

Guidelines on Urinary Incontinence

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1. INTRODUCTION

In the first International Consultation on Incontinence in 1998, a structure of 'Clinical Guidelines for Management of Incontinence' was developed (1). This included a summary and overview, which were presented in flow sheets ('algorithms'), with recommendations for 'Initial Management' and 'Specialised Management' of urinary incontinence (UI) in children, men, women, patients with neuropathic bladder and elderly patients. These algorithms have already been presented in the previous EAU Guidelines on Incontinence and continue to be the skeleton of the guidelines. The algorithms are uniformly constructed to follow from top to bottom a chronological pathway from patient's history and symptoms assessment, clinical assessment using appropriate studies, and tests so that the condition of the underlying pathophysiology can be defined as a basis for rational treatment decisions. To limit the number of diagnostic pathways in the algorithms, clinical presentations that require a similar complexity of diagnostic evaluation have been grouped together by history and symptoms.

Again, for simplification, treatment options have been grouped under a few diagnoses ('conditions') and their underlying pathophysiology, for which the terminology as standardised by the International Continence Society (ICS) is used. As a rule, the least invasive treatment option is recommended first, proceeding in a stepwise escalation to a more invasive treatment option, when the former fails.

Depth and intensity of diagnostic evaluation and therapeutic interventions are grouped into two levels, 'Initial Management' and 'Specialised Management'. The level of 'Initial Management' comprises measures generally needed at the first patient contact with a health professional. Depending on the healthcare system and local or general service restrictions, this first contact maybe with an incontinence nurse, a primary care physician, or a specialist.

The primary information about the patient's condition is established by medical history, physical examination, and applying basic diagnostic tests, which are readily available. If treatment is at all installed at this level of care, it will be mostly of an empirical nature.

The level of 'Specialised Management' appeals to patients in whom a diagnosis could not be established at the 'Initial Management', in whom primary treatment failed, or in whom history and symptoms suggest a more complex or serious condition requiring more elaborate diagnostic evaluation and/or specific treatment options. For instance, at this level urodynamic studies are usually required for establishing a diagnosis on the grounds of pathophysiology, and treatment options at this level include invasive interventions and surgery.

The principles of 'evidence-based medicine' (EBM) apply for analysis and rating of the relevant papers published in the literature, for which a modified Oxford system has been developed (2,3). This approach applies 'levels of evidence' (LE) to the body of analysed literature and, from there, derives 'grades of recommendation' (GR) (Tables 1 and 2).

This document presents a synthesis of the findings of the 4th International Consultation on Incontinence held in July 2008 (4). References have been included in the text, with a focus on new publications covering the time span 2005 to the present. An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the CD-rom version. Additionally, an ultra short document is available.

Following the complete updating in 2009 of the EAU Guidelines on Urinary Incontinence, the Incontinence Guidelines Writing Panel considered it would be helpful to provide an addendum to the Guidelines on the use of drugs for the treatment of urinary incontinence and the role of weight loss (see Appendix).

Table 1: Level of evidence*

Level	Type of evidence
1a	Evidence obtained from meta-analysis of randomised trials
1b	Evidence obtained from at least one randomised trial
2a	Evidence obtained from one well-designed controlled study without randomisation
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities

Modified from Sackett et al. (2,3).

Table 2: Grade of recommendation*

Grade	Nature of recommendations
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial
B	Based on well-conducted clinical studies, but without randomised clinical trials
C	Made despite the absence of directly applicable clinical studies of good quality

Modified from Sackett et al. (2,3).

1.1 References

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2. EPIDEMIOLOGY*

2.1 Introduction

There is a large variation in the estimated prevalence of urinary incontinence (UI), even after taking into account differences in definitions, epidemiological methodology, and demographic characteristics. However, recent prospective studies have provided much data on the incidence of UI and the natural history (progression, regression, and resolution) of UI (1-4).

Urinary incontinence, or urine loss occurring at least once during the last 12 months, has been estimated as occurring in 5-69% of women and 1-39% of men. In general, UI is twice as common in women as in men. Limited data from twin studies suggest there is a substantial genetic component to UI, especially stress urinary incontinence (SUI) (5,6).

2.2 Risk factors in women

Pregnancy and vaginal delivery are significant risk factors, but become less important with age. Contrary to previous popular belief, menopause per se does not appear to be a risk factor for UI and there is conflicting evidence regarding hysterectomy. Diabetes mellitus is a risk factor in most studies. Research also suggests that oral oestrogen substitution and body mass index are important modifiable risk factors for UI. Although mild loss of cognitive function is not a risk factor for UI, it increases the impact of UI.

Smoking, diet, depression, urinary tract infections (UTIs), and exercise are not risk factors.

2.2.1 Risk factors in pelvic organ prolapse (POP)

Pelvic organ prolapse (POP) has a prevalence of 5-10% based on the finding of a mass bulging in the vagina. Childbirth carries an increased risk for POP later in life, with the risk increasing with the number of children. It is unclear whether Caesarean section (CS) prevents the development of POP though most studies indicate CS carries less risk than vaginal delivery for subsequent pelvic floor morbidity. Several studies suggest hysterectomy and other pelvic surgery increase the risk of POP. Further research is needed.

2.3 Risk factors in men

Risk factors for UI in men include increasing age, lower urinary tract symptoms (LUTS), infections, functional and cognitive impairment, neurological disorders, and prostatectomy.

*This section of the guidelines is based on the recommendations of the ICI committee chaired by Ian Milsom (Committee 1: Epidemiology).

2.4 Overactive bladder (OAB)

The prevalence of OAB in adult males varies from 10% to 26% and in adult females from 8% to 42%. It increases with age and often occurs with other LUTS.

Several common chronic conditions, such as depression, constipation, neurological conditions, and erectile dysfunction, have been significantly associated with OAB, even after adjusting for important covariates, such as age, gender and country (7).

2.5 Disease progression

2.5.1 Longitudinal studies

The literature on incidence and remission of UI is still scarce, particularly among men. However, the annual incidence rates of UI in women ranges from 2% to 11%, with the highest incidence occurring during pregnancy. Rates of complete remission of UI range from 0% to 13%, with the highest remission rate after pregnancy. The annual incidence rates of OAB range from 4% to 6%, while annual remission rates of OAB range from 2% to 3%. The annual incidence of prolapse surgery ranges from 0.16% to 0.2%. The estimated life-time cumulative risk for prolapse surgery is estimated to be 7-11%.

2.5.2 Genetic epidemiology

The familial transmission of UI is well documented. However, it is often difficult to differentiate between heritability and non-inherited transmission (environmental factors) in the family environment. Ethnic and racial differences for UI and POP are also well documented.

2.5.3 Twin studies

It is possible to estimate the relative proportions of phenotypic variance caused by genetic and environmental factors by comparing monozygotic female twins (who have an identical genotype) with dizygotic female twins (who share an average of 50% of their segregating genes). A genetic influence is suggested when monozygotic twins are more concordant for the disease than dizygotic twins. Suggested candidate genes include, for example, a polymorphism of the gene for collagen type I. In contrast, an environmental effect is suggested when monozygotic twins are discordant for the disease.

2.5.4 Worldwide estimates of current and future LUTS including UI and OAB in individuals > 20 years old

The EPIC study is a population-based study estimating the prevalence of UI, OAB and other LUTS among men and women from five countries using the 2002 ICS definitions. The age- and gender-specific prevalence rates from the EPIC study were used to estimate the current and future worldwide number of individuals with LUTS, OAB and UI (8). This was done by extrapolating prevalence rates to the worldwide population aged 20 years and older (4.2 billion). Males and females from the age of 20 to 80+ years were stratified into five-year age groups (e.g. 20-24 years) to estimate the current and future worldwide number of individuals with LUTS, OAB and UI, and the age- and gender-specific prevalence rates.

Projected population estimates for all worldwide regions are based on information from the United States (US) Census Bureau International Database (IDB) (9).

2.5.5 Conclusions

As the population ages, the prevalence of LUTS is also expected to increase.

LUTS are burdensome to individuals. The projected increase in the number of individuals experiencing LUTS has implications for healthcare resources and overall health burden.

The estimated number of individuals with LUTS has been based on a conservative prevalence rate. Thus, the future number of those with LUTS may be much higher.

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**An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the guidelines CD-rom version.*

3. PHARMACOTHERAPY*

3.1 Introduction

More than 50 million people in the developed world are affected by UI and many drugs have been used for treatment (Table 3). Although drugs may be efficacious in some patients, side-effects mean they are often discontinued after short periods of time and they are best used as an adjuvant to conservative and surgical therapy (1).

3.2 Drugs used in the treatment of OAB/detrusor overactivity (DO)

The clinical relevance of efficacy of antimuscarinic drugs relative to placebo has been widely discussed (2). However, recent large meta-analyses of the most widely used antimuscarinic drugs have clearly shown these drugs provide a significant clinical benefit (3,4). More research is needed to decide the best drugs for first-, second-, or third-line treatment (4). None of the commonly used antimuscarinic drugs (darifenacin, fesoterodine, oxybutynin, propiverine, solifenacin, tolterodine, and trospium) is an ideal first-line treatment for all OAB/DO patients. Optimal treatment should be individualised, considering the patient's co-morbidities, concomitant medications, and the pharmacological profiles of the different drugs (5).

*This section of the guidelines is based on the recommendations of the ICI committee chaired by Karl-Erik Andersson (Committee 8: Drug Treatment).

