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LETTERS TO THE EDITOR

Potential influences of obstructive sleep apnea and obesity on COVID-19 severity

David McSharry, MD[1]; Atul Malhotra, MD[2]

[1]Acute Medicine and Pulmonary Department, Mater Misericordiae University Hospital and University College Dublin, Dublin, Ireland; [2]UC San Diego School of Medicine, San Diego, California

Pneumonia because of severe acute respiratory syndrome coronavirus-2 has caused considerable morbidity and mortality worldwide, particularly among those with comorbidities. The most frequent comorbidities in large Chinese and Italian cohorts are hypertension, diabetes, and cardiovascular disease.[1] There are limited data on patients' body mass index in current studies. In a French study of 124 patients with coronavirus disease-19 (COVID-19), obesity (body mass index >30 kg/m2) was a risk factor for invasive mechanical ventilation independent of age, diabetes, and hypertension.[2] OSA is strongly associated with major comorbidities associated with severe COVID-19 disease: hypertension, diabetes, cardiovascular disease, and obesity.[3] Two small studies of patients with severe COVID-19 pneumonia included data showing that one-quarter of patients had OSA.[4,5] Therefore, we suspect that OSA (particularly with concurrent obesity) could potentially contribute to worsening hypoxemia and the cytokine storm that occurs in patients with COVID-19. Obesity likely contributes to hypoxemia by reducing end-expiratory lung volume and by contributing to positive pleural pressures at end-exhalation. Both OSA and obesity hypoventilation can cause important hypoxemia, which could worsen hypoxemia in COVID-19 pneumonia. In addition, both OSA and obesity could worsen the cytokine storm that can occur in COVID-19 pneumonia, which can cause acute respiratory distress syndrome and multiorgan failure, given that both OSA and obesity may be proinflammatory conditions.[6,7] For example, Dou et al[8] showed that OSA is associated with acute kidney injury in critically ill patients. Conversely, Karnatovskaia et al[9] showed that obesity but not OSA was associated with incident acute respiratory distress syndrome in a high-risk cohort. In theory, benefits reported with early intubation in patients with COVID-19 could reflect OSA alleviation in some patients. Similarly, contamination fears from using nasal PAP may be contributing to deterioration in some patients with OSA. Given the possible link between OSA, obesity, and COVID-19, mechanistic research is encouraged.

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REFERENCES

1. Grasselli G, Zangrillo A, Zanella A, et al. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region. *JAMA*. 2020;323(16):1574–1581.
2. Simonnet A, Chetboun M, Poissy J, et al. High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. *Obesity (Silver Spring)*. Published online April 9, 2020. https://doi.org/10.1002/oby.22831.
3. Jordan AS, McSharry DG, Malhotra A. Adult obstructive sleep apnoea. *Lancet*. 2014;383(9918):736–747.
4. Bhatraju PK, Ghassemieh BJ, Nichols M, et al. Covid-19 in critically ill patients in the Seattle region—case series. *N Engl J Med*. Published online March 30, 2020. https://doi.org/10.1056/NEJMoa2004500.
5. Arentz M, Yim E, Klaff L, et al. Characteristics and outcomes of 21 critically ill patients with COVID-19 in Washington State. *JAMA*. 2020;323(16):1612–1614.
6. Lévy P, Kohler M, McNicholas WT, et al. Obstructive sleep apnoea syndrome. *Nat Rev Dis Primers*. June 2015;1:15015. Published correction appears in *Nat Rev Dis Primers*. July 2015;1:15024.
7. Heymsfield SB, Wadden TA. Mechanisms, pathophysiology, and management of obesity. *N Engl J Med*. 2017;376(3):254–266.
8. Dou L, Lan H, Reynolds DJ, et al. Association between obstructive sleep apnea and acute kidney injury in critically ill patients: a propensity-matched study. *Nephron*. 2017;135(2):137–146.
9. Karnatovskaia LV, Lee AS, Bender SP, et al. Obstructive sleep apnea, obesity, and the development of acute respiratory distress syndrome. *J Clin Sleep Med*. 2014;10(06):657–662.

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Address correspondence to: David McSharry, MD, Mater Misericordiae University Hospital, Eccles Street, Dublin, Ireland; Email: dmcsharry@mater.ie

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