

Introduction to

URINARY INCONTINENCE

By CARL BOOTH, MPhil, MRPharmS, and DEBBIE PASCOE, BPharm, MRPharmS

This article addresses the pathophysiology of urinary incontinence and gives a brief discussion of some of the available non-drug and drug treatments

Urinary incontinence is common and troublesome (particularly in women and the elderly), and there is a considerable reduction in the quality of life of patients with this condition. Many patients hesitate to seek medical advice due to embarrassment and they attempt to manage the problem by using incontinence pads, restricting their

fluid intake or adjusting their lifestyles, even though many cases of urinary incontinence can be cured or significantly improved with appropriate treatment.

Accurate assessment and diagnosis of the cause of incontinence is vital for treatment success, with drugs representing only one treatment option for this condition.¹

EPIDEMIOLOGY

Estimating the true prevalence of bladder problems is difficult and even the most conservative estimate, which suggests that 10 per cent of the population are affected by urinary incontinence, probably does not reflect the full extent of the problem.² It appears that half as many men as women experience bladder dysfunction, with a pro-

Table 1: Prevalence (per cent) of different types of incontinence

Incontinence type	Females	Males
Stress	49	8
Mixed	29	19
Urge	22	73

Mr Booth is clinical pharmacist, Airedale NHS Trust and prescribing support pharmacist, Airedale Primary Care Trust. Ms Pascoe is clinical economy pharmacist at Airedale NHS Trust

Table 2: *Classification of urinary incontinence*

Type of incontinence	Description	Treatment
Urge incontinence (also known as bladder instability, detrusor instability or unstable bladder)	Involuntary loss of urine accompanied by the urge to pass urine, with the patient usually incontinent before reaching the toilet. It is more common in women (often idiopathic bladder instability) than men and is a common type of incontinence in the elderly. It may be due to detrusor instability or detrusor hyper-reflexia (due to neurological conditions such as stroke, spinal cord lesions or multiple sclerosis)	Anticholinergic drugs and bladder training
Stress incontinence	Involuntary loss of urine in response to any physical activity which raises intra-abdominal pressure (eg, coughing, sneezing, laughing, bending down or exercise) without the urge to pass urine. There is no detrusor instability present. It is the most common form in women (50 per cent of women over 18 years old are estimated to have mild stress incontinence) often due to pelvic floor weakness after childbirth or atrophic changes to the urethra during the menopause. In men, it can occur after transurethral resection of the prostate. Obesity may worsen symptoms, which may improve with dieting	Pelvic floor exercises or, in severe cases, surgical intervention. In general, stress incontinence does not respond well to drug treatment
Mixed incontinence (urge and stress)	Bladder sphincter weakness associated with stress incontinence accompanied by urge incontinence, usually occurring in women	Initial treatment should be aimed at the predominant problem
Overflow incontinence	Involuntary loss of urine due to an over-distended bladder caused by outflow obstruction (in men, associated with enlarged prostate gland) or a poorly contracting bladder	Relief of the obstruction by prostatectomy in men or urethral dilatation/urethrotomy in women. Self-catheterisation may be employed to achieve adequate bladder emptying
Functional incontinence	Caused by chronic impairment of physical and/or cognitive functioning despite a normally functioning lower urinary tract. This is a common form of incontinence in the elderly	Drug therapy is often unhelpful. Best managed through regular visits to the toilet or an external drainage device
Reflex incontinence	Loss of urine without any warning or sensory awareness. Associated with neurological diseases or neural injury	Treatment is similar to that for functional incontinence

portion as high as 50 per cent of women over 18 years experiencing mild stress incontinence.³ Anatomical differences mean that men tend to suffer more from urge incontinence, whereas women tend to suffer with stress incontinence (see Table 1, p65).

A review of published literature indicates that the mean prevalence of incontinence in those aged 30–60 is 25 per cent in women and 6 per cent in men while in those under the age of 30, it is 16 per cent in women and 8 per cent in men.⁴ In the elderly, the prevalence of bladder control problems is reported to be as high as 30 per cent, increasing to 50 per cent in patients who are resident in nursing homes.⁵ Normal ageing is not a cause of urinary incontinence, but age-related changes in lower urinary tract function predispose older patients to urinary incontinence (due to anatomical or physiological insults to the lower urinary tract, and systemic disturbances).

It is now thought that urinary incontinence occurs more frequently in white women than in black women.⁶ This may represent a difference in the rates of genuine stress incontinence and may be related to a

shorter urethra, weaker pelvic floor muscles and a lower positioned bladder neck in white women.