Table 3: Drugs used in the treatment of OAB/DO*

Drugs	LE	GR
<i>Antimuscarinic drugs</i>		
• Tolterodine	1	A
• Trospium	1	A
• Solifenacin	1	A
• Darifenacin	1	A
• Propantheline	2	B
• Atropine, hyoscyamine	3	C
<i>Drugs acting on membrane channels</i>		
• Calcium antagonists	2	NR
• K ⁺ -channel openers	2	NR
<i>Drugs with mixed actions</i>		
• Oxybutynin	1	A
• Propiverine	1	A
• Dicyclomine	3	C
• Flavoxate	2	NR
<i>Antidepressants</i>		
• Imipramine	3	C
• Duloxetine	2	B
<i>Alpha-adrenoreceptor antagonists</i>		
• Alfuzosin	3	C
• Doxazosin	3	C
• Prazosin	3	C
• Terazosin	3	C
• Tamsulosin	3	C
<i>Beta-adrenoreceptor antagonists</i>		
• Terbutaline (beta-2)	3	C
• Salbutamol (beta-2)	3	C
• YM-178 (beta-3)	2	B
<i>PDE-5 inhibitors (for male LUTS/OAB)</i>		
• Sildenafil, tadalafil, vardenafil	2	B
<i>COX inhibitors</i>		
• Indomethacin	2	C
• Flurbiprofen	2	C
<i>Toxins</i>		
• Botulinum toxin (neurogenic), injected into bladder wall	2	A
• Botulinum toxin (idiopathic), injected into bladder wall	3	B
• Capsaicin (neurogenic), intravesical	2	C
• Resiniferatoxin (neurogenic), intravesical	2	C
<i>Other drugs</i>		
• Baclofen, intrathecal	3	C
<i>Hormones</i>		
• Oestrogen	2	C
• Desmopressin, for nocturia (nocturnal polyuria), but care should be taken because of the risk of hyponatraemia, especially in the elderly	1	A

*Assessments have been done according to the Oxford modified system, see Tables 1 and 2.

LE = level of evidence; GR = grade or recommendation; NR = no recommendation possible; PDE-5 inhibitor = phosphodiesterase-type 5 inhibitor; COX inhibitor = cyclo-oxygenase inhibitor.

3.3 Drugs used in the treatment of stress urinary incontinence (SUI)

Factors that may contribute to urethral closure include:

- the tone of urethral smooth and striated muscle;
- the passive properties of the urethral lamina propria, particularly its vasculature.

The relative contribution of these factors to intraurethral pressure is still debated. However, evidence shows that a substantial part of urethral tone is mediated through stimulation of alpha-adrenoreceptors in the urethral smooth muscle by released noradrenaline (6,7). A contributory factor to SUI, mainly in elderly women with a lack of oestrogen, may be a deterioration in the mucosal co-adaptation function. Pharmacological treatment of SUI aims to increase the force of intraurethral closure by increasing tone in the urethral smooth and striated muscles. Several drugs may contribute to such an increase (8,9). Their clinical use is limited by low efficacy and/or side-effects (Table 4).

Table 4: Drugs used in the treatment of stress urinary incontinence

Drug	LE	GR
Duloxetine	1	B
Imipramine	3	NR
Clenbuterol	3	C
Methoxamine	2	NR
Midodrine	2	C
Ephedrine	3	NR
Norephedrine (phenylpropanolamine)	3	NR
Oestrogen	2	NR

3.4 Drugs used for the treatment of ‘overflow incontinence’

Incontinence may occur when there are large quantities of residual urine with a markedly distended bladder (chronic urinary retention). The ICS no longer approves of the term, ‘overflow incontinence’ (10).

Various medical approaches to overflow incontinence have been suggested (11,12) based upon theoretical reasoning, animal studies (13,14) and reports of drugs associated with poor bladder emptying (15).

These include direct or indirect muscarinic receptor agonists and alpha-1-adrenoreceptor antagonists. However, a recent review of controlled clinical studies on direct and indirect parasympathetic agonists in patients with an underactive detrusor found these drugs were not consistently beneficial and may even be harmful (16). In contrast, alpha-1-adrenoreceptor antagonists have been consistently beneficial in patients with acute urinary retention (17).

A recent Medline search using the keyword ‘overflow incontinence’ did not find any randomised controlled trials (RCT) for treatment using parasympathomimetic drugs or alpha-1-adrenoreceptor antagonists nor even a case series with a meaningful number of patients. This indicates that medical treatments currently used to treat overflow incontinence are being used on the basis of empirical evidence. Any previous recommendations for the medical treatment of overflow incontinence can be considered as ‘expert opinion’ at best.

In addition, it is important to make sure any medical treatment for overflow incontinence is likely to reduce or eliminate residual urine better than the alternatives of catheterisation or surgery.

3.5 Hormonal treatment of UI

3.5.1 Oestrogen

Oestrogen deficiency is an aetiological factor in the pathogenesis of several conditions. However, oestrogen treatment, either alone or combined with progestogen, has achieved only poor results in UI. The current evidence (LE: 1) against the treatment of UI with oestrogen is based on studies originally designed to assess oestrogen for preventing cardiovascular events. In fact, the evidence is derived from secondary analyses of these studies using subjective, self-reported symptoms of urinary leakage. Nevertheless, these large RCTs showed a worsening of pre-existing UI (stress and urgency) and an increased new incidence of UI, with either oestrogen monotherapy or oestrogen combined with progestogen. It should be noted, however, that most patients were taking combined equine oestrogen, which may not be representative of all oestrogens taken by all routes of administration.

A systematic review of the effects of oestrogen on symptoms suggestive of OAB concluded that oestrogen therapy may be effective in alleviating OAB symptoms and local administration may be the most beneficial route of administration (18). It is possible that urinary urgency, frequency, and urgency incontinence are symptoms of urogenital atrophy in older post-menopausal women (19). There is good evidence that low-dose (local) vaginal oestrogen therapy may reverse the symptoms and cytological changes of urogenital atrophy. However, oestrogens (with or without progestogens) should not be used to treat UI, as there is no evidence to show they have a direct effect on the lower urinary tract.

3.5.2 **Other steroid hormones/receptor ligands**

There are no reported clinical trials evaluating the effect of androgens, particularly testosterone, on UI in women.

3.5.3 **Desmopressin**

Desmopressin (DDVAP) was found to be well tolerated and resulted in a significant improvement in UI compared to placebo in reducing nocturnal voids and increasing the hours of undisturbed sleep. Quality of life (QoL) also improved. However, hyponatraemia is one of the main, clinically important, side-effects of DDVAP administration. Hyponatraemia can lead to a range of adverse events from mild headache, anorexia, nausea, and vomiting to loss of consciousness, seizures, and death. The risk of hyponatraemia has been reported in a meta-analysis as about 7.6% (20) and seems to increase with age, cardiac disease, and a high 24-hour urine volume (21).

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**An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the guidelines CD-rom version.*

4. INCONTINENCE IN MEN*

4.1 Initial assessment

Initial assessment in men should triage patients with a 'complicated' incontinence, who need to be referred for specialist management, from the remainder who are suitable for general assessment.

The 'complicated' incontinence group comprises patients with:

- pain;
- haematuria;
- recurrent infection;
- previous failed incontinence surgery;
- total incontinence;
- voiding dysfunction (e.g. due to bladder outlet obstruction). Poor bladder emptying may be suspected from symptoms, physical examination or if imaging has been performed by ultrasound or X-ray after voiding;
- previous pelvic radiotherapy.

The group of remaining patients, with a history of UI identified by initial assessment, can be stratified into four main symptomatic groups of men suitable for initial management:

- post-micturition dribble alone;
- OAB symptoms: urgency (with or without urge incontinence), frequency, and nocturia;
- stress incontinence, most often after prostatectomy;
- mixed urgency and stress incontinence, most often after prostatectomy.

*This section of the guidelines is based on the recommendations of the ICI committees chaired by Jean Hay-Smith and Sender Herschorn. 4.1 (Initial assessment of UI) and 4.2 (Initial treatment of UI) provide the management algorithms and the explanatory notes; 4.4 (Surgical treatment of UI) provides additional evidence from the chapters.

4.2 Initial treatment

4.2.1 General management

Conservative management is the main approach to UI in men at the primary care level (Figure 1), and is often considered to be simple and low cost. The term ‘conservative management’ describes any treatment that does not involve pharmacological or surgical intervention. However, for conditions, such as OAB, conservative strategies are often combined with drug treatment.

Many conservative management interventions require a change of behaviour, which is neither easy to initiate nor to maintain. Most patients with minor-to-moderate symptoms wish to try less invasive treatments first. However, patients with complicated or severe symptoms may need to be referred directly for specialised management.

For men with post-micturition dribble, no further assessment is generally required. However, the patient should be told how to exert a strong pelvic floor muscle contraction after voiding or to manually compress the bulbous urethra directly after micturition (GR: B).

For men with stress incontinence, urgency, or mixed stress/urgency incontinence, initial treatment should include appropriate lifestyle advice, physical therapies, scheduled voiding regimes, behavioural therapies, and medication. In summary, these initial treatments carry lower grades of recommendation.

Recommendations for initial treatments for UI in men

	GR
Lifestyle intervention.	NR
Supervised pelvic floor muscle training for post prostatectomy SUI.	B
Scheduled voiding regimes for OAB.	C
When there is no evidence of significant post-void residual urine, antimuscarinic drugs for OAB symptoms, with or without urgency incontinence.	C
Alpha-adrenergic antagonists (alpha-blockers) can be added if there is also bladder outlet obstruction.	C

4.2.2 Post-radical prostatectomy (RP) incontinence

Despite the prevalence of UI and LUTS in older men, the only group to have been researched properly is men who have had RP. Overall, the effect of conservative treatment (lifestyle interventions, physical therapies, scheduled voiding regimes, complementary therapies) has been much less researched in men compared to women. There is generally insufficient level 1 or 2 evidence and most recommendations are essentially hypotheses requiring further research.

