



Research Article

## ASSESSMENT OF ERECTILE FUNCTIONS IN PATIENTS TREATED DUE TO OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS)

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### ABSTRACT

**Objective:** Obstructive sleep apnea syndrome (OSAS) is characterized by interrupted respiration, interrupted sleep and lowered oxygen saturation as a result of upper airway obstruction. Coexistence of OSAS and erectile dysfunction (ED) is frequent. Although the exact mechanism of ED in OSAS patients is not known, it has been reported that ED can be the first finding of neuronal damage; morning fatigue and high apnea-hypopnea index (AHI) have been reported to be predisposing factors for ED in patients with severe OSAS. This pathophysiology suggests that treatment of OSAS may also treat ED. This study investigates whether OSAS treatment has an effect on the severity of ED.

**Methods:** Seventy male patients above 40 years of age, who had been admitted to the Sleep Disorders Unit of the Neurology Clinic and diagnosed with OSAS were included in the study. Patients were asked to fill out the IIEF-5 form before and after 3 months of OSAS treatment.

**Results:** The mean age of 70 patients was determined as  $49,1 \pm 12,5$  years and 28 patients (43,8%) were evaluated as mild ED, 12 (18,8%) as moderate and 24 (37,5%) as severe OSAS according to the apnea hypopnea index (AHI). While the mean IIEF-5 score was determined as  $16,6 \pm 5,48$  in the mild OSAS group,  $18,05 \pm 6,12$  in the moderate OSAS group and  $19,45 \pm 7,25$  in the severe OSAS group before treatment, it was determined as  $15,43 \pm 7,36$ ,  $17,83 \pm 3,86$  and  $18,08 \pm 2,19$  after 3 months of treatment ( $p < 0.001$ ).

**Conclusion:** The IIEF-5 scores of patients were observed to increase after OSAS treatment. Although the erection quality increases with OSAS treatment only, urological assessment and treatment in addition to OSAS treatment should be carried out for erectile dysfunction.

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### INTRODUCTION

Obstructive sleep apnea syndrome (OSAS) is a significant condition characterized by recurrent airway collapse that leads to intermittence (hypopnea) or complete cessation (apnea) of airway from the mouth and nose for 10 seconds and it has been demonstrated to be experienced by more than 10% of males above 40 years of age (1). Apnea and hypopnea during sleep, temporal and recurrent nocturnal hypoxia and increased sympathetic activity have been proposed to be the underlying mechanism of ischemic heart diseases, increased stroke risk, hypertension and daytime sleepiness (2-7). Erectile dysfunction (ED) is another condition seen in 30-50% of males with OSAS (8-13). Despite the awareness of this association since 1977, the underlying mechanisms have not been clearly identified and have been suggested to result from multifactorial processes (9,14). Studies have revealed that continuous positive airway pressure (CPAP) treatment have improved sexual functions in approximately 40% of OSAS patients with ED (15).

Margel *et al.* have reported the best improvement in patients with severe OSAS following 1 year of OSAS treatment (16). While the same study s revealed that morning fatigue and the apnea-hypopnea index (AHI) were satisfactory for ED, the parameters associated with ED have not been clearly revealed in the literature.

The present study has aimed to investigate whether ED has improved after 3 months of CPAP treatment in patients who have had different degrees of OSAS.

### MATERIAL AND METHOD

A total of 70 patients, who had been admitted to the Sleep Disorders Unit of Neurology Clinic due to snoring and nocturnal dyspnea, who met the inclusion criteria and who agreed to participate were included in the study. The IIEF-5 form was filled out before commencement of and at the 3<sup>rd</sup> month of OSAS treatment.

The patients who were single, who were above 65 years of age, those who had a known hormonal problem and those who were receiving treatment, those who had received therapy for ED, those with a history of diabetes mellitus, hypertension,

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neurological, psychiatric, vascular diseases, those who smoked or consumed alcohol, those who had undergone prostate surgery, and those who regularly used anti-histamines, beta-blockers or 5-alpha reductase inhibitors, were excluded from the study.

The patients were allocated to three groups according to the AHI scores as mild OSAS (AHI: 5-14), moderate OSAS (AHI:15-20) and severe OSAS (AHI:30 and above) and the patients who did not require treatment were excluded from the study.

Raymond Rosen *et al.* (1977) filled out a scale, which aims at investigating the sexual functions before and after 12 weeks of CPAP treatment (17). The overall score (17-75 points) is obtained from the sum of the subscales of erectile function (1-30 points), intercourse satisfaction (6-15 points), orgasm (6-10 points), sexual desire (2-10 points), and overall satisfaction (2-10 points). The scores obtained from the erectile function subscale were classified as “no ED” (26-30 points), “mild ED” (22-25 points), “mild-moderate ED” (17-21 points), “moderate ED” (11-16 points) or “severe ED” (6-10 points).

