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**Syndrome: Pro and Con**

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# Urodynamics of Overactive Bladder Syndrome: Pro and Con

S. V. Yalla, M. Sullivan

Die überaktive Blase wird mit einer Detrusor-Überaktivität in Zusammenhang gebracht und wird allgemein empirisch als solche behandelt. Allerdings bleiben Unsicherheiten bestehen im Hinblick auf die Rolle der Urodynamik in der Evaluierung von Patienten mit dieser weitverbreiteten Störung. Die urodynamische Verifizierung einer Detrusor-Überaktivität mag bei neurologisch intakten jungen Frauen mit Dranginkontinenz nicht erforderlich sein, doch ist bei älteren Personen und bei jenen, die auf konventionelle Anti-Muskarin-Therapien nicht ansprechen, irgendeine Form einer funktionalen Bewertung nötig. Ferner ist eine urodynamische Bewertung unverzichtbar für den Ausschluß von Krankheiten, die sich mit OAB hinsichtlich der Symptome und der klinischen Anzeichen überschneiden, aber auch zur präzisen Beschreibung der vesikourethralen Dysfunktion.

The overactive bladder is assumed to be related to detrusor overactivity and is generally empirically treated as such. However, uncertainties remain regarding the role of urodynamics in the evaluation of patients with this highly prevalent disorder. Although urodynamic confirmation of detrusor overactivity may not be required in neurologically intact young women with urge incontinence, some form of functional assessment is needed in elderly individuals and those who do not respond to conventional anti-muscarinic therapies. Furthermore, urodynamic assessment is indispensable in ruling out disorders that overlap with OAB regarding symptoms and clinical signs, and in accurately characterizing vesicourethral dysfunction. *J Urol Urogynäkol* 2007; 14 (1): 24–26.

## Introduction

„Overactive bladder“ (OAB), a highly prevalent condition with a profound impact on quality of life, is a constellation of irritative lower urinary tract symptoms encompassing urgency, frequency, nocturia and urge incontinence. Typically occurring without a recognizable underlying etiologic factor, OAB is a diagnosis of exclusion, intuitively considered to be related to detrusor overactivity (DO). Thus, management of OAB generally parallels the principles underlying the treatment of overt DO.

In patients with OAB, evidence of DO as defined by the International Continence Society is not consistently demonstrated with functional urodynamic assessment. Does this reflect our inability to understand the pathogenesis of this phenomenon? Or does it simply indicate that DO is temporarily suppressed in certain patients during conventional urodynamic evaluation, since ambulatory urodynamic testing on these individuals often demonstrates functional evidence of DO? Regardless of DO, the etiology of OAB is puzzling. Do these patients have occult myeloneuropathies? Do they therefore require comprehensive neurologic evaluations that involve electrodiagnostic techniques to detect covered central and myeloneuropathies? Does assessment of OAB also require bladder biopsies for morphologic evidence of „dysfunctional“ patterns of smooth muscle structure? Are we justified in labelling DO as idiopathic without such comprehensive testing? Despite these unresolved issues, current management strategies of OAB remain the same as those advocated for DO, independent of our ability to functionally detect DO. Therefore, is comprehensive urodynamic testing required for these patients, since its results may have minimal impact on management strategies?

History and physical examination reveal several symptoms and signs of OAB and DO; most notably are urge incontinence and inability to interrupt voiding after it is initiated. A full voiding history using questionnaires and

voiding diaries will help determine the severity of OAB and factors that provoke DO. After excluding other conditions that are likely to produce irritative symptoms, such as urinary tract infection, carcinoma in-situ and neuropathology, some form of non-invasive testing such as uroflowmetry is warranted. For example, urinary flow patterns in patients with classic DO demonstrate greater acceleration of flow at the initiation of urination (fig. 1); furthermore  $Q_{max}$  and  $Q_{ave}$  are high, and post void residual volume is negligible. Voiding efficiency is typically greater than 80 % unless DO is associated with impaired contractile performance. Thus, with a careful history, voiding diary and noninvasive assessment such as uroflowmetry, a diagnosis of OAB with DO as an underlying pathogenesis can be considered in some cases without comprehensive urodynamics. In an adult female patient complaining of bothersome urge incontinence, DO can be predicted with high probability when associated with a normal urinary flow rate, negligible post void residual volume, normal urinary cytology, and absence of urinary tract infection. In addition, OAB patients with good bladder contractility may complain of post void dribble, suggestive of an „after contraction“. This condition is the result of continued

