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The Overactive Bladder: Prevalence and Effects on Quality of Life

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The term overactive bladder (OAB) has been popularized during the past 5 years as a condition that encompasses a wide range of irritative bladder filling and storage symptoms. It includes the symptoms of urinary frequency, urgency, and urge incontinence, singly or in combination. Urgency is a strong desire to void accompanied by a fear of leakage or fear of pain. Frequency represents the need to urinate on an abnormally frequent basis (more than eight times per day or more than two times per night [nocturia]). Urge incontinence refers to the symptom of urine loss preceded by a strong sense of urgency. The appropriate term to describe this storage-phase disorder depends on whether the diagnosis is made clinically or cystometrically. The loss of urine secondary to a spontaneous or provoked involuntary detrusor contraction shown on a cystometrogram has been termed detrusor instability or unstable bladder by the International Continence Society (ICS). If uninhibited detrusor contractions are due to an identified neurologic etiology, such as multiple sclerosis or Parkinson's disease, the term detrusor hyperreflexia is used. The accepted cystometric requirements for a diagnosis of detrusor instability are uninhibited detrusor contractions with an amplitude of more than 15 cm H_2O, or a true detrusor pressure rise of less than 15 cm H_2O associated with urgency or urge incontinence.[1]

Other terms that are clinically useful but have not been specifically defined by the ICS are motor urge incontinence and sensory urge incontinence. Motor urge incontinence is urine leakage associated with urodynamically demonstrated detrusor instability. Sensory urgency refers to symptoms of urgency without evidence of uninhibited detrusor contractions on urodynamics.[2] Although OAB and detrusor instability have different definitions, they are frequently used interchangeably by clinicians when de-

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scribing urine loss associated with urgency. Because the literature reflects this interchange of terms, for the sake of this chapter the terms are also used liberally.

Detrusor hyperactivity with impaired contractility (DHIC) is a disorder involving cystometric diagnosis of detrusor instability in association with large residual volumes. A more complex form of bladder overactivity, DHIC is unique to an elderly population. It has been shown to be the second most frequent cause of urinary incontinence in institutionalized elderly patients.[3] These patients tend to have the same symptoms as patients with detrusor instability, in addition to reports of incomplete bladder emptying, hesitancy, and straining to void. The etiology of the impaired contractility in these patients is unclear.[4] A series of papers that set out to describe the pathophysiology of DHIC showed that widespread degeneration of axons and muscle cells inhibits normal bladder contraction, resulting in a large residual.[5] Abnormal deposition of connective tissue and collagen within the bladder wall is thought to result from the chronic bladder overactivity, adversely impacting bladder contractility. Patients thought to have DHIC should undergo a pressure voiding study in addition to a cystometrogram if urodynamic testing is performed.

There have been several points of debate throughout the years regarding what criteria are required to fulfill the diagnosis of detrusor instability. Among the key issues is how the contractions are documented—during mechanical retrograde filling or physiologically during ambulatory urodynamics. This is a crucial differentiation, because office urodynamics carry a significant false-negative rate (up to 50%) in diagnosing detrusor instability. Ambulatory urodynamics may help identify detrusor instability in approximately 50% of patients diagnosed with sensory urgency during an office cystometrogram.[6] There has also been debate over whether low-compliance bladder demonstrated during a cystometrogram should be categorized as a type of detrusor instability.[7]

Epidemiology

Because of the variety of reported symptoms and recent modifications in applied terminology, there has been a wide range in the reported prevalence and incidence of OAB. A recent review of 48 epidemiologic studies concluded that the large discrepancy between the results was largely due to a lack of conformity with regard to the definitions used when describing voiding symptoms including incontinence, survey methods used, and validation of results.[7] In addition, because urinary incontinence is most frequently an underreported, embarrassing condition, OAB prevalence and incidence rates are known to underestimate the actual numbers.

