

## Does the treatment of obstructive sleep apnea syndrome improve lower urinary tract symptoms?

Öner ODABAŞ, Cavit CEYLAN, Metin YİĞMAN

**Aim:** To evaluate lower urinary tract symptoms in patients with obstructive sleep apnea syndrome (OSAS) and to determine if the symptoms improved after treatment for OSAS.

**Materials and methods:** In all, 145 male patients were diagnosed with OSAS via polysomnography and evaluated for lower urinary tract symptoms using the International Prostate Symptom Score (IPSS). All of the patients were evaluated by an ear, nose, and throat (ENT) specialist. Surgery or continuous positive airway pressure treatment was recommended based on the apnea-hypopnea index (AHI) and ENT examination results. Only 23 of the patients that were available for follow-up during treatment were included in the study. The IPSS form was administered after treatment and symptom scores were updated for the 23 patients. The age range of the 23 patients was 26-65 years. The Wilcoxon signed rank, Kruskal-Wallis, and Spearman rho tests were used to evaluate differences in IPSSs before and after treatment.

**Results:** After treatment, significant improvement in lower urinary tract symptoms was confirmed statistically based on the IPSSs of 23 OSAS patients ( $P < 0.001$ ). The difference in the IPSS before and after treatment was not associated with the AHI, treatment method, patient age, or body mass index ( $P > 0.05$ ).

**Conclusion:** Most of the OSAS patients had lower urinary tract symptoms, and significant improvement in these symptoms was observed following treatment for OSAS.

**Key words:** Obstructive sleep apnea syndrome, treatment, lower urinary tract symptoms

### Obstruktif uyku apnesinin tedavisi alt üriner semptomları düzeltir mi?

**Amaç:** Obstruktif uyku apnesi olan hastalarda alt üriner sistem semptomlarının sorgulanması ve apne tedavisi ile semptomlarda düzelmenin araştırılması.

**Yöntem ve gereç:** Uyku apnesi yakınmasıyla uyku laboratuvarında incelemeye alınan 145 erkek hastada alt üriner sistem semptomlarının sorgulanması için hastalara IPSS sorgulama formu dolduruldu. Bütün hastalara KBB muayeneleri yapıldı. Muayene bulgularına ve apne-hipopne indeksine (AHI) göre CPAP veya cerrahi tedavi önerildi. Takip edilebilen ve tedavi alan 23 hastaya IPSS formu tekrar doldurularak semptom skorlaması yinelenildi. Bu hastaların yaşları 26 ile 65 arasında değişmekteydi. Tedavi öncesi ve sonrası skor farklılıklarının değerlendirilmesinde Wilcoxon signed ranks, Kruskal-Wallis, Spearman rho testleri kullanıldı.

**Bulgular:** Uyku apnesi olan, tedavi ve takibi yapılabilen 23 hastanın IPSS'inde istatistiksel olarak anlamlı düzelme saptanmıştır ( $P < 0,001$ ). Tedavi öncesi ve sonrasında IPSS değişimi ile AHI, tedavi yöntemi, hasta yaşı ve vücut kitle indeksi arasında anlamlı bir ilişki saptanmamıştır ( $P > 0,05$ ).

**Sonuç:** Uyku apnesi yakınması olan hastaların çoğunda farkında olmaksızın alt üriner sistem semptomları mevcut olup, apne tedavisi ile bu semptomlarda belirgin düzelme olduğu saptanmıştır.

**Anahtar sözcükler:** Alt üriner sistem semptomları, tedavi, uyku apnesi

Received: 11.02.2011 – Accepted: 24.06.2011

Department of Urology, Türkiye Yüksek İhtisas Hospital, Ankara - TURKEY

**Correspondence:** Öner ODABAŞ, Department of Urology, Türkiye Yüksek İhtisas Hospital, Ankara - TURKEY

E-mail: onerodabas@gmail.com

## Introduction

Obstructive sleep apnea syndrome (OSAS) is a serious health problem involving several body systems, and it is a result of repetitive respiratory dysfunction (apnea and hypopnea) due to upper respiratory tract obstruction (1). OSAS is diagnosed via polysomnography. Most symptoms of OSAS are related to interrupted sleep. On the other hand, urological symptoms are related to sexual and lower urinary tract system functions. The cause of decreased libido and sexual dysfunction are not well understood. A reduction in the testosterone level, sleep impairment, snoring, respiratory impairment during sleep, and lack of interest in sex due to inefficient sleep are among the possible causes of sexual dysfunction. An increase in effort for respiration due to apnea and hypopnea, atrial natriuretic factor secretion due to change in pressure in the thorax, and rennin-angiotensin system dysfunction cause nocturia (2).

