviewed to identify any medicines that may affect bladder function.

**BOX 1. TERMINOLOGY IN LOWER URINARY TRACT FUNCTION**

- **Urgency:** a sudden compelling desire to pass urine which is difficult to defer.
- **Urge urinary incontinence:** involuntary leakage accompanied by or immediately preceded by urgency.
- **Increased daytime frequency:** when patients consider that they void too often by day.
- **Nocturia:** having to wake one or more times to void.
- **Nocturnal enuresis:** loss of urine during sleep.
- **Intermittent stream (intermittency):** when urine flow stops and starts, on one or more occasions, during micturition.
- **Hesitancy:** difficulty in initiating micturition, resulting in a delay in the onset of voiding after being ready to pass urine.

**Urine testing**

Urinary tract infections (UTIs) can cause symptoms of frequency, urgency and/or incontinence. All patients with bladder symptoms should have dipstick urinalysis using reagent strips. The negative predictive value of this test has been shown to be >98% (Fowlis et al, 1994).

**Measuring post-micturition residual volume (PRV)**

The initial assessment should include PRV measurement as this forms the basis for symptom management. This should be carried out before starting antimuscarinic medication. Ideally the PRV should be measured using an abdominal ultrasound of the bladder, however if this is not possible, an in-out catheterisation can be used.

This measurement should be repeated if patients’ symptoms do not improve with treatment or they have more than one confirmed UTI in the past year. Fig 2 shows the recommended management algorithm (Fowler et al, 2009).
Urodynamic investigation
The term “urodynamic” in this instance refers to multichannel cystometry and pressure/flow study of voiding. This investigation is carried out routinely in many centres abroad.

However, the UK consensus group recommended that this was only needed in patients with urinary urgency or those with incontinence who had not responded to management (Fig 2) and who wish to undergo further investigations (Fowler et al, 2009).

TREATMENT
Many patients with MS bladder symptoms – especially frequency – significantly restrict their fluid intake, believing this will help. They should be advised to increase their fluid intake to 1.5-2L in 24 hours (Hashim and Abrams, 2008). Many patients have also reported symptomatic improvement from reducing caffeine intake.

The amount of fluids and type of diet can have a bearing on frequency and type of bowel motions; some patients have noticed that their bladder symptoms are affected if they become constipated.

Advice on voiding routine is sometimes necessary, as patients often go to the toilet not when they want or need to but when there is a toilet available, “just in case”. This can increase their frequency to void.

A frequency/voiding chart may prove useful in these cases to ascertain over a number of days the actual fluid intake and voiding pattern and any relation this has to frequency, urgency and incontinence.

Medication
Patients with MS and neurogenic bladder overactivity usually respond well to oral antimuscarinics (anticholinergics). Several are available in the UK (Table 1, p26), but there are few studies specifically related to their efficacy in the treatment of neurogenic bladder (Ethans et al, 2004; Gajewski and Awad, 1986). Table 1 outlines drug dosages, but prescribers should consult the British National Formulary for full details.

Side effects such as dry mouth and constipation need to be taken into account when prescribing these drugs as they can affect patient compliance.

Antimuscarinics are associated with a deterioration in memory and confusion, particularly in older people (Kay et al, 2006), and this needs to be discussed with patients and carers before these drugs are prescribed.

The PRV may increase when a patient is taking these medicines and repeat measures of the residual urine are required to monitor for this potential side effect. In general, a “significant” residual is 100ml and management to aid bladder emptying should be considered if this is exceeded.

Desmopressin
Night time frequency and nocturnal enuresis can be frustrating for patients with MS and their partners/carers. The use of desmopressin at night can reduce urine output for 6-8 hours (Bosma et al, 2005).

Intradetrusor botulinum toxin
Several studies have now shown that intra-detrusor injections of botulinum toxin A is highly effective in treating symptoms of neurogenic detrusor overactivity. Studies on patients with MS show it is highly effective in reducing frequency, urgency and incontinent episodes, and also improves quality of life (Kalsi, 2007). A recent study suggested the incidence of urinary tract infections reduced after detrusor injections of BoNT-A for patients with neurogenic detrusor overactivity (Game et al, 2008). There is also some evidence that it may also help treat bypassing of urine associated with long term urinary indwelling urethral and suprapubic catheters (Lekka and Lee, 2006).