Urinary incontinence imposes a large financial burden on the individual patient as well as to society as a whole. In 1995, expenses totaled $26.3 billion, or $3,565 per individual aged 65 and older with urinary incontinence.[8]

Prevalence

Prevalence (the total number of cases at a certain point in time) estimates are influenced by the definition of urinary incontinence used in the particular study as well as the methodology used for collecting data from patients regarding incontinence. The prevalence range for urinary incontinence is 4.5% to 53% in women and 1.6% to 24% in men. In a recent survey, the estimated prevalence of urinary incontinence in community-dwelling females was 40%.[9] Unlike stress incontinence, where symptoms tend to correlate with the final diagnosis, the variability in OAB symptoms from individual to individual reduces the accuracy of population surveys.

AGE-RELATED DIFFERENCES

It is well documented that the prevalence of OAB increases with age. In a survey that analyzed more than 2,000 patients, detrusor instability was observed in 27% of patients

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younger than 65 and 38% of patients older than 65.[10] The rate of urge incontinence identified in personal interviews among the elderly by questions regarding loss associated with urgency is approximately 5–20%.[11] The prevalence of detrusor instability in incontinent nursing home patients has been shown to be 61%, with half of these patients having impaired contractility (DHIC).[3] Irritative bladder symptoms in nursing home patients include detrusor instability (31%), DHIC (30%), sensory urgency (1%), and mixed incontinence (4%), for a total prevalence of 65%.

GENDER DIFFERENCES

Almost all studies that investigate differences between the sexes find that the prevalence of urinary incontinence is at least 1.5 to 2 times higher among women. Because of the differences in incontinence pathophysiology between men and women, there is a different distribution of incontinence types (Fig. 1). Stress incontinence is more predominant than urge incontinence in women. Stress-related incontinence is reported to occur in 49% of women, compared with a 22% incidence of urge incontinence. In men, overactive bladder is more common than stress incontinence (73% vs. 8%).[12]

RACIAL DIFFERENCES

There is little information regarding the prevalence of urge incontinence in different racial groups. It is difficult to compare the data from country to country because of the lack of standardization of diagnostic criteria when evaluating adults with urinary incontinence. In a study of 200 women, 56% of black women reported symptoms of urge incontinence compared with 28% of white women.[13] A recent study by Mattox and Bhatia[14] evaluated the prevalence of incontinence among white and Hispanic women with similar age, gravity, and parity who had undergone urodynamic evaluation. The prevalence of urge incontinence was 18% in the white population and 9% in the Hispanic population.

OBESITY

Obesity and increased body mass index have been shown to be commonly associated with stress as well as urge incontinence. In women with more than 20% over the average weight for height for their age, 24% had detrusor instability.[15]

Urethral instability, a poorly understood condition, is characterized by wide fluctuations in urethral pressure resulting in symptoms of urgency, frequency, and possibly incontinence. An association with uninhibited bladder contractions has been found in approximately 42% of women with urethral instability.[16] This tends to occur in young adult women with a history of perineal trauma such as bicycle riders and horseback riders.

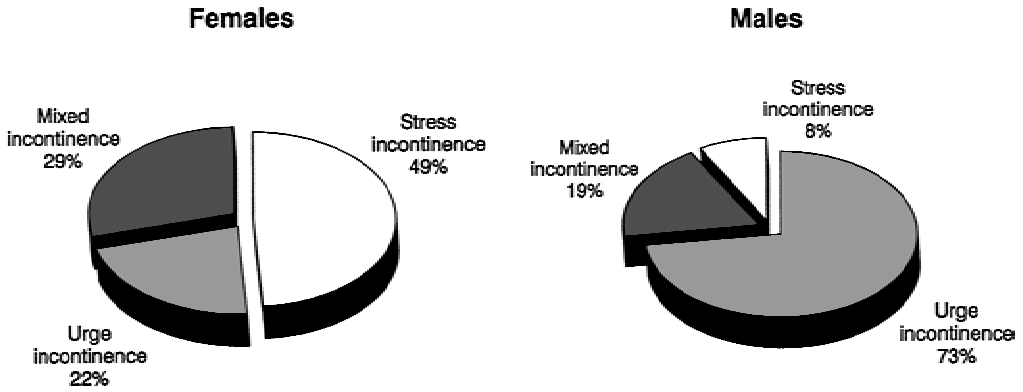

FIG. 1. Gender differences and incontinence types.

