Table 1

Common causes of urinary incontinence in women

Stress urinary incontinence	The complaint of involuntary leakage of urine on effort or exertion, or on sneezing or coughing
Overactive bladder syndrome (OAB) or urge urinary incontinence	The involuntary leakage of urine accompanied, or immediately preceded, by a strong desire to pass urine (void). Urgency, with or without urge urinary incontinence, usually with frequency and nocturia
Mixed urinary incontinence	The involuntary leakage of urine associated both with urgency and also with exertion, effort, sneezing or coughing. Usually, one of these is predominant i.e. either the symptoms of urge incontinence, or those of stress incontinence, are most bothersome
Overflow incontinence	This occurs when the bladder becomes large and flaccid and has little or no detrusor tone or function. It is usually caused by injury or insult e.g. postsurgery or postpartum. The bladder simply leaks when it becomes full
Incontinence due to a fistula	Incontinence resulting from a vesicovaginal, ureterovaginal or urethrovaginal fistula
Congenital incontinence	Congenital causes e.g. ectopic ureter

Box 2

Clinical indications for urodynamic assessment

- Complex mixed urinary symptoms (urge incontinence and stress incontinence)
- Symptoms suggestive of detrusor overactivity unresponsive to pharmacotherapy
- Voiding dysfunction with incomplete bladder emptying
- Neuropathic bladder disorder (videourodynamics preferred)

The patient should be asked to resist the sensation of urgency and void according to a timetable. A self-completed urinary diary should be used to monitor the times of voids. Continence rates of up to 90% have been reported but the corresponding cure rates could be considerably lower than this.

Pharmacotherapy

Anticholinergics: Pharmacological suppression of detrusor overactivity with anticholinergics is the most widely used treatment for this condition. Anticholinergic drugs block the muscarinic receptors that mediate detrusor smooth muscle contraction and have a direct, relaxing effect on the detrusor muscle. There are a number of drug treatments available (see table 2, below). They differ in their selectivity for various muscarinic receptors and some drugs have additional actions, such as direct smooth muscle effects. These drugs are essentially safe and, therefore, it would seem reasonable clinical practice to commence a short course of empirical treatment in cases where detrusor overactivity is suspected. If symptoms are not improved after one or two months of anticholinergics, the patient should be referred to a specialist clinic.

Immediate release non-proprietary oxybutynin should be offered to women with OAB or mixed incontinence as first-line anticholinergic drug treatment, if bladder training has been ineffective. If immediate release oxybutynin is not well tolerated, darifenacin, solifenacin, tolterodine, trospium or an extended release or transdermal formulation of oxybutynin should be considered as alternatives:

- Oxybutynin, propiverine, tolterodine and trospium chloride have been used for many years to treat OAB symptoms. Sustained release oxybutynin transdermal patches, which release 3.9 mg every 24 hours, have recently been launched in the UK.[4,5]
- Solifenacin and darifenacin are newer bladder-selective anticholinergic preparations. They are more recent useful additions to the list of available drugs and may possibly have a lower incidence of adverse effects.[6,7,8]
- Fesoterodine is the latest addition to the available list of drugs. It is a nonselective oral anticholinergic agent that exerts its pharmacological effects as a competitive muscarinic receptor antagonist.[9,10]

Patients should be advised about the possibility of side effects before starting treatment. The dosage may need to be titrated against clinical efficacy and adverse effects profile. Some may tolerate a particular preparation better than others and clinicians may need to try a number of preparations before finding one that suits the individual.[11,12,13] Adverse effects of anticholinergics may include: dry mouth (in up to 30% of cases), constipation, blurred vision, nausea, dyspepsia and flatulence, palpitations and arrhythmia, dizziness, insomnia and skin reactions.

An early treatment review should be undertaken following any change in anticholinergic drug therapy. If the treatment is effective in our practice we recommend continuation of pharmacotherapy with anticholinergics for six to nine months.

Contraindications to anticholinergics are listed in box 3, below.

