Current issues in the management of female urinary incontinence

Urinary incontinence can affect the quality of life of many women at all ages. When assessing a woman with urinary incontinence, it is important to establish the type and severity of problem to allow provision of the correct type of treatment. This article highlights current issues in the diagnosis and management of this condition.

Urinary incontinence is a disorder which affects 23–44% of women in Europe (Hunskaar et al, 2004) and is defined by the International Continence Society as 'any involuntary leakage of urine' (Abrams et al, 2003). Female urinary incontinence is an important problem not only because of the large number of women affected, but also because of the huge financial implications for both the individual and the NHS. A study in the mid-1990s found that female urinary incontinence accounted for at least 2% of the UK annual health-care budget (Working Party of the Royal College of Physicians, 1995). In addition to this, surgical procedures carried out for female incontinence during 2000–2001 cost the NHS £10.3 million (Viktrup et al, 2004).

Urinary incontinence is detrimental to the general health of women and those affected by it can suffer both depression and anxiety (Rosenweig et al, 1991). The effects of this are felt by society financially, socially and in terms of the burden of care.

Prevalence of urinary incontinence

European figures for urinary incontinence range from 10% to 40% (Hannestad et al, 2000); of those 50% complained of stress urinary incontinence, 11% of urge urinary incontinence and 36% had mixed picture incontinence.

The prevalence of urinary incontinence is age dependent peaking at 45–55 years of age, decreasing slightly thereafter before increasing again after 70 years of age (Thomas et al, 1980). This may be the result of a combination of diminishing stress urinary incontinence and the increase in detrusor overactivity that has been shown to occur with increasing age (Milsom et al, 2001).

The act of voiding is controlled by complex neurological mechanisms that interact to ensure continence. Many other factors have an important role in the maintenance of continence including cognitive function, mobility, motivation and manual dexterity (Parsons and Cardozo, 2004). Any impairment or deficit in any of these factors can have a detrimental effect on continence. This is shown by the increased prevalence of urinary incontinence in women who are institutionalized: 40% of those in nursing homes and 60% of those in long-term hospital care suffer from urinary incontinence, as opposed to just 15% of women at home (Working Party of the Royal College of Physicians, 1995). This could be because these women are more dependent or it may be that they are more impaired (in terms of either mobility issues or a deficit in cognitive function). Similarly, women who suffer from urinary incontinence are more likely to become hospitalized than those who do not.

Classification and investigation of urinary incontinence

The International Continence Society classifies lower urinary tract dysfunction as disorders of the storage and voiding phases of micturition (Abrams et al, 2003). This means that anything that negatively affects either of these two factors will result in urinary incontinence, including any disturbance of neurological control of muscle function or structural abnormalities (Bo et al, 1999).

The International Continence Society mainly recognizes three major categories of urinary incontinence outlined in *Table 1*.

The initial assessment of patients involves allocating patients into one of the above categories, based on symp-

Table 1. Types of urinary incontinence

Type	Definition
Stress urinary incontinence	Complaint of involuntary leakage of urine on effort or exertion, or on sneezing or coughing
Urge urinary incontinence	Complaint of involuntary leakage of urine accompanied by or immediately preceded by urgency
Mixed urinary incontinence	Complaint of involuntary leakage of urine associated with urgency and exertion, effort, sneezing of coughing
Continuous urinary incontinence	Caused by urinary conditions such as vesico-vaginal fistula, urethral diverticulum, ectopic ureter

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toms, while being aware of any symptoms that may be suspicious of malignancy. Any patient found to have any potentially suspicious symptoms (*Table 2*) is referred using the 2-week rule.

Diagnosis of urinary incontinence should begin with a thorough history and examination, focusing on the mechanisms of each of the causes of incontinence and factors that may affect them (*Table 3*).

Examination must include an abdominal exam (is there a palpable bladder?) and a pelvic exam (is there any prolapse, are the pelvic floor muscles lax?). If the cause of incontinence is suspected to be neurological, e.g. multiple sclerosis, then a 'screening neurological examination' should be performed. In addition the general inspection and observation should take account of the woman's mobility and mental function, as it may be that either of these factors rather than a functional urological problem is leading to incontinence.

National Institute for Clinical Excellence (NICE) guidelines (2006) recommend that all women, regardless of the suspected type of incontinence, undergo baseline investigations (*Table 4*). This ensures that any easily treatable or modifiable causes are ruled out before progressing to more costly and time-consuming specialist investigations and treatments.