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INCIDENCE, NATURAL HISTORY, SPONTANEOUS REMISSION

The natural history of OAB, including age of onset, actual incidence rates, occurrence of spontaneous remission, and associated risk factors for progression, is poorly understood.

Incidence is defined as the number of new cases over a certain period of time. There is limited reliable information available to describe incidence because of factors such as dropouts by migration, noncompliance, or death. The incidence of urge incontinence tends to increase with age, as do most of the underlying causes. Elving et al[17] reported an increase in the incidence of urinary incontinence between the ages of 45 and 59 years. For urge incontinence, the incidence increased from 0.08% to 0.2% (Fig. 2). Moller et al[18] reviewed the prevalence of lower urinary tract symptoms in a Danish population; irritative symptoms had a prevalence of 29% and an incidence of 10%, and spontaneous remission occurred in 28%.

Patients with neurologic lesions (multiple sclerosis, Parkinson's disease, stroke, dementia) are at high risk of manifesting bladder dysfunction at some point during their disease. In fact, 20–30% of patients with multiple sclerosis and Parkinson's have initial complaints of bladder dysfunction before the diagnosis of their disease. The risk of developing bladder dysfunction is approximately 90%, whether it is due to detrusor hyperreflexia or detrusor sphincter dyssynergia. The incidence of bladder dysfunction in Parkinson's ranges from 40% to 70%, the majority being due to detrusor hyperreflexia.[16]

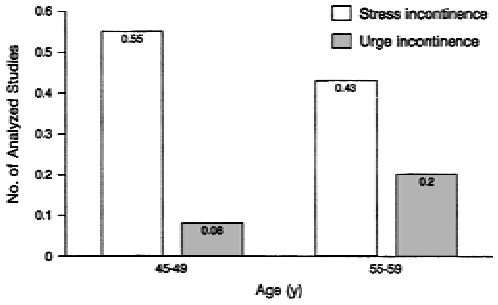

FIG. 2. Incidence of urge and stress incontinence increases with age.

Cardozo et al[19] reported the incidence of detrusor instability after surgery for stress urinary incontinence to be 15–30%.

Spontaneous remission of OAB requires complex examination of the same study population over long periods of time. Some investigators believe that spontaneous remission should in fact be included as part of the natural course of urinary incontinence, whether it is accredited to behavior modification by the patient or medical intervention.[17]

Various risk factors have been identified through epidemiologic research to be associated with the development of OAB symptoms. Many conditions may mimic OAB symptoms and not necessarily cause urge incontinence (Table 1).

TABLE 1. Conditions That Mimic Overactive Bladder

Local
Cystitis
Estrogen deficiency
Hypnotic drugs
Bowel problems
Bladder tumors
Pelvic mass
Radiation cystitis
Interstial cystitis
Neurologic
Parkinson's
Multiple sclerosis
Cognitive impairment
Stroke
Paraplegia
Impaired mobility
Medical
Diabetes mellitus
Diabetes insipidus
Congestive heart failure
Diuretics
Environmental
Caffeine
Alcohol
Tobacco
Poor toilet habits
Pyschosocial
Limited activity

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Severity Assessment and Quality of Life

Overactive bladder represents a distinct entity within the realm of lower urinary tract disorders because of the unique difficulty in assessing severity and individual impact. Unlike stress incontinence sufferers, who may be able to prevent incontinence by avoiding incontinence-causing physical activities, adults with OAB must cope with the unpredictability of urgency symptoms and urine loss. Traditionally used incontinence severity assessment tools such as bladder diaries and pad testing are not effective when evaluating a patient with OAB because of the great variability in symptoms and precipitating events.

Patients with OAB use a variety of behavioral modification and coping skills to reduce the impact of their symptoms. These include toilet-seeking, restriction of fluid intake, dietary restrictions, limitation of physical activity, and in severe cases limitation of social activities. A pervasive cycle of anxiety and distress regarding possible urine loss and embarrassment, and worsening urgency because of the internalized distress, frequently leads to a great psychological burden and various degrees of social isolation. This phenomenon is consistent with a well-known Chinese proverb: "The bladder is the window to the soul."

