

### In this article...

- The group of symptoms that characterise overactive bladder syndrome
- How the condition is assessed and diagnosed
- The stepwise approach to managing and treating overactive bladder symptoms

# Overactive bladder syndrome: an overview of diagnosis and management

## Key points

**Overactive bladder syndrome is a common condition that can negatively affect an individual's quality of life**

**The pathophysiology of the condition is not well understood**

**Clinical signs are usually absent on examination and diagnosis is based on symptoms**

**Patient education and behavioural changes are the first step in symptom management**

**Pharmacological interventions and invasive procedures are available for patients whose symptoms persist**

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**Abstract** Overactive bladder syndrome is a common, chronic condition that has a significant negative impact on quality of life. This review discusses the symptoms that characterise the condition and summarises the guidance on assessment and treatment that is currently available. A stepwise approach to treatment, starting with conservative management based on lifestyle and behavioural techniques, is recommended for most patients. Numerous pharmacological interventions are used as second-line treatments, and invasive procedures are available for patients who have refractory symptoms.

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Overactive bladder syndrome is a group of symptoms that include urinary urgency, frequency and nocturia, with or without urge urinary incontinence, in the absence of urinary tract infection or other obvious pathology (Haylen et al, 2010). Population-based studies have estimated its prevalence at 7-27% in men and 9-47% in women (Coyne et al, 2013). It is a distressing chronic problem that increases with advancing age and has a significant negative impact on quality of life.

The symptoms associated with overactive bladder syndrome (Box 1) can affect many activities, including the ability to work or take part in recreational pursuits. Fears about not reaching a toilet in time can lead to isolation and avoidance of social activities (Coyne et al, 2011), and anxiety about urinary leakage during intercourse and loss of self-esteem can have a negative impact on sexuality and relationships (Lin et al, 2021). There is also a positive association between overactive bladder syndrome and anxiety and depression (Lai et al, 2016).

The pathophysiology of overactive bladder syndrome is not well understood, and there are several mechanisms that could provoke symptoms. Until recently, it was assumed to be caused by detrusor overactivity that is either myogenic or neurogenic in origin; however, patients with the condition do not always show detrusor overactivity in urodynamic studies, suggesting that alternative mechanisms could be responsible (Peyronnet et al, 2019). Thorough assessment is vital to:

- Fully understand a patient's experience;
- Identify possible causes;
- Develop an individualised care plan.

## Assessment and diagnosis

The diagnosis of overactive bladder syndrome is based on symptoms. The first step in the assessment process is to take a thorough clinical history of the type, onset and severity of the patient's symptoms and their impact on quality of life. The history should identify potential red flags, such as associated pain or haematuria, which may need onward referral for more specialist investigation.

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It is important to take a comprehensive medical history because there are many comorbidities that can cause, or increase, symptoms, such as neurological diseases, urological conditions and metabolic disorders. There are also close correlations between overactive bladder syndrome and conditions such as:

- Anxiety;
- Depression;
- Functional gastrointestinal disorders (including irritable bowel syndrome and constipation);
- Genitourinary syndrome of the menopause.

Female patients should be asked about their obstetric and gynaecological history, because this may identify potential risk factors, such as birth injuries, previous surgery or the presence of urogenital prolapse. In women, there is also an established link between overactive bladder syndrome and obesity (Marcelissen et al, 2019).

The patient's current medications should be recorded, because numerous drugs can be responsible for inducing bladder symptoms. For example, alpha-blockers can reduce bladder outlet resistance, leading to urinary incontinence; diuretics increase urinary frequency and urgency; and antidepressants and calcium-channel blockers can result in urinary retention and overflow incontinence. Special consideration should be given to older patients, who have a greater risk of comorbidities and an increased likelihood of polypharmacy.

A bladder diary should be used to investigate the patient's fluid intake and urinary output. The diary is typically completed over a three-day period to record the type and volume of fluid intake, as well as bladder frequency, voided volumes and episodes of incontinence and urgency. The diary is a useful tool that can be used for both assessment and patient education. It can help identify symptom triggers such as:

- Excessive or inadequate fluid intake;
- Consumption of irritants, including caffeine, alcohol, carbonated drinks and aspartame.