PHYSIOLOGY

Urinary incontinence is a disorder of the reservoir function of the lower urinary tract, which consists of the bladder, urethra and sphincter muscles, and has been defined as the involuntary loss of urine which is objectively demonstrable, and which has become a social or hygienic problem.⁷

The bladder is made up of four layers; the serosa, the detrusor muscle, the submucosa and the mucosa. When the detrusor muscle relaxes, urine storage results, and when it contracts, micturition occurs. This contraction is brought about by parasympathetic activity mediated via acetylcholine at muscarinic receptors. The internal sphincter leading to the urethra is normally closed by sympathetic activity mediated by noradrenaline. The external sphincter is under voluntary control and is supplied by the pudendal nerve.

During micturition, sympathetic activity decreases and parasympathetic activity increases, leading to relaxation of the internal sphincter and contraction of the detrusor muscle. The external sphincter is relaxed at the same time by inhibition of the activity in the pudendal nerve.

AETIOLOGY

Urinary incontinence results when the pressure in the bladder exceeds that of the urethra, leading to involuntary micturition. This may be caused by uninhibited contraction of the detrusor muscle (sometimes known as detrusor instability or unstable/overactive bladder) or as a result of inappropriate relaxation of the urethra due to anatomical, physiological and/or pathological factors.

Urinary incontinence is classified into six main types. These are described in detail in Table 2.

In addition, temporary states such as urinary tract infection or faecal impaction may lead to urinary incontinence. Continuous incontinence (a continual leakage of

urine day and night) in men can be the result of chronic urinary retention with overflow, and in women can be due to fistulas involving the urinary bladder and, very rarely, vesicovaginal fistula following hysterectomy.

The following classes of drugs can also affect the bladder:

- Beta-blockers and cholinergic drugs, which can cause increased detrusor tone
- Neuroleptics, antidepressants, sedatives, hypnotics, opiates, calcium antagonists, inhibitors of prostaglandin synthesis, antihistamines and anti-emetics, which can all cause detrusor relaxation
- Antiepileptics, muscle relaxants and psychoactive drugs, which can cause sphincter relaxation

ASSESSMENT AND DIAGNOSIS

Accurate assessment and diagnosis of the cause of incontinence is vital for treatment success, especially in cases of mixed incontinence. Following presentation in a primary care setting, the decision needs to be taken as to whether urological assessment is required, depending largely on the patient's wishes. In cases of stress or urge incontinence, this involves urodynamic test-

ing by a specialist, using video cystometry to monitor detrusor pressure and contractions as the bladder fills. For continuous incontinence, other procedures are required such as intravenous urography, cystography and cystoscopy (see Table 3). The choice of investigation will depend on the clinical history.

MANAGEMENT

Conservative measures to manage incontinence should be tried first. The patient should be involved in the choice of treatment option, and patient counselling and support are important factors. A regular review of treatment progress should be carried out.

Non-drug treatment Non-drug treatment can be tried before resorting to the use of drugs. Patients with urinary incontinence can benefit greatly from the advice and support of a continence adviser or community nurse. Methods of managing stress incontinence are described below.

Lifestyle advice Lifestyle advice can be used to manage mild symptoms of stress incontinence. This includes advising patients on the use of incontinence pads and encouraging the reduction of fluid intake, avoidance of

Table 3: Some common urological procedures

Procedure	Description
Cystometry	Cystometry can be used to assess either the filling or voiding phases of micturition. The pressure within the bladder, or intravesical pressure, is measured using a catheter, along with intra-abdominal pressure (often measured using a pressure catheter inserted into the rectum). The detrusor pressure is calculated by subtracting the intra-abdominal pressure from the intravesical pressure. With the catheters in place, the bladder is filled with fluid, and then emptied. Information regarding the state of the detrusor muscle can be obtained by looking at the changes in pressure during filling and voiding
Intravenous urography	Also known as pyelography, this is a procedure which involves the intravenous injection of a radio-opaque contrast medium followed by x-ray investigation of the urinary tract. X-rays are taken at five, 10 and 30 minutes after injection, and pressure may be applied in the abdominal area to improve the definition of the central cavities of the kidney. Results allow the radiologist to see the anatomy of the urinary tract and any obvious abnormalities or obstructions
Cystoscopy	Cystoscopy involves an examination of the urethra and bladder using a cystoscope. This may be for diagnostic or therapeutic purposes. Diagnostic uses include inspection of the bladder for calculi (stones), bladder tumours or sites of bleeding and infection. Radio-opaque dye may be injected via the cystoscope for the purposes of investigating the site of any obstruction. This is known as retrograde pyelography. Some conditions can be treated using cystoscopy, including the removal of bladder tumours, destruction of calculi and insertion of stents to relieve obstruction

Pelvic floor exercises may be helpful in men with stress incontinence following transurethral resection of the prostate. One exercise in men, carried out during micturition, involves stopping and starting the flow of urine several times.

