Intrapulmonary bronchopulmonary anastomoses in COVID-19 respiratory failure

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Open intrapulmonary bronchopulmonary anastomoses (IBA) were identified in COVID-19 patients who died of respiratory failure. IBA may be the microanatomical basis of intrapulmonary right to left shunt leading to severe hypoxaemia in COVID-19. https://bit.ly/3e2GajO

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To the Editor:

The spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has led to a devastating and worldwide pandemic disease known as coronavirus disease 2019 (COVID-19). COVID-19 causes acute hypoxic respiratory failure (COVID-ARF), a major cause of mortality and morbidity, with an incompletely understood pathophysiological mechanism. Gattinoni *et al.* [1] noted that COVID-19 patients with acute hypoxic respiratory failure have lung disease that is often characterised by a remarkable dissociation between relatively well-preserved lung mechanics, including lung compliance, and severe hypoxaemia. These findings are consistent with the concept that profound hypoxaemia occurring in ventilated patients with highly compliant lungs could be due to the loss of regulation of lung perfusion and impaired hypoxic pulmonary vasoconstriction. Early autopsy studies suggest that the lung circulation is a major target of coronavirus infection, which leads to striking pulmonary vascular disease due to variable degrees of thrombosis, apoptosis, oedema, inflammation and angiogenesis [2–4]. These changes contribute to dysregulation of the pulmonary vasculature, which induces perfusion abnormalities and contributes to the physiological phenotypes reported in COVID-19 pneumonia. Further, computed tomography suggests a unique "tree in bud" appearance of small pulmonary arteries [3] and transcranial agitated saline microbubble doppler studies of COVID-19 patients with hypoxaemia have demonstrated intrapulmonary shunting of these bubbles, and that the presence and degree of transpulmonary bubble transit correlates with the degree of hypoxaemia [5]. Despite these studies, histopathological correlates of severe hypoxaemia and shunt in the setting of relatively normal lung compliance in COVID-19 patients are largely lacking.