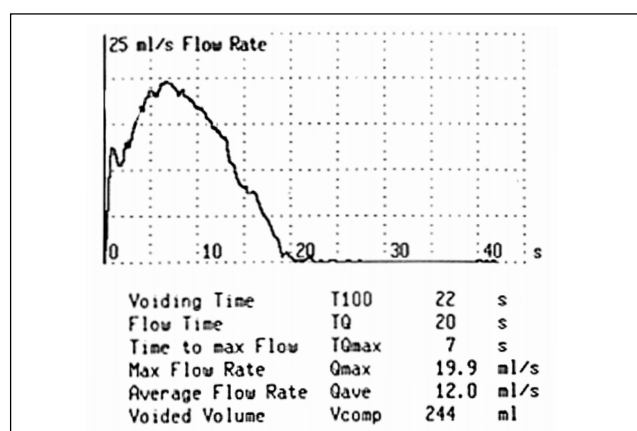


Figure 1. Uroflowmetry obtained from a male patient with urodynamic evidence of detrusor overactivity and symptoms of urgency. Note rapid acceleration of flow at initiation of urination, due to the sudden release of a voluntarily contracted external sphincter while the detrusor is in a state of contraction which could not be inhibited.

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detrusor activation despite the bladder being nearly empty.

### Relationship between Urgency and Detrusor Overactivity

Very few studies have considered the relationship between OAB syndrome and urodynamic evidence of DO. In a recent study of men and women with OAB, urodynamic evidence of DO was detected in 69 % of men and 44 % of women who were continent [1]. However, for those with OAB who were incontinent, 90 % of men and 58 % of women demonstrated DO. Our own observations in 139 symptomatic men without urodynamic evidence of bladder outlet obstruction indicate that DO (defined as the presence of involuntary detrusor contractions and/or the inability to suppress contractions after initiation of urinary flow) was present in 40 % of patients with urgency [2]. Moreover, when the definition of DO was expanded to include elevated  $P_{isv}$  (maximum isovolumetric contraction pressure), the incidence of demonstrated DO in those men with OAB was 73 %.  $P_{isv}$  can be obtained with continuous bladder neck occlusion, a technique that prevents urinary flow during uninterrupted detrusor activation and provides a useful measure of bladder contractility [3]. Our previous studies have shown that in both non-obstructed men and women (fig. 2),  $P_{isv}$  as well as the slope of the isovolumetric contraction is significantly higher in patients with DO compared to those without urodynamic evidence of DO [4, 5].

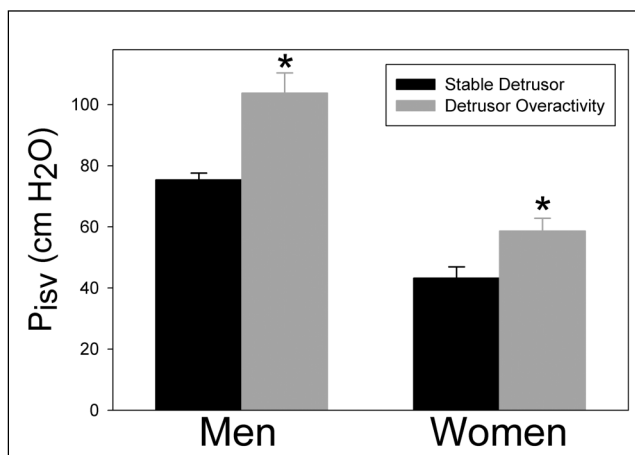
### Relationship between Urgency and Detrusor Overactivity with Impaired Contractility (DHIC)

Accurate clinical diagnosis of OAB is difficult when urgency with other irritative symptoms is associated with low urinary flow rates and large post void residual volumes [6]. This becomes more enigmatic when it is seen in women, since bladder outlet obstruction (BOO) is relatively uncommon. When such patients with irritative bladder symptoms demonstrate impaired voiding efficiency, a diagnosis of DO cannot be confidently entertained since other conditions such as BOO, sphincter dysfunction and/or impaired detrusor contractile function may also cause similar symptoms.

A previous urodynamic study of incontinent elderly women in a nursing home indicated that nearly 40 % of these patients showed detrusor overactivity with impaired contractile performance (DHIC) [7]. Notably, 24 % of women with DHIC were mistakenly diagnosed with simple stress urinary incontinence, despite evaluation with cystometry. In contrast, only one of the 25 patients with DO associated with normal detrusor function was misdiagnosed. In each case, the misdiagnosis was due to failure to appreciate low amplitude detrusor contractions. Combining stress tests with cystometry improved the accuracy of the diagnosis. When the functional assessment is coupled with fluoroscopic imaging, involuntary detrusor activation was better appreciated since unprovoked changes in bladder contour (with minimal changes in detrusor pressure), especially at its base, were observed suggestive of detrusor overactivity. Careful observation of the bladder contour is essential when video-urodynamic studies are performed. Thus, the discovery that DHIC can

