



The Risk Factor and The Severity of Symptoms Relation in Women with Overactive Bladder

Aşırı Aktif Mesanesi Olan Kadınlarda Risk Faktörü ve Semptomların Şiddeti Arasındaki İlişki

Aşırı Aktif Mesane Risk Faktörleri / Risk Factors of Overactive Bladder

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Özet

Amaç: Aşırı aktif mesanesi (AAM) olan kadınlarda, risk faktörlerinin semptom şiddeti ile ilişkili olup olmadığını araştırmak ve yaşam kalitesi üzerine semptom şiddetinin etkisini değerlendirmek. **Gereç ve Yöntem:** AAM tanısı konmuş olan 100 kadın hastanın (yaş 47.70 ± 12.34 yıl) üriner semptomları Boyarsky semptom skoru (BSS) ile değerlendirildi. Yaş, eğitim durumu, vücut kitle indeksi (VKİ), kronik hastalık, vajinal doğum, konstipasyon, sigara, alkol tüketimi, çay, kahve veya gazlı içecekler ve baharatlı yiyecekler içeren diyetler için veriler kaydedilerek alt kategoriler oluşturuldu. Bulguların BSS ile ve ayrı ayrı her bir üriner semptom ile olan istatistiksel ilişkisi araştırıldı. Hastaların Quality of Life (QoL) skorları, semptom şiddetiyle ve toplam, obstrüktif ve iritatif BSS ile korele edildi. **Bulgular:** Urge hissinin VKİ, baharatlı yiyecekler, vajinal doğum, menopoz ve yaş ile, noktürinin ise menopoz ve ileri yaş ile ilişkili olduğu görüldü. Total BSS kahve tüketimi ile, iritatif BSS menopoz ve yaş ile ve obstrüktif BSS konstipasyon ile ilişkili olduğu bulundu. Total ve iritatif BSS ve QoL skorları arasında pozitif anlamlı korelasyon bulundu. **Tartışma:** Risk faktörleri, semptomların şiddetini etkileyebilir ve tedavi planlanırken bu faktörler dikkate alınmalıdır.

Anahtar Kelimeler

Mesane Disfonksiyonu; Aşırı Aktif Mesane; Üriner Semptomlar

Abstract

Aim: To investigate whether risk factors for overactive bladder (OAB) in women are associated with symptom severity and to assess the impact of symptom severity on the quality of life. **Material and Method:** Symptoms of 100 female patients (aged, 47.70 ± 12.34 years) who were diagnosed with OAB were assessed using the Boyarsky symptom score (BSS). Data for age, educational status, body mass index (BMI), chronic disease, vaginal deliveries, constipation, smoking, consumption of alcohol, tea, coffee, or carbonated drinks and diets involving spicy food were recorded. Subcategories for each factor regarding quantity were established. The findings were statistically correlated with the BSS and with each urinary symptom individually. Each patient's quality-of-life (QoL) scores were correlated with the severity of each symptom and the total, obstructive and iritative BSS. **Results:** Urgency was related with BMI, spicy food, vaginal deliveries, menopause, and advanced age. Nocturia had a relation with menopause and advanced age. Total BSS was significantly correlated with coffee consumption. Irritative BSS was correlated with menopause and advanced age and obstructive BSS was correlated with constipation. Total and iritative BSS were both positively correlated with the QoL score. **Discussion:** Risk factors can affect the severity of symptoms and these factors should be considered when planning therapy.

Keywords

Bladder Dysfunction; Overactive Bladder; Urinary Symptoms

DOI: 10.4328/JCAM.2359

Received: 21.02.2014 Accepted: 05.03.2014 Published Online: 09.03.2014

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Introduction

Overactive bladder (OAB) is a syndrome defined as urinary urgency with or without urge incontinence, usually with increased daytime frequency and nocturia [1]. Epidemiologic studies have revealed wide variance in prevalence rates of OAB. Rates between 11 to 53.1% have been reported [2,3]. These investigations have also revealed many risk factors for OAB including age, body mass index (BMI), nutritional habits, living conditions, number of vaginal deliveries, smoking, alcohol and caffeine consumption. Some of these factors can result in permanent changes of the detrusor muscle itself and/or of the nerve supplying the detrusor. It is unclear whether risk factors for OAB are related strictly to the development of the disease or whether they also influence the severity of lower urinary tract symptoms (LUTS).