Bladder training Bladder training is used in patients with an overactive bladder and symptoms of urge incontinence. It aims to mimic the learning process of infancy when the conscious inhibition of the voiding reflex is acquired. Patients attempt to defer voiding for a set time, initially one hour. The deferral period is then gradually extended. Patients complete a frequency/volume chart over a period of six weeks and the aim is for them to develop control over urination. Table 4 shows a typical frequency/volume chart, which serves as a voiding chart. Bladder training can lead to a substantial reduction in symptoms in 50 per cent of patients, but less than 15 per cent of patients experience complete resolution. Bladder training is often used alongside anticholinergic therapy in the treatment of urge incontinence.

Surgical intervention Surgical intervention may be appropriate where conservative approaches have failed in patients with bladder neck descent, who tend to suffer more severe symptoms. The aim of surgery is to elevate and support the bladder neck, returning it to its normal position above the pelvic floor muscles (known as colposuspension). Many forms of surgical repair have been developed. These minimise surgical trauma and decrease length of hospital stay. Surgery may involve vaginal or suprapubic repair or, in cases of severe descent, open colposuspension. Tension-free vaginal tape may also be used. Surgical intervention can cure up to 75 per cent of patients with stress incontinence and improve 85 per cent.⁸

DRUG TREATMENT

Drug treatment of urge incontinence (detrusor instability) can be useful where behavioural and physical therapies cannot overcome the condition. In general, the drugs used are anticholinergic agents, which have a high incidence of side effects that may limit compliance (eg, dry mouth, blurred vision, constipation and difficulty with micturition). These drugs block acetylcholine release from the parasympathetic

nerves in the bladder, thus preventing contraction and voiding. They also exert a direct spasmolytic effect on the detrusor muscle of the bladder. These effects lower intravesical pressure, increase capacity and reduce the frequency of contractions.

Anticholinergic drugs currently available include flavoxate, oxybutynin, propantheline, propiverine, tolterodine and trospium chloride.

The tricyclic antidepressants imipramine, amitriptyline and nortriptyline are also sometimes effective in the management of the unstable bladder. This is because of their anticholinergic effects on the parasympathetic nervous system. In contrast to their use as antidepressant agents, this effect is seen soon after initiating treatment. The use of tricyclic antidepressants has been superseded by newer, more potent, anticholinergic agents such as those described above.

Oestrogen supplementation In postmenopausal women with stress incontinence where there is demonstrated oestrogen deprivation, oestrogen supplementation may have a role.⁹

tea, coffee and alcohol, weight reduction and smoking cessation.

Pelvic floor exercises Pelvic floor exercises are useful in cases of proven stress incontinence where there is minimal bladder neck descent. A series of progressive exercises aimed at strengthening the pelvic floor muscles are taught by specialist advisers or physiotherapists.

In women, these exercises are easily carried out using weights in the form of plastic cones inserted into the vagina. Patients are taught to increase tone in the pelvic floor by holding weights for a specified period. The weight and duration of hold are gradually increased as muscle tone increases. This is estimated to produce complete resolution of symptoms in 20 per cent and improvement of symptoms in 50–75 per cent of women.⁴

In women, electrical stimulation of the pelvic floor muscles may be used. It is effective in about 50 per cent of patients with mild stress incontinence.⁸

Table 4: Example of a frequency/volume chart

Day	Daytime: Time/volume (ml)		Night-time: Time/volume (ml)	
Monday	6am/250	11.30am/140	2am/150	4am/wet*
	2pm/350	6pm/250		

*Patient could not measure a specific volume of urine

REFERENCES

1. Drug treatment of urinary incontinence in adults. *MeReC Bulletin* 2000;11:9–12.
2. Bidmead J, Cardozo L. How treating incontinence can improve quality of life. *Costs and Options in Bladder Control* 2000;21:3–6.
3. Dawson C, Whitfield H. Urinary incontinence and urinary infection. *ABC of urology*. London: BMJ Publishing; 1997. pp19–21.
4. Daly M. Ditropan XL — once daily oxybutynin tablets for urinary incontinence. In: *Drug utilisation review*. London: A&M Publishing; 2000.
5. Resnick NM, Yalla SV, Laurino E. The pathophysiology of urinary incontinence amongst institutionalised elderly persons. *N Engl J Med* 1989;320:1–7.
6. Bulmer P, Abrams. The overactive bladder. *Rev Contemp Pharmacother* 2000;11:1–11.
7. Abrams P, Blavis JG, Stanton SL, Anderson JT. The standardisation and terminology of lower urinary tract function. *Br J Obstet Gynaecol* 1990;97:1–16.
8. Appell RA. Stress urinary incontinence. In: Resnick M, Novick A (editors). *Urology secrets*. Philadelphia: Hanley and Belfus Inc; 1995. pp133–8.
9. Bullock N, Sibley G, Whitaker R. *Essential urology*. Edinburgh: Churchill Livingstone; 1989. pp261–73.