Quality of life (QOL) assessment instruments are frequently used in the evaluation of the individual impact of various medical conditions. In conditions where life prolongation is not a goal of therapy and accurate response assessment tools are lacking, QOL impact measurement is imperative.[20] Urinary incontinence is particularly well suited for the use of QOL instruments because the impacts are greatly individually determined. QOL tools are either generic or condition-specific. Generic QOL questionnaires provide a profile of an individual's QOL covering several health concepts and are typically divided into physical, psychological, and social domains. Disease-specific questionnaires, a newer concept in QOL analysis, are targeted at a specific facet of the patient's health.

The most commonly used generic QOL tool is the MOS Short Form 36 (SF-36). In Europe, the EuroQOL EQ-5D has been used as an index that is particularly useful in cost-utility analysis. Because of their lack of specificity, generic instruments rarely provide enough information to measure a change in the condition's impact brought about by therapy.[21]

The impact of OAB has been evaluated using the SF-36 in various studies. It was shown to have a significant impact on five of the eight domains of the SF-36 (physical functioning, social functioning, physical role functioning, vitality, and emotional role functioning).[22] In a study comparing therapy with oral oxybutynin, tolterodine, and placebo in adults with OAB, no significant differences were noted after 12 weeks or 12 months among groups when SF-36 results were analyzed.[23] However, analysis of simultaneously collected data using a disease-specific QOL instrument, the King's Health Questionnaire (KHQ), showed that both treatment groups had significant improvements in QOL beginning at 10 weeks.

Other nonspecific questionnaires have been used for QOL analysis. The Sickness Impact Profile, when used to assess incontinent women, showed that women with bladder filling symptoms had a more significant QOL impact.[24] The impact was most marked in younger women. The main domains affected were sleep and rest, emotional behavior, mobility, social interaction, and recreational activities. The Nottingham Health Profile was applied to elderly women both with and without urinary incontinence. Those with incontinence recorded higher scores, with most impact noted in emotional disturbances and social isolation.[25]

Disease-specific QOL instruments have been developed for the evaluation of lower urinary tract and OAB impact. Specificity and sensitivity in identifying bladder dysfunction impact are higher because the ques-

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tions are directed at aspects of life typically affected by bladder problems. The Incontinence Impact Questionnaire (IIQ) was one of the first to be developed. The initial 30-item IIQ has recently been reduced to a more attractive 7-item questionnaire.[26] Aspects of QOL identified by the IIQ include daily living activities, physical activities, social interactions, and self-perception. The short form has been validated relative to the long form, increasing clinical use of the IIQ-7. This QOL tool is complemented by use of the Urogenital Distress Inventory (UDI), which was designed to quantify the impact of stress symptoms, bladder filling, and obstructive symptoms. The UDI was also shortened from a 19-item questionnaire to a 6-item tool, which was validated relative to the long form. Although not popularized for widespread clinical use, the IIQ/UDI combination is frequently used in clinical research studies.

Other disease-specific QOL instruments include the KHQ and the York Incontinence Perception Scale (YIPS), the Incontinence QOL (IQOL), and the Bristol Female Lower Urinary Tract Symptoms (FLUTS) questionnaires. The KHQ contains 30 items and has been validated.[27] The YIPS assesses psychosocial adjustment to incontinence and includes eight items focusing on self-perception, lifestyle adaptations, and health QOL.[28] The IQOL includes 28 items, including emotional adaptation to urinary incontinence.[29] The FLUTS reports primarily bladder symptoms such as filling, voiding, and incontinence symptoms, including a "bother" factor. It is a rather comprehensive questionnaire including sexual health issues and daily and social activities and has been validated against pad tests and bladder diaries.[30]