Based on the relationship between OSAS and lower urinary tract symptoms, the present study aimed to determine if treatment for OSAS improves lower urinary tract symptoms. All male patients diagnosed with OSAS were considered for inclusion in the study, but only those treated and followed up with for OSAS were included. The relationship between lower urinary tract system symptoms and OSAS before and after treatment was investigated.

## Materials and methods

In total, 145 male patients were monitored in the sleep lab due to complaints of sleep apnea and were diagnosed with OSAS between January and May 2010. The International Prostate Symptom Score (IPSS) screening tool was administered to these patients by a urologist to determine if they had lower urinary tract symptoms (with 2 additional questions: the number of daytime urinations and the number urinations due to sudden urge). All of the patients had both voiding and filling symptoms. Each patient was also examined by an ear, nose, and throat (ENT) specialist. Constant positive air pressure (CPAP), uvulopalatal flap, and radiofrequency treatment were suggested according to the severity of disease, which was determined via physical examination and the

apnea-hypopnea index (AHI). The AHI is among the parameters used to diagnose OSAS and its severity, as follows: AHI 5-14: mild, AHI 15-30: moderate, and AHI > 30: severe (3).

The IPSS test was readministered to 23 patients that were available for posttreatment follow-up. The Wilcoxon signed rank, Kruskal-Wallis, and Spearman rho tests were used to evaluate pre- and posttreatment differences.

## Results

The age range of the 23 patients that were followed up with after treatment was 26-65 years. Based on the AHI, 4 patients had mild OSAS, 5 had moderate OSAS, and 14 had severe OSAS. The IPSSs in these 23 patients were as follows: mild: n = 10, moderate: n = 9, and severe: n = 4. Treatment for OSAS was determined according to disease severity and ENT examination findings (Figure).

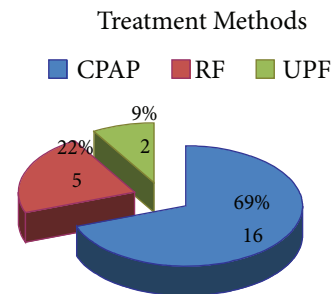


Figure. Treatment for OSAS.

After treatment, all 23 of the patients had a significantly improved IPSS as compared to before treatment ( $P < 0.001$ ) (Table 1). Posttreatment filling symptoms only improved in 4 patients and 2 patients'

Table 1. Pre- and posttreatment IPSSs.

	Pretreatment score	Posttreatment score
Mean	16	9
Minimum	5	2
Maximum	40	25

symptom scores remained the same. The other patients had improvement in both voiding and filling symptoms. After treatment, the patients that still had lower urinary tract symptoms were referred to the urology outpatient clinic. The means and standard deviations for patient age, height, weight, and AHI score are shown in Table 2.

There was no significant relationship between the difference in pre- and posttreatment IPSSs and age, BMI, AHI score, or method of treatment for OSAS ( $P > 0.05$ ) (Table 3).

**Discussion**

Numerous studies have reported that the relationship between OSAS and erectile dysfunction is substantial, but there are a limited number of studies published on the relationship between OSAS and urinary symptoms. In fact, these studies are related to nocturia and overactive bladder (4-8). OSAS may be due to urinary symptoms, as nocturia negatively affects sleep efficiency. Chartier-Kastler et al. reported that as the frequency of benign prostate growth-related nocturia increases, the severity of insomnia also increases (9). Kemmer et al. studied OSAS cases categorized as mild, moderate, and severe, and used patients with upper respiratory resistance syndrome as controls. They reported that overactive bladder symptom scores in the patients with moderate and

severe OSAS were higher than the scores in those with mild OSAS and the controls ( $P < 0.05$ ) (4). They indicated that hypoxia-related nerve dysfunction might play a role in the physiopathology of the event.