Recommendations for conservative treatment of UI in men

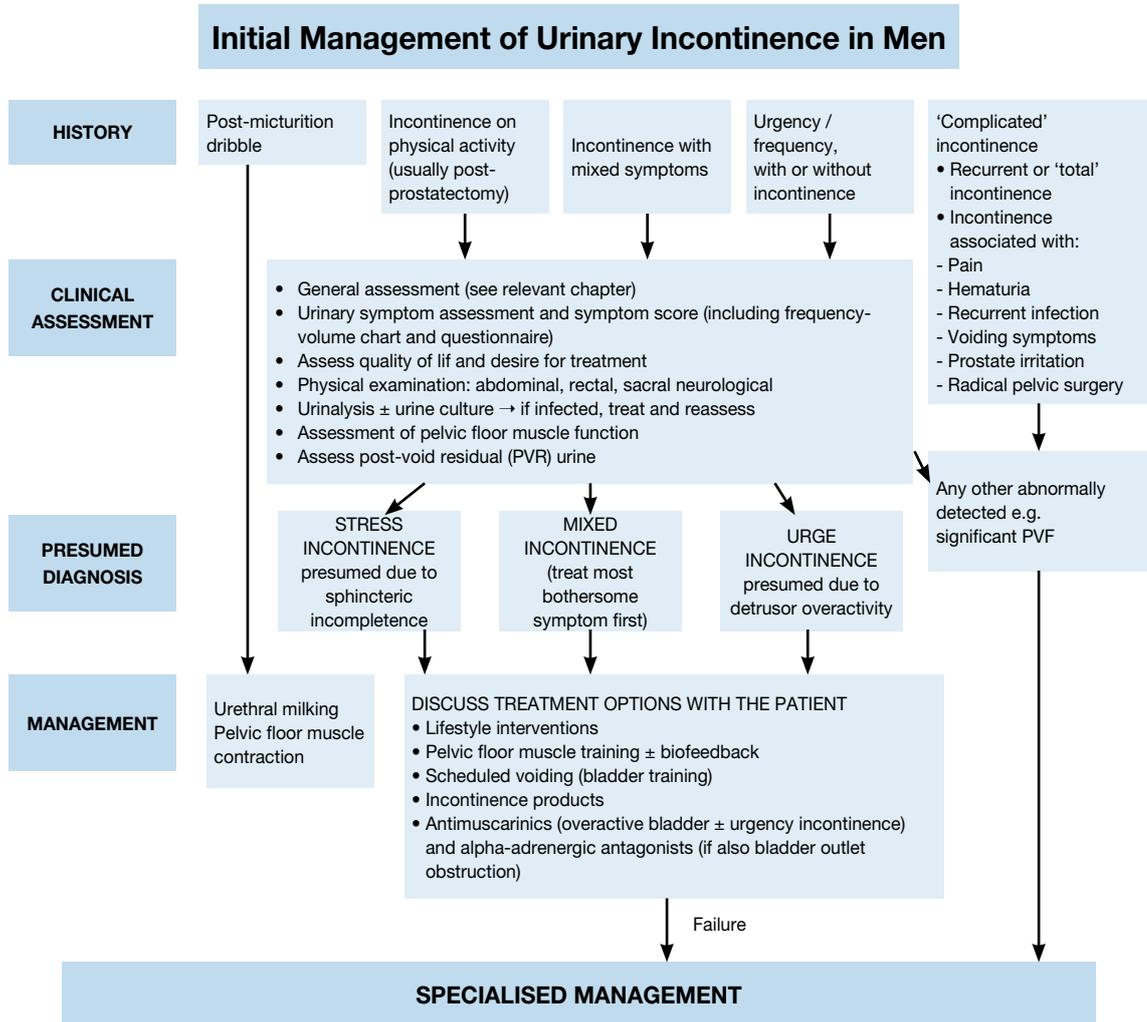
	GR
<i>Lifestyle interventions</i>	
It seems reasonable for health professionals to offer men advice on healthy lifestyle choices that may reduce or delay the onset of continence problems.	NR
<i>Pelvic floor muscle training (PFMT)</i>	
Some pre-operative or immediate post-operative instructions in PFMT for men undergoing radical prostatectomy may be helpful.	B
It is not clear whether PFMT taught by digital rectal examination (DRE) has more benefit than verbal or written instruction in PFMT.	B
The use of biofeedback to assist PFMT is currently a therapist/patient decision based on economics and preference.	B
<i>Electrical stimulation</i>	
For men with post-prostatectomy incontinence, adding electrical stimulation to a PFMT programme does not appear to be of benefit.	B

4.2.3 Conclusions

- There is generally insufficient level 1 or 2 evidence for these initial treatments. Most ‘recommendations’ are hypotheses needing further testing in high-quality research studies.

- If initial treatment is unsuccessful after a reasonable period of time (e.g. 8-12 weeks), a specialist's advice is highly recommended.

Figure 1: Algorithm for initial management of UI in men



4.3 Specialised management of UI in men

The specialist may first decide to re-institute initial management if previous therapy might have been inadequate. Specialised management of UI in men is summarised in Figure 2.

4.3.1 Assessment

Patients with 'complicated' incontinence referred directly to specialised management will probably need additional testing to exclude any other underlying pathology, i.e. cytology, cystourethroscopy and urinary tract imaging. If these tests are normal, patients can be treated for incontinence by initial or specialised management options as appropriate. If symptoms suggestive of detrusor overactivity or of sphincter incompetence persist, urodynamic studies are recommended to establish a diagnosis based on pathophysiological findings (urodynamic diagnosis).

4.3.2 Interventions

If initial management has failed and the patient's incontinence is affecting quality of life, invasive therapies may be considered.

4.3.3 Sphincter incompetence

For sphincter incompetence, the recommended option is surgical implantation of an artificial urinary sphincter (AUS) (GR: B). An alternative option is a male sling.

4.3.3.1 Detrusor overactivity (DO)

For idiopathic DO (with intractable OAB symptoms), the recommended therapies are:

- surgical bladder augmentation with intestinal segments (GR: C);
- implantation of a neuromodulator (GR: B).

Detrusor injections with botulinum toxin continue to show promise in the treatment of symptomatic detrusor overactivity unresponsive to other therapies.

4.3.3.2 Poor bladder emptying

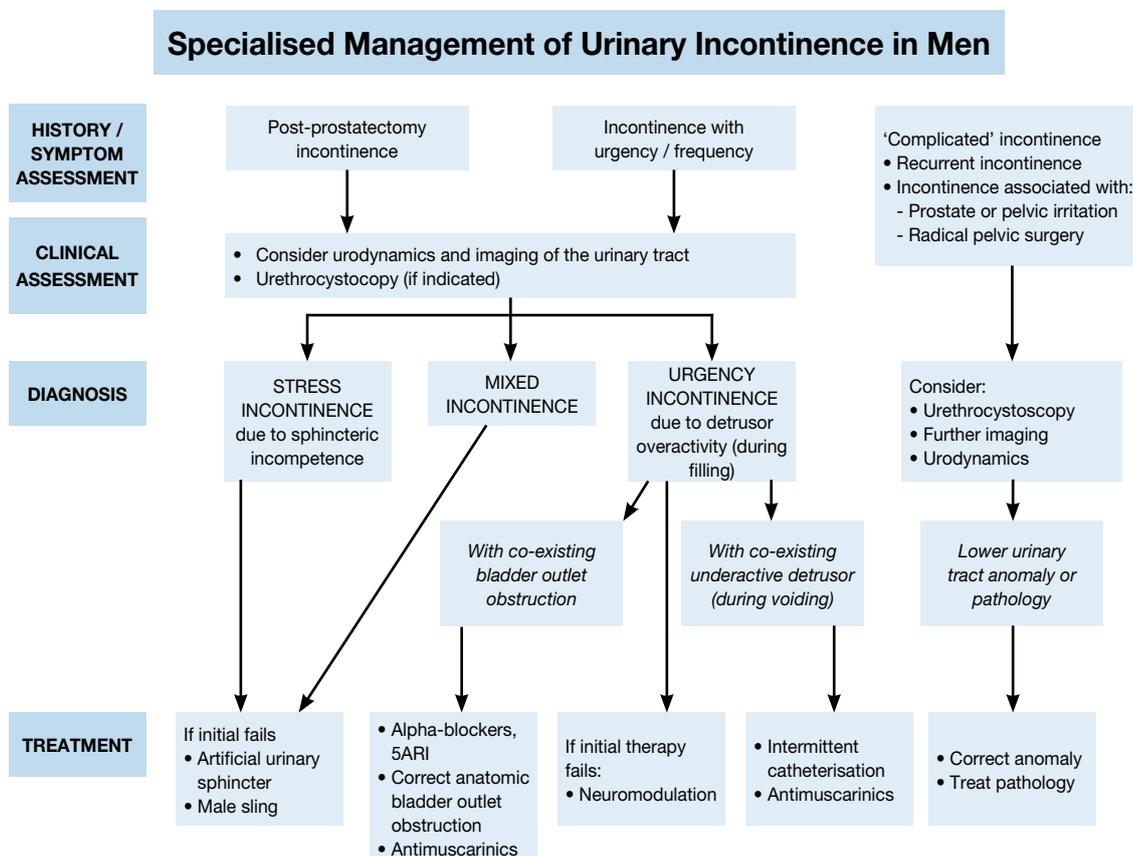
If incontinence is associated with poor bladder emptying due to detrusor underactivity, effective means should be used to ensure bladder emptying, e.g. CIC (GR: B-C).

4.3.3.3 Bladder outlet obstruction (BOO)

If incontinence is due to bladder outlet obstruction, then the obstruction should be relieved (GR: B-C).

Pharmacological treatment options for UI and proven outlet obstruction are alpha-blockers or 5-alpha-reductase inhibitors (GR: C). There is increasing evidence for the safety of antimuscarinic agents for OAB symptoms in men with outlet obstruction, when combined with an alpha-blocker (GR: B). Currently, botulinum toxin injections into the detrusor muscle are being used 'off-label' for this indication.

Figure 2: Algorithm for specialised management of UI in men



4.4 Surgical treatment

Urinary incontinence in men suitable for surgical correction can be classified by cause into sphincter-related incontinence (post-operative, post-traumatic, and congenital), bladder-related incontinence, and fistulae (Table 5). Initial routine assessment and further evaluations are described in Table 6.

Table 5: Aetiological classification of surgically correctable UI in men

Sphincter-related <ul style="list-style-type: none"> • Postoperative <ul style="list-style-type: none"> - Post-prostatectomy for benign disease - Post-prostatectomy for prostate cancer - Post radiotherapy, brachytherapy, cryosurgery, HIFU for prostate cancer - Post cystectomy and neobladder for bladder cancer

- Post-traumatic
 - After prostato-membranous disruption and urethral reconstruction
 - Pelvic floor trauma
 - Unresolved paediatric UI
 - Exstrophy and incontinent epispadias
- Bladder-related**
- Refractory UUI (overactive bladder)
 - Reduced capacity bladder
- Fistulae**
- Urethro-cutaneous
 - Recto-urethral

HIFU = high-intensity focused ultrasound; UI = urinary incontinence; UUI = urge urinary incontinence.

