Overactive bladder in women

advances in management

Overactive bladder is an important cause of urinary incontinence in women. Several new treatment options are available, but bladder training remains an essential part of management.

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The clinical syndrome of overactive bladder (OAB) is the second most common cause of urinary incontinence in women. Patients complain of frequency, and they may be afraid to leave the house unless they know where toilets are located near their destination. They often suffer from nocturia, which is defined as being awakened by the desire to void more than once during the night (rather than by another source, such as a crying child or a snoring husband).

Urinary frequency is defined as voiding more than eight times daily, but patients with OAB often void 10 to 15 times daily. The frequency is due to urgency – a sudden compelling desire to pass urine because of fear of leakage – which is usually caused by a bladder spasm arising in the detrusor muscle of the bladder wall (Figure 1). The fear of leakage is quite realistic because, once the feeling of urgency occurs, bladder spasm may overpower the urethral sphincter if the patient cannot reach the toilet in time. This is known as urge incontinence.

In the general community, urine leakage in women is usually thought to be caused by stress incontinence (i.e. associated with coughing or other episodes of raised intra-abdominal pressure). It is true that stress incontinence is the most common cause of leakage in women, but this perception indicates OAB has not received its fair share of publicity. A recent large European epidemiological survey found that about 17% of men and women over 40 years of age suffer from OAB and that the

IN SUMMARY

- **The clinical syndrome of overactive bladder (OAB) is a common cause of urinary incontinence in women.**
- **The unpredictable nature of OAB results in greater anxiety and depression than is seen in women suffering stress incontinence.**
- **Symptoms of OAB include frequency, urgency and nocturia (with or without urge incontinence).**
- **Urodynamic testing is not always indicated but may be useful for women who have symptoms of both stress incontinence and OAB.**
- **Nurse continence advisors and continence physiotherapists provide bladder training services.**
- **Treatment with bladder training and anticholinergic drug therapy is readily achieved in the general practice setting.**

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prevalence increases with age, with 31% of women over 75 years being affected (Figure 2).[1] However, OAB does occur in young women, and it is also found in children with both bedwetting and day-wetting.

Patients with OAB have been shown to have a much poorer quality of life than those with stress incontinence.[2] This is because women with stress incontinence know (reliably) that they will leak with coughing or playing tennis, whereas women with OAB cannot predict when their bladder spasms will occur. The unpredictable nature of OAB results in greater anxiety and depression than is seen in women suffering stress incontinence.

Causes

In order to diagnose OAB in a patient with frequency, urgency and nocturia with or without urge incontinence, urinary tract infections must be excluded by urine culture. If a midstream urine sample is negative for infection but positive for haematuria, it is necessary to exclude malignancy – for example, by urine cytology with or without cystoscopy.

Once the provisional diagnosis of OAB has been made, three broad aetiological groups exist. In men with prostatic obstruction, the condition is called obstructive OAB. Women can also acquire an obstructive form of OAB after continence surgery (such as colposuspension or tension-free vaginal tape). In patients with neurological conditions such as multiple sclerosis or spinal cord injuries, the condition is referred to as neuropathic OAB. If neither obstructive or neuropathic OAB is evident, the condition is considered to be 'idiopathic' OAB. This idiopathic form most commonly affects women.

Assessment

A sensitive history should be taken to elicit the symptoms of frequency, urgency and nocturia with or without urge incontinence. Patients who do not leak are termed 'OAB dry', but can be quite ashamed of their frequent trips to the toilet. Patients who do leak ('OAB wet') may be so embarrassed about the problem that they suffer in silence.