Patients with MS who are treated with botulinum toxin A must be informed that they will probably need to do intermittent self catheterisation during treatment or as a result of it (Harper et al, 2004). Kalsi et al (2007) found that 42 out of 43 patients receiving Botox needed ISC.

Intravesical medication
There is some evidence that introducing agents such as oxybutynin and atropine into the bladder will reduce detrusor overactivity and this local treatment reduces systemic side effects of the medicines that can affect

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**Fig 1. Progression of MS and Treatment for Continence Management**

<table>
<thead>
<tr>
<th>Walking unaided</th>
<th>Antimuscarinics +/- DDAP</th>
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<tbody>
<tr>
<td>Walking mostly without aids</td>
<td>Antimuscarinics + CISC Buzzer +/- DDAP BoNT-A</td>
</tr>
<tr>
<td>Walking mostly with aids</td>
<td>Antimuscarinics + CISC/IDC BoNT-A</td>
</tr>
<tr>
<td>Confined to chair</td>
<td>IDC</td>
</tr>
<tr>
<td>Confined to bed</td>
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**Fig 2. Recommended Algorithm for Managing Patients with MS and Bladder Overactivity**

1. **Urgency and frequency**
   - Test for UTI
   - Measure PVR
   - If residual <100ml, yes; no, teach CISC
2. **Treat with anticholinergics**
3. **Intradetrusor botulinum toxin**
4. **Desmopressin**
5. **Intravesical medication**

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DDAP = desmopressin; CISC = clean intermittent self catheterisation; BoNT-A = botulinum toxin A; IDC = indwelling catheter; buzzer = suprapubic vibration device. Figs 1 and 2 reproduced with permission from Professor C.J. Fowler.
TABLE 1. COMMON ANTIMUSCARINIC DRUGS FOR URINARY URGENCY, ENURESIS AND INCONTINENCE ASSOCIATED WITH MS

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
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<tr>
<td>Oxybutynin</td>
<td>2.5mg-20mg daily</td>
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<tr>
<td>Oxybutynin modified release</td>
<td>5mg-20mg daily</td>
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<tr>
<td>Tolterodine</td>
<td>1mg-2mg twice daily</td>
</tr>
<tr>
<td>Tolterodine modified release</td>
<td>4mg once daily</td>
</tr>
<tr>
<td>Trosplum chloride</td>
<td>20mg twice daily before food</td>
</tr>
<tr>
<td>Solifenacin</td>
<td>5-10mg once daily</td>
</tr>
<tr>
<td>Propiverine</td>
<td>15mg once to three times daily Increase to 15mg four times a day if necessary</td>
</tr>
<tr>
<td>Propantheline</td>
<td>15mg three times daily at least one hour before meals and 30mg at night</td>
</tr>
<tr>
<td>Darifenacin</td>
<td>7.5-15mg once daily</td>
</tr>
<tr>
<td>Fesoterodine</td>
<td>4-8mg once daily</td>
</tr>
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compliance. However, this route of administration requires regular intermittent catheterisation (Fader et al, 2007).

Cannabis based extract
There is some evidence that medical cannabis extract can reduce urinary urgency, incontinence, frequency and nocturia (Brady et al, 2004). The extract is taken sublingually and patients titrate the dosage to achieve the desired effect on bladder symptoms without experiencing psychotropic effects. Cannabis has not yet been licensed for medical use in the UK.

PHYSICAL INTERVENTION
Pelvic floor exercises, electrical stimulation and biofeedback
NICE (2003a) guidance recommends that patients with MS who continue to have incontinence despite treatment should be considered for a course of pelvic floor exercises preceded by a course of electrical stimulation of the pelvic floor muscles.

Pelvic floor exercises (training) are “repetitive selective voluntary contraction and relaxation of specific pelvic floor muscles” (Abrams et al, 2003). Some patients may find these difficult due to fatigue, cognitive impairment or motivation. Interventions that can help with pelvic floor muscle exercises include electrical stimulation and biofeedback.

