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Consequences of Sleep Apneas Syndrome in Poor CPAP Compliers

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Abstract

Obstructive sleep apnea/hypopnea syndrome (OSAS) is a disease with an important impact on human health, with an increasingly prevalent, because of the increased life expectancy and the greater knowledge and diagnosis of this disease. Its main treatment is the Continuous Positive Airway Pressure (CPAP), which reduces the harmful effect of this disease. Therefore, the early diagnosis and treatment is very important, as well as adherence to treatment. The study analyzes the differences in the incidence of cardiovascular events in patient diagnosed with OSAS who uses CPAP and those who do not use it or use it <4 hours a day, as well as deaths from vascular causes, the incidence and severity of kidney failure and cancer. In addition, the epidemiological characteristics of patients diagnosed with ASOS and adherence to treatment are described. This is a retrospective cohort study. The statistical analysis will be carried out using the SPSS program.

Keywords: Sleep Apnea; CPAP; Adherence; Stroke; Cardiovascular Events

Abbreviations: OSAS: Obstructive sleep apnea/hypopnea syndrome; CPAP: Continuous positive airway pressure.

Introduction

Obstructive sleep apnea/hypopnea syndrome (OSAS) is characterized by the presence of repeated episodes of complete (apnea) or partial (hypopnea) upper airway obstruction because the soft parts of the throat collapse and become occluded during the sleeping time [1]. Patients with OSAS used to stop breathing for 10 seconds to more than 1 minute, with many frequency in one night. These obstructions cause a significant reduction in the amount of oxygen available in the blood and multiple unaware awakenings, which lead to non-restorative sleep that is the cause of excessive daytime sleepiness and fatigue that these patients present [1,2].

It has been assessed that OSAS is an independent risk factor for vascular disease and should be present in the assessment of cardiological and neurological patients especially. The latest studies also point to its relation with kidney and tumor disease [3-6].

Continuous positive airway pressure (CPAP), applied during sleep, is the most important treatment for SAHS, reducing and/or eliminating obstructive events, although there is sometimes poor adherence to treatment. Effective treatment potentially reduces complications [7-11].

Objectives

Principal Objective

Analyze whether CPAP, used 4 or more hours/day, reduces the occurrence of cardiovascular events in patients diagnosed with OSAS.

Secondary Objectives

Analyze whether CPAP, used 4 or more hours/day, reduces the apparition of renal insufficiency in patients diagnosed

with OSAS, the degree of it (need for hemodialysis and kidney transplantation) and incidence of neoplasia.

a) Describe the epidemiological characteristics of patients diagnosed with OSAS at Hospital San Pedro of Logroño, in the period between 2003-2004.

b) Identify the clinical characteristics in patients with OSAS.

c) Assess the percentage of patients with good compliance with CPAP treatment.

d) Assess the main causes of rejection or poor compliance with CPAP treatment.

e) Estimate the incidence of cardiovascular events in patients diagnosed with OSAS in a 10-year follow-up.

Methodology

Design

It is a retrospective cohort study, in which the information comes from a database provided by the respiratory therapy company, which lists all patients diagnosed with OSAS (2003-2004) and has been medical monitored for 10 years. Two cohorts were analyzed; our study cohort consisted in patients who used CPAP for 4 or more hours on average per day, and the comparison cohort were patients diagnosed with OSAS who used CPAP for less than 4 hours per day or abandoned it.

Population

Patients diagnosed with SAHS and who began treatment with CPAP in the period of time from 2003-2004.

Inclusion criteria

Patients diagnosed with SAHS and who began treatment with CPAP in the period of time from 2003-2004.

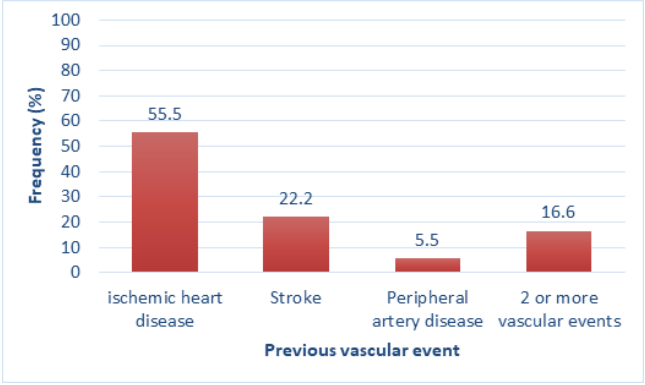
Exclusion criteria

None

Results

163 patients were analyzed, with important differences in sex, since 14.1% were women and 85.9% men (Graph 1). The mean age was 56.2 years (DS: 11.6). Only in 43 patients (26.3%) is the profession recorded in the medical history. Of them: 1st sector: 20.9%, 2nd sector: 46.5%, 3rd sector: 27.9% and 4th sector: 4.6%.

Of the 163 patients studied, 11.0% had a background of cardiovascular events at diagnosis. Of these, 55.5% had presented ischemic heart disease, 22.2% stroke, 5.5% peripheral artery disease and 16.6% of patients had 2 or more history of vascular event (Graph 2).