It can also be used to assess response to treatment or to structure bladder retraining (Corcos et al, 2017).

Urinalysis should be performed to screen for blood, glucose and protein. Dipstick tests that are negative for nitrite and leukocyte esterase can reliably exclude most urinary tract infections. If there are positive findings, a midstream urine specimen should be collected and analysed, and any infection should be treated. This

### Box 1. Symptoms of overactive bladder syndrome

- **Urgency** – sudden, compelling desire to pass urine that is difficult to defer
- **Frequency** – the need to void frequently, usually eight or more times in 24 hours
- **Nocturia** – waking up with the need to void more than twice in the night
- **Urge urinary incontinence** – involuntary loss of urine associated with urgency

*“Many women experience the onset of overactive bladder symptoms during the menopause; the role of oestrogen deficiency on the lower urinary tract has been established”*

can be followed by reassessment of overactive bladder symptoms.

The patient's post-void residual volume should be assessed using a bladder ultrasound scan or catheterisation. A scan is the preferred option, because it is less invasive and carries lower risk. A residual volume over 100ml implies a voiding inefficiency and usually suggests bladder outlet obstruction or detrusor underactivity.

To ascertain the severity and impact of the patient's symptoms, a validated quality-of-life questionnaire should be used, such as the International Consultation on Incontinence Questionnaire Overactive Bladder Module. Questionnaires such as this can be used both to take a baseline assessment and to monitor the effectiveness of treatment (National Institute for Health and Care Excellence (NICE), 2019).

Physical assessment of the patient should include observation of their mobility, dexterity and mental status. An abdominal examination and neurological screen should also be performed. Pelvic examination gives information about tissue quality and the presence of any urogenital prolapse. Pelvic floor and anal sphincter muscle function can be assessed by digital examination.

Urodynamic studies are not recommended during initial patient assessment; however, they can be useful if the diagnosis remains uncertain after subjective and objective examination, or if conservative treatment proves ineffective. These studies can verify the presence or absence

of detrusor overactivity, stress incontinence and bladder outlet obstruction.

### Treatment planning

A stepwise approach to treatment is recommended, although this may not be appropriate for all patients. First-line treatment consists of conservative management using largely behavioural and lifestyle changes that are non-invasive and carry little risk. These require clinician time to discuss the patient's understanding of their symptoms, ascertain their expectations, and agree on goals and strategies. Education empowers the patient to become an active participant in their treatment and incorporate changes into their daily routine. Motivating them and encouraging adherence are important aspects of conservative treatment and can have a big effect on outcomes.

Patients who have severe overactive bladder symptoms or who find it difficult to commit to behavioural and lifestyle treatments may need to move to second- or third-line therapies. At each stage, careful consideration is needed to assess whether the patient is suitable for a specific treatment. Although patients with overactive bladder syndrome may benefit from pharmacotherapy initially, some go on to discontinue medications due to adverse effects or lack of efficacy.

It is important to create a management plan that provides follow-up opportunities to enable ongoing assessment of treatment efficacy and safety. This allows a focus on optimising symptom control and maximising quality of life. The patient should be educated and empowered to make informed decisions about treatment options. Follow-up should be individualised according to the patient's needs and prescribed management.

The stepwise approach to treatment is explored in the following sections and summarised in Box 2.

### First-line treatment

First-line treatment for overactive bladder syndrome is conservative management using guidance on lifestyle and behavioural changes that might improve symptoms.

In obese women, weight loss can reduce overactive bladder symptoms and episodes of urge urinary incontinence (Olivera et al, 2016). Discussing strategies and signposting women to appropriate services are important aspects of the consultation. Moderate physical activity can improve symptoms, aid weight loss and help strengthen pelvic floor muscles.

It is important to discuss optimal fluid intake with the patient. They should be encouraged to reduce consumption of bladder irritants, such as caffeine, alcohol and carbonated drinks; these fluids act like diuretics and can increase overactive bladder symptoms (Corcos et al, 2017). Patients should aim to drink 1.5-2L of non-irritant fluids daily. An intake lower than this should be discouraged, due to the health risks associated with dehydration; however, there is moderate evidence that reducing an excessive intake will improve symptoms (Olivera et al, 2016). Restricting intake for 2-4 hours before bed can reduce nocturia and night-time incontinence episodes.