Table 6: Initial assessment prior to surgical therapy

Routine assessment

- Medical history and physical examination, urinalysis, post void residual urine, frequency/volume chart, pad test, and serum creatinine if renal disease is suspected

Further evaluation as required (LE: 2-4, GR: A-C)

- Cysto-urethroscopy to assess urethral integrity, sphincter appearance, stricture, bladder pathology, and imaging of the upper and lower urinary tract (ultrasound, cysto-urethrography, intravenous pyelogram)
- Urodynamic studies to assess sphincter and/or detrusor function
- Valsalva leak point pressure to measure sphincter weakness
- Urethral pressure profile (UPP) or retrograde perfusion sphincterometry may be performed if AUS or slings are to be implanted
- Sphincter electromyography to investigate suspected neuropathy
- Multichannel pressure/flow video-urodynamic evaluation to assess detrusor function and characterise the underlying pathophysiology

4.4.1 Incontinence after surgery for BPO or prostate cancer (CaP)

4.4.1.1 Incontinence after surgery for BPO

Incidence of UI is similar after open surgery, transurethral resection of the prostate (TURP), transurethral incision of the prostate (TUIP), and Holium laser enucleation.

4.4.1.2 Incontinence after surgery for CaP

Generally, the incidence of UI after RP has decreased, but it is still a significant problem. Overall, the reported incidences range between 5% and 48%. Generally, patients report higher degrees of UI than do their physicians. The degree of UI varies and is often estimated by the numbers of pads and their wetness, social impairment and bothersomeness, which are usually assessed by non-standardised instruments.

4.4.1.3 Definitions of post-RP continence

The definitions of post-RP continence are:

- total control without any pad or leakage;
- no pad but loss of few drops of urine ('underwear staining');
- none or 1 pad ('safety pad') per day.

4.4.1.4 Incontinence risk factors

Reported risk factors for incontinence after RP include age at surgery, prostate size, co-morbidities, nerve-sparing surgery, bladder neck stenosis, tumour stage (possibly related to surgical technique), and pre-operative bladder and sphincter dysfunction. The risk is unrelated to the technique of prostatectomy (radical vs non-radical vs robotic: these reports are entirely from centres of excellence).

4.4.1.5 Interventional treatment for post-RP incontinence

After a period of conservative management of at least 6-12 months, the artificial urinary sphincter (AUS) is the treatment of choice for patients with moderate-to-severe UI. In studies that report treatment results of UI after surgery of BPO and CaP together, the success rates for AUS range between 59% and 90% (0-1 pad/day). Long-term success rates and high patient satisfaction seem to outweigh the need for periodic revisions in some patients. Until similar experience is seen with newer, less invasive treatments, the AUS remains the reference standard to which all other treatments must be compared (LE: 2) (GR: B).

Male slings are an alternative for men with mild-to-moderate UI (radiotherapy is an adverse risk factor). The overall minimum success is 58%, with best results achieved in patients with low-to-moderate leakage of urine, who had not undergone radiotherapy (LE: 3) (GR: C).

Bulking agents are a less effective option for some men with mild-to-moderate UI. The early failure rate is about 50% and any beneficial effects decrease with time (LE: 3) (GR: C).

The implantation of compressive adjustable balloons is a new treatment option. Early high complication rates appear to have been resolved. However, more evidence is required before specific recommendations can be made (LE: 3).

4.4.1.6 Age

Age is not a restriction for surgical treatment of post-prostatectomy incontinence. However, cognitive impairment and a lack of normal dexterity may restrict use of an AUS and must be assessed pre-operatively (LE: 3-4; GR: C).

4.4.1.7 Post-RP incontinence with bladder neck stricture

Treatment options for incontinence following RP with concomitant bladder neck stricture and other types of surgical stricture are visual internal urethrotomy, followed by implantation of an AUS once the urethra has been stabilised.

4.4.2 Incontinence after external beam radiotherapy for CaP

The risk of incontinence after external beam radiotherapy ranges between 0 and 18.9%, but it may increase over time. There is a higher earlier risk in patients, who have had either a pre- or post-treatment TURP of 5-11%. Adjuvant radiotherapy may increase the risk of incontinence after RP. Also salvage RP after radiotherapy has an increased risk of incontinence.

4.4.2.1 AUS after radiotherapy

There is a variably higher revision rate after radiotherapy than without radiotherapy, due to a higher incidence of erosion and infection, possibly caused by urethral atrophy from radiation-induced vasculitis. Detrusor overactivity and bladder neck contractures may also occur. Prolonged and/or intermittent de-activation of the sphincter is recommended; the cuff of the sphincter must be placed outside the radiotherapy field.

4.4.2.2 Conclusion

An artificial sphincter is the most widely used treatment. Radiotherapy is a risk factor for an increase in complications (LE: 3; GR: C)

4.4.2.3 Other treatments for SUI after radiotherapy

Limited evidence suggests that perineal compression slings can be an alternative therapy. However, injectable agents have not been successful (LE: 3; GR: C).

4.4.3 Incontinence after other treatment for CaP

4.4.3.1 Brachytherapy

After brachytherapy, incontinence occurs in 0-45% of the cases. TURP after brachytherapy carries a high risk of incontinence.

4.4.3.2 Cryotherapy

Radiotherapy prior to cryotherapy is a risk factor for incontinence, fistulae occur in 0-5%.

4.4.3.3 High-intensity focused ultrasound (HIFU)

The rate of incontinence decreases with surgical experience.

4.4.3.4 Recommendation

The artificial sphincter is most widely used (GR: C). Injectable agents have not been successful (GR: C).

4.4.4 Treatment of incontinence after neobladder

Continence rates achieved 2 years after orthotopic urinary diversion are 85-100% during the day and 55-100% at night. Treatment includes conservative management, intermittent catheterisation, and artificial sphincter implantation (GR: C).

4.4.5 Urethral and pelvic floor injuries

Incontinence following injuries of the posterior urethra occurs in 0-20% of patients. The most commonly

published surgical therapy is the AUS (LE: 2; GR: B).

Depending on the individual case, additional procedures are needed, i.e. urethral or bladder neck reconstruction. If reconstruction is impossible, one treatment option is bladder neck closure and construction of a Mitrofanoff catheterisable abdominal stoma (LE: 3; GR: C).

For patients with severe bladder neck stricture and incontinence, an intra-urethral stent may be used together with an AUS (LE: 3; GR: C).

4.4.5.1 Recommendation

Although other treatments are possible, the AUS provides a reasonable outcome in appropriate cases.

4.4.6 **Incontinence in adult epispadias-exstrophy complex**

Patients should be treated in centres of excellence using a patient-directed approach. Treatment choices include:

- bladder neck reconstructive surgery;
- bladder neck closure;
- bladder reconstruction;
- urinary diversion.

There is not enough data to provide a specific recommendation. The patient's transition is important between the paediatric and adult urologist. Life-long follow-up is mandatory, particularly for continence, voiding efficiency, upper tract status, and other urological complications (LE: 3; GR: C).

4.4.7 **Refractory UUI and idiopathic DO**

Botulinum toxin A detrusor injection is a minimally invasive treatment with some efficacy that is currently used as an 'off-label' detrusor injection for this indication. Other treatment options include neuromodulation or detrusor myectomy, which have both been successful in a few male patients. Augmentation cystoplasty with intestinal segments is potentially successful in controlling symptoms but may have side-effects. Urinary diversion is a final option (LE: 3; GR: C).

4.4.8 **Incontinence and reduced capacity bladder**

Augmentation cystoplasty has been successful in helping with reduced capacity bladder due to most aetiologies except radiotherapy cystitis (LE: 3; GR: C).

4.4.9 **Urethro-cutaneous fistula and recto-urethral fistula**

The aetiology of acquired fistulae can be iatrogenic, trauma, inflammation, and tumour. Fistulae in men are most often iatrogenic (surgery, radiotherapy, cryotherapy, HIFU) or inflammatory (diverticulitis). The localisation and size of acquired urethro-cutaneous fistulae are demonstrated by clinical, endoscopic and imaging studies.

Surgical reconstruction is performed as required. Similar diagnostic manoeuvres are applied to recto-urethral fistulas. Surgical reconstruction may be carried out in fistulae that do not close, with or without temporary urinary and faecal diversion. Most repairs are carried out after prior faecal diversion. Various techniques are available for closure and can be done in collaboration with colorectal surgeons (LE: 3; GR: C).

4.4.10 **Management of AUS complications**

Recurrent incontinence after AUS implantation may result from alteration in bladder function, urethral atrophy, or mechanical malfunction. All or part of the prosthesis must be surgically removed if there is infection and/or erosion of components. Risk factors are surgery, radiotherapy, catheterisation, and endoscopy (LE: 3; GR: C).

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An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the guidelines CD-rom version.

5. INCONTINENCE IN WOMEN*

5.1 Initial assessment

Initial assessment should triage patients into those with a 'complicated' incontinence, who require referral for specialised management and those suitable for general assessment. The 'complicated' incontinence group comprises patients with:

- Pain;
- Haematuria;
- Recurrent infections;
- Voiding dysfunction;
- Significant pelvic organ prolapse;
- Failed previous incontinence surgery;
- Previous pelvic radiotherapy;
- Previous pelvic surgery;
- Suspected fistula.

The remaining patients, with a history of UI identified by initial assessment, can be stratified into three main symptomatic groups of women suitable for initial primary care management:

- Stress incontinence;
- Overactive bladder (OAB) symptoms: urgency with or without urgency incontinence, frequency and nocturia;
- Mixed urgency and stress incontinence.

Routine physical examination includes abdominal, pelvic and perineal examinations. Women should perform a 'stress test' (cough and strain) to detect leakage secondary to sphincter incompetence. Any POP or urogenital atrophy must be assessed. It is also important to assess voluntary pelvic floor muscle function by vaginal or rectal examination before teaching pelvic floor muscle training (PFMT).