Regardless of the instrument used, OAB has been shown to have a more significant impact on QOL than stress incontinence. Improved understanding of the unique QOL impact of irritative bladder symptoms and OAB have led to the development of QOL instruments directed specifically at identifying the impact of OAB. The IIQ and UDI were used as a basis for QOL evaluation in women with OAB. Critical analyses using focus panels, literature review, and expert opinions were then used to develop OAB-specific tools, the Urge-IIQ and Urge-UDI.[31] The Urge-IIQ is a 30-item questionnaire that also includes domains relative to sexual function. The Urge-UDI has nine items. They were validated against the generic SF-36. Clinical utility was shown in a multicenter, open-label, nonrandomized, single-arm clinical study evaluating the effect of a once-a-day formulation of oral oxybutynin (Ditropan XL). Adequate reliability, validity, and responsiveness to change were shown for the two urge-QOL tools during this study.[32]

Because the effect of OAB on QOL has significant variability from individual to individual, assessing a patient's perspective and explanatory style may add to the ability of a QOL questionnaire to identify QOL impact. This premise was studied in a focus group approach in women with OAB.[33] Patient-defined aspects of QOL impact were more focused on coping with embarrassment and interference with lifestyle. Experts may focus more on OAB functional impact on the individual, whereas patients cite the impact of OAB on their emotional well-being and interference with activities. The top-listed items by patients were the need for pre-emptive strategies to avert urinary incontinence, lack of self-control, adaptation of daily routine, shame, fear of public embarrassment, and lack of predictability (Table 2). Although these issues may seem obvious, they are not specifically identified or quantified in commonly used QOL instruments.

Because more women than men suffer from OAB, development of QOL questionnaires has focused on quantifying primarily female issues. A few instruments have provided insight into the impact of urinary incontinence in men. The ICSmale questionnaire was used for assessment of bladder symptoms in men older than 40 years.[34] Al-

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TABLE 2. Top 10 Incontinence-Related Quality of Life Items

10.	Urinary incontinence psychological, not physical problem
9.	Self-concept
8.	Resignation
7.	Loss of sleep
6.	Lack of predictability
5.	Fear of public embarrassment
4.	Shame
3.	Adaptation of daily routine
2.	Lack of self-control
1.	Need for pre-emptive strategies to avert urinary incontinence

Data from DuBeau CE, Levy B, Mangione CM, Resnick NM. The impact of urge urinary incontinence on quality of life. J Am Geriatr Soc. 1998;46:683–692.

though irritative symptoms such as urgency, frequency, and urge incontinence are not common in men, they were noted to have a higher QOL impact score.[35] The KHQ has been evaluated in a correlation with the SF-36, which resulted in validation in men.[23]

Many factors can hinder the assessment of QOL in patients with urinary incontinence. The QOL instrument used must have been validated in the population for which it is being used. Factors such as gender, age, culture, and language may reduce the reliability of a QOL tool. Preliminary work on an individual-specific QOL questionnaire has shown that identifying a specific activity adversely affected by incontinence can be helpful in determining impact and response to therapy.[36]

Because OAB symptoms tend to be chronic and no therapies curative, even a highly sensitive instrument may not be able to detect an improvement in bladder function. If OAB affects one aspect of QOL more significantly than others, that particular aspect may not be specifically quantified before and after therapy. Patients may have unrealistic expectations regarding therapy outcomes, long-term incontinence avoidance behaviors may persist despite improved bladder function, and patients may have unrecognized secondary gain benefits from their OAB symptoms.

Summary

Overactive bladder represents a health condition of increasing public and medical recognition. Because of the wide variation in reported symptoms of OAB, accurate estimates of prevalence and incidence are difficult to calculate. Specific causes of reversible OAB symptoms should be identified and treated accordingly. Because most cases of OAB are idiopathic, complete elimination of symptoms and "cure" are not realistic for most patients. Assessing severity and response to therapy is challenging. Few OAB severity assessment tools are specific enough to be used in all patients. Newer urge-related QOL questionnaires are helpful in assessing the severity of the condition and response to therapy. As our understanding of the epidemiology of OAB and impact assessment increases, we shall be able to improve our current means of addressing this common medical problem.

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