Table 2. Two-week referral guidelines

Microscopic haematuria if aged 50 years and older
Visible (gross) haematuria
Recurrent or persisting urinary tract infection associated with haematuria if aged 40 years or older
Suspected pelvic mass arising from the urinary tract

From National Institute for Clinical Excellence (2002)

Table 3. Key points of the history

Urological symptoms: frequency, urgency, urge incontinence, nocturia
Past medical history: previous episodes of incontinence, treatment and its outcome (specifically any surgery for incontinence)
Coexisting conditions: diabetes can be associated with increased urine output; rheumatoid deformities of the hands can make toileting difficult
Medication history: diuretics
Obstetric and gynaecological history: number of pregnancies, mode of deliveries, traumatic deliveries

Table 4. Baseline investigations for urinary incontinence

Bladder diary: completed for 3 days, documenting the number of voids, fluid intake (i.e. tea, coffee, water), episodes of incontinence
Post-void residual volume (preferably by ultrasound as opposed to catheterization) will exclude overflow incontinence
Urine dipstick to rule out a urinary tract infection or microscopic haematuria

Stress urinary incontinence

Symptoms

Symptoms of stress urinary incontinence are synchronous with exertion or sneezing or coughing (Abrams et al, 2003), and may be related to intercourse. The urine loss is usually small and not associated with any urgency.

Pathophysiology

The normal urethra is able to maintain a positive closure pressure despite raised intra-abdominal pressure (as occurs during coughing or sneezing), whereas an incompetent urethra allows leakage of urine. A number of theories have been proposed as to the cause of stress urinary incontinence, but the most likely explanation is that outlined by the 'integral theory' (Petros and Ulmsten, 1990), which is based on experimental and clinical studies. This theory relies on a correctly functioning pelvic floor and urethral closure mechanism with proper function of the pubo-urethral ligaments, vaginal hammock and pubococcygeal muscles being essential.

Conservative treatment

The first-line treatment for stress urinary incontinence should be pelvic floor muscle training, also known as 'Kegel exercises'. The purpose of pelvic floor muscle training is to increase the muscle volume (Bo et al, 1999), therefore increasing urethral closure pressure and allowing stronger reflex contractions following a quick rise in intra-abdominal pressure (Dolman and Getliffe, 2003).

A digital assessment of the pelvic muscle tone should be carried out before commencing pelvic floor muscle training, the results of which can be documented using the Oxford grading scale.

A brief verbal instruction on how to carry out pelvic floor muscle training does not adequately prepare a woman to start an exercise programme (Bump et al, 1991). Dolman and Getliffe (2003) suggest many women require some method of performance feedback in order to isolate the muscle function and muscle behaviour. An exercise programme should then be tailored to the individual using the findings of the digital assessment, provided that the woman has a recorded Oxford scale score of 3 or above.

NICE guidelines do not recommend the routine use of electrical stimulation and/or biofeedback as part of pelvic floor muscle training except in women who cannot actively contract their pelvic floor.

If conservative management has failed to produce acceptable symptom relief the next step is surgical treatment, although this should be avoided if a woman is planning on having more children or if symptoms have manifested during pregnancy. Duloxetine, a serotonin and noradrenaline reuptake inhibitor, can be offered as an alternative to surgery. Duloxetine has reduced the frequency of incontinence in many double-blind randomized controlled studies (Norton et al, 2002; Drutz et al, 2003). It is important to counsel patients about pos-

sible side effects with nausea being the most frequently reported, occurring in 25% of those taking duloxetine as opposed to 3.9% taking placebo. However, in a review by Marriapan et al (2007) cure rates in the groups allocated duloxetine 80 mg daily were higher than in the placebo group (10.8% *vs* 7.7% respectively).

Surgical treatment

Before embarking on surgical treatment it is essential to be clear about the exact cause of incontinence as surgery can be of great benefit in treating stress urinary incontinence, but can worsen urge urinary incontinence. The indications of multi-channel filling and voiding cystometry before surgery for urinary incontinence are listed in *Table 5*.

Traditional incontinence surgery was in the form of the Burch colposuspension (Burch, 1961) which Alcalay et al (1995) describe as the 'gold standard' with excellent long-term follow up: 69% cure rate at 10–20 years.

Minimally invasive procedures

The current trend is towards minimally invasive procedures such as tension-free vaginal tape and tension-free vaginal obturator tape. Synthetic slings were developed in the 1980s. They produce a continence rate of approximately 80% (Bidmead and Cardozo, 2000). The use of synthetic slings can be complicated by erosion into the vagina or urinary tract and a high incidence of voiding difficulties and detrusor overactivity (Jarvis, 1994).