## RESULTS

The records of the patients who had been admitted to the Neurology Clinic between March 2015 and January 2018 and who had been diagnosed with OSAS were retrospectively analyzed. A total of 70 patients in who CPAP had been begun due to OSAS, those who were regularly followed-up and those who fulfilled the inclusion criteria were included in the study. The man age was determined as 49,1 ± 12,5 years, and 28 patients (43,8%) were evaluated as mild ED, 12 (18,8%) as moderate and 24 (37,5%) as severe OSAS according to the apnea hypopnea index (AHI). The total testosterone levels were determined as 2,77 ng/ml, 2,75 ng/ml and 2,76 ng/ml, respectively (Table 1).

While the mean IIEF-5 score was determined as 16,6±5,48 in the mild OSAS group, 18,05±6,12 in the moderate OSAS group and 19,45±7,25 in the severe OSAS group before treatment, it was determined as 15,43±7,36, 17,83±3,86 and 18,08±2,19 after 3 months of treatment (p <0.001) (Table 2).

**Table 1** Patient characteristics

Severity of OSAS	Mild (n:28)	Moderate (n:12)	Severe (n:24)	P value
Age (year)	48,1±10,5	48,6±11,6	49,1±11,8	p <0.001
BMI(kg/m <sup>2</sup> )	28,2	28,5	28,6	p <0.001
Total Testosterone (ng/ml)	2,77	2,75	2,76	p <0.001

**Table 2** IIEF-5 scores before and after treatment

Severity of OSAS	Before treatment			After treatment		
	Mild (n:28)	Moderate (n:12)	Severe (n:24)	Mild (n:28)	Moderate (n:22)	Severe (n:24)
IIEF-5 Score	16,6±5,48	18,05±6,12	19,45±7,25	15,43±7,6	17,83±3,86	18,08±2,19
P value	p <0.001	p <0.001	p <0.001	p <0.001	p <0.001	p <0.001

## DISCUSSION

OSAS has been known to lead to ED for a long time. While hypoxic nerve destruction, nocturnal hypertension, sympathetic activity-related vascular anomalies and OSAS-related reduced androgen level have been contributed to as organic causes of ED, psychological factors have been described as apnea-related somnolence and depression (11,18-

21). ED has been shown to improve in 20-33% of patients as a result of the increase in oxygenation and nitric oxide levels through CPAP treatment (16,22-26).

Despite the presence of studies indicating that CPAP treatment is not effective in improving ED, and that it may even cause a further deterioration in ED in 20% of the patients, our study has revealed that both the overall and the subscales IIEF-5 scores have improved; a statistically significant improvement was detected in sexual functions in patients with ED, consistent with literature (10,15,16,27-31).

Fanfulla *et al.* have proposed that ED could result from a hyper-adrenergic response developing at the end of hypoxic episodes (11). A pathology developing in a reduction in nitric oxide (NO) cycle plays the key role. This is suggested to be platelet aggregation and vascular endothelial reaction-related vaso-constriction. Chronic intermittent hypoxia was suggested by McKenna *et al.* (32) to be able to lead to ED through affecting the central nervous system, peripheral nervous system, and peripheral erectile tissue. Spontaneous erection, which develops with complex sexual behaviors as a central neural mechanism, is suggested not to develop due to cerebral damage resulting from chronic intermittent hypoxia. Overstimulation of the sympathetic nervous system due to chronic intermittent hypoxia is suggested to increase the smooth muscle tone and decrease the arterial blood flow, and this is considered as the peripheral mechanism of ED. In erectile tissue, impairment of NO and endothelial physiology have been suggested to impair, and testosterone is suggested to remain inactive and thereby having a reduced effect in erectile tissue (12).

It has been suggested that the hormone profile can lead to ED in OSAS patients. Roizenblatt *et al.* detected that free and total testosterone levels were low in OSAS patients with ED (33). A significant difference was not determined between high and low OSAS groups with ED with regard to the hormone profiles in our study. It was reported that the Testosterone levels could be low due to the high body mass index in OSAS patients.

## CONCLUSION

Prospective studies with larger patient groups are required for clear understanding of the association between OSAS and ED. OSAS patients who have morning fatigue and who are determined to have low O<sub>2</sub> levels and high AHI as a result of polysomnography, are under risk for ED and should undergo a detailed urological analysis.

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