

LETTER TO THE EDITOR

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# Hypoxemia in COVID-19: cerebral oximetry should be explored as a warning indicator for mechanically ventilated adults with COVID-19

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## Letter to the editor

We read with interest the review on the pathophysiology of ‘happy’ hypoxemia in COVID-19 by Dhont et al. published in *BMC Respiratory Research* [1]. This exhaustive review, describing the pathophysiological abnormalities in COVID-19 that might explain the disconnect between the severity of hypoxemia and the relatively mild respiratory discomfort reported by the patients, aims at improving decision-making and management among the physicians treating COVID-19. Very recent articles and reviews on the neurological manifestations of COVID-19 report patients with severe COVID-19 at risk for multifocal microvascular hemorrhagic and ischemic lesions [2–7]. Therefore, it would be very valuable to monitor the brain oxygenation state in mechanically ventilated patients with COVID-19.

In the last decades, brain oxygenation has been successfully monitored noninvasively and transcranially in the operative room and in the intensive care unit by commercial near-infrared spectroscopy (NIRS) brain oximeters [8–11]. These oximeters provide the intensivists with a continuous measure of the prefrontal cortex oxyhemoglobin saturation (ScO<sub>2</sub>, %). Unlike conventional fingertip pulse oximetry, ScO<sub>2</sub> does not rely on a pulsating flow, and reflects the balance between oxygen supply and demand in the arteriolar, capillary and venular beds

of the brain cortex underlying the prefrontal area over the sensor is located. Detailed cerebral oximetry guidelines have recently been drawn up by the Japanese Society of Cardiovascular Anesthesiologists [12].

To the best of our knowledge, so far the use of cerebral oximetry on ventilated COVID-19 patients has never been reported. In this framework, we suggest that the ScO<sub>2</sub> monitoring in these patients might serve as an “early warning indicator” of the decreased brain oxygen delivery. The ScO<sub>2</sub> data can be utilized to optimize cerebral oxygen supply and demand, inverting the decreased cerebral perfusion and/or preventing protracted brain ischemia.

Interestingly, cortical oximetry is utilized in an ongoing clinical trial of the Hvidovre University Hospital (Denmark) aiming to examine whether ScO<sub>2</sub> could be a more useful parameter than peripheral arterial oxygen saturation, measured by fingertip pulse oximetry, to guide clinical titration of permissive hypoxemia in COVID-19 acute respiratory distress syndrome patients [13].

## Abbreviations

NIRS: Near-infrared spectroscopy; ScO<sub>2</sub>: Oxyhemoglobin saturation

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## Authors' contributions

MF: drafted the letter, edited and reviewed the final submission. VQ: provided content input, critical feedback, edited and reviewed the final submission. The author(s) read and approved the final manuscript.

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