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COMMENTARY

Obstructive sleep apnea and atrial fibrillation: we need to go step by step

Commentary on Mohammadieh AM, Sutherland K, Kanagaratnam LB, Whalley DW, Gillett MJ, Cistulli PA. Clinical screening tools for obstructive sleep apnea in a population with atrial fibrillation: a diagnostic accuracy trial. *J Clin Sleep Med*. 2021;17(5):1015–1024. doi:10.5664/jcsm.9098

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Obstructive sleep apnea (OSA) is a chronic disease that affects more than 20% of the global adult population.[1] Despite its high prevalence, OSA remains an underdiagnosed disease. In clinical practice, OSA is usually suspected in patients presenting with excessive daytime sleepiness. However, it has been shown that half of patients with moderate-to-severe OSA are asymptomatic, rendering this approach insensitive. As a result, the deleterious consequences of OSA are frequently unrecognized among asymptomatic individuals.

Beyond sleepiness, OSA is a prevalent cardiovascular risk factor, present in half of patients with hypertension.[2] The prevalence is even higher (up to 70%) in those with hypertension and concomitant high-risk profiles, such as resistant hypertension.[3] Although the benefit of continuous positive airway pressure therapy in symptom relief has been well established, the anticipated benefits in reducing the risk incidence of major adverse cardiovascular events have remained controversial. This dilemma makes the value of OSA screening in asymptomatic individuals questionable. Although there has been some progress in identifying patients with OSA who are at high risk of developing cardiovascular events,[4] there is still a long way to go before the therapeutic benefits of continuous positive airway pressure can be solidly established.

In recent years, the relationship between atrial fibrillation (AF) and OSA has been explored. A high prevalence of OSA has been reported in patients with AF.[5] The Sleep Heart Health Study found a 4-fold increase in the prevalence of AF in patients with OSA. One-third of participants had arrhythmia documented during sleep.[6] Likewise, the Olmsted County study found that OSA and its severity strongly predicted the 5-year incidence of AF.[7] Atrial stretch, neurohumoral activation, and chronic concomitant conditions (hypertension, metabolic syndrome, and obesity) create a progressive structural atrial substrate remodeling in patients with OSA. These, together with transient apnea–associated electrophysiological changes, contribute to the reentry substrate for AF that creates a complex and dynamic arrhythmogenic substrate in the atrium during sleep.[8] Apart from being associated with a high prevalence of AF, untreated OSA reduces the effectiveness of AF treatment.[8] Patients with AF who have concomitant OSA, compared with those without, show a lower response rate to antiarrhythmic drug therapy.[9] Similarly, prospective studies have shown that patients with OSA, compared to those without, have a lower success rate in maintaining sinus rhythm (ie, a higher recurrence of AF) after an initial successful cardioversion and catheter ablation.[10,11] Meta-analyses of observational studies with a total of approximately 1,000 patients have shown that patients with OSA have a 31% higher risk of AF recurrence after pulmonary vein isolation (a catheter-based intervention procedure for rhythm control).[12,13]

Screening for and treatment of OSA in the management of AF is endorsed by the 2020 European Society of Cardiology guidelines on AF.[14] It is conceivable that the potential benefits of OSA treatment in AF recurrence will need to be evaluated by clinical trials. Likewise, given the high prevalence of AF, the roles of simple and accessible diagnostic methods will need to be evaluated. In this regard, the report by Mohammadieh et al[15] in this issue of the *Journal of Clinical Sleep Medicine* is relevant and timely. In their well-designed study, the authors explored the validity of several commonly used OSA screening tools in patients who were admitted to the emergency department with AF or were scheduled to undergo pulmonary vein isolation.

Using the gold-standard in-laboratory polysomnography as a reference, the authors found that the portable home sleep apnea test showed the highest diagnostic accuracy at all levels of OSA severity, with the area under the curve reaching 0.9. More important, testing with the home sleep apnea test was perceived by patients as more comfortable, more convenient, and more closely matched to their usual sleep pattern than in-laboratory polysomnography. Because the home sleep apnea test is a sophisticated monitoring device, it is not surprising that the other OSA screening tools (snoring, obesity, airway crowding, Epworth Sleepiness Scale, STOP-BANG questionnaire, and Berlin questionnaire) were found to be inferior in diagnostic accuracy.

It is also worthwhile to note that patients with cardiovascular disease, even with concomitant OSA, generally do not experience daytime sleepiness. In Mohammadieh et al,[15] the Epworth Sleepiness Scale score was only marginally higher in the OSA group (apnea-hypopnea index ≥ 15 events/h) than in the non-OSA group (apnea-hypopnea index < 15 events/h; 6.9 vs 5.7). Although the authors did not report the prevalence of an Epworth Sleepiness Scale score > 10, it should conceivably be very low. These results again raise pertinent but unresolved issues: (1) the cardiovascular implications of untreated OSA beyond AF recurrence, and (2) the benefits of OSA therapy in improving cardiovascular outcomes in patients with AF. Although recent clinical trials have not shown a positive effect of continuous positive airway pressure in patients with coronary artery disease,[16–18] these studies carried inherent limitations as previously addressed.[19] AF, a cardiac electrophysiological disorder, is fundamentally different from coronary artery disease. The neutral results of the trials on coronary artery disease cannot be applied to AF. Currently, data showing the benefits of OSA treatment in mitigating the risk of AF recurrence after cardioversion and ablative procedures are only based on observational studies.[10,11]

In considering all of the above information, we have to go step by step: Once the high prevalence of OSA in the AF population has been reported, the positive effect of OSA treatment in this population needs to be confirmed. Only after this confirmation, regardless of the presence or absence of OSA symptoms, can the need to actively screen for the presence of this disease in patients with AF be claimed, noting the therapeutic approach of OSA as an effective response to treat the risks of AF.

CITATION

Sánchez-de-la-Torre M, Lee C-H, Barbé F. Obstructive sleep apnea and atrial fibrillation: we need to go step by step. *J Clin Sleep Med.* 2021;17(5):869–870.

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