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Obstructive Sleep Apnea and Cardiovascular Disease

Sleep-related breathing disorders are highly prevalent in patients with established cardiovascular disease. Obstructive sleep apnea (OSA) affects an estimated 22 million adult Americans¹ and is present in a large proportion of patients with hypertension and in those with other cardiovascular disorders, including coronary artery disease, stroke, tachycardia, cardiac arrhythmias, congestive heart failure and atrial fibrillation.²

Introduction

Quantity and quality of sleep show secular trends alongside changes in modern society, reducing the average duration of sleep across westernized populations with increased reporting of fatigue, tiredness, and excessive daytime sleepiness. Too little or too much sleep are associated with adverse health outcomes, including hypertension and other cardiovascular disorders.³

Obstructive Sleep Apnea (OSA) and Cardiovascular Disease Correlation

Obstructive sleep apnea (OSA) is characterized by repetitive interruption of ventilation during sleep caused by collapse of the pharyngeal airway. A diagnosis of OSA is accepted when a patient has an apnea-hypopnea index (AHI; number of apneas and hypopneas per hour of sleep) >5 and symptoms of excessive daytime sleepiness.

Available data indicate that OSA prevalence is 2 to 3 times higher in patients with cardiovascular disease.⁴ Obstructive apneas may induce severe intermittent hypoxemia and CO₂ retention during sleep, with oxygen saturation sometimes dropping to ≤60%, disrupting the normal structured autonomic and hemodynamic responses to sleep.⁵

The relationship between duration of sleep and vascular events is U-shaped, suggesting that different mechanisms may operate at either end of the distribution of sleep duration.⁶

In a systematic review of prospective population-based studies from 1966–2009, one study aimed to assess the relationship between duration of sleep and morbidity and mortality from coronary heart disease (CHD), stroke, and total cardiovascular disease (CVD).

This study showed an increased risk of developing or dying from CHD and stroke on either end of the distribution of sleep duration. Pooled analyses indicate that short sleepers have a greater risk of CHD and stroke than those sleeping 7–8 hours per night. Furthermore, long sleepers also show an increased risk for these events, confirming the presence of a U-shape association, with some heterogeneity among studies for CHD and CVD outcomes, no presence of publication bias, high statistical power, no difference between men and women, or by the duration of follow-up.⁷

Another respective study explored the incidence of CVD in a consecutive sleep clinic cohort of 182 middle-aged men (mean age, 46.8 ± 9.3; range, 30–69 years in 1991) with or without obstructive sleep apnea (OSA) throughout a period of seven years. The study concluded that the risk of developing CVD is increased in middle-aged OSA subjects independently of other risk factors like age, BMI, and smoking. Furthermore, the study concluded that efficient treatment of OSA reduces the excess CVD risk and may be considered also in relatively mild OSA without regard to daytime sleepiness.⁸

A systematic review of literature published in the Annals of Thoracic Medicine aimed to summarize a broad array of the pathophysiological mechanisms underlying the relationship between OSA and cardiac arrhythmias to assess the effects of OSA treatment on the presence of cardiac arrhythmias. The association between OSA and arrhythmias was first documented over 30 years ago. Since then, the literature has concluded that individuals with severe OSA were found to have two-to-fourfold higher odds of complex arrhythmias than those without OSA.⁹

Conclusion

Special emphasis should be given to recognizing the patient with cardiovascular disease who has coexisting sleep apnea to identifying strategies for co-management to best serve the patients needs. A board certified sleep medicine physician is best suited to work with you and your patients to determine an appropriate treatment plan.

SOMNAS and Allergy Sleep & Lung Care are dedicated to improving and maintaining the health status of our patients by providing compassionate, top-quality care. A patient's special needs, concerns, and lifestyle, and those of their family, will guide our treatment planning. The care our patients receive with us will be on par with the highest national standards.

SOMNAS Sleep and wake disorders center offers state-of-the-art diagnostic options to identify specific sleep disorders and manage them using the latest treatments and therapies in an individualized treatment plan. Our office will work with your patients, communicating every step of the way for the overall health and wellbeing of your patients.



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Dr. Ahmad has been practicing pulmonary, critical care and sleep medicine in Lee County since 2004. He has extensive clinical and academic experience and believes in a proactive approach to healthcare. His postgraduate training took place at the following well-respected institutions: Harvard University, Cornell University, State University of New York at Brooklyn and the University of Mississippi.

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References:

¹American Sleep Apnea Association.

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