Examination may reveal atrophic vulva and vagina in postmenopausal women. The thinning of the urethral epithelium (which usually coexists) encourages leakage into the urethra. This can occur even in women taking systemic hormone therapy (HT), because the tissue levels may not be adequate in the urethra. During examination, it is helpful to ask patients to cough – patients with

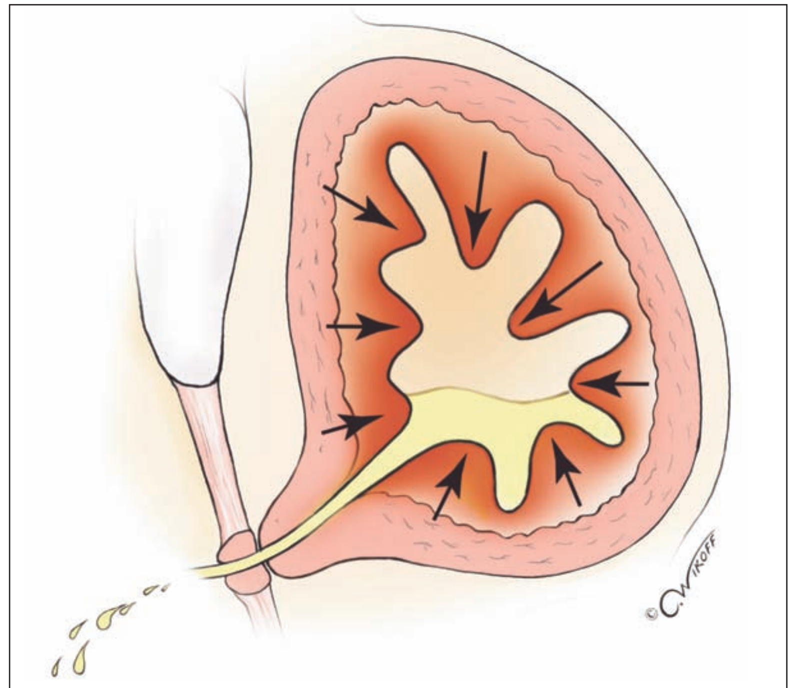

Figure 1. In patients with OAB, urgency is usually caused by a bladder spasm arising in the detrusor muscle of the bladder wall. This may overpower the urethral sphincter if the patient cannot reach the toilet in time, leading to urge incontinence.

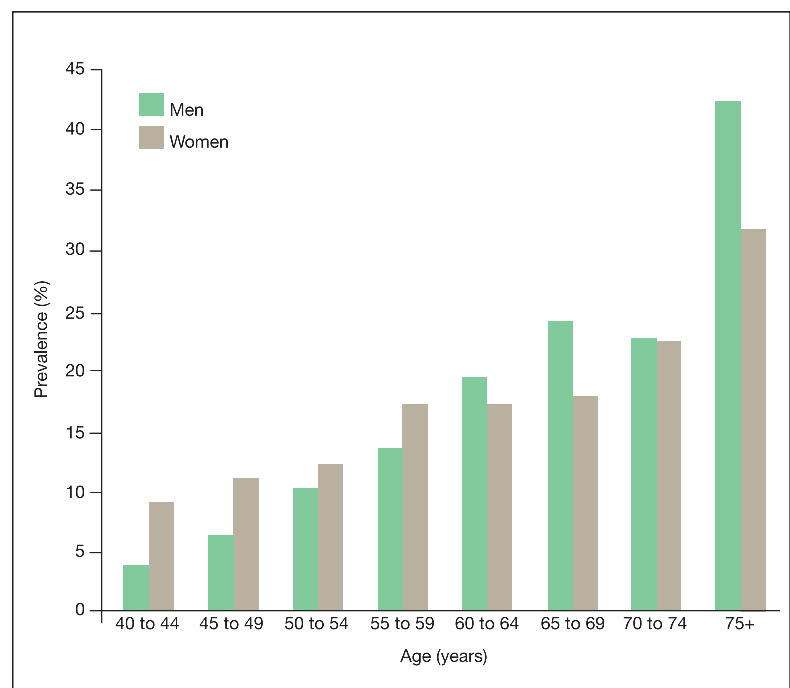

Figure 2. The prevalence of overactive bladder increases with age.[1]

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A 24-hour frequency volume chart

A 24-hour frequency volume chart is very useful in the initial assessment of patients with OAB. Typical features of the syndrome in the chart below include the large number of voids per day (10), three episodes of nocturia, and the small volumes of urine being passed.

