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Obstructive Sleep Apnea in the Elderly: A Distinct Entity?

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Abstract

***Introduction:** Elderly patients have age-related changes, anatomical and physiological, that predispose to obstructive sleep apnea (OSA). Symptoms and long-term consequences of OSA might differ from younger patients, but more studies are required.*

***Objectives:** To compare the characteristics of OSA in the elderly and younger patients.*

***Methods:** Retrospective study including patients with OSA (apnea hypopnea index, AHI, ≥5 with symptoms/ comorbidities or ≥15), divided in two groups: elderly (≥65 years) and younger patients (<65 years), selected from Pulmonology consultation.*

***Results:** A cohort of 328 patients with OSA was selected. In the elderly group (n=92), there were higher body mass index (BMI=29.9±8 kg/m^2), Mallampati class IV (55%), Beck depression score (median 9±15), complaints of nocturia, erectile dysfunction and impaired libido. On the other hand, daily somnolence, respiratory pauses, snoring and headaches were more prevalent in younger patients. Sleep study results revealed higher wakes after sleep onset (WASO=119±56 minutes, p=0,253) and AHI (22±26, p<0,001) in the elderly group. There was a positive correlation between AHI and BMI (r=0,163; p=0,004), AHI and age (r=0,202; p<0,001). There were lower minimal (80±13%, p=0,004) and mean saturation values (92±4%, p<0,001) in this group. Older patients also had a statistically higher prevalence of severe OSA (38%, p<0,001).*

***Conclusions:** In this analysis, we found significant differences in symptoms and sleep study results, between young and older patients. We infer that OSA in the elderly might be a different entity that requires a different management.*

Keywords: *obstructive sleep apnea; elderly; management*

Introduction

Sleep disordered breathing (SDB) describes respiratory disorders that occur periodically during sleep. [1] It includes obstructive sleep apnea (OSA), central sleep apnea, Cheyne-Stokes respiration, high-altitude periodic breathing, nonobstructive hypoventilation or hypoxemia disorders. [1,2] The prevalence of SDB increases with age. However, despite a prevalence of 20-40% in older patients, it is frequently underdiagnosed. [1]

There are specific risk factors associated with advanced age that predispose to OSA. [1,3] They include a reduction in pharyngeal muscle function that leads to airway collapse, age-related differences in pharyngeal morphology that lead to increased airway resistance, impaired central control of breathing that cause more arousals and respiratory instability, and the presence of multiple comorbidities, especially heart failure.[1]

Older patients tend to have a more fragmented sleep, with more arousals and altered sleep stages, and their symptoms might be devalued, leading to a delay in the diagnosis of a SDB.[1,2] Frequent symptoms include excessive sleepiness, fatigue, inattention, snoring or respiratory pauses.[5] A complete clinical history

of pathological background, symptoms, witnessed events (sleep apneas) and objective examination are fundamental in the diagnosis. These findings should be corroborated with polysomnography study (≥5 obstructive respiratory events/hour with symptoms or ≥15 obstructive respiratory events/hour without symptoms).[4,5] Despite being somewhat a distinct entity, OSA in the elderly still has the same diagnostic criteria as the general population and more data is required.[5]

Untreated SDB might worsen comorbidities, cognitive and functional outcomes and increase mortality.[1,3,5] Older patients might experience different consequences of SDB and it remains unclear if the same management should be applied.[1,6] General treatment of SDB includes adoption of a healthy lifestyle and sleep routine, weight loss, smoking cessation and optimized comorbidities treatment. Some patients require oral mandibular advancement splints, or continuous positive airway pressure (CPAP) in more severe cases.[1,6]

Data regarding OSA in the elderly is lacking and current understanding of this entity and its complications is limited. However, its incidence is increasing and further investigation is urgent.[5] With this study, we aimed to compare the characteristics of OSA in older and younger patients and infer about a different entity.

Methods

Study Design

We developed a retrospective study including a cohort of adult patients diagnosed with OSA, selected from pulmonology consultations, who underwent sleep study test.

The patients were divided in two groups for comparison: elderly (patients with ≥65 years-old) and younger patients (aged 18-64 years-old).

Inclusion Criteria

Adult patients diagnosed with OSA (apnea hypopnea index, AHI ≥5 with symptoms/comorbidities, or ≥15).

Exclusion Criteria

Patients with other sleep disturbances were excluded.

Objectives

With this retrospective study, we aimed to infer if OSA in the elderly is different from younger patients. We wanted to analyze and compare the differences of baseline characteristics, symptoms and sleep study results.

Data Analysis

We evaluated patients' baseline characteristics, including gender, age, body mass index (BMI), pathological background, diagnosis and sleep study results.

Data was analyzed using IBM SPSS Statistics v23. We used mean (± standard deviation) and median (± interquartile range) to analyze patients' values, and independent t-tests or Mann Whitney tests (if the variable distribution was parametric or non-parametric, respectively) to characterize statistical significance of the results. Chi-squared tests were used to compare nominal variables. Spearman correlations were used to compare continuous variables. A p-value of ≤0,05 was considered statistically significant.

Only valid percentages were used.

Ethics Approval

This study has been approved by the Hospital Ethics Commission and Administrative Council.

