How to Use High-Flow Nasal Cannula (HFNC) Devices to Provide Oxygen to Patients with CoViD-19 Induced Pneumonia

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The analysis of empirical recommendations available for the treatment of hypoxemia which characterizes the clinical course of numerous cases of COVID-19 can be summarized as follows.
Supplemental oxygen should be provided without delay in patients with Severe Acute Respiratory Infection (SARI, see WHO definition), respiratory distress or any form of hypoxemia, and those in shock. Oxygen therapy should be titrated with SpO2 targets > 90% (> 95% in pregnant women, > 94% in critically ill children, others > 90%).
It should be noted, as is known for most interstitial lung diseases, that dyspnea is a late onset symptom, as is respiratory distress.
It is essential that ER/Admissions and Emergency Department areas are equipped with adequate monitoring tools (continuous SpO2, blood gas analyzer); oxygen, compressed air and wall suction; oxygen therapy devices (venturi masks, NRB masks, high flow nasal cannulas - HFNC -, CPAP systems).
It is a priority to ensure an appropriate level of contact precaution when handling all oxygen therapy devices with COVID-19 patients or suspected COVID-19 patients at all times.
It is necessary to monitor the patient closely to detect early signs of failure (respiratory rate ≥ 24/min, PaO2/FiO2 < 200).
The use of oxygen therapy with HFNC, as well as that of non-invasive ventilation (NIV) should be reserved for carefully selected patients, with intact sensorium and ventilation dynamics, suffering from hypoxemic respiratory failure. It should be performed by experts in a suitable environment to ensure quick access to invasive ventilation, and should be used for no longer than two hours in case of absence of improvement.
It is essential to avoid any delay in tracheal intubation when indicated, as well as in the application of CPAP for deserving cases. Some improper situations can witness a real risk of delaying intubation due to an ephemeral improvement of the parameters. A high failure rate has been reported with these methods, a reason that further leads us to recommend maximum attention in the selection and stratification of risk. Close monitoring is needed especially in the first 2 hours, but also in the hours and days that follow.
HFNC devices can deliver a flow of up to 60 L/min of pre-humidified and pre-heated air-oxygen mixture with a pre-set and constant FiO2. This aspect, together with the "washing-out" of the CO2 from the dead space, seems to correlate with an improvement in respiratory work and oxygenation compared

to conventional oxygen therapy. Humidification and heating, combined with the comfort of the interface, guarantee greater tolerance even in the most prolonged treatments.
Some studies have shown a reduction in the need for intubation in patients with acute hypoxemic respiratory failure, however there are no evidence-based guidelines for the use of HFNC and data on the use in COVID-19 patients is extremely limited. The clinical experience of the Italian Emergency Departments in which the greatest number of patients with SARI have been treated, together with international case studies, indicates a prolonged course characterized by hypoxemia and slight dyspnea, which can be followed by a progressive and sometimes rapid deterioration. It is rational to believe that these physiological aspects make the benefits of HFNC relative to the reduction of the work of breathing aleatory and not preventive of the subsequent deterioration. Although some studies have shown the poor dispersion of viral particles for both NIV and HFNC devices, a consensus of experts has recommended covering the patient's face with a surgical mask during HFNC.
The current state of knowledge renders it reasonable to recommend the use of HFNC for COVID-19 patients with SARI in a very early and mild phase of the clinical course, and for mild-moderate hypoxemias (PaO2/FiO2 near 300), as an alternative to conventional oxygen therapy, without delaying the use of CPAP, closely monitoring the response especially on the pulse oximetry and ventilatory dynamics, and remaining ready for early endotracheal intubation when the P/F ratio tends to worsen and the respiratory rate is ≥ 24/min. The benefit/risk ratio of HFNC is therefore extremely weak in this context: the danger of delaying the use of the most effective ventilation methods exceeds, to date, the possible positive effects hoped for in cases that are not already responsive to conventional O2-therapy, or in an attempt to prevent further deterioration in mild cases. Conversely, the extreme tolerance of the device, combined with heating and humidification, can probably make it useful and effective in treatment intervals during CPAP.

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