

Urinary Incontinence in the Elderly

Margaret R Bird

ABSTRACT

Urinary incontinence is a common disability with considerable personal and carer burden in the elderly. Drugs play a role in causing and treating urinary incontinence and lower urinary tract symptoms. This article will discuss the therapeutic approach to managing urinary incontinence in the older person. *J Pharm Pract Res* 2004; 34: 319-21.

INTRODUCTION

Urinary incontinence is distressing and disabling for many elderly people. Prevalence studies in Australia suggest that one-third of people over 65 years have a degree of urinary incontinence, and this increases to over 50% of elderly people in residential care.^{1,2}

Clinicians may underestimate lower urinary tract symptoms if urinary incontinence is used as the single symptom. Other lower urinary tract symptoms include frequency, urgency and nocturia. Patients may minimise their episodes of incontinence by frequent toileting. Some patients become housebound due to fear of incontinence. Nocturia is also a concern for many elderly patients and their carers. Patients and carers may be woken repeatedly at night to toilet or with incontinent episodes.

Epidemiological studies suggest a significant difference in the aetiology of urinary incontinence between older and younger groups. Older groups are more likely to have contributing co-morbidities including conditions not directly pertaining to the urinary tract, e.g. poor health, frailty, mobility, cognitive deficits. Conditions such as cardiac and renal impairment may also contribute. Management of these contributing problems may improve the transient urinary incontinence. Reversible factors which cause urinary incontinence, especially in older and disabled groups, can be recalled using the mnemonic DIAPPERS (Table 1).³

Table 1. Causes of transient urinary incontinence

D = Delirium

I = Infection (urinary tract)

A = Atrophic vaginitis (women)

P = Psychological (depression, psychosis)

P = Pharmacological

E = Excess fluid intake or output

R = Restricted mobility and environment

S = Stool impaction (constipation)

Management of urinary incontinence in the elderly involves multiple interventions such as the use or rationalisation of medicines. A comprehensive continence assessment should include evaluation of cognitive

function, mobility, functional ability in toileting, social support and impact on quality of life. An assessment of the medical conditions prior to instituting specific drug 'treatments' is required.

CAUSATIVE DRUGS

Many drugs can directly or indirectly contribute to urinary incontinence (Table 2). Alpha blockers can cause stress incontinence in females with urethral sphincter weakness.⁴ Medications which are sedating or cause confusion can indirectly lead to urinary incontinence.

Table 2. Drug-induced causes of urinary incontinence⁵

Drug	Causes
Alpha blockers	Decreased urethral resistance
Opioids	Constipation
Anticonvulsants	Confusion, ataxia
Antihypertensives	Postural hypotension, impaired mobility
Antiparkinsonian drugs	Confusion, postural hypotension
H ₂ antagonists	Confusion
Loop diuretics	Frequency, urgency
Sedatives/hypnotics	Sedation, confusion
Spinal anaesthetics	Detrusor paralysis
Calcium channel blockers	Constipation, urinary retention
Angiotensin converting enzyme inhibitors	Cough
Other (alcohol, caffeine)	Polyuria causing frequency, urgency

The decision to cease drugs needs to be taken in light of concurrent medical conditions and the availability of alternatives. Drugs which cause constipation can be replaced by less constipating types, e.g. replace verapamil with a less constipating calcium blocker. Loop diuretics are a common cause of woe, with many patients unable to leave the house until the diuretic effect has passed. Increasing the dose of angiotensin converting enzyme inhibitors can allow minimisation of the use of such diuretics. Careful history taking often confirms that the diuretic is used to treat peripheral oedema (which may be a side effect of another medicine). Medicines that can cause confusion need to be justified for continuing use. Hypnotics are inappropriate for long-term use because of their association with falls, urinary incontinence and lack of long-term efficacy. Alpha blockers specifically cause relaxation of the internal urethral sphincter and decrease detrusor leak point pressure.⁴ As a myriad of other antihypertensives are available, prazosin should be replaced except if prostatic obstruction is the cause of incontinence.

Cholinesterase inhibitors (donepezil, galantamine, rivastigmine) have recently been approved for use in mild to moderate Alzheimer's disease.⁶ Urinary frequency

Margaret R Bird, MBBS, FRACP, Consultant Physician in Geriatric Medicine, Continence Service, Austin Health, Heidelberg, Victoria
Address for correspondence: Margaret Bird, Continence Service, Austin Health, Banksia Street, Heidelberg Vic. 3081, Australia
 E-mail: Margaret.Bird@austin.org.au

is reported as an adverse event in the product information and there have been anecdotal reports of urinary incontinence.⁷ The mode of action is presumably related to the unmasking of unstable detrusor contractions through excessive cholinergic activity. Although it seems illogical to prescribe an anticholinergic to treat urinary incontinence caused by an anticholinesterase, success with this combination has recently been described.⁸

PHARMACOLOGICAL MANAGEMENT

Topical hormone replacement is used in post-menopausal women due to the presence of oestrogen receptors throughout the pelvic floor and bladder neck. Symptoms of urgency can be improved and there are minimal side effects.⁹ Compliance can be problematic as older women may be unfamiliar or unable to use vaginal applicators. In such cases, local application of a cream to the vaginal entrance is recommended.