Time	Fluid ingested (type and amount)	Time	Urine passed	Comments (e.g. leakage, urge, pain, burning)
0900	*Juice, 200 mL*	*0700*	*280 mL*	*Urge with leak on rising from bed*
0930	*Tea, 250 mL*	*0900*	*110 mL*	*Urge*
		1030	*50 mL*	*Urge with leak when washing hands*
1130	*Water, 200 mL*	*Midday*	*100 mL*	
		1400	*90 mL*	*Urge*
1300	*Cola, 375 mL*	*1600*	*160 mL*	*Urge*
1400	*Tea, 250 mL*	*1630*	*90 mL*	*Urge with small leak when putting key in door*
1600	*Tea, 250 mL*	*1800*	*70 mL*	
1800	*Coffee, 200 mL*	*2000*	*10 mL*	*Urge with large leak*
1900	*Wine, 100 mL*	*2200*	*90 mL*	*Before bed*
2000	*Wine, 100 mL*	*Midnight*	*50 mL*	*Woken with urge, leak before reaching toilet*
		0300	*190 mL*	*Woken with urge*
		0500	*200 mL*	*Woken with urge*
		0730	*250 mL*	*Urge on rising from bed*

OAB can actually leak with coughing because the cough can provoke a detrusor contraction.

During vaginal examination, the doctor should ask the patient to contract her pelvic floor muscle while placing one finger in the vaginal introitus. Many patients will contract the wrong muscles – the gluteals (lifting their buttocks off the couch), the adductors (pulling their thighs together) or the abdominals (which causes them to bear down). Using the wrong muscles will not help them to stop urine escaping from the urethra during a bladder spasm! If the doctor does not have time or the facilities to examine patients vaginally, a continence physiotherapist or a nurse continence advisor will perform this examination as part of bladder training treatment (see below).

A 24-hour frequency volume chart may be cumbersome, but it is very useful in the initial assessment and for monitoring progress of treatment – an example is shown in the box on this page. The typical patient with OAB passes small amounts (e.g. 50 to 150 mL) in contrast to normal women, who usually can hold 250 to 450 mL. The time between voids is short in OAB (e.g. 30 to 90 minutes), compared with a normal voiding interval of three to four hours.

Urodynamic testing is not always indicated. A trial of treatment (as discussed below) is usually worthwhile in the family practice setting for patients with a clear history of OAB. However, many women have a ‘mixed’ history – that is, they have both stress incontinence and OAB

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symptoms. In these cases, a urodynamic test will show whether the OAB component dominates (large detrusor spasms seen on the test, called detrusor overactivity, with reduced bladder capacity). Other women will be found to have mainly stress incontinence (large leakage on cough from a wide open urethra) but with small detrusor contractions. The test thus helps guide the doctor as to which condition needs the most vigorous therapy.

Urodynamic testing also reveals any problem with bladder emptying (poor flow rate, residual bladder volume greater than 50 mL). If the patient has symptoms of incomplete emptying (poor stream, difficulty starting the flow, needing to return to the toilet because of feeling not empty), then a simple ultrasound should be performed to measure the postvoid residual. The family doctor needs to be aware that incomplete emptying will often be made worse by anticholinergic drug therapy (which relaxes the detrusor). In addition, chronic residual volumes encourage bacterial cystitis, which complicates the treatment of OAB.

MedicineToday PATIENT HANDOUT

Overactive bladder in women: how to defer urgency

When you feel a sudden desire to pass urine, look at your watch. If it is more than two hours since you last went to the toilet, you can go now. If it is less than two hours, you need to do three things:

- Sit down. The bladder has gravity nerves inside the wall that give you a stronger desire to go to the toilet when you are standing than when you are sitting.
- Contract your pelvic floor muscle. This will help you prevent escape of any urine from the bladder. Once fluid enters the urethra, an automatic reflex will make you start passing urine onto your pad. You need to 'nip this in the bud'.
- Send a strong message from your brain, down your spinal cord to the level of the tailbone, then out to your bladder, 'No, I am not going to the toilet for two minutes'. In patients with overactive bladder, this message pathway seems to have become 'rusty' or weak, but it can be strengthened by focused concentration.

