

Sleep Apnea and Asymptomatic Carotid Stenosis

A Complex Interaction

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BACKGROUND: Carotid arteriosclerosis and sleep apnea are considered as independent risk factors for stroke. Whether sleep apnea mediates severity of carotid stenosis remains unclear. Sleep apnea comprises two pathophysiologic conditions: OSA and central sleep apnea (CSA). Although OSA results from upper airway occlusion, CSA reflects enhanced ventilatory drive mainly due to carotid chemoreceptor dysfunction.

METHODS: Ninety-six patients with asymptomatic extracranial carotid stenosis of $\geq 50\%$ underwent polysomnography to (1) determine prevalence and severity of sleep apnea for different degrees of carotid stenosis and (2) analyze associations between OSA and CSA, carotid stenosis severity, and other arteriosclerotic risk factors.

RESULTS: Sleep apnea was present in 68.8% of patients with carotid stenosis. Prevalence and severity of sleep apnea increased with degree of stenosis ($P \leq .05$) because of a rise in CSA ($P \leq .01$) but not in OSA. Sleep apnea (OR, 3.8; $P \leq .03$) and arterial hypertension (OR, 4.1; $P \leq .05$) were associated with stenosis severity, whereas diabetes, smoking, dyslipidemia, BMI, age, and sex were not. Stenosis severity was related to CSA ($P \leq .06$) but not to OSA. In addition, CSA but not OSA showed a strong association with arterial hypertension (OR, 12.5; $P \leq .02$) and diabetes (OR, 4.5; $P \leq .04$).

CONCLUSIONS: Sleep apnea is highly prevalent in asymptomatic carotid stenosis. Further, it is associated with arteriosclerotic disease severity as well as presence of hypertension and diabetes. This vascular risk constellation seems to be more strongly connected with CSA than with OSA, possibly attributable to carotid chemoreceptor dysfunction. Because sleep apnea is well treatable, screening should be embedded in stroke prevention strategies.

CHEST 2015; 147(4):1029-1036