5.2 Initial treatment of UI in women

For women with stress, urgency or mixed urinary incontinence, initial treatment includes appropriate lifestyle advice, physical therapy, a scheduled voiding regime, behavioural therapy and medication (Table 7, Figure 3). Some recommendations are based on good and consistent evidence of effect. However, many other recommendations are based on insufficient level 1 or 2 evidence and are essentially hypotheses requiring better evidence of their benefit.

Table 7: Initial treatment for UI in women

Treatment	GR
<i>Lifestyle interventions</i>	
For morbidly and moderately obese women, weight loss helps to reduce UI prevalence	A
Caffeine intake reduction may benefit UI symptoms	B
A decrease in fluid intake should only be tried in patients with abnormally high fluid intakes, as a decrease in fluids may lead to UTIs, constipation, or dehydration	C
Crossing the legs and bending forward can help to reduce leakage during coughing or other provocations	C
<i>Pelvic floor muscle training: general considerations</i>	
PFMT should be offered as first-line conservative therapy to women with stress, urgency, or mixed UI	A
Provide the most intensive PFMT programme possible (i.e. amount of exercise and of health professional supervision) within service constraints, as health-professional or supervised programmes are more effective than self-directed programmes. In addition, greater health professional contact is better than less	A
The addition of biofeedback to the PFMT programme does not appear to be of benefit:	
- clinic biofeedback	A
- home-based biofeedback	B

* This section of the guidelines is based on the recommendations of the ICI committees chaired by Jean Hay-Smith (Committee 12: Adult Conservative Management), Tony Smith (Committee 14: Surgery for Urinary Incontinence in Women) and Linda Brubaker (Committee 15: Surgery for Pelvic Organ Prolapse).

Vaginal cones	
VC may be offered to women with SUI or MUI	NR
VC can be offered as first-line conservative therapy to those who can, and are prepared to use them	B
VC may not be helpful because of side-effects and discomfort	NR
VC and EStim seem equally effective in SUI and MUI, but the usefulness of VC and EStim is limited because of side-effects and discomfort	B
Electrical stimulation	
EStim may be offered to women with SUI, UUI or MUI	NR
For treating SUI, 6 months of EStim, 50 Hz twice daily at home, may be better than no treatment	C
Low-intensity home-based EStim daily for 6 months may be better than 16 sessions of maximal clinic-based EStim	C
For treating UUI secondary to DO, 9 weeks of EStim, 4-10 Hz twice daily at home, might be better than no treatment	C
Addition of EStim to a biofeedback-assisted PFMT programme does not appear to add benefit	C
EStim may have limited usefulness, because some women cannot use it (due to contraindications), have difficulty using it, or dislike it	NR
Magnetic stimulation (MStim)	
MStim should only be used as part of a clinical trial as its benefit has not been established	NR
Bladder training	
BT is an appropriate first-line treatment for UUI in women	A
Either BT or antimuscarinic drugs may be effective for treating UUI	B
Some patients may prefer BT because it does not produce the adverse events associated with drug therapy	NR
Addition of a brief written instruction for BT, in addition to drug therapy, has no benefit	B
For women with symptoms of SUI or MUI, a combination of PFMT/BT may be better than PFMT alone in the short-term	B
Clinicians and researchers should refer to the operant conditioning and educational literature to explain their choice of training parameters or approach	NR
Clinicians should provide the most intensive BT supervision possible within service constraints	B
Timed voiding	
Timed voiding with a 2-hour voiding interval may be beneficial as a sole intervention for women with mild UI and infrequent voiding patterns	C

GR = grade of recommendation; UI = urinary incontinence; UTI = urinary tract infection; PFMT = pelvic floor muscle training; VC = vaginal cone; SUI = stress urinary incontinence; MUI = mixed urinary incontinence; EStim = electrical stimulation; MStim = magnetic stimulation; UUI = urge urinary incontinence; DO = detrusor overactivity; NR = no recommendation possible; BT = bladder training.

5.2.1 Pelvic floor muscle training (PFMT) under special circumstances

The following recommendations may help with decision-making for specific groups. However, most of these are essentially hypotheses that need further testing. Since empirical evidence is lacking the recommendations presented below are supported by expert opinion.

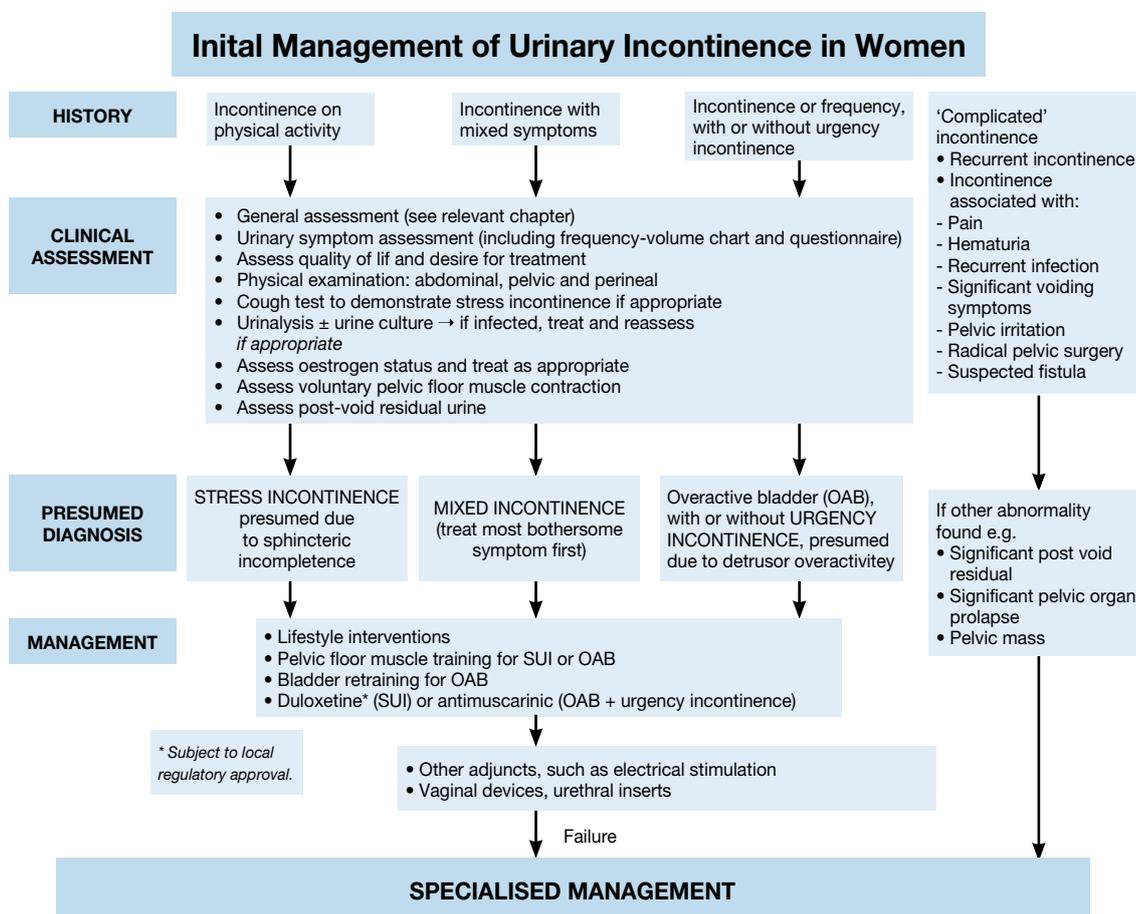
Recommendations for PFMT in special circumstances

	GR
<i>Pregnant women expecting their first baby</i>	
Offer an intensive strengthening ante-partum PFMT.	NR
Provide regular health professional contact to supervise PFMT training to prevent post-partum UI:	NR
- women continent at 18 weeks.	A
Population approaches, i.e. intervention offered whether or not women are continent at 20 weeks' gestation.	B

<i>Post-partum women, immediately after delivery</i>	
After vaginal delivery of a large baby (≥ 4000 g) or a forceps delivery an individually-taught PFMT programme, which includes advice on how to keep to the programme, will be beneficial.	C
<i>Post-partum women with persistent symptoms of UI at 3 months after delivery</i>	
PFMT is offered as first-line conservative therapy.	A
'Intensive' programmes, i.e. highly supervised and high amount of exercise.	B
<i>Women with SUI</i>	
PFMT is more effective than EStim as first-line conservative therapy, particularly if PFMT is intensively supervised.	B
PFMT is more effective than BT as first-line conservative therapy.	B
PFMT and duloxetine are both effective. Clinicians and women may choose to try PFMT first because of the side-effects associated with drug therapy.	C
PFMT and surgery are both effective, but many clinicians and women may prefer PFMT as a first-line therapy because it is less invasive.	C
PFMT and VC are both effective. PFMT is the preferred first choice because there is less leakage and some women cannot or do not like to use VCs.	B
PFMT is better than clenbuterol or phenylpropanolamine hydrochloride as first-line therapy because of the side-effects experienced with the medications.	B
A combination of PFMT + BT may be better than PFMT alone in short-term.	C
<i>Women with UUI or MUI</i>	
PFMT and BT are both effective as first-line conservative therapies.	B
PFMT is better than oxybutynin as first-line therapy.	B

GR = grade of recommendation; PFMT = pelvic floor muscle training; UI = urinary incontinence; SUI = stress urinary incontinence; EStim = electrical stimulation; BT = bladder training; VC = vaginal cone; UUI = urgency urinary incontinence; MUI = mixed urinary incontinence.

Figure 3: Algorithm for initial management of UI in women



5.3 Specialised management of UI in women

5.3.1 Assessment

Women with 'complicated' incontinence requiring specialist management will probably need additional testing to rule out any underlying pathology, i.e. cytology, cysto-urethroscopy or urinary tract imaging. If these tests reveal no further pathology, the patient should be treated for UI by initial or specialised management options, as appropriate (Figure 4).

Women who have failed initial management and with an impaired QoL are likely to request further treatment. If initial management has been given an adequate trial, then interventional therapy may be helpful. Urodynamic testing to diagnose the type of UI is highly recommended prior to intervention if the results are likely to influence the choice of management. It may also be helpful to test urethral function by urethral pressure profile or leak point pressure during urodynamic testing.

A systematic assessment for POP is highly recommended. The Pelvic Organ Prolapse Quantification (POPQ) method should be used in research studies. Co-existing POP should be treated.

