

Obstructive Sleep Apnea and Patent Foramen Ovale

To the Editor:

We read with great interest the Clinician Update by Wolk et al,¹ particularly the paragraph regarding obstructive sleep apnea (OSA). Among the linked-OSA diseases mentioned (hypertension, ischemic heart disease, heart failure, stroke, pulmonary hypertension, cardiac arrhythmias), right-to-left shunting through a patent foramen ovale (PFO) was omitted.

In patients with OSA, PFO prevalence is about ≈69% when assessed by means of contrast transesophageal echocardiography.² This high prevalence might further increase if evaluation of right-to-left shunting were made by contrast transcranial Doppler.

The number of microembolic signals detected during periods of nocturnal apnea is positively correlated with the number detected during provocative Valsalva maneuver in wakefulness,³ contributing to significant systemic hypoxemia and progression of disease in approximately one third of these patients.² In fact, repeated transient episodes of systemic arterial hypoxemia are well known to induce further pulmonary vasoconstriction and more severe pulmonary hypertension.

Even though OSA and PFO are more common than were previously thought, their association often remains undiagnosed in primary care practice, and both cardiologists and pulmonologists need to be more familiar with this clinical comorbidity. The way to find these patients is to be aware of the increased prevalence of clinically significant OSA in patients with asymptomatic PFO. Nocturnal polysomnography is the gold standard for diagnosing OSA, whereas contrast transcranial Doppler is a less invasive method for detecting PFO. By combining both these techniques while the patient is asleep in a laboratory, the magnitude of the right-to-left shunting⁴ may be semiquantitatively measured during apneic events (documented on chest wall movement), by detecting the number of high-intensity transient signals through sonication of the middle cerebral arteries.

Besides behavioral and lifestyle modification, the treatment of choice in OSA is continuous positive airway pressure, but patient noncompliance is a problem.

The availability of new user-friendly devices for percutaneous PFO closure might result in substantial relief of repeated transient episodes of systemic arterial hypoxemia in patients with both OSA and large right-to-left shunting, although the evidence of the benefit still remains to be proved.

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Response

We greatly appreciate the authors' interest in our article.¹ Among cardiovascular conditions related to obstructive sleep apnea (OSA), we discussed hypertension, atherosclerosis, stroke, heart failure, pulmonary hypertension, and cardiac arrhythmias. The manuscript length restrictions did not allow us to mention some other possible associations with OSA, such as metabolic abnormalities (insulin resistance and hyperleptinemia), pulmonary embolism, or deep venous thrombosis. The evidence for any causal link between OSA and these other conditions is still preliminary or inconclusive, warranting further experimental and clinical studies.

The evidence in support of the association between OSA and patent foramen ovale (PFO) is also preliminary, based only on a few studies, the clinical significance of which may be unclear. The original report by Shanoudy et al,² which demonstrated an intriguing higher prevalence of PFO in OSA, has some methodological limitations (as discussed by Gossage³). Another study, which showed the presence of right-to-left shunting during single OSA episodes, consisted of only 10 subjects with OSA who were preselected for the presence of right-to-left shunting during the Valsalva maneuver.⁴ Although it cannot be excluded that the coexistence of PFO with OSA may exacerbate hypoxemia and hemodynamic consequences of OSA, there is little evidence at present to suggest that the two conditions may be causally related. The authors' recommendation that percutaneous PFO closure should be considered in patients with OSA and right-to-left shunting would certainly merit further investigation. The initial clinical management of such patients should include the treatment of their OSA, which may decrease or even eliminate stress-induced right-to-left shunting.

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