Compliance, Side Effects and Results of CPAP Therapy in Cases with Obstructive Sleep Apnea Syndrome

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Abstract

Continuous positive airway pressure (CPAP) therapy in obstructive sleep apnea syndrome (OSAS) is an efficient method. Epworth Sleepiness Scale and a standard questionnaire were applied to 23 cases (mean age: 57.6±10.7 years; 17 (73.9%) male, 6 (26.1%) female) diagnosed as OSAS with full polysomnography who were prescribed to use CPAP between May 1999 and January 2001. Mean body mass index (BMI) was 30.7±5.9 kg/m^2 in males and 34.4±8.9 kg/m^2 in females, mean apne-hypopnea index (AHI) was 48.9±24.1 and mean duration of CPAP therapy was 234.2±212.6 days (18-810). Fourteen (60.8%) patients were using CPAP for ≥ 6 hours a night in seven days a week. The most common side effect was hyperaemia and erosion of the nose. Dryness of the eyes and upper airways, awaking at night and noise associated with CPAP were more rare complaints. Mean score of Epworth Sleepiness Scale before CPAP therapy was 15.1±5.1 and after therapy it was 5.5±4.6. The difference was statistically significant (p=0.000). No statistical significant correlation was detected between the score after CPAP usage and the duration of CPAP therapy (p=0.274). Symptoms like snoring daytime sleepiness and witnessed apnea were found to be significantly decreased. In conclusion, although side effects predominantly associated with nasal masks limit usage in patients using CPAP, subjective improvement in symptoms is a factor increasing patient compliance.

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Introduction

Obstructive sleep apnea syndrome (OSAS) is a condition characterized by recurrent episodes of upper airway obstruction and accompanying desaturation of oxygen (1). The prevalence of OSAS can be as high as 15% of the population. The most important reasons of morbidity and mortality are cardiovascular complications and accidents resulting from daytime sleepiness (2,3). Nasal continuous positive airway pressure (n CPAP) is approved as a first line therapy in OSAS (4). However, the effectiveness of the treatment is closely related with regular usage. The compliance rates of patients who use n CPAP at home have been reported to range from 68% to 80% (5-8). These data were collected by patient questionnaires (subjective compliance) or time coun-

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ters (objective compliance). Factors that influence compliance are: motivation related with the severity of the symptoms, satisfaction with the treatment style, discomfort when using the n CPAP device, the extent of knowledge on the disease and quality of the follow up (8).

Side effects due to n CPAP treatment are usually associated with the local irritation caused by the nasal mask and leakage from the mouth (4,9). Although symptoms of OSAS improve, these complications may cause discomfort to the patients, resulting in the cessation of the treatment (10). Other serious side effects, such as massive epistaxis (11), meningitis (12) are rare. Nasal side effects most commonly occurring such as nasal dryness, rhinorrhea and pharyngeal dryness are encountered in 15-65% of patients receiving n CPAP (4,9,13,14).

In this study, we evaluated subjective compliance, changes in the symptoms of OSAS and side effects related with n CPAP in 23 patients diagnosed as OSAS.

Materials and Methods

Between May 1999 and January 2001, the patients who were admitted to the Chest Diseases Outpatient Clinic and who were thought to have OSAS were evaluated with a 12 channel Schwarzer GmbH Digital Sleep Comlb 32/Epas 32 polysomnography device (electroencephalography, electrooculography, electromyography-submentalis, oro-nasal airflow, thoracoabdominal movements, oxygen saturation, electrocardiography, electromyography-tibialis, body position, larynx microphone and CPAP measurement) throughout a night sleep. The patients whose apnea hipopnea index (AHI) was ≥ 5 were regarded as OSAS. Twenty-three patients who had a diagnosis of OSAS and who were proposed n CPAP treatment and whose effective pressure was determined by one night manual CPAP titration were included in the study. The patients who had a AHI between 5 and 15 were prescribed CPAP according to the presence of one or more of the following criteria: associated daytime sleepiness, cognitive dysfunction, hypertension, ischemic heart disease and stroke. Body mass index (BMI) and Epworth Sleepiness Scale (ESS) were calculated before CPAP treatment. In the follow up, the evaluation of the ESS was repeated after at least 18 days' usage and the patients were subjected to a questionnaire.