The role of oestrogens: Many women develop bladder-filling symptoms after the menopause. Oestrogen treatment in postmenopausal women improves symptoms of vaginal atrophy, such as vaginal dryness and irritation. In a review of ten randomised placebo-controlled trials, vaginal oestrogen administration was found to be superior to placebo when considering symptoms of urgency, urge incontinence, frequency and nocturia.[14]

Complementary therapy: Patients who do not find conventional treatments acceptable often explore the use of complementary therapies for urinary incontinence and as adjuncts to conventional treatments.

There is some evidence, albeit of poor quality, which shows that acupuncture may reduce nocturia and both stress and urge incontinence in the short term (up to four weeks) but it is unclear whether any particular area of acupuncture treatment is more effective than another. There is also limited evidence that hypnotherapy for patients with urinary incontinence secondary to detrusor overactivity may offer some benefit over the short term (up to six months). However, there is no evidence that herbal medicines work for urinary incontinence or OAB, apart from the usual placebo effect.

No complementary therapies are recommended by NICE for the treatment of urinary incontinence or OAB.[3]

New developments

Some new treatments, such as intravesical botulinum toxin injections, neuromodulation and sacral nerve »

Table 2

Currently available preparations of anticholinergic drugs

	Route of delivery	Adult dosage
Oxybutynin	Oral	(a) 2.5–5 mg, 1 to 4 times/day (b) 5–10 mg once daily (SR)
	Transdermal patch	One patch, twice/week (3.9 mg/24hours)
Propiverine	Oral only	15 mg, 2 to 4 times/day
Solifenacin	Oral only	5-10 mg daily
Tolterodine	Oral only	(a) 1–2 mg, twice daily (b) 4 mg, once daily (SR)
Trospium	Oral only	20 mg, twice daily
Darifenacin	Oral only	7.5 or 15 mg once daily (SR)
Fesoterodine	Oral only	4–8 mg once daily (SR)

SR=Sustained release

Box 3

Contraindications to anticholinergics

- Acute (narrow angle) glaucoma
- Myasthenia gravis
- Urinary retention or outflow obstruction
- Severe ulcerative colitis
- Gastrointestinal obstruction

stimulation are showing considerable promise.

Botulinum toxin A: Botulinum toxin A (BTX) has the potential to revolutionise the management of OAB and refractory detrusor overactivity. It blocks neuromuscular transmission, causing the affected muscle to become weak. There is preliminary evidence of BTX injections showing remarkable efficacy in inhibiting the symptoms of OAB.[15,16] The toxin is injected cystoscopically under local or general anaesthesia into the detrusor muscle in 10 to 30 different locations, while sparing the trigonum. Intravesical BTX does appear to reduce incontinence when compared with placebo. A cure rate of 60-70% and significant improvement in up to 90% of cases, with the duration of benefit between 3 and 12 months has been reported.[15,16] The most common complication reported is voiding dysfunction and urinary retention (5-20%), which usually resolves as the effect of the treatment wears off.

Neuromodulation and sacral nerve stimulation: This technique provides continuous stimulation of the S3 nerve root via an implanted electrical pulse generator and is thought to improve the ability to suppress detrusor contractions. It is being used increasingly in the treatment of refractory detrusor overactivity. Overall, neuromodulation has a 30-50% clinical success rate.[17] Women should be offered sacral nerve stimulation on the basis of their response to preliminary percutaneous nerve evaluation. It is a very expensive treatment, as the implant alone costs around £10,000. There are only a few centres in the country that can offer this highly specialised treatment (e.g. The Institute of Neurology, London and UCH, London). Insertion of the implant is an invasive procedure and life-long follow-up is required.[18]

Surgery

Surgery for urge urinary incontinence is reserved for those with debilitating symptoms who have failed to derive benefit from medical and behavioural therapy. Procedures, such as bladder distention, detrusor myomectomy and augmentation cystoplasty, have limited efficacy and high rates of complications. Permanent urinary diversion is occasionally indicated in women with intractable incontinence.

