

# Discovery of a New Oxygen Delivery Method During COVID-19 Pandemic: Wearing a Surgical Mask Over Oxygen Cannula

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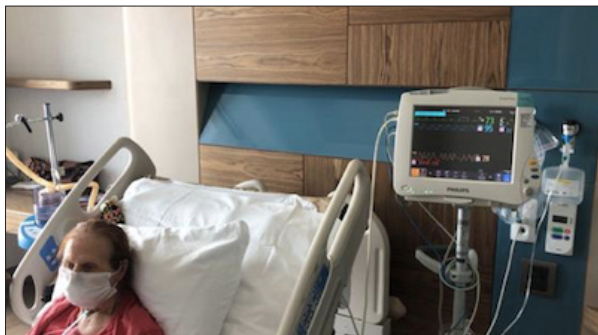
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There is an ongoing debate on the management of respiratory failure owing to coronavirus disease 2019 (COVID-19) in terms of the best method of oxygenation delivery, including oxygen inhalation by cannula or mask, high flow nasal oxygen (HFNO), noninvasive mechanical ventilation (NIMV), or invasive mechanical ventilation [1, 2]. Although some of the authors recommend early intubation in such cases [3], our experiences indicated that mortality and morbidity are significantly high in intubated patients with COVID-19 and intubation could either be delayed or avoided with the use of proper oxygen treatment modalities. Therefore, the availability of noninvasive oxygen delivery methods has a critical role in the management of patients with COVID-19, especially where medical sources are limited.

In our clinic, we had the first patient of COVID-19 on March 16, 2020. Thereafter, we hospitalized 185 patients; of those, approximately 10% of the patients met the criteria for respiratory failure. After we intubated the first 4 of our cases and experienced 1 death and 2 severe morbidities, we tried to avoid intubation in the rest of the cases. We used HFNO and/or NIMV until they were not required, and the maintenance of enough oxygen levels could be provided by traditional nasal oxygen cannula or mask with 8 L/min of oxygen flow. In 1 of the cases, we made an accidental discovery that could prove to be very useful in the management of cases with moderate to severe respiratory failure, especially when the sources are limited for the supplemental oxygen treatment modalities mentioned above.

After the interesting observation, we tested this method in 3 different patients, including the one in whom we made the discovery, with moderate to severe respiratory failure. The first patient was an 86-year-old woman with diffuse parenchymal lung disease and COVID-19 pneumonia. Her pulse oxygen saturation (SpO<sub>2</sub>) was less than 90% with the delivery of 8 L/min of nasal oxygen with a simple oxygen mask and she refused to use HFNO or NIMV. She also refused to be intubated. The nurse in charge (EK) noticed that her SpO<sub>2</sub> rises quickly as high as 100% with the same oxygen flow rate when she wears surgical mask covering her nose 2 cm higher than the nostrils over nasal oxygen cannula (Figure 1). Then, we compared this new method with other oxygen delivery methods such as simple oxygen mask and nonrebreathing mask. We observed that it works even better than the latter method.



**Figure 1.** The figure shows how to use a surgical mask over nasal oxygen cannula properly

The second case was a 47-year-old man with severe pneumonia owing to COVID-19. His SpO<sub>2</sub> was 84% on a non-rebreathing mask with 8 L/min of oxygen. The new method, surgical mask and nasal oxygen cannula with 8 L/min of oxygen, provided the same SpO<sub>2</sub> level with lower respiratory rate (34 vs 22 per minute).

We tried this method in another patient with metastatic lung cancer and bilateral malignant pleural effusion. The patient needed at least 8 L/min of oxygen delivery, and therefore, her oxygen concentration device at home was

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not able to provide the sufficient oxygen. In this patient, wearing a surgical mask over nasal oxygen cannula worked perfectly and the oxygen saturation was increased from 90% to 97% with less oxygen flow (3 L vs 5 L).

In conclusion, wearing a surgical mask over nasal oxygen cannula by covering the nose up to at least 2 cm higher than nostrils works at least as good as a nonbreathing oxygen mask. This simple method of oxygen delivery may prove to be very beneficial in emergency settings and especially where oxygen sources are limited.

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