

Appendix 2: Management of sequential NIV and oxygen therapy

Management of sequential NIV

The following steps will be undertaken:

- Semi-recumbent position
- Naso-buccal (facial) mask as first choice
- Humidification (humidifier or heat and moisture exchanger)
- ICU ventilator with specific NIV mode or dedicated NIV ventilator
- Pressure mode: pressure support ventilation (PSV) + positive end expiratory pressure (PEEP) or bilevel positive airway pressure (BiPAP)

Initial settings

- Inspiratory pressure level (PSV or IPAP: cmH₂O) for expired tidal volume (V_{te}) between 6 to 8 ml/kg of ideal body weight (IBW)
- Expiratory pressure level (PEEP or EPAP: cmH₂O)
 - between 3 to 5 cmH₂O to counteract a potential intrinsic PEEP
 - between 5 to 10 cmH₂O to counteract a potential intrinsic PEEP and improving oxygenation
- FiO₂ (%) set for a 88% ≤ SpO₂ ≤ 92%

Suggested adjustments to limit patient-ventilator asynchrony

- Rapid ramp flow pressure: 0.20-0.25sec
- Minimal flow inspiratory trigger: 0.5-1 l/min
- Adjustable flow (40-60%) or timed (1-1.2 sec) expiratory trigger (I/E cycling) secondary adapted to tolerance, air-leaks and ABG controls

Management of oxygen therapy

Standard oxygen therapy

- Interface: nasal cannula, nasal tube or face mask according to the O₂ flow needed and/or tolerance of interface.
- Flow: set for a 88% ≤ SpO₂ ≤ 92%

High-flow heated and humidified nasal oxygen therapy (HFHO)

- Preparation of the device 10 to 15 min before use (to reach the good temperature for tolerance).
- FiO₂: set for a 88% ≤ SpO₂ ≤ 92%
- Gas-flow: set between 50 to 60 L/min according to tolerance.

Procedures to withdraw from HFHO

- First, gas flow maintained at 50L/min with progressive decrease in FiO₂ of 0.05 to 0.1 every 2 hours until 30% if 88% ≤ SpO₂ ≤ 92% and/or PaO₂ ≥ 60 mmHg (8 kPa), respectively,
- Then, progressive decrease in gas flow of 5L every 2 hours until < 20L/min,
- Then, relay by standard O₂ with nasal cannula with a flow rate < 5L/min for :
 - PaO₂ ≥ 60 mmHg (8kPa),
 - PaCO₂ ≤ 45 mmHg (6kPa) (taking into account for baseline PaCO₂ in steady state)
 - pH ≥ 7.35

Procedures to withdraw from standard oxygen therapy

Although most, if not all the patients will be discharged from the ICU/intermediate care/respiratory care unit with the need for supplemental oxygen, we suggest the following steps for potential withdrawal of oxygen:

- Progressive decrease in O₂ flow until 2L/min
- O₂ can be stopped if $88\% \leq \text{SpO}_2 \leq 92\%$ and/or ≥ 60 mmHg (8 kPa), respectively, at a flow of $\leq 2\text{L}/\text{min}$ for a minimum of 2 hours

Criteria to definitely stop NIV

NIV will be stopped definitely if one of the following criteria, at least, is met:

- Intubation criteria (see Box 2)
- Clinical and gazometric (ABG) stability under oxygen therapy (HFHO or standard O₂) during 12 hours with :
 - PaO₂ ≥ 60 mmHg (8kPa),
 - PaCO₂ ≤ 45 mmHg (6kPa) (taking into account for baseline PaCO₂ in steady state),
 - pH ≥ 7.35 .
- NIV intolerance or refuse