5.3.2 Treatment

If urodynamic SUI is confirmed, the following treatment options may be recommended for patients with some bladder-neck and urethral mobility:

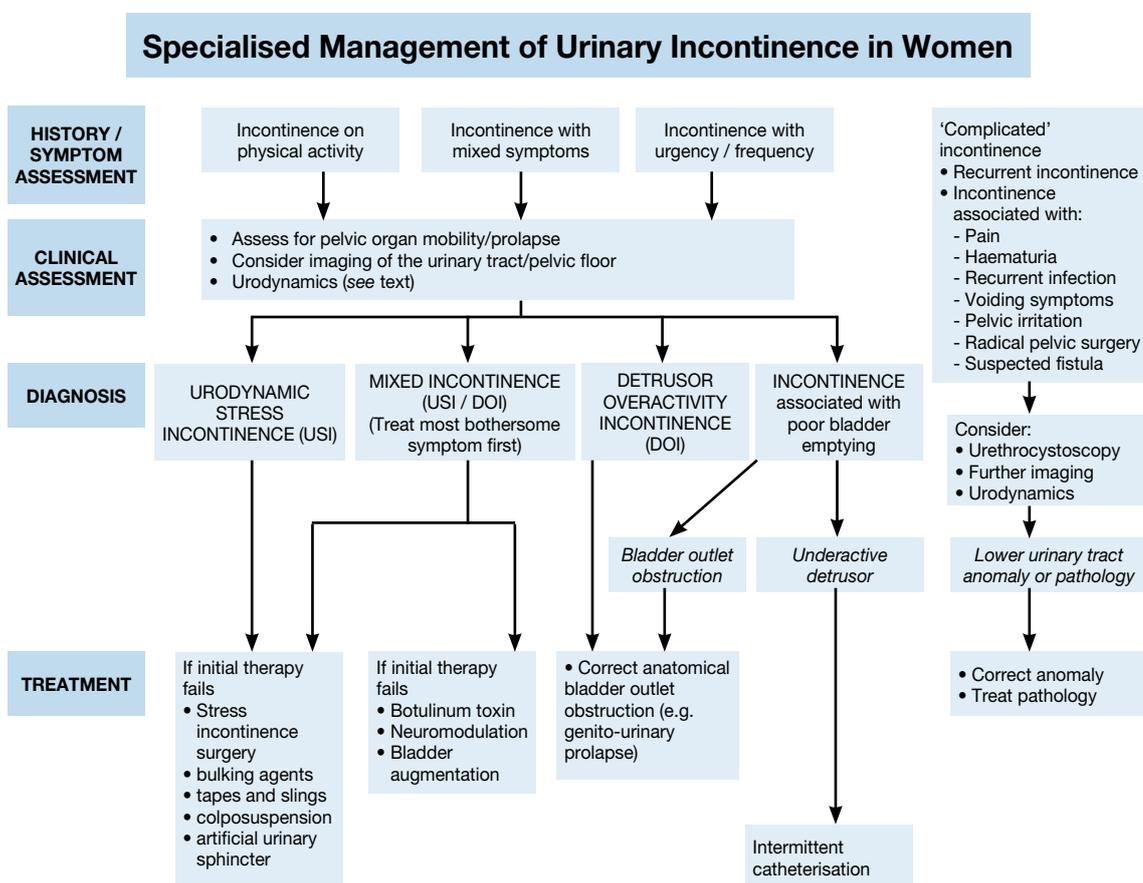
- full range of non-surgical treatments;
- retropubic suspension procedures;
- bladder neck/sub-urethral sling operations.

It may be helpful to correct symptomatic POP at the same time. For patients with limited bladder-neck mobility, consider using bladder neck sling procedures, injectable bulking agents, and the artificial urinary sphincter.

Urgency incontinence (overactive bladder) secondary to idiopathic DO may be treated by neuromodulation or bladder augmentation. Botulinum toxin injection can be used to treat symptomatic DO unresponsive to other therapies (GR: C). Botulinum toxin is currently being used for detrusor injection 'off-label' for this indication.

Patients with voiding dysfunction leading to significant post-void residual urine may have bladder outlet obstruction or detrusor underactivity. Pelvic organ prolapse is a common cause of voiding dysfunction.

Figure 4: Algorithm for specialised management of UI in women



5.4 Surgery for UI in women

Surgical approaches to UI in women are listed in Table 8. There are various confounding variables for successful surgery (Table 9). The true incidence of complications associated with surgery for UI is not known, due to a lack of standard methods of reporting and definitions. In addition, there is a discrepancy between academic and community practice. However, there appears to be a low incidence of most complications, which makes it difficult to perform power calculations for RCTs. National registries provide some information about the level of complications. Complications are less likely with proper surgical training (LE: 2-3) and skills can be maintained by performing at least 20 cases annually for each primary procedure (National Institute of Clinical Excellence, NICE).

Table 8: Surgery for UI in women

Surgical approach	LE	GR
<i>Anterior colporrhaphy</i>		
Outcome of anterior colporrhaphy is comparable to needle suspension, but less effective than open colposuspension. The effectiveness deteriorates substantially with time	2	NR
Anterior colporrhaphy is not recommended as treatment of SUI alone		A
<i>Open colposuspension</i>		
Similar success compared to mid-urethral retropubic slings	1	NR
Similar success compared to bladder neck slings	1-2	NR
Similar success compared to transobturator slings	2	NR
Risk of voiding dysfunction is higher than with TVT	1	NR
Risk of voiding dysfunction is less than with slings	1	NR
Prolapse after colposuspension is more likely than after TVT	1	NR
The risk of de-novo DO is the same as after TVT	1	NR
Mitrofanoff urethroplasty, BNS suspension, and paravaginal repair are not recommended for treatment of SUI alone		B
Open colposuspension is an effective, long-lasting treatment for primary SUI		A
<i>Laparoscopic colposuspension</i>		
Laparoscopic colposuspension is comparable to open colposuspension when performed by experienced laparoscopic surgeons	1-2	NR
Equal or higher cure rates compared to TVT	1-2	NR
Shorter operating time and faster recovery compared to TVT	1-2	NR
Laparoscopic colposuspension is an option for treating SUI		B
Laparoscopic colposuspension should only be performed by experienced laparoscopic surgeons		NR
<i>Traditional sling procedures</i>		
Autologous fascial sling is effective	1	NR
Autologous fascial sling may be more effective than biological and synthetic slings	2	NR
Adverse events may be more common than with non-autologous materials	3	NR
Autologous fascial sling is recommended as an effective, long-lasting treatment for SUI		A
<i>Urethral bulking agents</i>		
Urethral bulking agents show similar symptomatic improvement with both placebo and autologous fat	1	NR
Less effective than conventional surgery	2	NR
No evidence to show that any bulking agent is more effective than another	2	NR
No data to compare urethral bulking agents with non-surgical treatments or with other minimal-access surgical techniques	2	NR
Women should be aware that efficacy of urethral bulking agents decreases with time, repeat injections may be necessary, and efficacy is less than that of other surgical techniques		B
<i>Mid-urethral tapes</i>		
TVT [®] is more effective than SPARC [®] tape	2	NR
IVS [®] has similar efficacy as TVT [®] , but a higher complication rate	2	NR
<i>Mid-urethral tapes vs other procedures</i>		
TVT [®] is equally effective as colposuspension and traditional sling operations	1-2	NR
Operation time, hospital stay and return to normal activity is shorter with TVT [®] than with colposuspension	1-2	NR

Post-operative voiding problems and need for prolapse surgery are more common with colposuspension	1-2	NR
Retropubic tapes vs transobturator tapes		
Similar efficacy up to 12 months		NR
Similar complication rates in Finnish study	1	NR
Relative risk of bladder injury increased by 6-fold for retropubic sling		NR
Relative risk of urethral injury increased by 4-fold for transobturator sling		NR
Contraindications for mid-urethral slings		
Absolute contraindications are urethrovaginal fistula, urethral diverticulum, intra-operative urethral injury and untreated urinary malignancy	4	NR
Increased risk of complications including failure with radiotherapy, UTI, steroids, COPD, anticoagulant therapy, vaginal atrophy, congenital anomalies (exstrophy, ureteral ectopy, etc) and planned pregnancy		NR
'Mini-slings'		
Data immature, no recommendation possible		NR
Surgery for detrusor overactivity		
Sacral neuromodulation appears to have benefit for patients with urgency incontinence, as well as urgency and frequency	1-3	A
Posterior tibial nerve stimulation is effective, but durability is a concern	3-4	NR
Urethral diverticulae		
No grade A recommendations regarding optimal diagnostic algorithm or adjuvant therapy of concomitant SUI		NR
One long-term study showing recurrence of diverticulum in 17%, de-novo SUI in 38%, and dyspareunia in 22%	3	NR
Non-obstetric urinary fistulae		
No grade A recommendation for fistula evaluation, timing of corrective intervention, methods and adjuncts of correction, and associated management strategies. All evidence is based on clinical series and/or case studies and lacks randomised and/or controlled studies	2-4	NR

LE = level of evidence; GR = grade of recommendation; SUI = stress urinary incontinence; TVT = tension-free vaginal tape; NR = no recommendation possible; MMK = Marshall-Marchetti-Krantz; BNS = bladder-neck suspension; DO = detrusor overactivity; IVS = intravaginal slingplasty; UTI = urinary tract infection; COPD = chronic obstructive pulmonary disease.

Table 9: Confounding variables for use of surgery for UI in women

Confounding variables for use of surgery
Age
Physical activity
Medical illness
Psychiatric illness
Obesity
Parity
Previous incontinence surgery
Hysterectomy during anti-incontinence procedure
Race
Severity and duration of symptoms
Overactive bladder
Urethral occlusive forces
Surgical factors

5.4.1 Outcome measures

Until a universal outcome tool has been established, multiple outcome measures must be used. They include:

- symptoms and separate bother questionnaire;
- clinically important outcomes (pad use, re-operation rates, anticholinergics, clean intermittent self-catheterisation (CIC) and recurrent UTIs);
- complications;
- QoL tool with 'minimal clinically important difference' (MCID) Global Impression Index;
- health-economic outcome.