Aperients are commonly used to actively manage constipation. A loaded rectum may cause worsening of urinary and faecal incontinence by interfering with pelvic floor dynamics and defecation dynamics. Elderly patients on multiple medications are prone to constipation especially during periods of immobility and hospitalisation.

Antibiotics are used for the treatment and prophylaxis of urinary tract infections. Urinary tract infections are a common cause of incontinence due to the irritation caused by cystitis. Post-menopausal women are especially prone to infections due to the proximity of the anus and resultant faecal contamination, combined with decreased urethral sphincter and pelvic floor tone. Topical oestrogens have a role in preventing recurrent urinary tract infections.¹⁰

SPECIFIC CONDITIONS

Urinary incontinence can be treated when it is due to a specific cause usually diagnosed with urodynamic studies. Drugs need to be used appropriately as indiscriminate use without clarifying the diagnosis can worsen the condition. Anticholinergics are often given a trial and if unrecognised impaired bladder emptying is the cause of the incontinence, acute urinary retention can be precipitated.

Overactive Bladder

Overactive bladder (previously detrusor instability and hyperreflexia) on urodynamic diagnosis is common in the elderly and results from spontaneous or reflexic detrusor contractions and subsequent urge urinary incontinence. Prevalence is between 33 to 61% of people over 65 years of age with urinary incontinence.¹¹ It is associated with neurological conditions such as stroke, Parkinson's disease and dementing disorders.

Anticholinergics (Table 3) are the mainstay of the pharmacological management of overactive bladder. Anticholinergics decrease bladder muscle contractility and increase bladder capacity. However, anticholinergics are often poorly tolerated by the elderly due to increased sensitivity to anticholinergic effects especially dry mouth, confusion and postural hypotension.¹² Anticholinergics worsen confusion and need to be used with caution in patients with dementing disorders.¹³ Anticholinergics are contraindicated in many conditions which occur commonly in the elderly, e.g. glaucoma, intestinal obstruction or atony, impaired bladder emptying, cardiac arrhythmias. Once the decision is made that it is safe to trial an anticholinergic, it

Table 3. Anticholinergics for treatment of overactive bladder

Drug	Efficacy	Side effects	Initial dose	Max. dose
Propantheline	++	+++	15 mg 2 x daily	30 mg 3 x daily
Imipramine	+	++	10 mg night	20 mg 3 x daily
Oxybutynin	+++	++	2.5 mg night	5 mg 3 x daily
Tolterodine	+++	+	1 mg night	2 mg 2 x daily

is essential that low doses are commenced and increased slowly until the desired result or appearance of side effects.

Propantheline has been used for urge urinary incontinence for many years. Low-dose imipramine is used for its anticholinergic side effect and it also has a mild alpha adrenergic effect which can be beneficial where additional urethral sphincter weakness is suspected.

Oxybutynin is a tertiary amine with anticholinergic and spasmolytic effects on the bladder smooth muscle.¹⁴ It was developed specifically for overactive bladder and to suppress involuntary bladder contractions. Oxybutynin works by a direct antispasmodic action on smooth muscle and inhibits the muscarinic action of acetylcholine on smooth muscle. It is selective for muscarinic receptors on the detrusor and is more potent and more direct than atropine. Despite an improved anticholinergic side effect profile, side effects are still frequently dose limiting, or cannot be tolerated in the elderly. Alternative oxybutynin delivery systems are available overseas, e.g. transdermal,¹⁵ extended-release.¹⁶ Intravesical oxybutynin is also effective; the patient needs to learn to dissolve oxybutynin in water and deliver via self catheterisation up to three times per day.

Tolterodine is a specific anticholinergic targeting detrusor muscarinic receptors. Tolterodine is as effective as oxybutynin but better tolerated¹⁷ and is available in a slow-release form.¹⁸ Tolterodine has the most desirable tolerability profile, allowing therapeutic levels to be achieved. Extended-release oxybutynin is considered to be as effective and well tolerated as tolterodine.¹⁶

There are experimental non-anticholinergic treatments for overactive bladder such as intravesical capsaicin and resiniferatoxin that selectively inhibit reflexic bladder contractions.¹⁹ Botulinum A toxin injections into the bladder neck or detrusor have been used to control bladder spasms in spinal cord injured patients.²⁰ Nimodipine (smooth muscle relaxant) is not effective.²¹

Benign Prostatic Hypertrophy

Benign prostatic hypertrophy is a pathological condition of ageing men and frequently causes troublesome lower urinary tract symptoms. These symptoms include irritative symptoms of frequency, urgency and urge incontinence, and obstructive symptoms of hesitancy, poor flow and dribbling.