STRESS URINARY INCONTINENCE

Conservative treatment for stress urinary incontinence is usually initiated in primary care. This involves treating the conditions predisposing to stress incontinence, for example by lifestyle adjustments (weight reduction if BMI>30, smoking cessation, treatment of chronic cough and constipation), pelvic floor exercises and pharmacotherapy.

Pelvic floor muscle training

Pelvic floor muscle training (PFMT) is an appropriate first-line treatment for most women. The aim of pelvic floor exercise is to promote the woman's awareness of her pelvic floor muscles and to improve their contractility and coordination. PFMT is more effective than no treatment. A trial of supervised PFMT of at least 3 months' duration should be offered as first-line treatment to women with stress or mixed UI.[3] A PFMT programme should comprise at least eight contractions performed three times per day. If pelvic floor muscle training is beneficial, the exercise programme should be maintained. Exercise needs to be continued on a long-term basis to prevent recurrence of symptoms.

To obtain biofeedback a device to convert the effect of pelvic floor contraction into a visual or auditory response signal is used. It allows women and health professionals to observe improvement in an objective manner.

Electrical stimulation can assist in production of muscle contractions in women who either have extremely weak contractions or are unable to produce muscle contraction.

Vaginal cones have been developed as a way of applying graded resistance against which the pelvic floor muscles contract. Vaginal cones are thought to improve muscle activity to counteract gravity and downward movement.

In order to maximise the benefits that can be obtained using these techniques, it is vital to ensure that the treatment is supervised by a health professional and tailored to the individual.

Pharmacological management

Duloxetine is the only drug licensed for the treatment of moderate to severe stress urinary incontinence. It is a serotonin and noradrenaline reuptake inhibitor (SNRI) that enhances urethral striated sphincter activity via a centrally mediated pathway. Duloxetine is associated with significant and dose-dependent decreases in frequency of incontinence episodes. Nausea is the most frequently reported side effect (up to 25%). Other side effects, including dyspepsia, dry mouth, insomnia or drowsiness, and dizziness can limit its use.

Surgery

Surgery for stress urinary incontinence can be considered when conservative measures have failed and the woman's quality of life is compromised. It is important to be clear about the underlying cause of the incontinence, as the effects of surgery are largely irreversible. The options depend on the woman's fitness for anaesthesia and whether there is any co-existing prolapse. Anterior colporrhaphy, the Marshall-Marchetti-Krantz procedure and needle suspensions are no longer recommended.

Burch colposuspension was for many years the gold standard for treatment of stress urinary incontinence, with a success rate of 87-92%. In this procedure, the retropubic space is entered through a suprapubic incision and two or three permanent sutures are placed on either side of the bladder neck to the corresponding ileopectineal ligament. This procedure can also be performed laparoscopically.

There is also a variety of sling procedures that can be performed abdominally or vaginally, with rectus sheath, fascia lata or synthetic materials. The most common of these is the tension-free vaginal tape (TVT) procedure. TVT was first described by Ulmsten in 1995 and now is the most commonly performed surgical procedure for stress urinary incontinence in the UK.