Urgency is the sine qua non criterion that is solely enough for the diagnosis of OAB, while increased daytime frequency and nocturia may or may not be present. Patients diagnosed as OAB may have other LUTS that are not present in the diagnostic criteria for OAB. Studies investigating the risk factors for LUTS revealed separate risk factors for nocturia and urgency [4]. This raises the question: does each symptom of the OAB have different risk factors? The aim of this study was to evaluate the risk factors of each symptom (i.e. urgency, nocturia, increased daytime frequency) separately, to investigate whether the quantity of each factor has a relation with symptom severity and to assess the impact of symptom severity on the quality-of-life (QoL).

Material and Method

The study was prospectively designed and involved 127 consecutive female OAB patients (age range, 18-76 years; mean, 47.70 ± 12.34 years) who presented to the urology outpatient clinic. The study was approved by the university Ethics Committee and informed, written consent was obtained from all subjects.

In each case, fasting glucose and serum creatinine levels were measured and urinalysis, urine culture and uroflowmetry were performed. Depending on the findings, further investigations with urinary system imaging, cystoscopy or conventional urodynamic studies were performed when necessary. Patients who had urinary tract infection, urolithiasis, microscopic hematuria, uroflowmetry findings concordant with obstruction (maximum flow of <15 mL/s and an uroflowmetry curve other than a normal bell-shaped voiding pattern), postvoid residual more than 50 ml, those taking diuretics, alpha-blockers or drugs that may have an effect on bladder sensation and normal detrusor function were also excluded from the study. Severity of symptoms of the remaining 100 patients, who were eligible for the study, was evaluated by the Boyarsky symptom score. To document this, patients completed the self-administered symptom scoring system evaluating the severity of voiding (obstructive) and storage (irritative) symptoms. The system allows 0 to 3 points for each of the 9 questions for a total Boyarsky score with a maximum of 27 points. The obstructive symptom score was calculated, being the sum of responses to questions relating only to slow stream, hesitancy, terminal dribble, intermittency and feeling of incomplete emptying (total possible score 15). The irrita-

tive symptom score was calculated for the remaining irritative symptoms (urgency, nocturia, increased daytime frequency and dysuria) with a total possible score of 12.

Age, educational status, Body Mass Index (BMI), history of chronic disease, number of vaginal deliveries, constipation, smoking frequency, consumption of alcohol and dietary factors such as tea, coffee, carbonated drinks and spicy food were recorded for each case and subcategories for each factor regarding quantity were established. The number of patients in each subcategory was recorded (Table 1). Correlation analysis was performed for

Table 1. Patient characteristics and subcategories of the risk factors (N=100).

Age (years)	Patient No. (%)	Coffee	Patient No. (%)
20-29	8	None	40
30-39	15	Rarely	6
40-49	31	1-5 cups/day	54
50-59	29	Carbonated drinks	
60-69	12	None	16
70-79	5	Rarely	60
BMI		1 glass/week	16
19-24	20	2-6 glass/week	7
25-29	43	Everyday	1
30-34	26	Spicy food	
35-39	10	None	19
39-44	1	Rarely	35
Education		Often	46
None	17	Chronic disease	
Primary school	30	No	65
Secondary school	11	Yes	35
High school	20	Vaginal deliveries	
University	22	0	18
Cigarette Smoking		1	7
None	71	2	15
1-10/day	14	3	21
11-20/day	7	4	11
More than 20/day	6	5	15
Ex-smoker	2	More than 5	13
Alcohol		Constipation	
None	94	No	52
Rarely	6	Yes	48
Tea			
None	3		
1-5 cups/day	71		
6-10 cups/day	19		
More than 10 cups/day	7		

the assessment of the relation between the findings for each risk factor and the patients' Boyarsky symptom scores. The relation between the quantitative amount of each factor and each different OAB symptom was statistically analyzed. Each patient's quality of life was assessed using the QoL questionnaire of the International Prostate Symptom Score and these scores then were correlated with the severity of each symptom and the total, obstructive and irritative BSS. Spearman's rank correlation coefficient (rho) test was used for statistical analyses. All calculations were done using SPSS (Statistical Package for the

Social Sciences) version 14software. A 'p' value ≤ 0.05 was considered significant. Definitions in this study confirm to the standards recommended by the International Continence Society [1].

