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Case Report

A Case of Positional Obstructive Sleep Apnea

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Abstract

Obstructive sleep apnea (OSA) is the most common sleep-related breathing disorder. OSA is characterized by recurrent obstruction of the pharyngeal airway during sleep, resulting in reduced (hypopnea) or complete cessation (apnea) of airflow despite ongoing breathing efforts.

One phenotype of OSA is positional obstructive sleep apnea (POSA); in this condition sleep-related obstructive events occur predominantly in the supine position. Its prevalence is underestimated, because there is no consensus on the definition. Treatments for POSA include behavioral and lifestyle modifications, continuos positive airway pressure therapy, positional therapy (PT), which in the last years, has become more reliable for patients with the use of new device.

We present a POSA's case treated with benefit with positional therapy.

Keywords: *Obstructive Sleep Apnea; Positional Obstructive Sleep Apnea; Positional Therapy*

Introduction

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder that occurs when the muscles relax during sleep, causing soft tissue in the back of the throat to collapse and close the upper airway [1]. In accordance with the American Academy of Sleep Medicine (AASM), the definition of OSA is that this condition is a specific sleep disturbance, characterized by recurring apneas (cessation of airflow for 10s or longer) or hypopneas (reduction of respiratory flow by at least 50%, for at least 10 seconds) associated with a reduction in oxygen saturation [1].

The prevalence of OSA (apnea-hypopnea index ≥ 5 events per hour) in individuals between 30 and 70 years is 26% in the U.S [2]. The severity of the disease is mainly defined on the basis of the apnea hypopnea index (AHI). It is a measurement index given by the sum of apneas and hypopneas for each hour of sleep: patients with an apnea-hypopnea index (AHI) < 5 are considered normal subjects or simple snorers if night snoring is present. Patients with an AHI > 5 to < 15 are classified as mild OSA, those with an AHI > 15 to < 30 are considered moderate OSA and patients with an AHI > 30 are classified as severe OSA [1].

The frequency and duration of apneas could be varied also by body position.

Patients, with variations in the number/duration of apneas/hypopneas related to changes in their sleeping position, have been defined as position-dependent OSA (POSA) patients [3-5].

It occurs in > 50% of adult OSA patients.

There is no consensus about the classification of POSA: in the literature are proposed various classification systems. Cartwright's classification was the first [6]; recently has been proposed the Amsterdam Positional OSA Classification (APOC) [7,8]. It considers the

total sleep time (TST) in both the best sleeping position (BSP) and worst sleeping position (WSP), as well as the grade of AHI reduction in the best sleeping position: greater than 10% of the total sleep time (TST) in both the best sleeping position (BSP) and worst sleeping position (WSP). The patients with POSA are APOC 1 if AHI < 5 was present in BSP; APOC II if the AHI in the BSP falls into a lower OSA severity category than the overall AHI; and APOC III with an overall AHI > 40 AHI in BSP > 25% reduction compared to overall AHI [8,9].

Continuous positive airway pressure (CPAP) is the primary treatment for most adults with OSA, however some patients don't accept or cannot tolerate [10].

Use of oral appliances, nasal resistors, oropharyngeal exercises, surgical therapy are other interventions necessary for different phenotypes of OSA patients [11]. Other therapeutic advices are behavioral measures, including weight loss when indicated, frequent physical exercise, avoidance of alcohol and sedative medication before bedtime [8].

For treatment of POSA there is no consensus: CPAP and positional therapy (PT) with the use of new devices are the proposed treatments. APOC seems to be more helpful to identify patients candidates for PT [8]. The patients with APOC I theorically could be cured with only PT, APOC II could reduce the severity of OSA with positional therapy (PT) and other available methods, APOC III patients with severe OSA (AHI > 40/h) could obtain the reduction > 25% of AHI with PT and other therapies [8].

We describe a POSA's case treated with benefit with PT.

Case Report

A 64 yrs old man nonsmoker with hypertension, with BMI 21 Kg/m^2 was admitted to our sleep surgery department for excessive daytime sleepiness, loud snoring, morning headache, difficulty in concentrating during the day.

His neck circumference was of 38 cm. The Epworth sleepiness scale showed a high degree of sleepiness, with a score of 16/24 [12] and the 6-point STOP Bang questionnaire revealed a suspicion of OSA [13]. The Mallampati classification value was 2.

The patient underwent home sleep test (HST) in room air. Apneas, hypopneas, and apnea-hypopnea index (AHI) were defined per current criteria (1). Events of obstructive apneas (OA), central apnea (CA), number of mixed apnea (MA), number and events of hypopnea (H) and average of arterial saturation (SpO_2 average%) with time of desaturation (T < 90%) respiratory movement and airflow, number of desaturation for hour (ODI), heart rate, patient's position, and sleep time were analyzed.

The examination revealed POSA APOC I.

Baseline HST:

- TST (Total sleep time) 5h 58 min., % Time in supine position 39%, % Time in non-supine position 61% (Time left position 24%, Time right position 37%).
- Snoring time = 10 min, % snoring in supine position 99%, % snoring in non-supine position 1%.
- Number of respiratory events: Obstructive n. 88, Mixed n. 5, Central n. 7, Hypopneas n. 17.
- AHI 19,6/h, AHI in supine position 47/h, AHI non supine position 1,9/h (AHI left position 1,4/h, AHI Right position 2,3/h.
- Oxygen desaturation index: 15/h.

- Mean SpO_2 96%.
- T < 90% 1.6%.

The patient was treated with TP using neck-worn vibrating device with benefit and good correction of polygraphic indexes (AH residual index 3/h, %time in supine position 2%). At the 3 months follow-up the patient's quality of life had improved, with a decline in ESS to 9/24 and great adherence.

Discussion

In patients with OSA, the frequency and duration of apneas could be influenced by body position. Patients, with variations in the number/duration of apneas/hypopneas related to changes in their sleeping position, have been defined as POSA patients.

Cartwright's first description of POSA dates back to 1984, using an arbitrary cut off point of a difference of > 50% in apnea index between supine and lateral sleep position. In the last years is used the APOC classification according the following criteria: the patients should be diagnosed with OSA according to the AASM criteria and patients spend greater than 10% of TST in BSP and WST [7].

Our case with POSA is resolved with use of PT: this treatment forces the subject to sleep on the side. From the various more traditional methods used for years (sewing a pocket in the back of the pajamas, where to insert one or more tennis balls, wearing a rigid backpack, using a particular pillow that allows you to stay only on the side), new devices are more effective and are based on a good vibrotactile in the neck or chest: when the patient assumes the supine position, a vibration starts which continues until the change of body position. CPAP is the first line of treatment for moderate to severe OSA, but compliance with this therapy sometimes is poor. PT has been shown to be an effective, conservative option for management of POSA [14] and in particular it seems to be useful in elderly patients classified as APOC I [15].

In a very recent systematic review which evaluated 8 different studies, PT seems to be less effective than CPAP in POSA's therapy, but it has the advantage of greater therapeutic adherence [16,17].

Conclusion

There is no shared consensus about the classification of POSA. APOC is recently introduced and seems to be the best system aimed at facilitating the identification of suitable candidates for PT.

Randomized controlled studies with larger sample size are needed to value clinical advantages of PT over CPAP in adult populations and to determine its efficacy on adherence and longer-term effects.

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