Retropubic mid-urethral tape procedures (tension-free vaginal tape)

This procedure is based on the integral theory described by Petros and Ulmsten, and the effect of a properly functioning pelvic floor closing off the bladder neck. Tension-free vaginal tape has some similarity to the conventional sling method although in tension-free vaginal tape the tape is placed under the mid-urethra. A multicentre randomized controlled trial carried out in the UK that compared tension-free vaginal tape with Burch colposuspension found that, at 2 years, follow-up cure rates were similar (78% and 68% for tension-free vaginal tape *vs* Burch colposuspension respectively) (Ward and Hilton, 2004).

Tension-free vaginal obturator tape

Tension-free vaginal obturator tape was introduced to reduce the incidence of some of the operative complications of tension-free vaginal tape, primarily bladder penetration and postoperative outlet obstruction. Neuman (2007) reported on 300 cases of tension-free vaginal obturator tape with 4–24 months follow up. The early treatment failure rate is only 2.7% and postoperative voiding difficulties 6% with no bladder injury. However, NICE guidelines (2006) state that longer follow up is needed before this can be recommended routinely for the treatment of stress urinary incontinence.

Intramural bulking agents

Bulking agents are the least successful of all the surgical procedures and it is important to inform patients of this, and that repeat injections may be needed over time. There are reports of improvement rates between 60% and 80%, but these fall to about 40% after 2 years (Monga et al, 1995). Despite the short-term, low cure rates this is still an important and useful technique, especially for the frail elderly, to treat secondary incontinence in women who have undergone multiple failed procedures or for cases where the urethra is fixed and scarred after radiotherapy (Parsons and Cardozo, 2004).

Urge urinary incontinence

Overactive bladder or detrusor overactivity describes the involuntary contractions of the detrusor during the filling phase and these can be either spontaneous or provoked (i.e. by actively trying to inhibit micturition). Overactive bladder and urge urinary incontinence are closely linked and urge urinary incontinence is found in more than half of all patients with overactive bladder (Serels, 2004). Overactive bladder is characterized by increased daytime frequency, nocturia, and urgency with or without urge urinary incontinence, coital or orgasmic incontinence.

Pathophysiology and aetiology

Detrusor overactivity is believed to be caused either by disruption of the central control of the bladder or by a problem with the detrusor muscle itself. As mentioned previously, surgical treatment for stress urinary incontinence can lead to secondary detrusor overactivity and urge urinary incontinence (Cardozo et al, 1979). This could be the result either of trauma at the time of surgery or the partially obstructive nature of most procedures for stress urinary incontinence. Urge urinary incontinence can also be a feature of neurological disease and may be the presenting symptom in women with multiple sclerosis. Most detrusor overactivity is idiopathic and may be the result of poorly learned toilet training as an infant or maladaptive behaviour learnt as an adult. Detrusor overactivity can also coexist with stress urinary incontinence and this can present with mixed symptoms, the treatment of which will be discussed later.

Conservative treatment

Lifestyle changes

Recommending a modification of high or low fluid intake aiming at approximately 2 litres per day, weight

Table 5. Recommendation for urodynamic study

Multi-channel and voiding cystometry, ambulatory urodynamics or videourodynamics may be used before surgery if:	There is clinical suspicion of detrusor overactivity
	There has been previous surgery for stress urinary incontinence or anterior compartment prolapse
	There are symptoms of voiding dysfunction

From National Institute for Clinical Excellence (2006)

reduction, reduction of fizzy drinks, and a reduction in caffeine (known to being a diuretic) has been shown to improve bladder irritability symptoms in those with detrusor overactivity (Creighton and Stanton, 1990). It is also suggested that stopping smoking will help those with detrusor overactivity as nicotine acts as a bladder irritant.

Bladder training

As discussed above bladder control is a function that is learnt during toilet training. The aim of bladder training is to re-educate the bladder and override any maladaptive behaviour that may have been adopted by the patient. There are a number of approaches that may be taken to bladder training, which include bladder drill, biofeedback and maximal electrical stimulation.

Anticholinergic medications

If bladder training is not successful a trial of one of the antimuscarinic drugs is advisable (*Table 6*). A systematic review of antimuscarinic treatment of overactive bladder by Chapple et al (2005) found that all the antimuscarinics have different tolerability and safety profiles. Therefore if one antimuscarinic drug is not tolerated then another antimuscarinic drug or a different formulation, e.g. slow release, can be tried. The same study found that none of the antimuscarinic drugs were associated with any serious adverse events, although the incidence of adverse events varied from one drug to another, all were associated with a higher incidence of adverse events like dry mouth, constipation and blurred vision, compared to placebo, which sometimes leads to withdrawal from treatment.