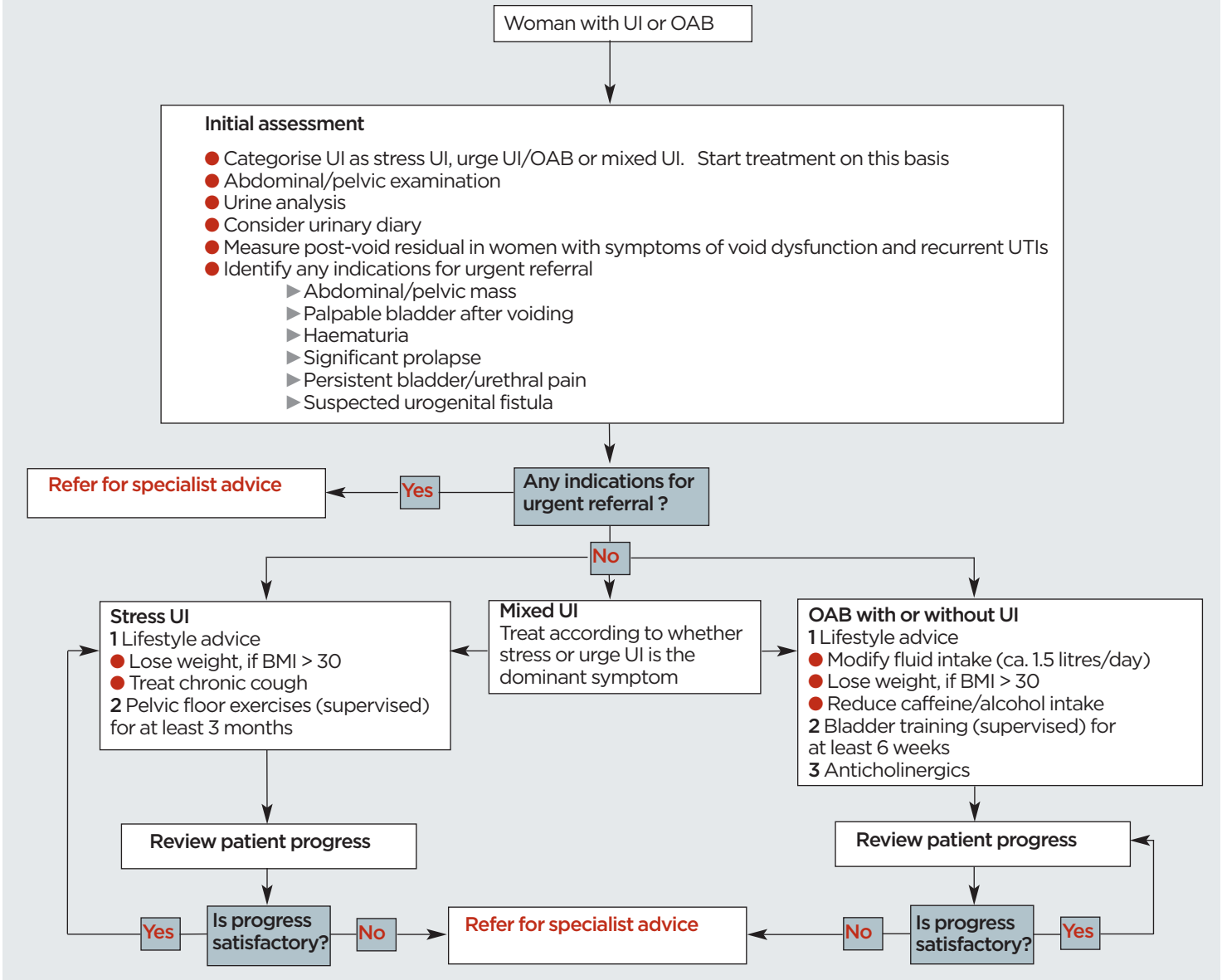
In the TVT procedure, a synthetic polypropylene tape is placed in a U-shape under the mid-urethra via a small vaginal incision, using local, regional or general anaesthesia. The tension is then adjusted to prevent leakage as the woman coughs. Cystourethroscopy is carried out to ensure that there has been no damage to the bladder or urethra. The procedure is minimally invasive and most women can return to normal activity within a few weeks.

Complications of TVT include:

- Moderately high risk of bladder injuries 5–10%, but these do not seem to be long-term sequelae, if recognised intraoperatively and treated

Figure 2

Initial assessment and management of women with urinary incontinence (UI)



- Bleeding in retropubic space, infection, voiding difficulties
- Tape erosion into the vagina and urethra have also been described

The objective cure rate is 89–98%, mean 94%.

The transobturator tape (TOT) procedure is similar to the TVT but a different technique is used to insert the tape. A polypropylene tape is passed via a transobturator foramen, through the transobturator and puborectalis muscles. The main difference from TVT is that with TOT the retropubic space is not entered. Consequently, the risk of bladder perforation is low. Early data suggest that this approach has a high success rate of 85-95%, similar to that of TVT.

