



Do obstructive sleep apnea and chronic obstructive pulmonary disease overlap coincidentally or intrinsically?



As unveiled by previous studies that obstructive sleep apnea (OSA) and chronic obstructive pulmonary disease (COPD) happen concomitantly in about 1% of general population.¹ OSA and COPD interact pathologically, causing severe hypoxemia and high risk of cardiovascular mortality.² Hypercarbia, induced by moderate-severe COPD aggregates weakness of respiratory muscles and represses respiratory response to hypoxia stimulation, thus leading to prolonged breathing events during sleep. Negative thoracic pressure during OSA increases respiratory effort and accentuates muscular fatigue, causing decreased ventilation volume in patients with concomitant COPD. Generally, COPD and OSA occasionally happen simultaneously and bring about significant internal disturbance collectively. However, do they overlap coincidentally or intrinsically?

There are few shared traditional risk factors between: patients with COPD are exposed to tobacco or air pollution, while obesity and maxillofacial deformities are the main risks for OSA incidence. Corticosteroid is mostly needed for patients with acute exacerbation of COPD, although systemic glucocorticoids are associated with increased risk of venous thromboembolism.³ For patients with stable COPD, no evidence exists suggesting inhaled corticosteroid increases the risk of hypercoagulation and PE, neither the risk of obesity or OSA. On the contrary, effective treatment of COPD may attenuate hypoxia and respiratory muscular fatigue, which may benefit OSA remission.

To the best of our knowledge, OSA and COPD do not have overlapping genetic risk markers. Most of the genetic architectures

underlying COPD are associated with inflammation and pulmonary detriment,⁴ while susceptibility genes related with OSA incidence is more linking to metabolic disorder and cardiovascular risks.⁵ Generally, although OSA and COPD exist simultaneously in clinics, they tend to happen independently of each other rather than intrinsically.

References

1. McNicholas WT. COPD-OSA overlap syndrome: evolving evidence regarding epidemiology, clinical consequences, and management. *Chest*. 2017;94:772–778.
2. Du W, Liu J, Zhou J, Ye D, OuYang Y, Deng Q. Obstructive sleep apnea, COPD, the overlap syndrome, and mortality: results from the 2005–2008 national health and nutrition examination survey. *Int J Chron Obstruct Pulmon Dis*. 2018;13:665–674.
3. Johannsdottir SA, Horváth-Puhó E, Dekkers OM, et al. Use of glucocorticoids and risk of venous thromboembolism: a nationwide population-based case-control study. *JAMA Intern Med*. 2013;173(9):743–752.
4. Hardin M1, Zielinski J, Wan ES, et al. CHRNA3/5, IREB2, and ADCY2 are associated with severe chronic obstructive pulmonary disease in Poland. *Am J Respir Cell Mol Biol*. 2012;47:203–208.
5. Gottlieb DJ, DeStefano AL, Foley DJ, Mignot E, Redline S, Givelber RJ. APOE epsilon4 is associated with obstructive sleep apnea/hypopnea: the Sleep Heart Health Study. *Neurology*. 2004;63:664–668.

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