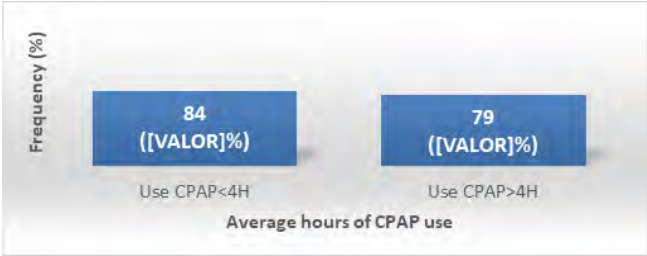


Graph 2: Prevalence previous vascular event.

The 77% of the patients, 126, cardiovascular risk factors were added to the diagnosis. HBP was found in 54.6%, DLP in 28.8%, DM in 20.2% and BMI> 30 in 49.0%. 6.7% presented the 4 associated risk factors.

Regarding smoking, we found that 33.6% were smokers, 43.6% non-smokers and 22.8% ex-smokers.

At 10 years of follow-up, the mean time of use of CPAP treatment per day was analyzed, and it was obtained that seventy-nine patients, 48.4%, used CPAP 4 hours or more per day (mean of 7.1h / day). In contrast, 51.5% (84 patients) used it less 4 hours per day, and of them 76.2% abandoned the treatment (Graph 3).



Graph 3: Adherence to CPAP.

The median time that CPAP is maintained until abandonment is 13.5 months (50% abandon at 13.5 months), and the rest, use it an average of 1.9h / day, SD (DS): 1.3, range 0.1-3.7. The main reason for dropping out is due to intolerance (89.1% of cases), and in 8.1% due to weight loss.

The mean apnea hypopnea index (AHI) of patients who had been treated with CPAP was 53, median 49.8, interquartile range 26.4, (range 22.2 to 115.4) and the mean EPWORTH was 13.7, range 3 -25.

26.3% (43) presented some vascular event in 10 years after diagnosis. Of these events, 58.1% were ischemic heart disease, 25.5% were stroke, and 16.3% were peripheral artery disease. Of the 43 patients, 16.2% had two vascular events, which are divided as follows: 11.6% had ischemic heart disease and peripheral arterial disease and 4.6% had stroke and peripheral arterial disease (Graph 4).

Graph 4: Incidence of vascular events in follow-up.

The mean age of onset of vascular event is at 66.4 years, DS: 9.4, range 45-84 years, and the mean time to onset after SAHS diagnosis is 5.3 years DS: 3.3, range 0.3-11.3, median 5.6.

65.6% had some hospital admission during the follow-up, the mean admissions are 2.7, DS: 3.4, range 1-30, median 2. It should be noted that 15.3% of the patients die during the follow-up. Of these, 36% were due to vascular causes. The mean age at which they died was 70.4 years, DS: 7.8, range 56-83. Then, the two groups were analyzed separately. On the one hand those who use CPAP for less than 4 hours a day and on the other hand, those who use it for 4 hours or more. First, a homogeneity analysis was performed to verify that there are no significant differences between them and to be able to compare them.

They were obtained the following results (Table 1).

Variables	CPAP<4h/D (N:84)	CPAP≥4h/D (N:79)	P Value	Statistical Significance
AGE	55,2 (11,5)	57,3 (11,7)	0,45	Not significant
(X, DS, range)	33-77	32-79		
SEX Man	75 (46,0%)	65 (39,8%)	0,19	Not significant
Woman	9 (5,5%)	14 (8,6%)		
History of vascular disease	12 (14,3%)	6 (7,6%)	0,17	Not significant
FRCV	63 (75,0%)	63 (79,8%)	0,47	Not significant
TOBACCO	28 (38,4%)	22 (29,0%)	0,46	Not significant

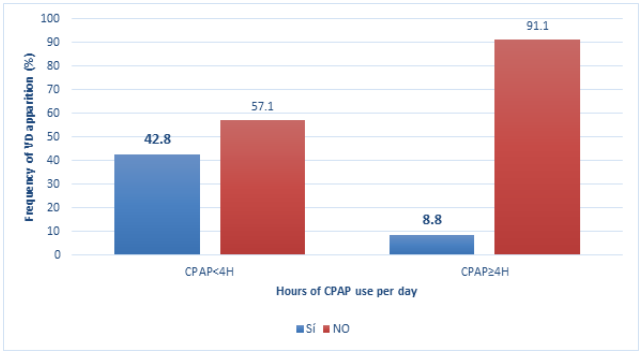
Therefore, it is concluded that the two groups are homogeneous and comparable.
Table 1: Homogeneity analysis of the two study groups.

With all this information, it is possible to proceed to a comparative analysis of the two groups, to demonstrate if there are differences in the appearance of vascular events in the 10 years following diagnosis, in patients who use CPAP correctly and therefore protect themselves from the syndrome of Obstructive sleep apnea, against those who use it for less than 4 hours or abandon the treatment and therefore do not correct this problem (Table 2).

