

REVIEW

EVALUATION AND TREATMENT OF THE OVERACTIVE BLADDER

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The overactive bladder is characterized by symptoms of frequency, urgency, and urge incontinence, substantially affecting the quality of life of millions of people throughout the world. The symptoms are associated with significant social, psychological, occupational, domestic, physical, and sexual problems. Despite the considerable impact of this condition on quality of life, sufferers are often unwilling to discuss their problem with family members or health care professionals. This situation is unfortunate, for much can be done to alleviate the symptoms of this distressing condition. It is therefore of utmost importance that medical education about symptoms of the overactive bladder and other related problems be improved to help health care professionals identify and treat patients who will benefit from therapy. This article reviews current thinking regarding definition, epidemiology, quality of life effects, evaluation, and management of the overactive bladder.

DESCRIPTORS: Bladder diseases. Urinary incontinence. Urodynamics.

The overactive bladder (OAB) is a highly prevalent disorder that impacts the lives of millions of people worldwide. Despite its high prevalence, most sufferers do not seek medical attention and are unaware that OAB is treatable. Notwithstanding the recently increased medical and media attention given to it in many countries, OAB remains vastly underreported and its sufferers untreated. The purpose of this manuscript is to update the definition of OAB for the clinicians involved with the treatment of patients with voiding dysfunction and to present a clinically relevant approach for the evaluation and treatment of this disorder. Further, expanded information may be found in recently published reviews and conference proceedings¹⁻³.

SYMPTOMS AND DEFINITION

Typical symptoms of the overactive bladder include an increased number of micturitions (frequency—emptying the bladder more often than 8 times a day), a strong and sudden desire to void (urgency), and if the urge cannot be suppressed, urinary urge incontinence. Symptoms of OAB presumably occur because the detrusor muscle is overactive and contracts inappropriately during the filling phase⁴⁻⁷. Frequency can occur as a result of reduced functional bladder capacity. It can also be

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caused at least partly by a coping mechanism adopted by patients to avoid leakage of large volumes of urine by maintaining a relatively low volume in the bladder. When patients experience a sensation of urgency, they may leak urine if they are unable to reach the toilet quickly or if the sensation of urgency is very strong. The amount of urine lost may be large, since the bladder may empty completely. Sleep may be disturbed, since the need to void may be experienced during the night. Nighttime frequency and nocturnal enuresis (bedwetting) is often particularly disruptive. When bladder contraction occurs without warning and sensation is absent, as in a patient with neurologic disease such as spinal cord injury, the condition is referred to as reflex incontinence.

The definition of the overactive bladder by the International Continence Society (ICS) is based on urodynamics and is currently being re-evaluated^{6,8,9}. The ICS definition includes the presence of *involuntary bladder contractions* that are provoked during a filling cystometrogram *while the patient is attempting to suppress them*⁸. The reasons why the definition must be changed are twofold: (1) on a worldwide basis, it is impractical, unnecessary, and impossible for all patients with symptoms of bladder overactivity to be treated by urologists and undergo urodynamic studies, a necessary step in the diagnosis of this condition based on the present definition of the ICS, and (2) urodynamic studies can have both false-positive and false-negative results, and these mistaken test results can include normal patients in the diagnosis of bladder overactivity or exclude patients who clearly have overactive bladder symptoms based on a false-negative urodynamic study.

It should be possible to define bladder overactivity based on symptoms³. A reasonable symptom-based definition would be a condition referring to the symptoms of frequency and urgency, with or without urge or reflex incontinence, when appearing in the absence of local pathological factors (e.g. cancer, carcinoma-in-situ, urinary tract infection, stones, interstitial cystitis) as explanations for these symptoms. Patients with overactive bladder can include individuals with and without a possible neurologic cause for their symptoms. Urodynamic bladder overactivity would then describe the phenomenon of involuntary bladder contractions causing symptoms or signs. The distinction between detrusor hyperreflexia and instability is not as clear-cut as it once seemed, however. Does an individual with involuntary bladder contractions with no gross neurological signs or symptoms but with

a cerebral imaging abnormality have hyperreflexia or instability? Does it matter?