Management of lower urinary tract symptoms secondary to benign prostatic hypertrophy is recommended except where surgery is mandated by significant urinary retention with recurrent urinary tract infection or renal failure, presence of stones or suspicion of malignancy, gross haematuria or bladder diverticulae.²²

Alpha₁ blockers (Table 4) are used to decrease the smooth muscle tone in the bladder neck causing the bladder outlet obstruction. Androgen blockade is reserved for the

Table 4. Alpha blockers for treatment of lower urinary tract symptoms secondary to benign prostatic hypertrophy

Drug	Features	Hypotensive effect	Start dose	Max. dose
Prazosin	-	+++	0.5 mg 2 x daily	1 mg 2 x daily
Terazosin	Titrate dose	++	1 mg night	5 mg daily
Tamsulosin	Alpha ₁ selectivity CYP450 hepatic metabolism Highly plasma protein bound	+	400 µg daily	400 µg daily

clinically enlarged prostate (over 40 g) and requires a prolonged course before improvement is observed (6-12 months).²³ Studies demonstrate that both groups of these agents are safe and efficacious in the elderly. End points of increased flow rate and decreased symptom scores are consistently reported.²⁴ Postural hypotension is the most concerning side effect—tamsulosin has selective alpha₁ properties that theoretically target prostatic alpha receptors without significant effect on blood pressure.²⁵ A retrospective study of patients taking tamsulosin (mean age 66 years), confirmed good safety data including less reporting of postural hypotension.²⁶

Terazosin, a long-acting alpha blocker is indicated for hypertension and symptomatic treatment of benign prostatic hypertrophy. First-dose syncope is described and the dosing schedule involves a complex titration regimen. However, in a study of 50 to 86 year old males both with and without concomitant hypertension, the incidence of dizziness and postural hypotension was 10% and 3% respectively.²⁷

Nocturnal Polyuria

Overproduction of urine overnight can lead to nocturia. This is common in the elderly and is due to altered diurnal rhythm of the pituitary hormone arginine vasopressin and decreased renal tubular sensitivity to it with ageing.²⁸ Additionally, conditions which result in dependent oedema such as cardiac and renal impairment commonly result in a nocturnal diuresis.

Desmopressin is a synthetic nonapeptide analogue of the antidiuretic hormone. It causes decreased urine production and has an indication for nocturnal enuresis in children. Prescribing guidelines do not recommend use in patients over the age of 65 years due to the risk of hyponatraemia. Despite this, reports of the use of desmopressin in older age groups are appearing. One study included females up to 81 years (mean 53 years) and claimed the desmopressin was well tolerated.²⁹ Another study of men aged 37 to 87 years (mean 64.5 years) reported 4% hyponatraemia and similarly claimed that desmopressin was effective and well tolerated.³⁰

CONCLUSION

Drugs can cause urinary incontinence and other urinary symptoms and provide effective treatment for such conditions in the elderly. It is important to review concurrent medication in an elderly person with urinary incontinence. Although anticholinergics are commonly prescribed to the elderly, care needs to be taken because of the risk of side effects. Effective continence management involves multidisciplinary assessment and strategies of which medication review is an important component.