Moriyama et al. reported that the AHI was higher in male OSAS patients aged <50 years in the nocturia symptoms group ( $P = 0.005$ ), but a statistically significant relationship between the AHI and nocturia was not observed in the patients aged >50 years. Moreover, while there was no difference in IPSSs between the OSAS patients aged <50 years with and without nocturia, the IPSSs in the OSAS patients aged >50 years with nocturia were higher than in the OSAS patients aged >50 years without nocturia ( $P = 0.001$ ) (5). In the present study, we used a modified IPSS test that included 2 additional questions, including irritative symptoms. A large-scale study by Oztura et al. reported that the prevalence of nocturia was 52%-76.9% and that it was due to the severity of sleep dysfunction (8). There are a limited number of studies on the relationship between the treatment of sleep dysfunction and urinary symptoms (10-12). Margel et al. examined nocturia only in OSAS patients before and during CPAP treatment and reported that there was statistically significant improvement ( $P < 0.001$ ) in response to CPAP treatment (10). Guilleminault et al. reported that nasal CPAP treatment reduced the nocturia and severity of OSAS in oldd patients (11). In the

Table 2. Age, height, weight, and AHI score in the OSAS patients.

	Age (years)	Height (cm)	Weight (kg)	AHI
Number	23	23	23	23
Mean	45.57	172.26	91.09	48.830
Standard deviation	10.786	5.754	15.150	32.523

Table 3. The relationship between pre- and post-treatment IPSSs and the characteristics of the patients and treatments.

	Age (years)	Body mass index (BMI)	Severity of OSAS*	Treatment method
Difference in pre- and posttreatment IPSSs	0.49 $P > 0.05$	0.80 $P > 0.05$	0.31 $P > 0.05$	0.35 $P > 0.05$

\*Mild OSAS: n = 4, moderate OSAS: n = 5, and severe OSAS: n = 14.

present study, lower urinary tract symptoms in OSAS patients before and after treatment for OSAS were examined, and the symptoms significantly improved following appropriate treatment. Guilleminault et al. reported that the BMI and AHI scores were higher in OSAS patients with nocturia (6). In the present study, no statistically significant relationship between

the severity of lower urinary tract system symptoms in OSAS patients and age, BMI, AHI, or treatment method was observed.

In conclusion, most of the OSAS patients in the present study unwittingly had lower urinary tract symptoms, which significantly improved following treatment for OSAS.

## References

1. Muller JE, Toftler GH, Stone PH. Circadian variation and triggers of onset of acute cardiovascular disease. *Circulation* 1989; 79: 733-43.
2. Krieger J. Clinical presentations of sleep apnoea. *European Respiratory Monograph* 1998; 10: 75-105.
3. American Academy of Sleep Medicine Task Force. Sleep-related breathing disorders in adults: recommendations for syndrome definition and measurement techniques in clinical research. *Sleep* 1999; 22: 667-89.
4. Kemmer H, Mathes AM, Dilk O, Gröschel A, Grass C, Stöckle M. Obstructive sleep apnea syndrome is associated with overactive bladder and urgency incontinence in men. *Sleep* 2009; 32: 271-5.
5. Moriyama Y, Miwa K, Tanaka H, Fujihira S, Nishino Y, Deguchi T. Nocturia in men less than 50 years of age may be associated with obstructive sleep apnea syndrome. *Urology* 2008; 71: 1096-8.
6. Kemmer H. The relationship between sleep apnea and overactive bladder. *Curr Urol Rep* 2009; 10: 448-50.
7. Kemmer H. [Sleep apnea in urology. Influence of obstructive sleep apnea on erection and bladder function]. *Urologe A* 2009; 48: 1199-202 (article in German).
8. Oztura I, Kaynak D, Kaynak HC. Nocturia in sleep-disordered breathing. *Sleep Med* 2006; 7: 362-7.
9. Chartier-Kastler E, Leger D, Montauban V, Comet D, Haab F. [Impact of nocturia on sleep efficiency in patients with benign prostatic hypertrophy]. *Prog Urol* 2009; 19: 333-40 (article in French).
10. Margel D, Shochat T, Getzler O, Livne PM, Pillar G. Continuous positive airway pressure reduces nocturia in patients with obstructive sleep apnea. *Urology* 2006; 67: 974-7.
11. Guilleminault C, Lin CM, Gonçalves MA, Ramos E. A prospective study of nocturia and the quality of life of elderly patients with obstructive sleep apnea or sleep onset insomnia. *J Psychosom Res* 2004; 56: 511-5.
12. Hajdug IA, Strollo PJ Jr, Jasani RR. Prevalence and predictors of nocturia in obstructive sleep apnea-hypopnea syndrome - a retrospective study. *Sleep* 2003; 26: 61-4.