PREVALENCE

It is difficult to estimate the true prevalence of bladder overactivity for two reasons: (1) Despite the considerable impact of bladder storage symptoms on quality of life, many patients never seek medical help and are thus uncounted; (2) There have been very few epidemiologic surveys carried out on the symptoms of urgency and frequency alone without incontinence. Surveys on the prevalence of urinary incontinence have been done, and estimates of the prevalence of bladder overactivity have been obtained by adding together the fraction of urge incontinent patients to the number of those with mixed incontinence^{6,9,10}. Thus, the most prevalent figures that are available significantly underestimate the extent of the problem. A recent survey has found that the vast majority of people with chronic, bothersome symptoms of bladder overactivity complained of frequency and urgency, while only a third complained of urge incontinence¹¹. The survey found that the total prevalence of OAB within the general population aged 40 years and over ranged from 12% to 22% in a sample of some 17 000 people in 6 European countries. It demonstrated that the risk of developing OAB increases with age. In the group of people 75 years and older, the prevalence ranged between 30% and 40%¹¹. Another problem that one encounters is exactly how to define urgency and frequency. For instance, if one defines frequency as simply voiding over 8 times per day, one will conclude that an incredible proportion of the world's population has overactive bladder. Furthermore, most of us experience significant urgency on one occasion or another, but

it is not a chronic problem for us. Thus, the way that questions are asked regarding frequency and urgency makes a great difference with respect to reported prevalence.

QUALITY OF LIFE; SOCIAL COSTS

Urinary incontinence is associated with reduced levels of social and personal activities, increased psychological distress, and overall decreased quality of life (QOL) as measured by numerous indices¹²⁻¹⁶. Urinary incontinence is, however, only one aspect of OAB. Little data exists on the QOL impact of OAB in general or of urgency and/or frequency without incontinence¹⁷.

Emerging studies and studies in progress have shown that patients with OAB do suffer significantly poorer QOL than an age matched population^{11,18}. Those with OAB have been found to experience a lower QOL in the social and functional domains than diabetics. Other studies have shown that the QOL of patients with symptoms caused by the overactive bladder is more adversely affected than that of stress incontinence sufferers. This finding presumably reflects the differences in the symptoms experienced. Compared with stress incontinence, the overactive bladder is harder to predict, is more likely to disrupt sleep and daily activities, and more often leads to the loss of large volumes of urine^{14,19}.

The overactive bladder and stress incontinence are problems that both sufferers and their physicians often fail to discuss. In a survey conducted in the UK, it has been shown that although approximately half of all sufferers would welcome some form of treatment, there is a reluctance to seek help¹¹. Only one-third of regularly incontinent women discuss their problem with a nurse or primary care physician.

Up to two-thirds of patients first seeking medical advice have had their symptoms for over 2 years. The reasons cited for this marked reluctance to seek help include low expectations of treatment and being too embarrassed.

The medical profession has often done little to dispel patients' common misconceptions about the condition. Research in this area has shown that although the majority of patients who discuss their condition with their primary care physician feel that they are treated sympathetically, 30% of those who discuss their problems with a health care professional receive no assessment and about 80% are not examined. Dismissing incontinence and related symptoms as minor ailments is misguided.

These symptoms can be the cause of great discomfort, shame, and loss of confidence, causing withdrawal from social life and affecting physical and mental health. In addition to the negative impact on the quality of life of those affected, a considerable financial burden is placed on society as a result of neglecting to diagnose and treat the condition²⁰. Studies of health care costs in the USA and Sweden estimate that urinary incontinence accounts for at least 2% of the national health care budgets¹¹. Wagner and Hu estimated that the societal cost of incontinence for individuals in the USA aged 65 years and older in 1995 was a staggering 26.3 billion dollars²¹.