Generally, a combination of bladder retraining and antimuscaric drugs give more favourable results in terms of symptom improvement.

Surgical treatment

Further investigation before surgery is for the same indications as with stress urinary incontinence (*Table 5*); considerations again include the woman's future child-bearing wishes. The treatment options are intravesical botulinum neurotoxin A injection, sacral nerve stimulation, augmentation cystoplasty and urinary diversion.

Table 6. Common antimuscarinic drugs used to treat overactive bladder

Oxybutynine: 2.5–5 mg three time daily
Oxybutynine MR: 5 mg daily increase up to 20 mg daily
Tolterodine XL: 4 mg once daily
Trospium chloride: 20 mg twice daily
Solifenacin: 5 mg daily increasing to 10 mg daily
Darifenacin: 7.5–15 mg once a day

Botulinum neurotoxin A injection

Intravesical botulinum injection therapy has shown promising results for the treatment of patients with idio-pathic detrusor overactivity and clinical trials so far have reported few or no adverse effects. Cross and Schurch (2006) reviewed the literature concerning the use of botulinum neurotoxin A injection (Botox and/or Dysport) in patients with neurogenic detrusor overactivity or idiopathic detrusor overactivity. They found 21 studies investigated efficacy of botulinum toxin A in neurogenic detrusor overactivity reported increases in continence rates after botulinum toxin A varying between 7.3 and 90%. Also they found 20 studies of idiopathic detrusor overactivity, which showed improvements in symptoms and/or urodynamic variables for most patients after botulinum toxin A. Continence was regained in 33–91% with duration of effect of 5–9 months. Side effects of Botox included procedure-related urinary tract infection, haematuria and transient urinary retention requiring intermittent self-catheterization. However, the National Institute for Clinical Excellence guidelines (2006) recommended the use of botulinum toxin A in the treatment of refractory idiopathic detrusor overactivity in those patients willing and able to self-catheterize, with an explanation of the lack of long-term efficacy and safety data.

Sacral nerve stimulation

Patients are selected on the basis of their response to a preliminary, temporary external stimulator. If this is successful a permanent stimulator can be implanted (Janknegt et al, 1997). In a randomized controlled trial of sacral stimulation 47% of women were dry and 29% reported a reduction in the frequency of episodes of incontinence at 6 months (Schmidt et al, 1999). The major limiting factor to the use of this technique is the high cost of the implant (Parsons and Cardozo, 2004).

Augmentation cystoplasty

This is recommended in refractory cases of overactive bladder. It increases the volume of the bladder and should be used in those willing to self-catheterize. 'Clam' cystoplasty is the most commonly used technique and involves removing a section of ileum and suturing it onto the bladder; this is believed to reduce detrusor overactivity by acting as a non-contractile patch. Common reported complications are voiding difficulty, which may need self-urethral catheterization, increased risk of urinary stones and malignant change in the ileal segment (NICE, 2006).

Urinary diversion

This is the last resort surgical option and should only be used if sacral nerve stimulation and augmentation cystoplasty are 'not appropriate or unacceptable' (NICE, 2006). The procedure involves creating an ileal conduit and for many women managing the stoma may be easier and provide them with a better quality of life than having to change pads and wash wet clothes continuously.

Mixed urinary incontinence

Often patients may present with a combination of symptoms that encompass both stress urinary incontinence and overactive bladder; these patients are said to have a mixed incontinence. Patients presenting with this type of incontinence should have pelvic floor muscle training and bladder training as described above. If these conservative measures are unsuccessful patients should then be treated for either stress urinary incontinence or overactive bladder depending on which is their predominant and most troublesome symptom.

Conclusions

Female urinary incontinence is a common condition and challenging to treat. Owing to the nature of the problem many women may be reluctant to seek treatment, so the prevalence figures are likely to underestimate the scale of the problem. With the increase in the ageing population in the UK it is a problem that is likely to grow. When treating incontinence it is essential that all conservative treatment options are explored and tried before referral for surgery. This is important as it prevents women from undergoing invasive, painful and time-consuming procedures and reduces inappropriate use of NHS resources. BJHM

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KEY POINTS

- Urinary incontinence is a common problem that can affect women of all ages.
- It often has a serious and bothersome impact on quality of life of the patient, her family and her carers.
- The assessment of urinary incontinence should identify the type of incontinence: urge, stress or mixed.
- Baseline investigations should include: 3 days diary, assessment of post-void residual volume and urine dipstick examination.
- The first-line treatments are lifestyle adjustments, pelvic floor exercises, bladder retraining, and medical treatments.
- Patients who failed to respond to first-line management strategies should be referred for further assessment.