Injectable periurethral bulking agents have a lower immediate success rate of 28-62%. There is also a long-term continued decline in continence. The procedure has low morbidity, however. The most commonly used periurethral bulking agents are:

- glutaraldehyde cross-linked bovine collagen
- macroparticulate silicon particles

Injectables or bulking agents are appropriate, if previous surgery has failed or in very elderly patients.

Objective cure rates for the various surgical procedures are shown in table 3, p32.

Complications for all these procedures include post-operative voiding difficulty, bleeding, infection, de novo detrusor overactivity and suture or mesh erosion (in sling procedures).

CONCLUSION

Much can be done by GPs to initiate investigation and management of women with urinary incontinence. The flow chart, figure 2 above, »

key points

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Urinary incontinence is a common symptom that can affect women of all ages. It has been estimated that there are more than 3.5 million sufferers in the UK alone.

History taking guides the investigation and management of patients by evaluating symptoms, their progression and the impact of symptoms on lifestyle. The onset of urinary symptoms, their duration and their severity should be recorded. The predominant bother symptom, e.g. urgency, urge incontinence or stress incontinence, should be identified. The clinician should also enquire about colorectal symptoms and genitourinary prolapse. Accompanying symptoms that may indicate the possibility of a more serious diagnosis and which require referral, such as haematuria, persistent bladder or urethral pain, or recurrent UTI, can also be identified when taking a urinary history.

Clinical examination should include an abdominal examination to exclude abdominal mass or palpable bladder, a bimanual examination to exclude pelvic mass, and a vaginal examination. Neurological assessment of the lower limbs and perineum is required if a neurological cause is suspected.

Patients are categorised according to their symptoms into those with stress, mixed or urge incontinence. Women with mixed urinary incontinence, who have an involuntary leakage associated with urgency and also with exertion, are treated according to the symptom they report to be the most troublesome.

Conservative treatment for OAB should be initiated in primary care. Reducing fluid intake and cutting out caffeinated products will often have a dramatic effect. Various drugs, such as diuretics and antipsychotics, alter bladder function and should be reviewed. Bladder training lasting for a minimum of 6 weeks should be offered as first-line treatment to patients with OAB with or without urinary incontinence. Pharmacological suppression of detrusor overactivity with anticholinergics is the most widely used treatment for this condition. Immediate release non-proprietary oxybutynin should be offered to women with OAB or mixed urinary incontinence as first-line anticholinergic drug treatment, if bladder training has been ineffective. Surgery is reserved for those with debilitating symptoms who have failed to derive benefit from medical and behavioural therapy.

Treatment for stress urinary incontinence involves treating the predisposing conditions, e.g. through adjustment of lifestyle (weight reduction if BMI>30, smoking cessation, treatment of chronic cough and constipation), pelvic floor exercises and pharmacotherapy. Duloxetine is the only drug licensed for the treatment of moderate to severe stress incontinence. Surgery can be considered when conservative measures have failed and the woman's quality of life is compromised.

Table 3

Management of stress urinary incontinence: objective cure rates for first procedure and recurrent incontinence[19]

Procedure	First procedure		Recurrent incontinence	
	Mean (%)	95% CI	Mean (%)	95% CI
Slings (TVT, TOT)	93.9	89.2–98.6	86.1	77.4–89.8
Burch colposuspension	89.8	87.6–92.1	82.5	76.3–88.7
Injectables	45.5	28.5–62.5	57.8	43.2–72.4

summarises the approach during primary care and advises when to refer to the specialist.

When managing urinary incontinence, doctors should also consider the patient's history of vaginal prolapse, bowel function and plans to have children. It is important to treat predisposing factors, such as obesity, obstructive airway disease, constipation and pelvic masses.

Conservative treatment should always be offered before referral to hospital. When conservative treatment is not effective or is declined by a woman, referral to a urogynaecologist in secondary care should be considered.

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