Cigarette smoking has been shown to be associated with overactive bladder symptoms (Madhu et al, 2015). Nicotine can irritate the detrusor muscle, resulting in increased activity, and recurrent coughing can raise intra-abdominal pressure and weaken pelvic floor muscles.

Patients should be encouraged to use urge-suppression techniques when urinary urgency is experienced, with the aim of delaying voiding and improving bladder-control skills. These techniques include:

- 'Holding on';
- Standing or sitting still;
- Relaxation techniques;
- Pelvic floor muscle exercises.

Bladder retraining is the process of introducing a voiding schedule and increasing the time between voids until an improved pattern is established. This process should be done alongside monitoring fluid intake and completing a bladder diary. Timed voiding may be appropriate for some patients, who can be encouraged to toilet by caregivers at regular intervals.

Pelvic floor muscle exercises are recommended as a strategy for urinary incontinence (NICE, 2019), although their effectiveness for the treatment of overactive bladder syndrome is inconclusive (Monteiro et al, 2018). It has been suggested that strengthening the pelvic floor can improve urethral stability or inhibit detrusor contraction (Monteiro et al, 2018) and may, therefore, help manage urgency and prolong intervals between voiding in a bladder-retraining programme.

The patient should be encouraged to avoid constipation using dietary interventions or, if necessary, suppositories or laxatives. The aim is to achieve regular bowel frequency, passing soft stools.

Containment products may be necessary for patients who continue to experience incontinence or toileting problems.

## Box 2. Stepwise treatment for overactive bladder syndrome

### First-line treatments: behavioural changes

- Weight loss
- Avoidance of bladder irritants
- Optimal fluid intake
- Smoking cessation
- Urge-suppression techniques
- Bladder retraining
- Timed voiding
- Pelvic-floor exercises
- Constipation avoidance
- Containment products

### Second-line treatments: pharmacological treatments

- Antimuscarinic drugs
- Mirabegron (with or without solifenacin)
- Vaginal oestrogen in postmenopausal women

### Third-line treatments: invasive procedures

- Botulinum toxin A
- Percutaneous posterior tibial nerve stimulation
- Sacral nerve stimulation
- Reconstructive surgery



There is a large range of items available, including absorbent products, clothing and toileting aids. The Continence Product Advisor ([continenceproductadvisor.org](https://continenceproductadvisor.org)) is a free, independent, evidence-based resource with useful information about products available for patients.

## Second-line treatment

The next step in managing overactive bladder syndrome is pharmacological intervention, with the goal of achieving symptomatic relief with minimal adverse effects. Antimuscarinic (anticholinergic) drugs cause relaxation of the detrusor muscle by blocking the muscarinic M2 and M3 receptors. They also work on urothelial sensory receptors, inhibiting afferent nerve activity. There are several antimuscarinic drugs available on prescription, including tolterodine, oxybutynin, darifenacin, solifenacin, trospium chloride and fesoterodine. Guidance

*“Education empowers the patient to become an active participant in their treatment and incorporate changes into their daily routine”*

suggests first selecting the drug with the lowest acquisition cost; however, oxybutynin (immediate-release) is contraindicated in older patients who are at risk of deterioration in physical or mental health, due to a higher risk of adverse cognitive effects and falls (NICE, 2019).

Common side-effects of antimuscarinics include dry mouth, constipation and blurred vision, which occur as a result of blockade of muscarinic receptors outside the bladder. Antimuscarinics are contraindicated in patients with narrow-angle glaucoma, due to their effects on the M3 and M5 receptors in the eye (Corcos et al, 2017). There is increasing evidence that antimuscarinics may act on the central nervous system, leading to cognitive impairment and physical decline (Fox et al, 2014), and higher cumulative antimuscarinic use has also been associated with an increased risk of dementia (Gray et al, 2015). These medications are not contraindicated in elderly patients, but it is important to consider comorbidities and drug history: many common drugs have antimuscarinic properties, and older people are more likely to be exposed to a cumulative effect if they are taking a number of these medicines. This creates an increased likelihood of adverse effects, known as an anticholinergic burden. The potential for harm can be assessed using scales such as the Anticholinergic Drug Scale, which score medications according to their risk (Villalba-Moreno et al, 2016). Sensitivity to adverse effects can increase with ageing and comorbidities, such as hypertension, diabetes and neurological conditions.

