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COVID-19 patients: when and whom to ventilate?

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Letter to the Editor

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Dear editor:

The coronavirus disease-19 (COVID-19) pandemic has severely strained intensive care unit (ICU) resources worldwide. It is estimated that a country like India with a population of 1.3 billion, has one doctor for every 1,457 individuals, 1.7 nurses per 1,000 people, approximately 1.9 million hospital beds, 95 thousand ICU beds, and 48 thousand ventilators. As the cases of severe acute respiratory syndrome (SARS) increase rapidly, finding ICU beds, ventilators, intensivists, and critical care nurses remains a big challenge. The need for mechanical ventilation in COVID-19 patients, however, remains a subject of debate. A Chinese study reported that invasive ventilation was required in only 2.3% of 1,099 COVID-19 positive patients [1]. In contrast, noninvasive ventilation (NIV), including bilevel positive airway pressure and continuous positive airway pressure, is being advocated for early/mild disease [1]. Patients needing mechanical ventilation were sicker and had a higher mortality rate, as compared to those receiving NIV. Additionally, the PaO_2/FiO_2 ratio was worse among nonsurvivors [2]. A meta-analysis that included 1,084 patients from eight selected studies showed that high-flow nasal cannula (HFNC) treatment could reduce the rate of endotracheal intubation and ICU mortality [3]. A more recent review concluded that HFNC and NIV should be reserved for patients with mild acute respiratory distress syndrome until further data are available [4]. Although aerosolization risk exists for both HFNC (up to 62 cm around the face) and NIV (within 92 cm distance), the former has been recommended by surviving sepsis guidelines [5,6]. NIV must be delivered with a well-fitted full-face non-vented mask, delivered in negative pressure (or single) rooms, and by adding a viral filter between the mask and the expiratory leak or tubing. Besides face masks, NIV may also be provided by nasal pillows (aerosolization risk up to 33 cm distance) and helmet masks (aerosolization risk up to zero to 27 cm distance) [5].

Potentially, HFNC and NIV have the advantage of being provided even outside the ICU and can be managed by trained paramedical staff which conserves ICU resources for more severe patients [7]. Further, recent research has shown an emerging role for awake prone HFNC and NIV [8]. Awake prone positioning improves the mismatch between ventilation-perfusion and opens the atelectatic lungs by promoting adequate sputum drainage. Many patients will immediately improve their oxygenation while others show signs of exhaustion or excessive respiratory effort. High tidal volumes (breathing spontaneously or on HFNC/NIV), may expose diseased lungs to swings of trans-pulmonary pressures and may lead to patient self-inflicted lung injury. Any undue delay in switching to invasive ventilation may worsen outcomes [9]. A recent study has shown that maximal level of interleukin-6 (IL-6), followed by C-reactive protein (CRP) level, was highly predictive of the need for mechanical ventilation suggesting the possibility of using IL-6 or CRP level to guide escalation of treat-

ment in patients with COVID-19-related hyperinflammatory syndrome [10].

With medical facilities severely stretched out, especially in resource-limited regions like India and other developing nations with large population clusters, selective use of HFNC or NIV may reduce the need for ventilated ICU beds while achieving desired clinical results. The decision to switch from HFNC/NIV to invasive ventilation could be a tricky one with several factors and co-morbidities to be taken into account. However, in the absence of randomized controlled trials (RCTs) and lack of clear guidelines, the clinical judgment of physicians and the availability of necessary resources in their respective hospitals will largely determine the ventilation techniques employed. Large RCTs or well-designed observational studies are needed to define stratification of COVID-19 patients for the best choice of initial respiratory support keeping in mind the resources available and the judicious and timely use of invasive ventilation.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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