Recommendations for surgical treatment of SUI

Surgical procedure	GR
Anterior colporrhaphy	NR
Transvaginal BNS (needle)	NR
Burch procedure: open	A
Burch procedure: laparoscopic (by experienced laparoscopic surgeon only)	B
Paravaginal	NR
MMK urethroplasty	NR
BN sling: autologous fascia	A
Sub-urethral slings (TVT)	A
Urethral bulking agents	B

NR = no recommendation possible; BNS = bladder-neck suspension; GR = grade of recommendation; MMK = Marshall-Marchetti-Krantz; BN = bladder neck; TVT = tension-free vaginal tape.

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An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the guidelines CD-rom version.

6. URINARY INCONTINENCE IN FRAIL / OLDER MEN AND WOMEN*

Healthy older persons should be offered a similar range of treatment options as younger persons. Frail / older persons, however, require a different approach. Their evaluation must address the potential role of co-morbidity, current medications (prescribed, over-the-counter, and/or naturopathic), and functional and/or cognitive impairment for the management of UI. Studies and intervention in frail / older people should consider

* This section of the guidelines focuses on frail / older men and women. It has been based on the recommendations of the ICI committee chaired by Catherine Dubeau.

the degree of bother to the patient and/or carer, their goals for care, level of co-operation, and the overall prognosis and life expectancy. Effective management to meet the goals of care should be possible for most frail, elderly persons.

6.1 History and symptom assessment

6.1.1 General principles

Because frail / older men and women have a very high prevalence of UI, active case finding and screening for UI should be done in all frail / older persons (GR: A). The history should identify co-morbid conditions and medications likely to cause or worsen UI.

Recommendations for evaluation

	GR
Rectal examination for faecal loading or impaction.	C
Functional assessment (mobility, transfers, manual dexterity, ability to successfully toilet).	A
Screening test for depression.	B
Cognitive assessment to assist in planning management.	C

The mnemonic DIAPPERS (Delirium, Infection, Atrophic vaginitis, Pharmaceuticals, Psychological condition, Excess urine output, Reduced mobility, Stool impaction) includes some co-morbid conditions and factors to be considered. Two alterations from the original mnemonic should be noted; they are:

- atrophic vaginitis does not by itself cause UI and should not be treated solely for the purpose of decreasing UI alone (GR: B);
- current consensus criteria for diagnosis of UTIs are both poorly sensitive and non-specific in nursing-home residents (LE: 2).

The patient and/or their carer should be asked directly about:

- the degree of bother of UI (GR: B);
- goals for UI care (dryness, specific decrease in symptom severity, quality of life, reduction of co-morbidity, decreased care burden) (GR: B);
- the likely level of co-operation with management (GR: C).

It is also important to consider the patient's overall prognosis and remaining life expectancy (GR: C).

All patients must be screened for haematuria (GR: C), as it is not known if treatment of otherwise asymptomatic bacteriuria and pyuria is beneficial (no recommendation possible). Such treatment may cause harm by increasing the risk of antibiotic resistance and causing severe adverse effects, such as *Clostridium difficile* colitis (GR: C). There is insufficient evidence to recommend a clinical stress test in frail / older persons.

6.1.2 Nocturia

For frail / older people with bothersome nocturia, assessment should focus on identifying the potential underlying cause(s), including (GR: C):

- nocturnal polyuria;
- primary sleep problem (including sleep apnoea);
- conditions resulting in a low voided volumes (e.g. elevated post-voiding residual) co-morbidity.

A bladder diary (frequency-volume chart) or wet checks may be useful in the evaluation of patients with nocturia (GR: C). Wet checks can be used to assess UI frequency in long-term care residents (GR: C).

6.1.3 Post-void residual (PVR) volume

A post-void residual volume (PVR) is impractical to obtain in many care settings. However, there is compelling clinical experience for measuring PVR in selected frail / older persons with:

- diabetes mellitus (especially if longstanding);
- prior episodes of urinary retention or history of high PVR;
- recurrent UTIs;
- medications that impair bladder emptying (e.g. anticholinergics);
- chronic constipation;
- persistent or worsening UI despite treatment with antimuscarinics;
- prior urodynamic study demonstrating detrusor underactivity and/or bladder outlet obstruction (GR: C).

Treatment of co-existing conditions (e.g. constipation) and stopping anticholinergic drugs may reduce PVR. There is no consensus regarding what constitutes 'high' PVR in any population. A trial of catheter

decompression may be considered in patients with PVR > 200–500 mL, in whom high PVR may be a major contributor to UI or bothersome frequency (GR: C).

6.2 Clinical diagnosis

The most common types of UI in frail / older persons are urgency UI, stress UI, and mixed UI (in frail / older women). Frail / older persons with urgency UI often have concomitant detrusor underactivity with an elevated PVR in the absence of outlet obstruction, a condition called detrusor hyperactivity with impaired contractility during voiding (DHIC). There is no published evidence that antimuscarinics are less effective or cause retention in persons with DHIC (no recommendation possible).

6.3 Initial management

Initial treatment should be individualised and influenced by goals of care, treatment preferences, and estimated remaining life expectancy, as well as the most likely clinical diagnosis (GR: C).

In some patients, it is important to recognise that contained UI (e.g. managed with pads) may be the only possible outcome for UI that persists after treatment of contributing co-morbidity and other factors. This is especially true for frail persons with no or minimal mobility (i.e. require the help of at least two persons to transfer), advanced dementia (i.e. unable to state their own name), and/or nocturnal UI.

Conservative and behavioural therapies for UI include:

- lifestyle changes (GR: C);
- bladder training in fit or alert patients (GR: B);
- prompted voiding for frail and cognitively impaired patients (GR: A).

For selected, cognitively intact, frail persons, pelvic muscle exercises may be considered, but they have not been well studied in this population (GR: C).

6.3.1 Drug therapy

Any drug treatment should be started with a low dose and titrated with regular review, until the desired improvement has been achieved or there are adverse effects.

Recommendations for drug therapy in frail / older men and women with UI

	GR
A trial of antimuscarinic drugs may be considered as an adjunct to conservative therapy of UUI.	A-C, depending on agent
Similarly, alpha-blockers may be cautiously considered in frail men with suspected outlet obstruction from prostate disease.	C
Because DDAVP (vasopressin) carries a high risk of clinically significant hyponatraemia, it should not be used in frail / older persons to treat nocturia or nocturnal polyuria.	A

6.4 Ongoing management and reassessment

Urinary incontinence can usually be managed successfully using a combination of the above approaches. However, if initial management does not provide sufficient improvement in UI, then the next step should be to reassess the patient for contributing co-morbidity and/or functional impairment and to treat it.

6.5 Specialised management

Specialist referral should be considered if the initial assessment finds that a frail / older person with UI has:

- Other significant factors (e.g. pain, haematuria);
- UI symptoms that cannot be classified as urgency, stress, or mixed incontinence, or other complicated co-morbidity, which the primary clinician is unable to address (e.g. dementia, functional impairment);
- An insufficient response to initial management.

The type of specialist will depend on local resources and the reason for referral. Surgical specialists could include urologists or gynaecologists. Patients with functional impairment could be referred to a geriatrician or physical therapist. Continence nurse specialists may be helpful for homebound patients. The decision to refer a patient should take into account the goals of care, patient/carer's desire for invasive therapy, and estimated life expectancy.

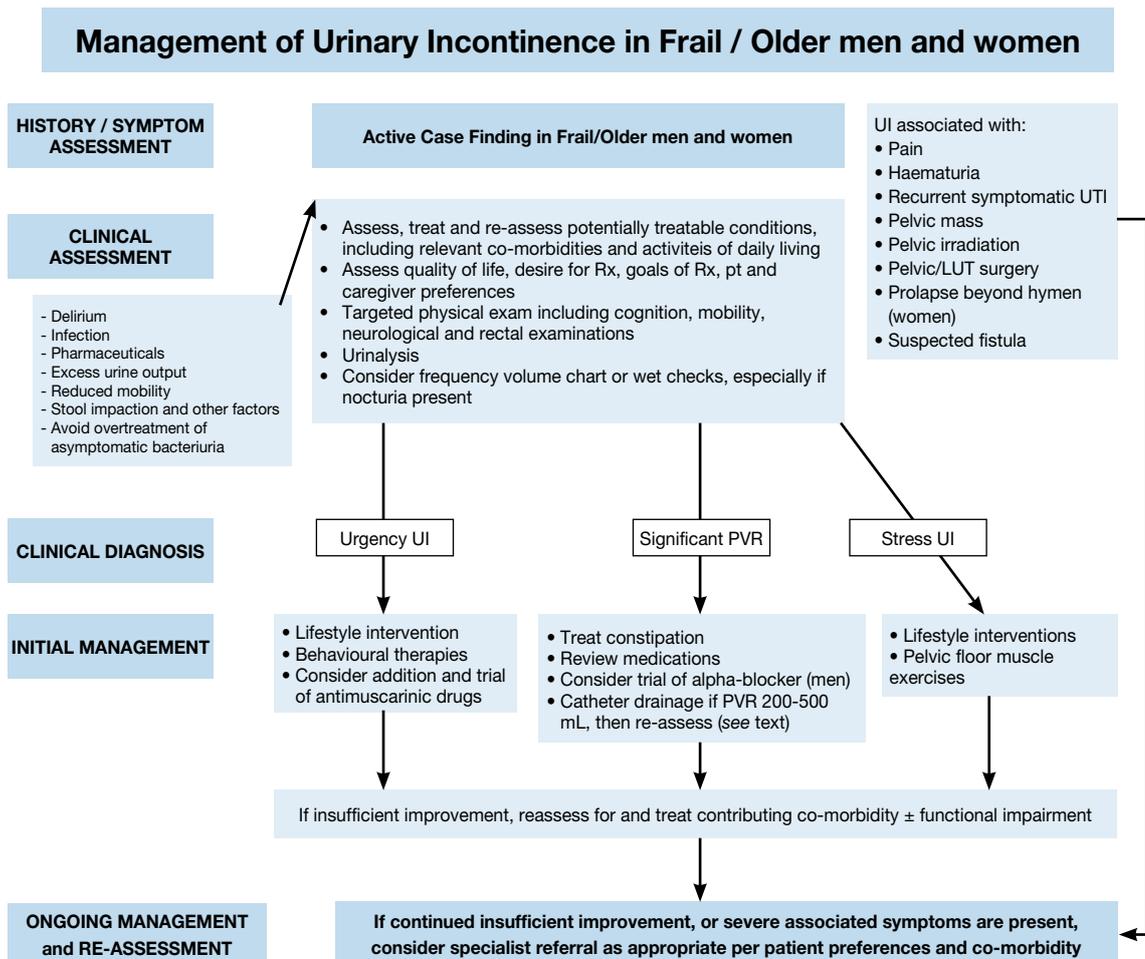
6.5.1 Surgical approaches to UI in frail / older men and women

Age itself is not a contraindication to incontinence surgery (GR: C). Before surgery is considered, all patients should undergo the following.

