Obstructive Sleep Apnea and Hypertension; A New Way to Go

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Editorial

Screening studies have demonstrated that a substantial number of people in general population have mild to moderate sleep disorders in breathing [1]. Many exhibit a condition with repeated episodes of apnea and hypoapnea during sleep, which is frequently caused by airway obstruction, i.e., obstructive sleep apnea (OSA). OSA is common among middle-aged and elderly persons, but is seen in all age groups, and is more frequently seen in obese people. OSA is also known to increase comorbidity and mortality of cardiovascular disorders [2]. A study of adults with chronic heart failure, who were treated with evidence based therapies, found that more than 60% had sleep apnea [3]. In patients with hypertension, in particular with resistant hypertension, more than 70% has OSA [4]. OSA also contribute to poor control of blood pressure [5]. Accordingly, treating OSA is now recommended, in most cases, by continuous positive airway pressure (CPAP) in guidelines for those cardiovascular disorders [6,7].

Although consideration of sleep apnea is recommended as a cause of hypertension [8,9], there is little evidence about the effect of CPAP treatment on blood pressure. A recent study has demonstrated that among patients with OSA and resistant hypertension, CPAP treatment for 12 weeks resulted in a decrease in 24-hour mean and diastolic blood pressure and an improvement in the nocturnal blood pressure pattern [10]. Although the magnitude of blood pressure was small (~3 mm Hg), the study clearly demonstrated, in a randomized multicenter trial, that CPAP was effective in reducing blood pressure. Their findings agree with those in several previous studies, in which the beneficial effect of CPAP was also shown in patients with high blood pressure [11,12]. Thus, CPAP should be considered in patients with hypertension and OSA.

If CPAP is effective in reducing blood pressure, what is the mechanism for it? There have been many proposed mechanisms for the pathogenesis of OSA-related hypertension, e.g., the activation of the sympathetic nervous system and the renin–angiotensin–aldosterone system, alterations in autonomic cardiovascular regulation, endothelial dysfunction, vascular inflammation, oxidative stress, metabolic abnormalities, arterial stiffness or alterations in cardiac function [12]. Perhaps, an easy one to understand as mechanism may be changes induced by hypoxia. Because apnea-hypopnea index (API) is currently used to indicate the severity of OSA.

A most recent study has examined the role of hypoxia in OSA [13]. They indeed compare the effect of CPAP and oxygen in patients with OSA in a randomized, controlled trial. Patients, after recruitment form general cardiology practice, were first screened for OSA with home sleep test. Patients with an AHl of 15 to 50 were randomly assigned to receive education (control), either CPAP or nocturnal supplemental oxygen. They found that the 24 hour mean arterial pressure was lower in CPAP than in control or supplemental oxygen group. Indeed, there was no difference in blood pressure between control and supplemental oxygen group. Nocturnal hypoxemia reductions were similar between CPAP and supplemental oxygen groups. Thus, repetitive hypoxemia and re-oxygenation in OSA may not the major reason to propagates chronic system in hypertension [14].

Together with a similar recent study, in which the comparison of CPAP with weight loss was examined in OSA [15], a new study trend may be initiated: Effect of CPAP may be compared with other known risk factor reduction, or even therapeutic methods, in hypertension or other cardiovascular disorders. More investigators into this field are required in the near future.

References

8. Vongpatanasin W (2014) Resistant hypertension: a review of diagnosis and treatment on blood pressure. A recent study has demonstrated that among patients with OSA and resistant hypertension, CPAP treatment for 12 weeks resulted in a decrease in 24-hour mean and diastolic blood pressure and an improvement in the nocturnal blood pressure pattern [10]. Although the magnitude of blood pressure was small (~3 mm Hg), the study clearly demonstrated, in a randomized multicenter trial, that CPAP was effective in reducing blood pressure. Their findings agree with those in several previous studies, in which the beneficial effect of CPAP was also shown in patients with high blood pressure [11,12]. Thus, CPAP should be considered in patients with hypertension and OSA.