Results

Urgency had a statistically significant correlation with BMI, spicy food, vaginal delivery number, menopause and advanced age (Table 2). Nocturia had a correlation with menopause and advanced age. Increased daytime frequency had no statistically significant correlation with the risk factors included in the study but patients with urgency usually also had increased daytime frequency. Patients with increased daytime frequency usually also had an accompanying urgency or nocturia symptom and these findings were statistically significant. A positive directional relation between the severity of urgency and the quantity of the risk factors was found. The relation was very weak for BMI, spicy food and number of vaginal deliveries and weak for age and menopause. The relation with nocturia was positively very weak for menopause and weak for age.

Urgency, increased daytime frequency and nocturia had a strong positive relation with the irritative BSS (p<0.001 and r=0.673). In addition to urgency, increased daytime frequency, and nocturia, which are the criteria for the diagnosis of OAB, 81 (81%) of the patients also had one or several other LUTS (Table 3). These symptoms were assessed by the Boyarsky symptom score. Total, irritative, and obstructive Boyarsky symptom scores were

Table 2. Risk factor and overactive bladder symptom relation according to the Spearman's rank correlation coefficient test (r: correlation coefficient, p: p value).

		Urgency	Increased daytime Frequency	Nocturia
BMI	r	0,259	-0,076	0,114
	p	0,010	0,456	0,264
Smoking	r	-0,078	0,118	-0,130
	p	0,438	0,241	0,198
Alcohol	r	-0,146	0,180	0,018
	p	0,146	0,074	0,859
Tea	r	-0,058	0,131	0,062
	p	0,568	0,195	0,539
Coffee	r	-0,020	0,025	0,062
	p	0,841	0,802	0,540
Carbonated drinks	r	-0,102	-0,174	0,039
	p	0,313	0,084	0,700
Spicy food	r	0,242	-0,068	-0,155
	p	0,015	0,498	0,124
Menopause	r	0,315	-0,005	0,231
	p	0,001	0,962	0,021
Vaginal delivery No.	r	0,211	-0,193	0,093
	p	0,035	0,055	0,358
Constipation	r	0,046	0,027	0,073
	p	0,652	0,788	0,470
Age	r	0,320	-0,011	0,288
	p	0,001	0,919	0,004
Concomitant disease	r	0,142	-0,055	0,172
	p	0,157	0,584	0,087
QoL score	r	0,171	0,082	0,040
	p	0,088	0,416	0,693

Table 3. Symptom distribution according to the Boyarsky and QoL questionnaires.

	Patient No.(%)	Mean±SD
Irritative Boyarsky Score		6,2±2,0
Total No. of patients with irritative symptoms	100	
Urgency	100	
Nocturia	70	
Increased daytime frequency	89	
Dysuria	31	
Obstructive Boyarsky Score		3,8±2,7
Total No. of patients with voiding symptoms	81	
Slowstream	41	
Hesitancy	18	
Terminal dribble	35	
Intermittency	21	
Feeling of incomplete emptying	43	
Total Boyarsky Score		10,1±4,7
QoL Score		4,6±1,0
(0) Delighted	1	
(1) Pleased	1	
(2) Mostly satisfied	2	
(3) Mixed	15	
(4) Mostly dissatisfied	15	
(5) Unhappy	45	
(6) Terrible	21	

Table 4. Boyarsky score, risk factor and QoL score corelation according to the Spearman's rank correlation coefficient test (r: correlation coefficient, p: p value).

		Total Boyarsky score	Obstructive Boyarsky score	Irritative Boyarsky score
BMI	r	0,028	0,093	0,144
	p	0,791	0,368	0,158
Smoking	r	0,072	0,071	-0,039
	p	0,416	0,470	0,701
Alcohol	r	0,049	0,082	-0,003
	p	0,578	0,416	0,977
Tea	r	0,024	0,021	0,053
	p	0,421	0,719	0,597
Coffee	r	0,612	0,012	0,044
	p	0,038	0,418	0,663
Carbonated drinks	r	0,032	0,091	-0,142
	p	0,680	0,662	0,158
Spicy food	r	0,068	0,031	0,017
	p	0,368	0,364	0,865
Menopause	r	0,023	0,071	0,281
	p	0,162	0,291	0,005
Vaginal delivery No.	r	0,073	0,091	0,035
	p	0,487	0,582	0,732
Constipation	r	0,691	0,723	0,066
	p	0,005	0,005	0,515
Age	r	0,072	0,071	0,290
	p	0,410	0,445	0,004
Concomitant disease	r	0,049	0,082	0,113
	p	0,579	0,406	0,264
QoL score	r	0,581	0,093	0,664
	p	<0,001	0,478	<0,001

