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

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Pneumonia due to SARS-CoV-2 has caused considerable morbidity and mortality worldwide particularly amongst those with comorbidities. The most frequent comorbidities in large Chinese and Italian cohorts are hypertension, diabetes and cardiovascular disease1. There are limited data on patients' body mass indices(BMIs) in these studies. In a French study of 124 COVID patients, obesity (BMI>30kg/m2) was a risk factor for invasive mechanical ventilation independent of age, DM and hypertension2. Obstructive sleep apnea (OSA) is strongly associated with major comorbidities associated with severe COVID disease namely hypertension, diabetes, cardiovascular disease and obesity3. Two small studies of patients with severe COVID pneumonia included data which showed one quarter of patients had OSA4,5. Therefore, we suspect OSA (particularly with concurrent obesity) could potentially contribute to worsening hypoxemia and the cytokine storm that occurs in COVID patients. 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 pneumonia. Both OSA and obesity could worsen the cytokine storm that can occur in COVID pneumonia which can cause ARDS and multiorgan failure, given that both OSA and obesity may be pro-inflammatory conditions6,7 e.g. Dou showed that OSA is associated with acute kidney injury in critically ill patients8. Conversely, Karnatovskaia et al. showed that obesity but not OSA was associated with incident ARDS in a high risk cohort9. In theory, benefits reported with early intubation in Covid patients could reflect OSA alleviation in some patients. Similarly contamination fears from using nasal positive airway pressure may be contributing to deterioration in some OSA patients. Given the possible link between OSA, obesity and Covid, mechanistic research is encouraged.

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