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References

- Millard R. The prevalence of urinary incontinence in Australia: A demographic survey conducted in Sydney in 1983. *Aust Cont J* 1998; 4: 92-99.
- Chiarelli P, Brown WJ. Leaking urine in Australian women: prevalence and associated condition. *Neurourol and Urodynamics* 1999; 18: 567-77.
- Resnick N. Urinary incontinence in the elderly. *Med Grand Rounds* 1984; 3: 281-90.
- Thien T, Delaere KP, Debruyne FM, Koene RA. Urinary incontinence caused by prazosin. *Br Med J* 1978; 1: 622-3.
- Fonda D, Benvenuti F, Cottenden A, DuBeau D, Kirshner-Hermanns R, Miller K, et al. Urinary incontinence and bladder dysfunction in older persons. In: Abrams P, Cardozo L, Khoury S, Wein A, editors. *Incontinence*. 2nd ed. Plymouth: Health Publication Ltd; 2002. p. 627-94.
- Ritchie CW, Ames D, Calyton T, Lai R. Metaanalysis of randomized trials of the efficacy and safety of donepezil, galantamine, and rivastigmine for the treatment of Alzheimer disease. *Am J Geriatr Psychiatry* 2004; 12: 358-69.
- Hashimoto M, Imamura T, Tanimukai S, Kazul H, Mori E. Urinary incontinence: an unrecognised adverse effect with donepezil. *Lancet* 2000; 356: 568.
- Siegler EL, Reidenberg M. Treatment of urinary incontinence with anticholinergics in patients taking cholinesterase inhibitors for dementia. *Clin Pharmacol Ther* 2004; 75: 484-8.
- Bird M, DeLuise M. Gonadal hormone replacement therapy in the elderly. *Aust J Hosp Pharm* 1996; 26: 564-8.
- Robinson D, Cardozo LD. The role of oestrogens in lower urinary tract dysfunction. *Urology* 2003; 64: 5-51.
- Davila WG. Emerging trends in the management of overactive bladder. *Geriatrics* 2002; 57 (Suppl. 1): S5-S12.
- Australian Medicines Handbook Pty Ltd. *Australian Medicines Handbook*. Adelaide: Australian Medicines Handbook Pty Ltd; 2004.
- Tune LE. Anticholinergic effects of medication in elderly patients. *J Clin Psychiatry* 2001; 62 (Suppl. 21): 11-14.
- Yarker YE, Goa KL, Fitton A. Oxybutynin: a review of its pharmacodynamic and pharmacokinetic properties, and its therapeutic use in detrusor instability. *Drugs Aging* 1995; 6: 243-62.
- Dmochowski RR, Davila GW, Zinner NR, Gittelman MC, Saltzstein DR, Lyttle S, et al for the Transdermal Oxybutynin Study Group. Efficacy and safety of transdermal oxybutynin in patients with urge and mixed urinary incontinence. *J Urol* 2002; 168: 580-6.
- Appell RA, Sand P, Dmochowski R, Anderson R, Zinner N, Lama D, et al. Prospective randomized trial of extended-release oxybutynin chloride and tolterodine tartrate in the treatment of overactive bladder: results of the OBJECT study. *Mayo Clin Proc* 2001; 76: 358-63.
- Abrams P, Freeman R, Anderstrom C, Mattiasson A, et al. Tolterodine, a new antimuscarinic agent: as effective but better tolerated than oxybutynin in patients overactive bladder. *Br J Urol* 1998; 81: 801-10.
- Landis JR, Kaplan S, Swift S, Versi E. Efficacy of antimuscarinic therapy for overactive bladder with varying degrees of incontinence severity. *J Urol* 2004; 171: 752-6.
- Robinson D, Khullar V, Cardozo L. Pharmacological management of detrusor instability. *Int Urogynecol J Pelvic Floor Dysfunct* 2001; 12: 271-8.
- Schurch B, Stohrer M, Kramer G, Schmid DM, Gaul G, Hauri D. Botulinum-A toxin for treating detrusor hyperreflexia in spinal cord injured patient: a new alternative to anticholinergic drugs? Preliminary results. *J Urol* 2000; 164: 692-7.
- Naglie G, Radomski SB, Brymer C, Mathiasen K, O'Rourke K, Tomlinson G. A randomized, double-blind, placebo controlled crossover trial of nimodipine in older persons with detrusor instability and urge incontinence. *J Urol* 2002; 167: 586-90.
- Bruskewitz R, Fourcade R, Koshiha K. Interventional therapy: surgery. *Proceedings of the 4th International Consultation on Benign Prostatic Hypertrophy*. Paris: World Health Organization; 1998. p. 523-8.
- Tammela T. *Benign prostatic hypertrophy: Practical treatment guidelines*. *Drugs Aging* 1997; 10: 349-66.
- Chapple CR. Alphaadrenoantagonists in the year 2000: is there anything new? *Curr Opin Urol* 2001; 11: 9-16.
- Michel MC, Bressel HU, Goepel M, Rubben H. A 6 month large-scale study into the safety of tamsulosin. *Br J Clin Pharm* 2001; 51: 609-14.
- Mann RD, Biswas P, Freemantle S, Pearce G, Wilton L. The pharmacovigilance of tamsulosin: event data on 12484 patients. *BJU Int* 2000; 85: 446-50.
- Lepor H, Auerbach S, Puras-Baez Narayan P, Soloway M, Lowe F, et al. A randomized, placebo-controlled multicenter study of the efficacy and safety of terazosin in the treatment of benign prostatic hyperplasia. *J Urol* 1992; 148: 1467-74.
- Miller M. Nocturnal polyuria in older people: pathophysiology and clinical implications. *J Am Geriatr Soc* 2000; 48: 1321-9.
- Robinson D, Cardozo L, Akesson M, Hvistendahl G, Riis A, Norgaard JP. Antidiuresis: a new concept in managing female daytime urinary incontinence. *BJU Int* 2004; 93: 996-1000.
- Mattiasson A, Abrams P, van Kerrebroeck P, Walter S, Weiss J. Efficacy of desmopressin in the treatment of nocturia: a double-blind placebo-controlled study in men. *BJU Int* 2002; 89: 855-62.

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