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ORIGINAL ARTICLE

Pay attention to treating a subgroup of positional obstructive sleep apnea patients

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KEYWORDS

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Background/purpose: Positional obstructive sleep apnea (OSA) is defined as an apnea hypopnea index at least twice as high in the supine position as in the lateral position. Whether a positional OSA patient persistently has positional OSA in the follow-up period is unknown. This study was conducted to investigate the maintenance of the positional effect on OSA patients and the predictors of changing from positional OSA to nonpositional OSA.

Methods: Patients who were diagnosed to have positional OSA were screened for a follow-up polysomnography (PSG), which evaluated the effect of the same lateral position as baseline PSG on the severity of OSA. Those who met the criteria of positional OSA in both PSGs were classified as the unchanged group, the others were classified as the changed group.

Results: Seventy-eight positional OSA patients were enrolled in the final analyses. Twenty-seven of the enrolled patients (35%) were changed to nonpositional OSA patients in the second PSG. A higher apnea index in the lateral position was found in the changed group compared with that in the unchanged group ($p = 0.02$). Logistic regression also showed that the apnea index in the lateral position was the only independent predictor of changing from positional OSA to nonpositional OSA in the follow-up PSG (odds ratio = 1.13, $p = 0.004$).

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

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Conclusion: One-third of positional OSA patients who had a high apnea index in the lateral position tends to become nonpositional OSA patients in the follow-up PSG and must be closely monitored if receiving positional therapy only.

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Introduction

Obstructive sleep apnea (OSA) affects approximately 9–28% of middle-aged adults in developed countries, and is an independent risk factor for cardiovascular morbidity and poorer health outcomes in several disorders.^{1–3} At present, OSA is diagnosed by polysomnography (PSG), which is measuring and analyzing electrographic physiological signals during sleep.⁴ The apnea–hypopnea index (AHI), defined as the average number of apnea and hypopnea events per hour during sleep, is used to define the disorder and evaluate the severity of OSA.^{4,5}

Positional OSA was first described by Cartwright⁶ in 1984 and is defined as an AHI at least twice as high in the supine position as in the lateral position. Since the introduction of Cartwright's criteria, several other criteria have been proposed by other investigators, such as “an AHI of less than 5/h while in the nonsupine position as well as a decrease in the AHI by more than 50%” by Mador et al,⁷ “a supine AHI \geq 10/h, together with a lateral AHI $<$ 10/h” by Marklund et al,⁸ and “overall AHI \geq 15/h, supine AHI \geq twice the nonsupine AHI, with \geq 20 minutes of sleep in supine and nonsupine postures and nonsupine AHI $<$ 15/h” by Bignold et al.⁹ The prevalence of positional OSA among all OSA patients has been reported to range from 26.7% to 74.5%.^{7,10–14} In general, positional OSA is diagnosed according to the AHI at different positions in PSG.

Positional therapy is an alternative option for OSA treatment. Positional therapy being relatively more convenient and comfortable, its compliance is better than that of continuous positive airway pressure (CPAP) treatment.¹⁵ However, the long-term benefit of positional therapy on outcomes of OSA patients is unclear. Furthermore, whether a positional OSA patient remains to be a positional OSA patient in the follow-up period is unknown. This study was conducted to investigate how many positional OSA patients will change to nonpositional OSA patients in the follow-up PSG and what the predictors of changing from positional OSA to nonpositional OSA are from the baseline PSG.

Methods

Study design and setting

This retrospective analysis was performed using the pooled PSG database at a teaching hospital in Taiwan. The National Health Insurance System covers PSGs in Taiwan. OSA patients are required to undergo PSGs periodically (at intervals of 6 months to 2 years, depending on their severity of OSA) if they want to qualify for or continue disability

certification. Thus, we had repeated PSG results from patients in our laboratory database. No split-night PSG was performed in our laboratory, and all results were from full-night PSG.

Patient selection

This study was approved by the Research and Ethics Committee of Chang Gung Memorial Hospital, Taiwan (IRB 102–4270B). Patients 20 years and older with PSG performed between January 2010 and December 2011 were screened for positional OSA. We excluded patients with an AHI of $<$ 15/h, those without \geq 20 minutes of sleeping duration in both the supine and the lateral position during PSG, and those who did not meet the criteria of positional OSA (Figure 1). All positional OSA patients were screened for a follow-up PSG. A total of 84 patients had the follow-up PSG, which was with \geq 20 minutes of sleeping duration in both the supine position and the same lateral position as the baseline PSG. Six of these patients underwent repeated PSG for postsurgical treatment follow-up and were excluded from final analyses.

Definition of positional OSA

The positional OSA defined by Cartwright⁶ is an AHI at least twice as high in the supine position as in the lateral position. However, when reviewing the patient's PSGs, we found that many patients were in the lateral position for a few minutes, which had a significant influence on the value of AHI in the lateral position. Only Bignold et al⁹ defined the minimal required duration for the supine and nonsupine positions in their report. Referring to studies by Cartwright⁶ and Bignold et al,⁹ the definition of positional OSA in our study was an AHI at least twice as high in the supine position as in the lateral position, with \geq 20 minutes of sleep in supine and nonsupine postures.

Definition of the unchanged and changed groups

The patients who met the criteria of positional OSA in both baseline and follow-up PSGs were classified as the unchanged group, and those who did not qualify as positional OSA patients in the follow-up PSG were classified as the changed group.

Confounding factors

To investigate the possible confounding factors that may have resulted in the change from positional to nonpositional OSA, the interval between two PSGs, changes of body

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