Hours of Vascular Event CPAP	Yes	No	Sample Size (n)
CPAP<4H/D	36 (42.8%)	48 (57.1%)	84 (51.5%)
CPAP≥4H/D	7 (8.8%)	72 (91.1%)	79 (48.4%)
	43 (26.3%)	120 (73.6%)	163

They are analyzed using chi square, obtaining statistically significant results with a p-value of 0.0001.
Table 2: Incidence of vascular events as a function of CPAP adherence.

In the same way, the relative risk is calculated: 4.84 with a CI 2.29-10.23, so we can affirm that patients who Do Not Use CPAP Correctly have a relative risk of suffering a vascular event of 4.8 Greater Than Those Patients Who Do (Graph 5).

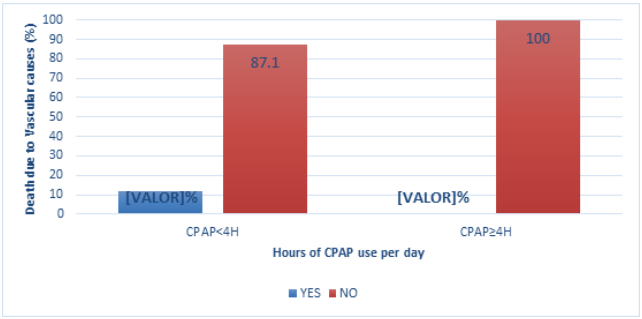


Graph 5: Incidence of vascular events as a function of CPAP adherence.

The statistically significant differences (p <0.001) in deaths from vascular causes between the two groups studied should also be highlighted (Table 3 & Graph 6).

Hours of use Vascular death CPAP	Yes	No	Size (n)
CPAP<4H/D	10 (11,9%)	74 (87,1%)	84 (51.5%)
CPAP≥4H/D	0 (0%)	79 (100%)	79 (41.4%)
	10 (6.1%)	153 (93.8%)	163

Table 3: Incidence of death due to vascular cause as a function of CPAP adherence.

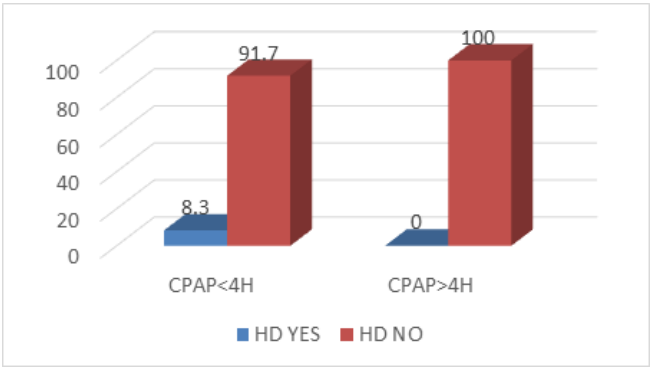


Graph 6: Incidence of death due to vascular cause as a function of CPAP adherence.

Regarding the appearance of atrial fibrillation in the observed populations, it is observed that there is atrial fibrillation in 17.1% in the population that uses CPAP <4h and 21.1% in those that use it> 4h, statistically non-significant differences (Chi squared).

Regarding renal failure, on the one hand, it was found in 11.8% in patients with poor adherence to CPAP and 15.5% in those with good adherence, without being statistically significant differences. On the other hand, kidney failure in patients with good use of CPAP is less progressive and milder, since in this group 0% of patients required hemodialysis, and in the group with poor use of CPAP 8.3% statistically significant difference (p = 0.027), presenting a relative risk of 1.09.

The same happens with those who undergo kidney transplantation, of those who use less than 4hours the CPAP, 6.3% had a kidney transplant, and those who used it correctly 0%, with a significance of 0.05 and a relative risk of 1.075 (Graph 7).



Cancer incidence was also analyzed, with 11.8% incidences in patients who used CPAP <4h and 16.9% in those who used it> 4% without statistically significant differences.
Graph 7: Hemodialysis as a function of CPAP adherence.

Discussion and Conclusion

In La Rioja, SAHS is more prevalent in middle-aged men, who, frequently, associate cardiovascular risk factors with the diagnosis, mainly hypertension and obesity. Up to 11.0% had suffered a cardiovascular event at diagnosis. Approximately half of the patients (51.5%) do not use the treatment long enough, with 25% abandonment mainly due to intolerance. Data much lower than the Spanish average, which adherence to treatment is approximately 70%. Therefore, it is necessary to adopt measures to improve adherence to treatment and prevent further complications.

As we also showed in the study, OSAS is an important vascular risk factor, and CPAP is a protective factor for such events in patients with this disease. When is not used a minimum of 4 hours a day or treatment is abandoned, the relative risk of suffering ischemic heart disease, stroke, and peripheral arterial disease increases substantially (RR: 4.8) in a statistically significant way. Furthermore, all deaths from vascular causes occurred in the group of patients who did not use the device correctly. Its relationship with the severity of kidney failure has also been demonstrated, because of the

significant differences that has been in patients requiring dialysis and kidney transplantation. The most frequent cancers in the poor CPAP compliers were prostate, digestive and breast cancers. Very relevant data to adopt the necessary measures for its correct diagnosis and treatment.

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