Mirabegron is a beta-3 adrenoceptor agonist and has a different mechanism of action from antimuscarinic drugs. It activates beta-3 adrenoceptors, causing detrusor relaxation during bladder filling and inhibiting detrusor overactivity. It is recommended as an option for treating symptoms of overactive bladder syndrome in patients where antimuscarinic drugs are contraindicated, ineffective or have unacceptable side-effects (NICE, 2019). The most common adverse effects of mirabegron are hypertension, nasopharyngitis and urinary-tract infections.

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Optimal fluid intake should be discussed with patients

Combination treatment using mirabegron and solifenacin has been shown to improve overactive bladder symptoms without exacerbating adverse effects (Drake et al, 2016). This uses two proven drugs with different mechanisms of action, which can be offered if there is a lack of response to monotherapy or if there are adverse effects with higher-dose antimuscarinic treatment.

Many women experience the onset of overactive bladder symptoms during the menopause, and the role of oestrogen deficiency on the lower urinary tract has been established (Peyronnet et al, 2019). There is some evidence that urinary incontinence in postmenopausal women may be improved using:

- Topical oestrogen delivered via a cream, pessary or vaginal ring (Cody et al, 2012);
- Combination therapy of vaginal oestrogen and antimuscarinic drugs (Robinson and Cardozo, 2019).

### Third-line treatment

Further steps may be needed for patients with refractory overactive bladder syndrome whose symptoms have not responded to behavioural changes or medication. These patients may be offered the following third-line treatments, which are minimally invasive.

Botulinum toxin A can be injected into the detrusor muscle at multiple sites via cystoscopy, causing an inhibition of acetylcholine release at the neuromuscular junction. This results in localised paralysis of the detrusor muscle. The technique has been shown to have efficacy regardless of whether detrusor overactivity has been proven in urodynamic studies. It is associated with

significant increases in bladder capacity and reduction in urinary frequency and episodes of urge incontinence. The effects last for approximately 9-12 months, after which repeated injections are needed. The most common adverse effects reported are urinary retention and urinary-tract infections (Marcelissen et al, 2018). It is indicated only in patients who are willing and able to learn self-catheterisation prior to treatment (NICE, 2019).

Percutaneous posterior tibial nerve stimulation is a procedure that causes neuromodulation to the sacral nerve plexus, which controls bladder function. The posterior tibial nerve originates from the L4-S3 spinal roots, and stimulation is achieved via a percutaneous needle electrode and is delivered weekly. The technique carries few adverse risks; the main disadvantage is that the patient has to attend regular hospital appointments.

Sacral nerve stimulation is a treatment in which the S3 sacral nerve root is directly stimulated. This is thought to activate inhibitory sympathetic neurons, resulting in reduced detrusor activity. In the first phase, a temporary wire is placed next to the S3 nerve root while the patient monitors their symptoms. If the first phase is successful, a permanent lead and generator are implanted.

### Invasive surgical procedures

Reconstructive surgery is rare, but it may be considered in extreme cases of severe overactive bladder syndrome that is refractory to all other treatments. Augmentation cystoplasty is a procedure that enlarges the bladder by adding a piece of bowel into the bladder wall. Patients should be counselled regarding the risk of needing to perform intermittent self-catheterisation post-operatively. For those unwilling to consider this, a urinary diversion procedure involving an ileal conduit and stoma may be an option.

### Conclusion

Overactive bladder syndrome is a common condition that has physical, psychological and social impact. It is a symptom-based diagnosis, made in the absence of other pathology. Stepwise treatment is recommended: patients should have the opportunity to engage with conservative management in the first instance, followed by pharmacological interventions. If these are unsuccessful, minimally invasive treatments can be trialled. Invasive surgical procedures are rarely used, but can be considered in extreme cases. **NT**

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