The questionnaire included questions on the use of n CPAP, how many nights in a week, how many hours in a night and whether the use was continued throughout the night. Questions on symptoms of OSAS such as snoring, experienced apnea, daytime sleepiness, waking tired in the morning, morning headaches, dryness of mouth and obstruction of nose were also asked.

The results were evaluated with a scale ranging from 0 to 3. According to this scale, a score of 0 indicated no complaints; a score of 1, occasional complaint; a score of 2, usually present complaint, and a score of 3, continuous complaint.

Questions on side effects related to n CPAP such as the mask fitting too closely to the face or other discomfort related to the mask; congestion or dryness of the nose, rhinorrhea, epistaxis; ulceration, erythema or pruritis of the skin, dryness of the mouth, erythema of the eyes, awakening at night, air swallowing and difficulty of usage were also asked.

Patients using n CPAP more than 5 days a week and more than 4 hours a night were considered as compliant. The numerical average of the answers of the symptoms of OSAS that were asked in the questionnaire were calculated before and after the treatment.

Correlation between n CPAP usage throughout the night and age, BMI, initial ESS (ESS 1), AHI were calculated by the Spearman correlation test. ESS 1 and repeat ESS (ESS 2) were compared with the Wilcoxon test and the relationship between ESS 2 and n CPAP usage duration was evaluated by the Pearson correlation test.

Results

The mean age of the 23 patients included in the study was 57.6±10.7. Seventeen of the patients (23%) were males and 6 (26.1%) were females. Mean BMI was 30.7±5.9 kg/m^2 in males and 34±5.9 kg/m^2 in females. Median AHI of the patients was found 46.0 (q1=40.1, q2=59.2). The severity of OSAS of the patients is shown in Table 1.

Median n CPAP usage period of the patients was 210.0 days (q1=60.0, q2=310.0) showing a wide range from 18 days to 810 days (Table 2).

Eighty-seven percent of patients were using their n CPAP devices every night in a week, 78.3% were using the device continuously during the whole night and 87.6% were using it more than 5 hours. 73.9% of the patients were

Table 1. Distribution of OSAS patients by degree of severity

OSAS Degree	Number of patients	(%)
Mild (AHI 5-15)	2	8.70
Moderate (AHI 15-30)	3	13.04
Severe (AHI ≥30)	18	78.26

Table 2. Duration of n CPAP usage in OSAS patients

(n) CPAP Usage Durations	Number of patients	(%)
0-1 months	2	8.70
1-3 months	7	30.43
3-6 months	0	0.00
6-12 months	11	47.83
12 months and more	3	13.04

using the device 5 nights a week, for at least 4 hours a night. Mean usage period was 5.82±1.82 hrs throughout the night. Age, BMI, ESS 1 and AHI were not related with compliance rates.

The most common complaint of the patients was snoring, followed by dryness of mouth. Snoring, witnessed apnea, daytime sleepiness, awaking from the sleep with air need, morning headaches, dryness of mouth, obstruction of nose decreased or disappeared with n CPAP treatment (Figure 1). The most significant improvement was determined in snoring.

Erythema over the nasal bridge and scarring were the most common side effects of n CPAP application (56.5%). Discomfort due to mask (52.2%) and distress because of the mask (47.8%) were other common side effects. Air swallowing (8.7%) and erythema in the eyes (8.7%) were the least common side effects (Figure 2).

Mean ESS before using the CPAP device (ESS 1) was 15.5±5.1, mean repeat ESS (ESS2) was 5.5±4.6. The difference was statistically significant (p=0.000). ESS2 and usage period were not related significantly (p=0.274).

