



Perioperative nocturnal hypoxemia matters in surgical patients with obstructive sleep apnea

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To the Editor,

Obstructive sleep apnea (OSA) is a common co-morbidity in surgical patients, with a prevalence of 7–10%.^{1,2} Patients with OSA – especially those with undiagnosed and untreated OSA – are at increased risk of postoperative complications.^{1–3} The risk of cardiovascular complications, primarily cardiac arrest and shock, was significantly higher in patients with undiagnosed OSA than in those with diagnosed OSA who had been given a prescription for continuous positive airway therapy.⁴

The exact mechanism for the increased risk of postoperative complications associated with OSA is unknown. In a recent letter to the *Journal*, Deflandre *et al.* showed that surgical patients with OSA of similar severity may have different degrees of hypoxia.⁵ Among their patients with severe OSA (i.e., apnea hypopnea index [AHI] > 30 events per hour), 33% had no or only mild nocturnal hypoxia [defined as an oxygen desaturation index (ODI) of < 5 or 5–15 events per hour], and 29% and 38% had moderate or severe nocturnal hypoxia (ODI 15–30 or > 30 events per hour).⁵ This variation in the severity of

hypoxia may be related to different OSA phenotypes and variations in the underlying OSA pathophysiology.⁶

Deflandre *et al.* proposed the hypothesis that hypoxia-mediated inflammatory modifications could increase the risk of postoperative complications.⁵ At present, however, there are no direct data indicating that hypoxia-mediated inflammation in a patient with OSA increases the risk of postoperative complications. Indirect data, however, show that preoperative nocturnal hypoxia is associated with increased postoperative complications.

We have shown that ODI is a sensitive, specific predictor of OSA. In 573 patients (37.1% with moderate/severe OSA and an AHI of >15 events per hour), preoperative nocturnal hypoxia was associated with the incidence of postoperative complications.⁷ In the same study, among patients with a mean oxygen saturation (SpO₂) of < 92.7%, an ODI of > 28.5 events per hour, and/or an accumulated overnight duration of oxygen saturation of < 90%, > 7.2% were at higher risk for postoperative adverse events.⁷ In addition, in a longitudinal study (5.3 years) of 10,701 patients with OSA, sudden cardiac death was associated with an AHI of > 20 events per hour [hazard ratio (HR), 1.60], a mean nocturnal SpO₂ of < 93% (HR, 2.93), and a lowest nocturnal SpO₂ of < 78% (HR, 2.60) (all *P* < 0.001).⁸ The lowest nocturnal SpO₂ predicted an 81% increase in sudden cardiac death.⁸

Various potential mechanisms for increased cardiovascular complications have been proposed, including increased vascular sympathetic activity and serum catecholamines, cardiac autonomic dysfunction, and an ineffective arousal mechanism related to impaired chemosensitivity.⁸ If the hypothesis that nocturnal hypoxia plays a key role in mediating complications is confirmed, supplemental oxygen and/or continuous positive airway therapy during the postoperative period may prevent

This letter is accompanied by a reply. Please see Can J Anesth 2017; 64: this issue.

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hypoxic episodes and thus reduce sudden cardiac death.⁹ At present, limited evidence from our previous study⁷ supports the idea that nocturnal hypoxia may play a key role in mediating complications. Further trials are needed to investigate this hypothesis.

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