found to be 10.1 ± 4.7 , 6.2 ± 2.0 , and 3.8 ± 2.7 , respectively. Total Boyarsky symptom score had a statistically significant correlation and a strong positive relation with coffee drinking and constipation (Table 4). Women who drank at least 1 cup of coffee per day had a higher total BSS than those who drank rarely or no coffee. Higher irritative BSSs had a positive and weak relation with menopause and advanced age. A strong positive relation was found between higher obstructive Boyarsky symptom scores and constipation.

The patients' mean QoL score was 4.61 ± 1.18 (Table 3). Irritative and total Boyarsky symptom scores had a positive relation with the QoL score (Table 4). But each individual OAB symptom did not show a statistical significant correlation with the QoL score when analyzed separately (Table 2).

Educational status; history of chronic disease; smoking; and consumption of alcohol, tea, and/or carbonated drinks were not statistically correlated with the severity of symptoms or the BSSs.

Discussion

Overactive bladder is a syndrome that has serious negative impact on quality of life. The International Continence Society defined this condition as "urgency with or without urge incontinence, usually with frequency and nocturia" [1]. However, some patients with OAB also have other LUTS in addition to this combination. Jeffery et al. [5], using uroflowmetry and assessment of urinary residual volume, have examined the relationship between symptoms of voiding dysfunction in women and the objective measurements of voiding dysfunction. In their study group, 50% of the patients had at least one symptom of voiding dysfunction. Only 6.9% of the patients had an abnormal flow curve and 82.1% of the women had a normal bell-shaped voiding pattern. Their results supported the study of Haylen [6] which the relationship between voiding symptoms and objective parameters were also investigated. These studies show that only a small proportion of women with voiding symptoms have voiding dysfunction on objective tests. In this study, although patients with uroflowmetry findings and post void residual concordant with obstruction were not included in the study, 81% of the remaining 100 patients also had voiding complaints of varying severity. Therefore, in addition to the relation between the risk factors and the OAB symptoms, the relation between these risk factors and the obstructive symptoms listed in the Boyarsky scoring system has also been investigated. Boyarsky symptom score has been previously validated and has been used to assess LUTS in previous studies [7].

Increased BMI, increased spicy food consumption, and higher number of vaginal deliveries appear to be the risk factors for the severity of urgency, while menopause and advanced age are the risk factors for nocturia. However, evaluation of the symptoms which are not among the diagnostic criteria of OAB showed that coffee and constipation also appear to be risk factors which effect the severity of LUTS in patients with OAB. These results indicate the need for an overall evaluation of the OAB patient not only focusing on the current diagnostic criteria but on all existing LUTS symptoms and the related risk factors. Age and menopause: Previous research has demonstrated a correlation between advanced age and detrusor overactivity

[8]. As a woman ages, factors such as reduced bladder capacity, estrogen deficiency, neural control, and connective tissue changes in the bladder are all thought to contribute to development of OAB [9]. Findings related to the effects of menopause on stress or urge urinary incontinence are conflicting [10,11]. In this study, in concordance with these previous studies, it was found that age and menopause was positively correlated with both urgency and nocturia. However, it is difficult to determine whether this relation is specifically related to menopause or to advanced age in general.

Obesity: BMI is a risk factor for urinary incontinence. Obesity can increase intraabdominal and intravesicular pressure. In turn, this chronic stress can lead to pudendal nerve damage, resulting in pelvic floor dysfunction [12]. BMI >30 kg/m² is accepted as a risk factor in both sexes [13]. Furthermore, it has been shown that obese female patients experience a relief in urge incontinence after losing weight [14]. In this series, there was a positive correlation between BMI and severity of urgency.

