Letter to the Editor http://mjiri.tums.ac.ir
Medical Journal of the Islamic Republic of Iran, Vol. 27, No. 3, Aug 2013, pp. 161-162

Is Apnea-Hypopnea Index a proper measure for Obstructive Sleep Apnea severity?

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Received: 11 Feb 2013 Accepted: 4 April 2013

The apnea-hypopnea index (AHI) is the combined average number of apneas and hypopneas that occur per hour of sleep. According to the American Academy of Sleep Medicine (AASM) it is categorized into mild (5-15 events/hour), moderate (15-30 events/hr), and severe (> 30 events/hr) (1).

In most studies, AHI has been used to evaluate severity of obstructive sleep apnea (OSA) and treatment outcome (2). However, it does not seem to be a proper measure to determine the disease severity and for making treatment decisions both in clinical practice and research.

As an example, in a study evaluating two patients with the same AHI (like 60), the severity of the disease is assumed to be the same in both patients. Nevertheless, the mean time of apnea- hypopnea might be longer in one patient than the other (12sec vs 50sec). In this scenario, the objective is to determine whether both patients are suffering from the same severity, or the longer apnea-hypopnea causes more severe conditions.

On the other hand, apnea may be the major breathing event in one patient while hypopnea is more prevalent in the other one. It should therefore be considered that apnea is a complete pause which can lead to more reduction in the airflow and arterial oxygen saturation than hypopnea.

Many studies have shown that AHI may not quantify the disease complications and hence response to the treatment. Although mood disorders seem to be a disease burden, they do not have any association with the severity of OSA measured by AHI (3). Moreover, despite the significant impairment in quality of life in patients with OSA, AHI is not associated with OSA-related quality of life (4).

Considering the aforementioned problems, we believe that most of the controversies in the field of sleep apnea have happened due to the inability of AHI to measure the exact severity of the disease. For better evaluation of sleep apnea, development of a new index demonstrating the disease severity more accurate than AHI is recommended. In this index, apnea/hypopnea ratio and the mean time of apnea and hypopnea events should be considered as a determining factor in addition to the average number of events/hr. Such index may help clinicians in assessing prognosis or in making treatment decisions. We hope that development of a more applicable index opens new area of discussion in the field of sleep medicine.

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