Title - Noninvasive versus invasive ventilation- one modality cannot fit all during COVID-19 outbreak.

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To,

The Editor

Sub: Submission of Manuscript for Publication

We intend to publish an article entitled “Noninvasive versus invasive ventilation- one modality cannot fit all during COVID-19 outbreak” in your esteemed journal as letter to editor.

On behalf of all the contributors I will act and guarantor and will correspond with the journal from this point onward.

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Thanking you,

Yours’ sincerely,

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Noninvasive versus invasive ventilation: one modality cannot fit all during COVID-19 outbreak

- Letter to the Editor –

The use of noninvasive ventilation (NIV) as a mode of respiratory support in acute respiratory distress syndrome (ARDS) remains controversial. Various studies are giving evidence in favor of NIV usage in this setting, but the demographics of patients who would benefit from the use of NIV is still indefinable. The current approach by most of the clinician around the world during COVID-19 outbreak is to maintain a low threshold for intubation in patients suffering from COVID-19 related ARDS. This has resulted in undermining the role of NIV for managing ARDS due to COVID-19. We would like to briefly review this approach while dealing with patients and the COVID-19 outbreak.

Clinical benefit of NIV in COVID-19: Data from various studies on the use of NIV in severe acute respiratory illness has shown that it can avoid intubation in up to 70% cases with mild hypoxic respiratory failure. Zhou et al. [1] in their retrospective study in COVID-19 patients showed that mortality was higher in the intubated group (96%) than the NIV group (92%). Yang et al. [2] in their study on COVID-19 patients reported the mortality rate of 86% in the intubated group versus 57% in the NIV group. Cascella et al. [3] has shown a favorable outcome of NIV in COVID-19 patients suffering from a non-severe form of respiratory failure along with a low risk of transmission to a healthcare worker with the proper fitting interface.

Exaggerating disadvantages of NIV in COVID-19: The main concern raised by clinicians regarding the application of NIV during the COVID-19 pandemic is the potential for aerosol generation and transmission of infection to healthcare providers (HCP). Cheung et al. [4] in 2004 presented data from
the SARS outbreak where he had studied the efficacy of NIV in 20 patients suffering from SARS virus and the risk of transmission of the virus among HCP taking care of these patients. He found NIV was effective in the treatment of acute respiratory failure due to the SARS virus and none of the HCP tested positive for the virus.

**ARDS in COVID-19:** COVID-19 results in the destruction of alveoli due to inflammatory exudates in the alveoli and infiltrates in the interstitium leading to the development of ARDS. Gattinoni et al. [5] described that severe ARDS by COVID-19 has shown atypically high compliance and shunt fraction than severe ARDS from other causes. Pan et al. [6] used the Recruitment-to-Inflation ratio (R/I ratio) to assess the potential for lung recruitment in COVID-19 patients and found poor R/I ratio in more than 80 percent of patients with severe ARDS suggesting poor recruitability. Disturbed pulmonary vascular autoregulation has been implicated for hypoxemia and poor oxygenation during the early stages of ARDS. Hence using the common protocol of applying high positive end-expiratory pressure to all the patients may aggravate the lung injury and result in a poor outcome.

**Invasive ventilation (disadvantage):** Procedure associated with invasive ventilation like preoxygenation, bag-mask ventilation, and intubation and suctioning of the airway are highly aerosol-generating and pose a serious risk to HCP. Ventilator-associated complications like lung injury, pneumonia, and prolonged intubation should also be taken into account while assessing non-invasive versus invasive ventilation.

Finally, we conclude that there is a certain population of patients with COVID-19 ARDS having a particular demographic profile and lesser comorbidities may benefit from early and meticulously supervised NIV trial instead of blindly intubating all patients with hypoxemia and ARDS.
References


