

Obstructive Sleep Apnea and Hypertension; A New Way to Go

Yoshihiro Ishikawa*

Cardiovascular Research Institute, Yokohama City University School of Medicine, Japan

*Corresponding author: Yoshihiro Ishikawa, Cardiovascular Research Institute, Yokohama City University School of Medicine, Japan, Tel: 011-81-45-787-2573, E-mail: yishikaw@med.yokohama-cu.ac.jp

Received date: June 20, 2014, Accepted date: June 24, 2014, Published date: June 28, 2014

Copyright: © 2014 Ishikawa Y. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

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 multi-center 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 (AHI) 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 from general cardiology practice, were first screened for OSA with home sleep test. Patients with an AHI 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 propagate 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

1. Young T, Palta M, Dempsey J, Skatrud J, Weber S, et al. (1993) The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med* 328: 1230-1235.
2. Durán-Cantolla J, Aizpuru F, Montserrat JM, Ballester E, Terán-Santos J, et al. (2010) Continuous positive airway pressure as treatment for systemic hypertension in people with obstructive sleep apnoea: randomised controlled trial. *BMJ* 341: c5991.
3. MacDonald M, Fang J, Pittman SD, White DP, Malhotra A (2008) The current prevalence of sleep disordered breathing in congestive heart failure patients treated with beta-blockers. *J Clin Sleep Med* 4: 38-42.
4. Peppard PE, Young T, Palta M, Skatrud J (2000) Prospective study of the association between sleep-disordered breathing and hypertension. *N Engl J Med* 342: 1378-1384.
5. Lavie P, Herer P, Hoffstein V (2000) Obstructive sleep apnoea syndrome as a risk factor for hypertension: population study. *BMJ* 320: 479-482.
6. Qaseem A, Holty JE, Owens DK, Dallas P, Starkey M, et al. (2013) Management of Obstructive Sleep Apnea in Adults: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med*.
7. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, et al. (2013) 2013 ACCF/AHA guideline for the management of heart failure: executive summary a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 62: 1495-1539.
8. Vongpatanasin W (2014) Resistant hypertension: a review of diagnosis and management. *JAMA* 311: 2216-2224.
9. Marin JM, Agustí A, Villar I, Forner M, Nieto D, et al. (2012) Association between treated and untreated obstructive sleep apnea and risk of hypertension. *JAMA* 307: 2169-2176.
10. Martínez-García MA, Capote F, Campos-Rodríguez F, Lloberes P, Díaz de Atauri MJ, et al. (2013) Effect of CPAP on blood pressure in patients with obstructive sleep apnea and resistant hypertension: the HIPARCO randomized clinical trial. *JAMA* 310: 2407-2415.
11. Barbé F, Durán-Cantolla J, Sánchez-de-la-Torre M, Martínez-Alonso M, Carmona C, et al. (2012) Effect of continuous positive airway pressure on the incidence of hypertension and cardiovascular events in nonsleepy patients with obstructive sleep apnea: a randomized controlled trial. *JAMA* 307: 2161-2168.

-
12. Parati G, Ochoa JE, Bilo G, Mattaliano P, Salvi P, et al. (2014) Obstructive sleep apnea syndrome as a cause of resistant hypertension. *Hypertens Res* .
 13. Gottlieb DJ, Punjabi NM, Mehra R, Patel SR, Quan SF, et al. (2014) CPAP versus oxygen in obstructive sleep apnea. *N Engl J Med* 370: 2276-2285.
 14. Basner RC (2014) Cardiovascular morbidity and obstructive sleep apnea. *N Engl J Med* 370: 2339-2341.
 15. Chirinos JA, Gurubhagavatula I, Teff K, Rader DJ, Wadden TA, et al. (2014) CPAP, weight loss, or both for obstructive sleep apnea. *N Engl J Med* 370: 2265-2275.