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Sleep apnea headaches

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ABSTRACT

Obstructive sleep apnea syndrome (OSAS) is a common disorder characterized by recurrent apnea during sleep. Nocturnal laboratory-based polysomnography (PSG) is the gold standard test for diagnosis of OSA. The sufferers may complain from daytime sleepiness, snoring or occasional headaches. Serious consequences such as cardiovascular complications, stroke or symptoms of depression may complicate the syndrome. Headache prevalence due to sleep apnea is estimated 1%-2% in general population and affects 2%-8% of middle age population. Morning headache is more common in the OSAS patients. OSAS patients present with various characteristics of morning headache. Treatment with continuous positive airway pressure usually reduces headache. The pathophysiologic background for a relation between obstructive sleep apnea and morning headache is multifactorial. Some theories have been proposed for OSAS-related headaches such as changing oxygen saturation during sleep, cerebral vasodilation and increased intracranial pressure due to cerebral vasodilation, sleep disruption and depression but the definite cause of headaches in OSAS patients is not yet clear.

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Introduction

Obstructive sleep apnea syndrome (OSAS) is a relatively common disorder characterized by recurrent episodes of apnea or hypopnea for at least 10 seconds during sleep. The term apnea means the complete pause of airflow. Hypopnea is referred to the partial airflow pause terminated in oxygen desaturation or arousal. As a consequence, sleep disruption and daytime sleepiness constitute the main clinical features. Snoring is also common among patients with OSAS and occurs due to increased resistance in the pharyngeal airflow pathway. Association between OSAS and various chronic conditions has been proved. Obesity, cognitive disorders, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), hypertension, glucose intolerance and psychological disorders such as depression and anxiety are some of these diseases (1,2).

The disease definition and its severity are ascertained by the apnea–hypopnea index (AHI), which is defined as apneas and/or hypopneas per hour of sleep (1). OSAS refers to AHI equal or more than 5/hour. The American Academy of Sleep Medicine (AASM) classified OSAS severity based on AHI and the degree of sleepiness (Table 1) (3).

Table 1. Obstructive sleep apnea grading

	Mild	Moderate	Severe
AHI[1]	5-15 times	15-30 times	More than 30 times
Sleepiness	Unwanted or involuntary during activities that need little attention	During activities that need some attention	During activities that need more active attention

[1]AHI: Apnea–hypopnea index

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Obesity leads to upper airway narrowing by mechanical pressure or structural changes. Several studies show that OSAS is a state of oxidative stress. Free radical production (especially superoxide) in OSAS intensifies atherosclerosis and endothelial damage (4). The treatment of choice in severe sleep apnea is continuous positive airway pressure (CPAP) (1). While this potentially life-threatening condition is common, many of the patients remain unrecognized (5). Thus, updating the knowledge about various clinical features of this syndrome is of great value. This article aims to review the studies regarding headache as one of the clinical presentation of OSAS.

Sleep apnea and headaches

Previous studies showed a strong association between sleep apnea and headache and there is growing evidence about hypothalamus involvement in this disorder. In 1970, a relationship has been described between sleep stage and headache (6). Some types of headache are present during rapid eye movement (REM) sleep. Locus ceruleus, periaqueductal gray matter (PAG) and dorsal raphe nucleus function reduce during REM and they might be the fundamental causes of headaches (7). These headaches divide into two classes including the first group with headaches correlated with OSAS and the second group consists of headaches associated with insomnia (8). Initially, it is crucial to rule out secondary headaches. International headache society (IHS) defined OSAS headaches as a compressive pain occurred on awaking, without nausea, photophobia and phonophobia, accompanied by AHI more than 5 (9). Sleep apnea headache prevalence is estimated 1%-2% in general population and 2% -8% in middle age (10).

Recently, polysomnography findings improve our knowledge about sleep related headaches. Various pathophysiological theories have been proposed for sleep apnea headaches such as changing in oxygen saturation during sleep, cerebral vasodilation, increased intracranial pressure (ICP), sleep fragmentation or depression. However, the exact cause of this type of headache still remains unclear (11).

Literature review

Headaches are reported in at least 50 percent of OSAS sufferers (10) and may be the main complaint (12). Moreover, previous studies showed that morning headache was more common in habitual snorers (13). IHS classifies obstructive sleep apnea (OSA) headaches under the subgroup of "headache attributed to hypoxia and/or hypercapnia" (9). There are articles that show the role of intermittent hypoxia in pathophysiology of OSA headaches (14,15); however, the recent studies have made a question regarding such a relationship (10,12,15).

Sleep fragmentation due to frequent apneas and arousals has been suggested as a cause of headaches (8). Furthermore, further investigation failed to show a significant difference between OSA patients with and without headaches regarding sleep efficiency (12,15) or a relationship between OSA severity and headaches (16-18).

There is evidence that anxiety and depression are more common in patients with OSAS (19). Depression prevalence in OSAS population has been reported between 7% and 56% and higher depression score is associated with severe OSAS (4). While these patients take several medications for their psychological problems, they would benefit from sleep management policies (20). Therefore, headaches in OSAS patients may be attributed to simultaneous coincidence depression or anxiety disorders (12).

According to IHS criteria, appropriate treatment of OSAS relieves OSA headaches (8). Several studies showed that the CPAP usage, the treatment of choice for OSAS, for a month could treat sleep apnea headaches (8,16).

Conclusion

There is a strong link between morning headaches and OSAS. Although several mechanisms have been suggested as the pathophysiology, the definite cause of headaches in OSAS patients is not yet clear. Investigation for the existence of sleep apnea is recommended for individuals with morning headaches, especially in the presence of snoring, daytime sleepiness, hypertension or high BMI.

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Conflict of Interest

The authors declare no conflict of interest.

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