Constipation: Constipation is defined as <3 defecations in a week. Coyne et al. have shown that in both sexes, constipation is encountered more in OAB patients compared to the patients without an OAB [15]. Similar to the mechanism triggered by obesity, it has been suggested that chronic constipation also has negative effects on the nerve supply to the pelvic floor muscles that can cause OAB symptoms [11]. The data of this study has shown that an association exists between chronic constipation, total and obstructive symptom severity. Constipation should be considered a contributing factor to OAB and patients should be instructed to consume fibrous foods as a component of therapy.

Vaginal delivery: Vaginal delivery has been shown to damage the peripheral nerves of the pelvis, and consequently leads to bladder hypersensitivity and hyperactivity [16]. Work by Lapitan and Chye [2] revealed that more than two vaginal deliveries are strongly associated with development of OAB. In agreement with their results, this study has shown that number of vaginal deliveries is positively correlated with the severity of urgency.

Coffee, tea, carbonated drinks and spicy food: Caffeine is known to have a diuretic effect and to stimulate the smooth muscle fibers of the detrusor by increasing detrusor pressure and detrusor muscle excitability [17]. Research by Bryant et al. [18] has shown that reduction of caffeine on diets in patients with urinary symptoms is associated with reduced urgency and frequency. The effect of caffeine seems to be dose dependent and daily caffeine consumption should be limited to <200 mg/day keeping in mind that tea chocolate and some carbonated drinks also contain caffeine [19]. The effect of tea, coffee and carbonated drinks on OAB is controversial. Dallosso et al. [20] reported that there is no effect of coffee or tea on OAB. On the other hand, Yeniel et al. [21] have found a significant relationship between 5 or more units of tea and OAB. In this study, coffee consumption was positively correlated with severity of symptoms but a relation between each individual symptom was not found. The majority of the patients in this study group (74%) were drinking less than 5 cups/day which may have had an effect on the results. On the other hand, spicy food had a statistically significant correlation and a positive very weak relation with urgency.

Smoking and alcohol: Dallosso et al. [20] have identified smoking as a risk factor for OAB. Likewise, alcohol consumption can have irritating effects on the bladder and also cause diuresis [22]. Nicotine has been shown to increase phasic detrusor contractions in pigs and to induce detrusor overactivity in cats [23,24]. Furthermore, intra-abdominal pressure increase caused by coughing due to smoking is thought to be one of the adverse effects leading to bladder dysfunction. This study revealed no correlation between smoking or alcohol use and OAB symptom severity. But it should be noted that 71% of the patients enrolled in the study were nonsmokers and 94% did not drink alcohol. Chronic disease: It is also a well-established fact that chronic diseases, such as diabetes mellitus and hypertension, are associated with OAB [25]. These conditions can play etiological roles in OAB via different mechanisms; however, this study failed to reveal any association between presence of chronic disease (diabetes mellitus or hypertension) and OAB symptoms. In this study, patients using drugs that may have an effect on bladder sensation and normal detrusor function such as diuretics, alpha-blockers, calcium antagonists were excluded from the study which may have had an effect on the results by leaving patients with less severe chronic disease to be included in the study.

The majority of the women in the study (81%) stated that OAB had a negative impact on their quality of life and have marked the mostly dissatisfied, unhappy or terrible options on the QoL questionnaire (Table 3). The QoL score and each individual symptom did not show a statistically significant correlation. But the QoL scores had statistically significant relations with the total and irritative Boyarsky scores. These results may reflect that the symptom complex as a whole is the reason for deterioration of the QoL and not each individual symptom by itself. OAB is a syndrome that has important negative impact on quality of life and is not necessarily the same disease process in every patient. It is rather a collection of symptoms that create bother caused by one of many possible disease processes. These patients would benefit from a chronic care model in which the focus shifts from curing the disease, which in fact is unrealistic, to optimizing symptom management. Coffee drinking, constipation, obesity, spicy food consumption, higher number of vaginal deliveries, menopause, and advanced age all can influence the severity of OAB symptoms. This study shows that risk factors may vary according to the symptoms.

Conclusion: Concomitant symptoms are also major causes of decreased quality of life as much as urgency in female patients with OAB. Apart from the consistent risk factors, such as age and number of vaginal deliveries that cannot be manipulated, regulation of the changeable risk factors such as quitting smoking, weight loss in overweight patients, treatment of constipation, decreasing the daily caffeine consumption, may have positive impact on the success of treatment.

Competing interests

The authors declare that they have no competing interests.

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