

## Can Noninvasive Ventilation Be Applied Safely in Patients with Covid-19 Pneumonia?

### *Covid-19 Pnömonisi Olan Hastalarda Non-İnvaziv Ventilasyon Güvenle Uygulanabilir mi?*

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Dear editor,

In the novel coronavirus disease (COVID-19) caused by SARS-CoV-2, a progressive respiratory failure develops due to the effect of the virus in the lungs. Invasive mechanical ventilation therapy is one of the basic treatment methods in these patients with respiratory failure. However, satisfactory results cannot be achieved in all patients, and some of these patients are unfortunately lost. Cheung et al. recommended avoiding noninvasive ventilation strategies to protect healthcare workers and non-infected patients and reported that these patients should be intubated at an early stage <sup>[1]</sup>. However, we observed that in a certain group of patients who were intubated, clinical results worsened in a very short time with positive pressure ventilation. Therefore, in patients with respiratory distress who can be admitted to the ICU without delay, we recommend avoiding early intubation strategy and giving time to noninvasive techniques. However, contamination should also be avoided. What should be the right timing in the intubation? The main question is how can we safely apply these methods? We tried to draw attention to additional measures that can be applied to protect healthcare workers and non-infected patients while using noninvasive ventilation (NIV) methods.

Gattinoni et al. <sup>[2]</sup> divided COVID-19 patients into 2 phenotypic groups and reported that patients in the L group, who are called silent hypoxemia, had proper compliance. In about 2/3 of intubated patients, compliance has been preserved, and the clinical course is not like classical ARDS <sup>[3]</sup>. In conscious and cooperative patients, Noninvasive ventilation (NIV) therapy can prevent intubation. Patients should be closely followed during NIV therapy. If refractory hypoxemia, tachypnea, insufficient tidal volume, or high tidal volume such as > 9 ml/kg are detected in the first critical hour, it should be evaluated in terms of invasive mechanical ventilation <sup>[3]</sup>.

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**Figure 1. Our Non-Invasive Ventilation method (with a protective nylon barrier and viral/bacterial circuit filter using a dual-line ventilator circuit).**

The Society of Intensive Care reported that there are methods that can be applied before intubation in patients who do not need intubation, and one of these methods is NIV therapy<sup>[4]</sup>.

NIV therapy should be done in negative pressure rooms, if possible, to avoid aerosol generation and transmission risk. If it is not possible, it should be applied in single rooms using maximum personal protective equipment. It also should be used with intensive care ventilators or dual circuit ventilators. A viral/bacterial circuit filter must be added to the inspiratory and expiratory outputs of the circuits. NIV should be avoided in patients whose secretions cannot be controlled, who have aspiration risk, hemodynamic instability, multiorgan failure, or impaired mental state<sup>[3]</sup>. One of the important points is that the interface connections of the system are fully seated and no disconnection in the lines is allowed<sup>[5]</sup>.

In order to minimize the risk of contamination in our method, we have paid attention to some points such as ensuring the fitting of the masks properly and the use of personal protective equipment. Besides, during the treatment, we placed a protective nylon

barrier that resembled Helmet on the patient's head (Figure 1). Thus, an extra precaution was taken in terms of transmission. We placed a viral/bacterial circuit filter on both inspiratory and expiratory hold using a dual-line ventilator circuit. We definitely turned the ventilator to a standby mode before the procedures applied such as aspiration and sampling. With this application, we were able to improve PaO<sub>2</sub> levels in patients with hypoxic arterial blood gas analysis, and prevented untimely intubation and achieved better clinical responses.

Consequently, NIV treatment should be considered as an option in COVID-19 patients who are conscious and cooperative before invasive mechanical ventilation treatment. The result achieved can be beneficial during the fight against COVID-19 because it can prevent the intubation despite the respiratory distress in these patients. It is also very important to take all precautions to protect healthcare workers and non-infected patients from transmission.

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