After sitting quietly for two minutes, stand up (contracting the pelvic floor muscle as you do so) and walk slowly towards the toilet. Do not run, as running will increase the likelihood that you will leak. However, if you have waited two minutes then it is likely that you will no longer want to go. This is because the bladder spasms that cause leakage are like a muscle cramp – they normally last only one to two minutes. When the muscle cannot hold the spasm any more, it relaxes.

After completing these steps, you may be able to hold on until another bladder spasm occurs, maybe half an hour later. If this happens after you have successfully stopped an earlier spasm, then you should go ahead and walk to the toilet for this one.

This patient handout was prepared by Associate Professor Kate Moore.

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Management

Bladder training (or retraining) is an essential part of management of OAB. The aim is to help the woman go to the toilet less frequently, thereby encouraging the bladder spasms to relax. Patients are taught how to ignore the 'urgency' symptom,and reduce urge incontinence. Other behavioural techniques help OAB symptoms, such as reducing caffeine and alcohol intake (which act as diuretics, making the kidneys dump fluid into the bladder more rapidly). Patients should be encouraged to drink about 1.5 to 2 litres of noncaffeinated, nonalcoholic fluids per day to help increase bladder capacity. Many patients with OAB restrict their fluids in the mistaken belief that it helps the problem. In fact, this just encourages a small bladder capacity, which is part of the OAB problem.

When starting a bladder training program, the doctor should explain that OAB is a common complaint which is readily treatable. The cause of idiopathic OAB is not fully understood yet, but research indicates that there are three problems. Firstly, the subepithelial (afferent) nerves are overly sensitive to the feeling of fullness in the bladder. Secondly, the brain messages from the cerebral cortex that normally inhibit the desire to void are weakened (or may have 'become rusty' from disuse). Thirdly, the detrusor muscle in the wall of the bladder is overactive, and there appears to be some disturbance in the efferent nerve supply to the detrusor muscle.

The overly contractile detrusor muscle can be controlled by the cerebral cortex. This control is improved with practice. Bladder training includes an assessment of the frequency volume chart to find realistic target 'voiding intervals' that the patient can aim towards. For example, if the chart shows that the patient usually voids every hour but sometimes can hold for two hours, then the target voiding interval should initially be two hours. This voiding time will be gradually increased over a few weeks as she masters this goal. The bladder training instructions in the Patient Handout on this page are given to assist patients when the urge to void occurs prior to the target voiding interval.

As can be seen in the Patient Handout instructions, the patient does need to know how to contract her pelvic floor muscle in order to defer urgency. She must be able to stop drops of urine from entering the proximal urethra; once this happens, the micturition reflex is usually triggered and she will leak.

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The process of increasing the voiding interval over a period of weeks, by looking at the frequency volume chart with the patient and upgrading her target interval, is often carried out by a nurse continence advisor, a specially trained nurse who focuses on weekly bladder training visits with the patient. Nurse continence advisors also specialise in teaching pelvic floor muscle exercises. They are usually based in a public hospital or community health centre. Continence physiotherapists also provide these services (as well as administering special training to women with very weak pelvic floor muscles), and may be found in public hospitals or private practice. The Continence Helpline of the Continence Foundation of Australia can help doctors and patients locate their nearest nurse continence advisor or continence physiotherapist (phone 1800 330 066).

Why do we use anticholinergic drugs?

Normal voiding relies on co-ordinated detrusor muscle contractions. Involuntary contractions produce OAB symptoms. Both depend on acetylcholine (muscarinic) receptor activation in the bladder. Anticholinergic (or antimuscarinic) drugs are first line drug therapy for OAB. They block muscarinic receptors and thus reduce (and in some cases abolish) detrusor muscle contractions. The anticholinergic effects at other nonbladder sites often cause side effects such as dry mouth, dry eyes, constipation, drowsiness, dizziness, and mental confusion in the elderly. As mentioned above, incomplete emptying will often be worsened by anticholinergic drug therapy.