Results

Cohort Characteristics

A cohort of 328 patients with OSA was selected and divided in 2 groups (Table 1). In the elderly group (n=92), there was a prevalence of male gender (n=49; 53,3%) and mean age was 71±6 years-old. In the younger group, there was also a prevalence of males (n=159; 67,4%) and mean age was 50±9 years-old.

The elderly had higher BMI (median 29,9±8 kg/m^2; p=0,347) and Mallampati class IV (n=11, 55%; p=0,424), compared with younger patients, but with no clinical significance. Median Beck depression score was 9±15 in this group (p=0,132).

Older patients reported more complaints of nocturia (n=25; 35,7%; p=0,037) and erectile dysfunction (n=7; 77,8%; p=0,055) and impaired libido (n=10; 47,6%; p=0,891). On the other hand, headaches (n=47; 24,2%; p=636), excessive daily somnolence (n=120; 57,1%; p=0,759), snoring (n=201; 92,2%; p=0,046) and witnessed respiratory pauses (n=119; 60,7%; p=0,225) were more prevalent in younger patients.

Table1. *Patients' baseline characteristics.*

Characteristics	Elderly	Young	p Value
Total of patients, n (%)	92 (100)	236 (100)	
Females	43 (46,7)	77 (32,6)	0,021
Age (years), mean (SD)	71 (6)	50 (9)	<0,001
BMI (kg/m^2), median (IQR)	29,9 (8)	29,4 (6,4)	0,347
Mallampati class IV, n (%)	11 (55)	20 (41,7)	0,424
Beck depression score, median (IQR)	9 (15)	5 (10)	0,132
Epworth scale, mean (SD)	9 (5)	10 (6)	0,203
Symptoms, n (%)			
Nocturia	25 (35,7)	42 (22,8)	0,037
Erectile dysfunction	7 (77,8)	11 (36,7)	0,055
Impaired libido	10 (47,6)	22 (45,8)	0,891
Headaches	15 (21,4)	47 (24,2)	0,636
Excessive daily somnolence	43 (55,1)	120 (57,1)	0,759
Snoring	71 (84,5)	201 (92,2)	0,046
Respiratory pauses	40 (52,6)	119 (60,7)	0,225

SD, Standard Deviation; BMI, Body mass index; IQR, Interquartile range.

Sleep Study Results

Sleep study results revealed the elderly had higher wakes after sleep onset (WASO=119±56 minutes; p=0,253) and AHI (22±26, p<0,001) (Table 2). They also had the lowest values of oxygen saturation, with a median of 92±4% (p<0,001), a minimum of 80±13% (p=0,004), spent more time with saturation <90% (T90= 6,6±35 minutes; p<0,001) and had higher oxygen desaturation index (ODI= 17±27%; p=0,011).

Older patients had a statistically significant higher prevalence of severe OSA (n=35; 38%; p<0,001).

We found positive statistically significant correlations between AHI and BMI (r=0,163; p=0,004) and between age and AHI (r=0,202; p<0,001).

Table2. *Sleep study results.*

Variables	Elderly	Young	p Value
Total sleep time (hours), median (IQR)	7 (2)	7 (2)	0,617
Sleep Latency (minutes), median (IQR)	15 (48)	15 (25)	0,671
Sleep Stage (minutes), median (IQR)			
S1	50 (43)	51 (26,3)	1
S2	169 (38)	195 (95)	0,126
S3	76 (74)	55 (43)	0,731
WASO (minutes), mean (SD)	119 (56)	93 (59)	0,253
AHI (n/hour), median (IQR)	22 (26)	14 (16)	<0,001
SatO2 (%), median (IQR)	92 (4)	94 (3)	<0,001
Lowest SatO2 (%), median (IQR)	80 (13)	82 (11)	0,004
T90 (minutes), median (IQR)	6,6 (35)	2,3 (13,1)	<0,001
ODI (%), median (IQR)	17 (27)	12 (18)	0,011
OSA Classification, n(%)			
Mild	32 (34,8)	120 (50,8)	0,009
Moderate	24 (26,1)	75 (31,8)	0,313
Severe	35 (38)	41 (17,4)	<0,001

IQR, Interquartile range; WASO, Wake after sleep onset; SD, Standard deviation; AHI, Apnea hypopnea index; SatO2, Oxygen saturation; T90, Time with oxygen saturation <90%; ODI, Oxygen desaturation index; OSA, Obstructive sleep apnea.

Discussion

There are anatomical and physiological characteristics of elderly patients, associated with multiple comorbidities, that, together, predispose to SDB in this population.[1]

With this study, we aimed at analyzing a cohort of patients with OSA and compare the differences among older and younger ones. We found that older patients with OSA present differently, since they had significant more symptoms of nocturia (p=0,037) and snoring (p=0,046). Also, these patients had more severe OSA (p<0,001) with consequently increased AHI (p<0,001) and lower oxygen saturation (p<0,001), which means they require different CPAP settings. There was a positive correlation between age and AHI values (r=0,202; p<0,001).

OSA is more prevalent in the elderly, might present differently, have higher severity and, therefore, be considered a different entity.[5,7,8] There is still uncertainty about the long-term consequences of the disorder in this population, but subgroups of patients appear to have increased risk of mortality. Until further clear evidence, it is likely that novel diagnostic and therapeutic approaches remain underdeveloped. Larger prospective trials are, therefore, required. [5,7,9,10]

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