

COVID-19: Respiratory treatment in critical care – some facts

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The following recommendations have been made by the WHO and SIAARTI Airway Management Research Group with respect to respiratory treatment of COVID-19 patients.

Choices regarding supplemental oxygen delivery and providing invasive respiratory support are crucial, and may impact outcomes as well as the saturation of critical care beds. The following action is essential:

- Ensure airborne protection for every phase/step in critical care settings (wherever possible)
- Anticipate needs, maximize first-pass success

SpO₂

Target SpO₂ $\geq$ 90%, higher for emergency patients. Use supplemental oxygen therapy at 5 l/min and higher. Hygiene precautions are essential: HFOT (High Flow Oxygen Therapy) and leaking NIV (noninvasive ventilation) interfaces may generate contaminated aerosols.

Caution with HFOT and NIV!

Before deciding to apply noninvasive therapies such as HFOT or NIV, consider their benefits versus the risk of airborne diffusion. These therapies may result in the widespread dispersion of exhaled air and infectious aerosols.

Known high failure rates in COVID-19 patients may be an additional argument against treating them with noninvasive therapies. Use HFOT and NIV in selected patients only, and closely monitor the patient situation for deterioration. Patients receiving a NIV trial should be in a monitored setting and cared for by experienced staff capable of endotracheal intubation, in case the patient deteriorates acutely or does not improve after about one hour. Patients with hemodynamic instability, multi-organ failure, or an abnormal mental status should not receive NIV.

Intubation

When deciding whether to perform an endotracheal intubation:

- Adopt Early Warning Scores for intubation/quod vitam prognosis (consider DNR cases)
- Identify an isolated room (negative pressure environment if possible)

It is preferable to perform intubation as an elective procedure, rather than waiting until it is an emergency (greater patient risk).

If the decision is made to intubate, ensure the minimum number of team members:

- The most expert team member should perform the intubation and advanced airway control/ventilation (wearing PPE)
- Expert assistant on protocols and devices (doctor/nurse wearing PPE)
- Second doctor wearing PPE if complex maneuver/difficult airway is expected/planned
- Doctor available wearing PPE outside the room
- Observer putting on / taking off PPE outside the room

Additional considerations for intubation:

- Consider video laryngoscopy to ensure the highest possible level of hygiene and self-protection.
- Ensure the duration of pre-oxygenation is sufficient before intubating ARDS patients (5 min with 100% Oxygen, using a face mask with reservoir bag, bag-valve mask, or NIV).

Before applying mechanical ventilation, consider the following:

- Bacterial/viral filter on every oxygenation interface (face mask, circuit, endotracheal tube, supraglottic airway devices, introducer, airway exchange catheters, ventilator inspiratory and expiratory outlet)
- Airway cart ready (disposable devices preferable)
- Suction: Closed system prepared with tube extension

Mechanical ventilation

- Apply mechanical ventilation according to the current recommendations for treatment of ARDS patients (see also <http://www.ardsnet.org/tools.shtml>):
 - Tidal volume: 4 - 6 ml/kg predicted body weight 1,2
 - Pplat < 30 cmH2O
 - Permissive Hypercapnia
- Prone position patients for > 16 hours, if appropriate. Higher PEEP settings may be beneficial in patients with moderate to severe ARDS; therefore, use of the higher PEEP Table from the ARDSnet is recommended (see below).¹
- Maintain the driving pressure (Pplat-PEEP) as low as possible (< 14 cmH2O).³
- Unselected high pressure recruitment is not recommended.
- Avoid unnecessary disconnections of breathing circuits (if needed: ventilator on standby / clamp endotracheal tube) to ensure airborne protection and maintain PEEP.
- Use weaning protocols to reduce the duration of invasive mechanical ventilation.
- Follow a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
- Closely monitor the cardiac function of the patient.

References

1. Papazian, Laurent, et al. "Formal guidelines: management of acute respiratory distress syndrome." *Annals of intensive care* 9.1 (2019): 69.
2. Kluge, S., Janssens, U., Welte, T. et al. Empfehlungen zur intensivmedizinischen Therapie von Patienten mit COVID-19. *Med Klin Intensivmed Notfmed* (2020).
<https://doi.org/10.1007/s00063-020-00674-3>.
3. Amato, Marcelo BP, et al. "Driving pressure and survival in the acute respiratory distress syndrome." *New England Journal of Medicine* 372.8 (2015): 747-755.

[World Health Organisation: Clinical management of severe acute respiratory infection \(SARI\) when COVID-19 disease is suspected: Interim guidance V 1.2 \(March 2020\)](#)

WHO guidelines: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>

COVID-19 Airway Management Rev 1.1, SIAARTI, M. Sorbello, I. Di Giacinto, F. Bressan, R. Cataldo, G. Cortese, C. Esposito, S. Falcetta, G. Merli, F. Petrini on behalf of SIAARTI Airway Management Research Group (March 2020)

For additional information on COVID-19:

ESICM information: <https://www.esicm.org/resources/coronavirus-public-health-emergency/>

Current evidence about COVID-19:

<https://jamanetwork.com/journals/jama/pages/coronavirus-alert>

Centers for Disease Control and Prevention, CDC: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html>

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