PATHOPHYSIOLOGY

Ultimately, whatever the primary cause of OAB, the mechanism for bladder overactivity must be either neurogenic or myogenic^{22,23}. The central nervous system mechanisms controlling the lower urinary tract are organized in the brain and spinal cord as simple on-off switching circuits under voluntary control. Damage to central

pathways that are normally inhibitory (stroke, Parkinson's disease, multiple sclerosis, spinal cord injury, etc.) or sensitization of peripheral afferent terminals in the bladder can unmask primitive voiding reflexes that trigger bladder overactivity. This neurogenic basis is fully explored by deGroat²³. Brading summarizes evidence for myogenic basis for OAB²². She describes spontaneous contractile (electrical) activity in detrusor strips from all species that is myogenic (originating in the muscle itself) but that fails to produce fused tetanic contractions because of poor electrical coupling between bladder smooth muscle cells. Precipitating factors such as bladder outlet obstruction can cause a partial denervation of smooth muscle, leading to a state of decreased responsiveness to activation of intrinsic nerves but supersensitivity to contractile agonists and direct electrical activation²⁴⁻²⁶. Spontaneous activity increases, and there is an increase in cell-to-cell electrical coupling. Filling, under these circumstances, could cause synchronous activation of the smooth muscle of the bladder wall and an increase in intravesical pressure. The most plausible situation for this type of phenomenon to occur would be in the male with bladder outlet obstruction, a condition in which 50% of affected individuals exhibit detrusor instability²⁷⁻³⁰. Each theory has its proponents, and doubtless, neither can account for all instances of OAB. It is often difficult to separate neurogenic and myogenic origin, and often they seem to be interconnected and complementary.

EVALUATION

Identifying patients with lower urinary tract symptoms caused by an OAB, and differentiating between OAB and other types of urinary incontinence (i.e. stress incontinence, etc) is paramount to selecting appropriate

treatment for the individual patient. National and international urological societies recommend that the initial evaluation should include, at a minimum (1) an assessment of the patient's symptoms; (2) physical examination; and (3) urinalysis^{31,32}. A holistic approach should be employed, in which confounding conditions are identified and addressed. Once urinary tract infection has been excluded, it is possible in most cases to establish a working diagnosis based on the patient's description of symptoms and initiate therapy. In some patients, particularly those with symptoms of difficulty emptying, it may be desirable to measure post-void residual urine by catheterization or ultrasound to exclude incomplete bladder emptying as a cause of the patient's symptoms. In cases where there is uncertainty regarding the diagnosis, more advanced investigations, such as urodynamic assessment and/or cystoscopy should be carried out.

Symptom Assessment. When taking the patient's history, the aim is to both make a working diagnosis and to assess the impact of the symptoms on the patient's quality of life. As discussed previously, the typical symptoms of OAB include frequency, urgency, and urge incontinence. However, symptoms are not always diagnostic. Patients with stress incontinence, for example, may void frequently in an attempt to avoid leakage, since this condition is generally worse when the bladder is full. A careful history of the condition, with special emphasis on onset, progression/regression, response/nonresponse to treatments, is valuable. The use of a diagnostic aid is sometimes helpful for distinguishing between the symptoms of OAB and stress incontinence (Table 1). However, these two conditions often coexist⁹. Symptoms of bladder overactivity can, however, be treated successfully in women with mixed incontinence symptoms. The review of

Other Studies. Urodynamic studies quantitate data referable to the activity of the bladder and bladder outlet during the filling/storage and emptying phases of micturition. This technique allows exact characterization of any voiding dysfunction as well as the demonstration of lower urinary tract obstruction and its secondary effects on the bladder. A great deal of information regarding the function of the lower urinary tract is readily available from a properly performed urodynamic study, but its interpretation should be made within the context of the patient's presenting symptoms. Clearly, not all patients presenting with complaints of the OAB require sophisticated or even simple urodynamics. These studies are generally reserved for patients with mixed symptomatology or those who have failed initial therapy.