Standard drug therapies

Oxybutynin (oral)

Oxybutynin (Ditropan) has been used since the 1970s and is still the most widely used anticholinergic agent for OAB, preventing urge incontinence in up to 60% of patients who can tolerate it.[3] At least 50% of patients experience dry mouth as a side effect.[4] The dose should be titrated against symptoms and side effects, up to a maximum of 5 mg three times daily. For patients with nocturia but fewer daytime symptoms, start with 2.5 mg in the morning and 5 mg at night. For patients with worse morning symptoms but no nocturia, start with 5 mg in the morning and 2.5 mg after lunch. Oxybutynin has a half-life of 12 hours; the onset of action is within the first hour, with the main effect lasting six to eight hours.

Propantheline

Propantheline (Pro-Banthine) is a very old antimuscarinic agent and is much cheaper than oxybutynin. Because it is a quaternary amine (i.e. a large molecule), gastrointestinal absorption is poor, but patients still experience common side effects. The usual dose is 15 mg three times daily.

Imipramine

The anticholinergic agent imipramine (Tofranil) has an additional beta-mimetic action that relaxes the bladder dome. Drowsiness is a common side effect, which makes it useful for treating nocturia and nocturnal enuresis. Usually the drowsiness wears off within three weeks, which is the time taken to achieve a steady state blood level, but it can be very troublesome in elderly patients. The usual dose is 10 mg in the morning and 20 mg at night.

Desmopressin

A nasal spray formulation of the vasopressin analogue desmopressin (Minirin Nasal Spray) is available that markedly reduces urine production for six hours. It is useful for patients with severe nocturia. Prior to commencing treatment with this agent, women must complete a frequency volume chart to determine if nocturnal polyuria is present (defined as passing more than 30% of total urine output at night), which is a relative contraindication. Elderly patients using this therapy for prolonged periods are at high risk of severe hyponatraemia, so the serum sodium level should be checked in this group on days 2 and 5.

Topical oestrogen therapy

Topical vaginal oestrogen therapy is thought to improve urogenital tissue quality, increase bladder capacity and thicken the urethral mucosa. Few randomised controlled trials of topical oestrogen therapy have been performed, but those that are available show it to be more likely to help urge incontinence with no benefit for stress incontinence. Topical oestrogen is poorly absorbed into the bloodstream, so the very low serum levels attained make it safe to use.[5] A large randomised controlled trial has shown systemic hormone therapy (e.g. patches or tablets) to have no benefit for any form of incontinence.[6]

New drug therapies

Tolterodine

Tolterodine (Detrusitol) was developed in the 1990s for OAB. It has greater specificity for the muscarinic receptors in the bladder than in the salivary glands, and is equally as effective as oxybutynin with fewer side effects (dry mouth, for example, occurs in about 15% of patients).[7] Because it is much better tolerated, it has a greater overall effect. Tolterodine is available as a private prescription and costs between $55 and $80 per month. The dose is 2 mg twice daily.

Oxybutynin (transdermal)

A transdermal oxybutynin patch (Oxytrol) became available on the Special Access Scheme in October 2005.[8] Unlike oral oxybutynin, it does not undergo first pass metabolism, so there is no exposure to N-desethyloxybutynin, the secondary metabolite heavily implicated in generating side effects. The patches are thus associated with much fewer side effects, but pruritis at the patch site occurs in about 7% of users.

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Others

Propiverine, darifenacin and solifenacin are three anticholinergic drugs that have been recently developed. These are available in some other countries and will hopefully soon arrive in Australia.

Do anticholinergics work?

The fact that anticholinergics reduce detrusor contractions is well established. However, controversy exists whether they are statistically significantly better than placebo. A well known Cochrane review identified a very high placebo effect (45% improvement or cure), with anticholinergics giving an additional 15% improvement.[9] This translates to one less urge leak per 48 hours and one less void per 48 hours (over placebo). However, a major criticism of the Cochrane review was that it did not feature many studies that included bladder training. In clinical practice, bladder training should always be given with anticholinergic drugs for idiopathic OAB.

Long term efficacy of anticholinergic drugs is poorly understood.[10] The natural history of detrusor overactivity has received little attention. Recently a review of 76 patients with proven pure detrusor overactivity who answered a postal questionnaire at a median of 6 years found that symptoms had largely resolved in about 16%.[11] Symptoms were no different in 59% of patients, and were worse in rest. However, this study must be interpreted with caution because not all the patients with OAB in the cohort answered the questionnaire.