Electrical stimulation involves applying electrical currents to stimulate the pelvic viscera or their nerve supply (Abrams et al, 2003). Biofeedback is “the technique by which information about a normally unconscious physiological process is given to the individual as a visual, auditory or tactile signal” (Abrams et al, 2003). The aim of biofeedback and electrical stimulation is to increase awareness of the pelvic floor muscles to enable the patient to postpone voiding in urinary urgency, and to aid bladder emptying by relaxation (McClurg et al, 2009; 2008).

This form of treatment is thought to enhance the inhibitory effect of pelvic floor contraction on the detrusor muscle of the bladder. However, NICE acknowledges that not everyone will have access to such treatment.

Selecting appropriate patients for this type of management is important as it can only be effective if there is an intact spinal neural pathway. It is also important to assess the patient’s motivation, cognition and disability, which can have a significant bearing on the outcome of treatment.

INCOMPLETE BLADDER EMPTYING Voiding techniques
For some patients, stimulating trigger points such as tapping the abdomen, stroking the inner thigh or perineal area, standing up and sitting down may precipitate voiding. Many patients with MS who have voiding problems develop their own methods, and experimentation by individuals can help find the manoeuvre that will help with bladder emptying or hesitancy. However, this may not result in complete bladder emptying.

Some patients will use Crede (manual pushing on the lower abdomen) or Valsalva (holding the breath and bearing down) manoeuvres to aid bladder emptying. These methods should not be encouraged, although patients may carry out various versions of this spontaneously (Abrams et al, 2008; Fader and Craggs, 2003).

Suprapubic vibration
There is little evidence on the use of non-invasive aids to help bladder emptying. Studies have shown that a handheld vibrating device placed on the lower abdomen could help some patients with MS to reduce residual volumes (Prasad et al, 2003; Dasgupta and Haslam, 1999).

Clean intermittent self catheterisation
In patients with a PRV >100ml and symptoms of overactivity and/or frequent urinary tract infections, the benefit of inserting a catheter 1-5 times a day (depending on amount of residual and symptoms) can be substantial.

ISC is now a well recognised procedure which has benefited many patients with MS. The majority of patients, even those with reduced dexterity and mobility, can be taught the technique. Vahter et al (2009) have shown that most patients with cognitive impairment can also manage ISC.

The procedure is best taught by nursing staff with experience in teaching ISC, as compliance may be poor if it is not explained properly (Logan et al, 2008).

Many types of catheters are now available for intermittent use. With patience and understanding of patients’ general neurological condition, the most suitable type for each individual can be found. It is important to maintain follow-up and reassessment, since MS is a progressive disease with changing symptoms, which means that ISC may not always remain an appropriate treatment.

In some cases patients may not be able to carry out their own catheterisation, and partners/carers may be trained to undertake the procedure for them. This requires mutual understanding, and some thought should be given to the implications of this on their relationship.

Long term catheterisation
If bladder symptom management has become increasingly troublesome for patients and/or carers, an indwelling urinary catheter may be the best option. It is generally thought that a suprapubic catheter is preferable to a urethral one due to
potential urethral damage with long term catheterisation. The nurses involved need to discuss all aspects of management with patients and carers, including care of indwelling catheters, catheter valves and types of bags holders to ensure the correct choice is made (NICE, 2003b).

**Surgical Management**

Sacral Neurourodial Modulation

Sacral neuroumodulation involves the stimulation of the sacral nerves with an implanted electrode and a battery-powered pulse generator. It can be used for all types of continence symptoms.

There are very few studies with significant numbers of patients with MS to ascertain the long term efficacy of sacral neuroumodulation on neurogenic detrusor overactivity. It may be more suitable for patients whose disease has a benign course (Wallace et al, 2007).

**Surgery**

Surgical procedures such as cystoplasty or urinary diversion may be suitable for patients who do not respond to conservative treatments. Surgeons should consider patients’ MS status (how they present and the progression of the disease), and surgery should be carried out by a centre that regularly treats this patient group (NICE, 2003a).

**Conclusion**

There are many issues to consider when planning management of bladder symptoms in patients with MS. It is important to remember that due to the progressive nature of their condition, these patients need ongoing assessment. It is our responsibility to offer a service that recognises this and responds to individual needs and expectations. No matter where patients are treated, all management options should be considered and offered if appropriate.

**References**