Other studies including cystoscopy, measurement of serum PSA, serum chemistries, including creatinine and radiographic imaging, should be done in a selective and judicious manner when clinically indicated.

MANAGEMENT

Transient or reversible conditions that result in OAB-type symptoms should immediately be addressed. These will be readily identified from a properly performed history, physical examination, and initial evaluation as described previously (e.g. urinary infection, hormone deficiency, drug side effects, excessive urine output, fecal impaction, altered mental state). Appropriate treatment of other conditions that can contribute to or be associated with OAB (bladder outlet obstruction, vaginal prolapse, significant stress incontinence, diabetes) should always be considered, since therapy of these problems may often improve or alleviate symptoms completely.

Except in those cases where OAB

is clearly secondary and reversible by correction of a primary cause (bladder outlet obstruction, etc.), one does not cure OAB. One rebalances lower urinary tract function with the help of behavioral, pharmacologic, neurostimulatory, or surgical modalities. Actual management options for OAB are fairly easy to characterize and are designed to facilitate bladder filling/urine storage by decreasing contractility, increasing capacity, or decreasing sensation (Table 2). We will consider only some of these in detail and refer the reader to other sources for a more complete discussion and references^{1,2,36-41}.

Behavioral therapy

This rubric includes: (1) patient education about lower urinary tract function; (2) fluid management; (3) bladder training or retraining; (4) pelvic floor physiotherapy; and (5) for physically or mentally challenged individuals, scheduled and/or prompted voiding. For the average community-dwelling individual, the aim of behavioral therapy is to help regain bladder control by increasing the effective capacity of the bladder and thereby reducing the symptoms of the overactive bladder. Keeping a record in the form of a frequency/volume chart, plays a central role in bladder training, as well as looking at the urine output in relation to the patient's fluid intake, which may need to be reduced. The patient is asked to gradually increase the intervals between voiding by maneuvers that inhibit the micturition reflex (i.e. pelvic floor exercise or "Kegel" exercises), resulting in a gradual increase in bladder capacity. These exercises are taught in such a way that patients can use this physiologic mechanism to inhibit an impending or beginning bladder contraction (micturition reflex). A properly timed "Kegel" exercise (voluntary contraction of the striated muscle of the pelvic floor) may have the dual benefit of increasing out-

Table 2 - Therapy to facilitate bladder filling and urine storage.

Inhibiting bladder contractility, decreasing sensory input and/or increasing bladder capacity

Behavioral therapy
 Timed bladder emptying
 Bladder training; biofeedback

Pharmacologic therapy
 Anticholinergic agents
 Musculotropic relaxants
 Calcium antagonists
 Potassium channel openers
 Prostaglandin inhibitors
 Beta-adrenergic agonists
 Alpha-adrenergic antagonists
 Tricyclic antidepressants
 Dimethyl sulfoxide (DMSO)
 Polysynaptic inhibitors

Therapy decreasing sensory input
 Bladder overdistention
 Electrical stimulation (reflex inhibition); neuromodulation
 Acupuncture

Interruption of Innervation
 Central (subarachnoid block)
 Sacral rhizotomy, selective sacral rhizotomy
 Perivesical (peripheral bladder denervation)

Augmentation cystoplasty

let resistance as well as inhibiting the micturition reflex and sacral arc during an involuntary bladder contraction. Often patients are initially unable to "find" and voluntarily contract their pelvic floor effectively. Biofeedback and/or electrical stimulation may be quite beneficial as adjunctive measures in enabling patients to locate and utilize their pelvic floor in an effective manner. The frequency/volume chart is used throughout therapy in order to monitor its success. Initially, in some cases, it may be useful to ask the patient to void hourly by the clock. Once this is managed without leakage, the interval is increased by 15 minutes at a time, until the interval between voiding is between 2 and 4 hours.

Results with behavioral therapy are quite good. Fantl et al. recorded a 57% reduction in incontinent episodes and a 54% reduction in the quantity of urine loss in older women⁴². The reduction in incontinence episodes was similar in patients with OAB and stress in-

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