Recommendations for patient care prior to surgery

	GR
Evaluation and treatment for any co-morbidity, medications and cognitive and/or functional impairment that may be contributing to UI and/or could compromise the outcome of the planned surgery. For example, artificial sphincter should not be placed in men with dementia, who cannot manage the device on their own.	C
An adequate trial of conservative therapy followed by reassessment of the need for surgery.	C
A discussion with the patient and/or carer to make sure that the anticipated surgical outcome is consistent with the preferred goals of care in the context of the patient's remaining life expectancy.	C
Urodynamic testing because the clinical diagnosis may be inaccurate.	B
Pre-operative assessment and peri-operative care to establish risks for, and to minimise, common post-operative complications in the elderly, such as: - delirium and infection - dehydration and falls	A C

Figure 5: Management of UI in the frail / older men and women



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An exhaustive reference list is available for consultation on line at the society website (<http://www.uroweb.org/guidelines/online-guidelines/>) and on the guidelines CD-rom version.

7. APPENDIX: 2010 ADDENDUM TO 2009 URINARY INCONTINENCE GUIDELINES

2010 Guidelines Writing Panel: M. Lucas (Chairman), R. Bosch, F. Cruz, D. de Ridder, A. Neisius, R. Pickard, A. Schröder, A. Tubaro, W. Turner.

Following the complete updating for print in 2009 of the EAU Guidelines on Urinary Incontinence, the Incontinence Guidelines Writing Panel considered it helpful to provide this addendum to the Guidelines on the use of fesoterodine for the treatment of urinary incontinence and the role of weight loss. Recent high-quality scientific publications underpin the statements made here.

Section A3 of this addendum presents an update of subsection 3.3. of the current guidelines document.

A.1 Fesoterodine

Fesoterodine is a pro-drug, which after oral administration, is hydrolysed to the same active metabolite as tolterodine. It is licensed in two doses, 4 mg and 8 mg daily. Two systematic reviews have recently included two randomised controlled trials (RCTs) of fesoterodine (1,2) in their analyses (3,4) (Amstar scores 9/10). For subjects with an overactive bladder syndrome and urgency incontinence, the mean reduction in incontinence episodes per day was statistically significantly better for fesoterodine treatment arms at doses of both 4 mg and 8 mg per day compared to placebo. At a dose of 8 mg/day, fesoterodine was more effective than tolterodine, 4 mg/day (5).

In a pooled analysis, the findings in men were consistent with those in a mixed group of patients (6).

Conclusion

	LE
Fesoterodine is more effective than placebo in reducing episodes of urinary incontinence in patients with overactive bladder.	1a

Recommendation

	GR
Fesoterodine can be added to the list of recommended antimuscarinic agents for treatment of incontinence associated with overactive bladder.	A

A.1.2 References

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A.2 Weight loss

The effect of programmed weight loss on the symptoms of urinary incontinence has been analysed in a systematic review (Amstar score 5/10) (1). The review considered three RCTs, although one of these was a pilot study (2) for a larger, fully powered study by the same authors (3). The two main RCTs compared programmed weight loss or intensive lifestyle intervention, in overweight and obese women, with control groups who received advice on healthy living and behavioural advice for incontinence (3,4). However, there were methodological problems with the trials that may have biased the outcome in favour of weight loss.

Conclusion	LE
Programmed weight loss in overweight women suffering with urinary incontinence leads to a reduction in incontinence symptoms.	1b

Recommendation

Recommendation	GR
Overweight or obese women suffering from stress urinary incontinence should be encouraged to enrol on facilitated weight reduction programmes.	B

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A.3 Drugs used in the treatment of stress urinary incontinence (update of section 3.3)

The maintenance of urethral closure pressure depends on a number of factors, including:

- coaptation of urethral mucosa;
- submucosal vascularity;
- urethral smooth muscle tone;
- pelvic floor striated muscle contraction.

Although various drugs have been tried with the aim of enhancing each of these possible mechanisms for the treatment of stress urinary incontinence, only two drugs are currently used routinely in clinical practice:

- oestrogen therapy;
- serotonin-norepinephrine reuptake inhibitor (SNRI), duloxetine.

A.3.1 Oestrogen

A high-quality systematic review found that oral oestrogen therapy increased the incidence of stress incontinence (relative risk [RR] 2.1 [1.7-2.5]) and worsened symptoms in women with pre-existing stress incontinence (RR 5.3 [1.2-23.5]) (1).

Evidence concerning the usefulness of topical oestrogen therapy was found to be less certain, with the few randomised trials available showing inconsistent results. These data have also been summarised in a further, more recent, high-quality systematic review and meta-analysis, which showed that topical oestrogen was effective at improving urinary incontinence amongst post-menopausal women (RR 0.74 [0.64-0.86]) (2). This review also confirmed worsened incontinence in women treated with systemic oestrogen, irrespective of hysterectomy status.

Evidence	LE
Systemic oestrogen therapy worsens and may precipitate urinary incontinence in post-menopausal women irrespective of hysterectomy status.	1a
Local oestrogen is effective at improving stress urinary incontinence amongst post-menopausal women.	1a

Recommendations

	GR
Urinary incontinence is not an indication for systemic oestrogen therapy and women receiving such therapy should be counselled that incontinence symptoms may worsen.	A
Post-menopausal women with stress urinary incontinence should be offered a trial of topical oestrogen therapy with appropriate safeguards to its use.	B

A.3.2 Duloxetine

The effectiveness of duloxetine for cure or improvement of stress incontinence in women has been the subject of a recent Cochrane systematic review (3,4), which has since been updated and extended by a further high-quality systematic review and meta-analysis (5). These analyses included 10 randomised controlled trials and showed that the drug was no better at curing incontinence than placebo. For the outcome of improvement in symptoms or quality of life, duloxetine, 80 mg daily, showed a mean (95% confidence interval [CI]) 11% (7-14%) advantage in terms of effectiveness over placebo. A single trial found higher relative rates of benefit (95% CI: 36% (17-56%)), when duloxetine was combined with pelvic floor muscle training. It was noted that the use of duloxetine in these trials was hampered by the high occurrence of side-effects, principally nausea, which resulted in up to 20% of subjects withdrawing prematurely.

A moderate-quality systematic review of drug treatments for men suffering stress urinary incontinence following radical prostatectomy (6) found only one randomised controlled trial of duloxetine therapy combined with pelvic floor muscle training (7). This 16-week trial with 112 men showed that the combination of duloxetine and pelvic floor muscle training was associated with a significantly reduced risk of continued incontinence (RR = 0.46 (0.25 – 0.83)). However, the analysis was not intention to treat and 15% of the duloxetine group withdrew due to nausea prior to the end of the study.

Evidence	LE
Duloxetine does not cure stress urinary incontinence in women.	1a
Duloxetine is more effective than placebo and pelvic floor muscle training alone at improving stress urinary incontinence and associated quality of life in women, although the difference in effectiveness is small.	1a
Duloxetine combined with pelvic floor muscle training is more effective than pelvic floor muscle training alone at improving stress urinary incontinence in men.	1b

Recommendations

	GR
Duloxetine should not be used in women seeking cure for stress incontinence.	A
Women with stress urinary incontinence, whose priority is symptom-reduction not cure, may be offered duloxetine, together with counselling concerning side-effects, particularly nausea.	A
Men with post-prostatectomy incontinence may be offered a trial of duloxetine in combination with pelvic floor muscle training, but only under close supervision and preferably as part of a clinical trial.	B

A.3.3 **References**

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8. ABBREVIATIONS USED IN THE TEXT

This list is not comprehensive for the most common abbreviations.

AUS	artificial urinary sphincter
CaP	cancer of the prostate
CS	Caesarean section
BF	biofeedback
BOO	bladder outlet obstruction
BPO	benign prostatic obstruction
BT	bladder training
COX inhibitor	cyclo-oxygenase inhibitor
DHIC	detrusor hyperactivity with impaired contractility during voiding
DIAPPERS	Delirium, Infection, Atrophic vaginitis, Pharmaceuticals, Psychological condition, Excess urine output, Reduced mobility, Stool impaction
DO	detrusor overactivity
ESim	electrical stimulation
GR	grade of recommendation (modified Oxford system)
HIFU	high-intensity focused ultrasound
LE	level of evidence (modified Oxford system)
MStim	magnetic stimulation
MUI	mixed urinary incontinence
NR	no recommendation possible
OAB	overactive bladder
PFMT	pelvic floor muscle training
PDE-5 inhibitor	phosphodiesterase-type 5 inhibitor
POP	pelvic organ prolapse
PVR	post-void residual (urine)
QoL	Quality of Life
RCT	randomised controlled trial
RP	radical prostatectomy
SUI	stress urinary incontinence
TURP	transurethral resection of prostate
TUIP	transurethral incision of the prostate (TUIP)
UPP	urethral pressure profile
UUI	urgency urinary incontinence
UTI	urinary tract infection
VC	vaginal cones

Conflict of interest

All members of the Incontinence Guidelines working group have provided disclosure statements on all relationships that they have and that might be perceived to be a potential source of conflict of interest. This information is kept on file in the European Association of Urology Central Office database. This guidelines document was developed with the financial support of the European Association of Urology. No external sources of funding and support have been involved. The EAU is a non-profit organisation and funding is limited to administrative assistance and travel and meeting expenses. No honoraria or other reimbursements have been provided.