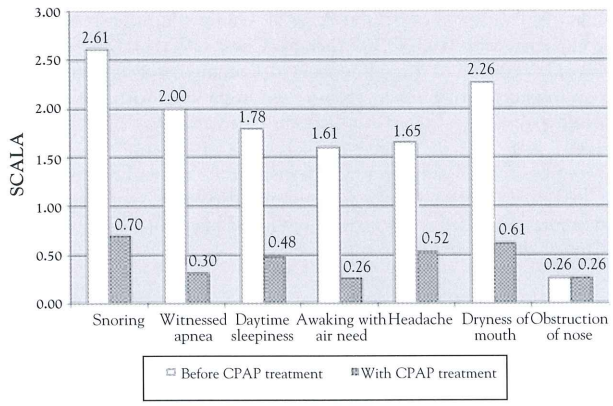

Figure 1. Improvement of OSAS symptoms with n CPAP treatment.

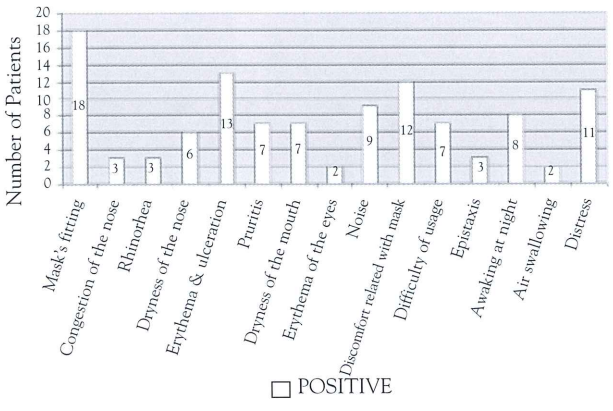

Figure 2. Side effects of n CPAP treatment.

Discussion

Because of accompanying cardiorespiratory complications, development of an effective treatment of OSAS and one which will not lead to any side effects must be encouraged (5). The effectiveness of nocturnal ventilation with n CPAP, which was suggested, by Sullivan and colleagues (15) in the long-term treatment of OSAS has been shown in a number of studies (16,17).

In our study most of our patients were men, as also reported from other clinics in Turkey (18,19), but our patients were older. We investigated the subjective compliance of patients with OSAS, who were treated by n CPAP and the side effects of n CPAP treatment. In accordance with Pépin et al (8), patients who were using n CPAP more than 5 days a week and 4 hours or longer during the night were accepted to comply with the treatment and we found that 73.9% of our patients were compliant. This result was similar to other reported data (5-8). In these studies objective compliance was evaluated and it was established that objective compliance was higher than subjective compliance (20-22) Duration of usage of n CPAP was reported to vary between 4.7 and -6.5 hours in a night (5,14,20,23). In our study, subjective n CPAP compliance was determined and duration of usage was found as 5.82±1.82 hours in a night.

Some studies mentioned that the most important factor related with good compliance was high initial AHI (5,20), while others reported that there was no relationship between AHI and compliance (6,15,21). We did not find any relationship between compliance and BMI, AHI, or ESS 1. Improvement of the symptoms and controlling CPAP education and usage (24,25) were also reported to be associated with compliance (6,24,25). On the other hand, Engelman et al stated that compliance was only related to side effects (23).

In our study, snoring was the most common OSAS symptom, followed by mouth dryness. All symptoms associated with OSAS showed a decrease after n CPAP treatment. Similar results are reported in some studies (20,26). In a study by Pépin et al, only 1% of patients had no subjective benefit from n CPAP treatment, while 75% showed an improvement in sleep quality and 65% had a decrease in snoring and daytime sleepiness (14).

Among the known side effects of the n CPAP device, complaints about the mask, especially erosion over the nasal bridge are common (5,14). In our study, also erythema and scarring over the nose, which developed in 56.5% of patients, were common side effects. It was suggested that, side effects could be reduced by made to order individual masks. All our patients were using silicon masks. We did not determine any relationship between side effects and compliance.

Although the duration of n CPAP usage showed a wide range in our patients, we did not find any relationship between the change in ESS and compliance. The acceptable reason for including patients with very different treatment durations

is the decrease of symptoms like daytime sleepiness and snoring even with only 3 hours a night treatment (8).

In conclusion we can state that we found an improvement of OSAS related symptoms in patients who were treated with n CPAP. Although side effects may restrict regular usage, many of the patients were found to be compliant. This is attributed to the motivation that resulted from the improvement of symptoms. There is a need for larger trials and investigation of objective compliance.

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