### Diagnostic Work Up For OAB

- **History and Physical Examination:**
  - Childhood GU History (UTI, Enuresis)
  - Pharmacologic History
  - Targeted Neurological Assessment (e. g. sacral cord function, autonomic dysfunction)
  - Voiding Diary
  - Sx and Botherscore
  - Targeted Lab Workup (Urinalysis, Urine Culture/Sensitivity, Cytology): For positive microhematuria or Cytology; Cystoscopy/Radiological imaging Of Upper Urinary Tract
- **Uroflowmetry**
- **Post Void Residual**
- **Video-UDS:**
  - To rule out obstruction in men
  - Patients with childhood GU problems
  - To rule out Interstitial Cystitis and Prostatodynia
  - To rule out occult neurogenic bladder
  - To rule out DHIC in the aging elderly
  - To characterize mixed incontinence
  - To evaluate patients who have failed empirical therapy



**Figure 2.** Comparison of maximum isovolumetric pressure ( $P_{isv}$ ) measured from continuous occlusion test in men (left bars) and women (right bars). In both men and women,  $P_{isv}$  is significantly higher in patients with urodynamic evidence of detrusor overactivity (grey bars) compared to those with stable bladders (black bars); \* $p < 0.05$ .

mimic not only stress urinary incontinence but also other types of voiding dysfunction should be recognized when considering a diagnosis in more complex cases.

### OAB and Bladder Outlet Obstruction

In young adults as well as aging men, bladder outlet obstruction can generate symptoms suggestive of OAB, especially in early stages of compensated BOO. To arrive at an accurate diagnosis, urodynamic assessment is paramount, despite somewhat normal urinary flow rates and post void residual volumes. For these patients, the urodynamic findings can have a significant impact on management strategies. In symptomatic aging men, bothersome symptoms are often presumed to be related to obstructive BPH. However, about 34 % of this population does not have BOO; furthermore, in nonobstructed symptomatic patients, only about half have functional evidence of DO [8].

## Other Conditions Mimicking OAB

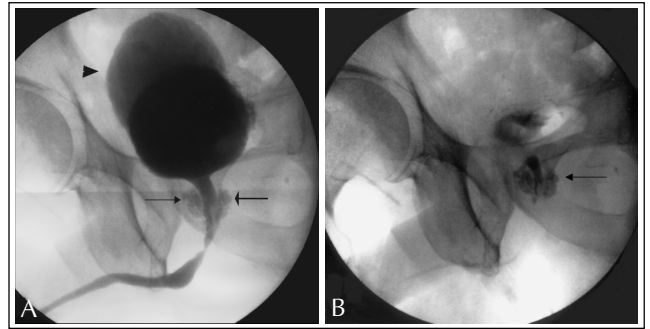
Frequently, patients suspected of interstitial cystitis (IC) or chronic prostatitis (or prostatodynia) are mistaken as OAB since symptoms in both disorders are similar and cannot be differentiated from one another. To develop a reasonable plan of management for either condition, a comprehensive video-urodynamic evaluation is essential. Very often, lower urinary tract symptoms in patients with prostatic reflux with or without prostatic calculi can simulate OAB [9], thus leading to unnecessary and ineffective treatment and delayed management (fig. 3). Consequently, without comprehensive imaging assessment, these conditions can easily be overlooked.

## Summary and Perspective

Urodynamic confirmation of DO is not required in young women with urge incontinence who empty their bladders completely and have no evidence of neurologic disease. However, in elderly individuals, both men and women, and those who do not respond to conventional anti-muscarinic therapies, some form of functional assessment is needed. Because of their overlap of symptoms and clinical signs with OAB, patients suspected of IC or chronic prostatitis and its related conditions may need videourodynamics either to confirm or rule out these disorders. Nursing home patients with a suspicion of DHIC require urodynamic assessment to prevent adverse side effects of injudicious pharmacologic management. Finally, patients suspected to have ambiguous BOO with predominant signs of OAB will require functional assessment for accurate characterization of vesicourethral dysfunction.

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**Figure 3. A)** Voiding cystourethrogram from 65 year old patient with long-standing lower urinary tract symptoms and urgency as the most bothersome symptom. This patient was originally treated for OAB but failed anticholinergic treatment and other conservative measures. Video-urodynamics showed no evidence of outlet obstruction but did show evidence of severe reflux into the prostatic ducts (arrows) and large pseudodiverticulum at the dome (arrowhead) indicating severe unrecognized morphologic alterations. These changes are attributed to dysfunctional (non-neuropathic) striated sphincter behavior. **B)** Post void film shows complete emptying of the bladder, but a substantial amount of contrast is retained in the prostatic ducts.

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