Despite our uncertainty about the long term 'cure' rates for anticholinergic therapies, they certainly do give substantial relief of symptoms in the short to medium term and are the best treatment that is currently available.

Alternative therapies

TENS

Transcutaneous electrical nerve stimulation (TENS) has been used with some success in patients who feel the urge to void as a painful spasm.[12] It works by interrupting the relay of afferent impulses to the brain (the 'gateway' theory of pain control). The stimulator is carried in a belt and the electrodes are applied over the pubic symphysis or sacrum. The patient regulates the intensity of the electrical impulses until the urge to void is no longer felt. The device costs approximately $80 and is available from many continence physiotherapists.

Acupuncture

Acupuncture has been shown to improve symptoms more than placebo.[13] It increases endogenous opioids (such as met-enkephalin)[14] that have been shown to inhibit

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detrusor contractions *in vitro*.[15] It can be used with stoller afferent nerve stimulator (SANS), which adds an electrical stimulus to the acupuncture needle inserted at the bladder point over the medial malleolus (near the posterior tibial nerve). A 12-week course of SANS results in significant improvement in urodynamic parameters and OAB symptoms.[16] It can be administered by nurse continence advisors.

Intravesical resiniferatoxin

Intravesical installation of resiniferatoxin is a highly effective treatment for neuropathic OAB, with effects lasting from three to six months. Resiniferatoxin desensitises the vanilloid receptors in the bladder lining which convey the sense of urgency.[17] Small clinical trials for idiopathic OAB show early promise. The solution is cheap, but patients must be catheterised for administration. It is available as a clinical trial agent.

Surgical management

Surgical management should be reserved for patients with severe OAB symptoms and refractory detrusor overactivity (defined as failure to respond to two anticholinergic drugs with bladder training for more than 12 months).[18] It should be performed by specialists in the field.

Cystodistention

Cystodistention is mainly offered to exclude other causes of refractory irritative symptoms such as bladder tumours and interstitial cystitis. Saline is used to distend the bladder (under gravity) for five minutes (rather than hours, as originally described). Cystodistention has been reported to provide short term relief (three to six months) from symptoms in 32% of patients in one study[19] and in 70%[20] in another. Because of this variable response rate, it is mainly used to exclude other conditions.

Botulinum toxin type A injection

Botulinum toxin type A (Botox, Dysport) is injected under direct cystoscopic vision to the detrusor muscle. This expensive drug is most widely used in patients with neuropathic detrusor overactivity with objective and symptomatic improvements (89 to 96%).[21] Trials in patients with idiopathic detrusor overactivity have been limited. The neurotoxin blocks acetylcholine release from local cholinergic terminals, causing paralysis at the injected muscle site.

Sacral nerve root stimulator

Implantation of an S3 sacral nerve root stimulator is a two-stage procedure that can be effective for refractory detrusor overactivity. The first stage involves peripheral nerve evaluation, which involves insertion of a temporary stimulation wire at S3 under local anaesthetic and a temporary pulse generator that is worn externally for five to seven days. If the symptomatic benefit is greater than 50 to 70%, a permanent electrode and pulse generator are implanted. Long term, the frequency and severity of urge incontinence episodes are substantially reduced.[22] However, Medicare rebates have recently been withdrawn and the procedure is expensive (approximately $11,000).

Clam cystoplasty

Clam cystoplasty was popular in the 1980s for severe refractory OAB (often neuropathic). The procedure involves opening the bladder (in the manner of opening a clam) and inserting a flattened bowel segment to impair detrusor muscle contractility and increase bladder capacity. The modest long term success rates and 1% mortality rate have led to the development of partial detrusor myomectomy, which yields better results with less morbidity.[23] Such procedures are now strictly limited to 'end stage' refractory patients.

Summary

OAB is the second most common cause of urinary incontinence in women and deserves much wider publicity in the community. Treatment with bladder training and anticholinergic drugs is readily achieved in the general practice setting. MT

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