

Non Invasive Ventilation (NIV) In Adult Acute Care during COVID-19 Pandemic

Intended audience:

All Acute Care Physicians, Emergency Room Physicians, Respiratory Therapists, Nursing Unit Managers

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Background and Rationale

In routine practice, noninvasive ventilation (NIV, e.g. BiPAP and CPAP) is commonly used on medical wards in patients suffering severe respiratory failure who are not candidates for intubation/ventilation (M Goals of Care). There are generally two types of respiratory failure: 1) Hypercapnic (high carbon dioxide) and 2) hypoxemic. NIV is an Aerosol Generating Medical Procedure (AGMP) so it increases the risk of transmission of COVID-19 to health care workers (HCWs).

Current AHS guidelines for the [Care of the Adult Critically Ill COVID-19 Patient \(Annex D\)](#) recommends against using NIV in these patients (R GOC) because of very high failure rates often resulting in a need for emergent intubation, in addition to the increased risk of transmission to HCWs. That guideline does not extend to the care of patients outside of the ICU.

The practice of using NIV in patients who are not candidates for intubation is not based on high quality data, but rather is extrapolated from studies of patients who **are** candidates for intubation, with the primary outcome being reduction in intubation rates. NIV has been found to be most effective in reducing intubation rates in hypercapnic respiratory failure due to COPD and in acute pulmonary edema. In both of these clinical situations the duration of NIV therapy is brief (often only hours) and failure to improve rapidly, portends a poor prognosis. Notably, NIV has not been shown to improve survival in patients with hypoxemic respiratory failure due to pneumonia even though the majority of these studies have been done in ideal circumstances with R-GOC patients receiving close monitoring in an ICU setting.

Recommendations consider the balance of likely benefit of NIV to the patient versus risk of AGMP to HCWs, other patients, and the resources consumed by the intervention (PPE, staff, and isolation rooms).

Recommendations:

1) **GOC = M1-2 with Acute Respiratory Failure** (regardless of COVID-19 status)

CONSULT Pulmonary Medicine for advice

- a. Hypoxemic respiratory failure with persistent hypoxemia despite Nasal prongs (NP) and Non rebreather (NRB) is **NOT a candidate for NIV** during the COVID Pandemic. Due to the risks of AGMP and the lack of evidence for effectiveness, this applies to all causes of hypoxemic respiratory failure, except “acute pulmonary edema”, in which a short trial of NIV can allow for other medical therapies (diuretics) to work.
- b. Acute hypercapnic respiratory failure¹ in a patient with known COPD, meeting criteria based on the AHS protocol - [AHS Non invasive ventilation in the management of acute respiratory failure](#). In the current COVID pandemic, the “trigger” for AECOPD could be COVID-19 (regardless of history of ILI); accordingly a short BiPAP trial (if indicated) can be undertaken **ONLY** in a private room with full PPE precautions (including N-95 and eye protection). As per AHS protocol, if after **two hours of optimized NIV** (well-sealed interface, reasonable tidal volumes & minute ventilation), an ABG reveals pH <7.25, and/or clinical parameters are not improving, then it would be recommended to discontinue NIV and provide appropriate palliation. This recommendation is

¹ pH < 7.3 on an ABG (not a VBG) and elevated PCO₂

based on data from Confalonieri et alⁱ where the 2 hour post BiPAP status is predictive of NIV success.

2) **GOC= R with Acute respiratory Failure** (regardless of COVID status)

The patient with acute respiratory failure who is a candidate for intubation/ventilation should be seen by critical care physicians for decisions regarding NIV/Optiflow/AIRVO/intubation, as per the AHS guideline for the [Care of the Adult Critically Ill COVID-19 Patient \(Annex D\)](#).

3) **GOC= C:** There is no role for NIV in management of patient with C-GOC.

4) **ANY GOC : Chronic use of NIV (COVID – confirmed, probable, or under investigation)**

- a. **Chronic use of home nocturnal NIV** (e.g. Obesity Hypoventilation, COPD): As per [AHS Chronic Non-Invasive Ventilation for the Adult Hospitalized Patient](#) practice support document, consult pulmonary medicine regarding continuation of home therapy. If NIV/BiPAP is **life-sustaining** then the patient must be cared for in a private room with Contact and Droplet precautions including door closed, PPE, eye protection and N95 whenever the therapy is being used (for many patients it may only be during sleep).
- b. **Neuromuscular Disease:** In the event that a patient with a new diagnosis or a known diagnosis of neuromuscular disease presents with new hypercapnic respiratory failure, NIV/ BiPAP can be initiated in a private room with full PPE (including N95 and eye protection). **Urgent consultation** with the neuromuscular service is required (pager available in ROCA). During the COVID Pandemic, deterioration in respiratory status will be suspected COVID. Clearance and recruitment techniques in **neuromuscular patients** are essential. Lung Volume Recruitment and Cough Assist procedures are considered AGMP and should be performed in a private room with appropriate PPE (including N95 and eye protection) in consultation with the neuromuscular consult service.
- c. **CPAP for OSA:** During the COVID pandemic, nocturnal CPAP will **not** be routinely used for hospitalized patients with OSA due to the fact that this is an AGMP. Pulmonary consultation is advised if there is concern that the therapy is essential to current medical care. If deemed essential, then the patient must be cared for in a private room with Contact and Droplet precautions including door closed, PPE, eye protection and N95 whenever the therapy is being used (for almost all patients it would only be used during sleep).

If the number of patients with COVID related disease approaches maximum Surge Capacity: this document will likely evolve in response to changing patient and resource conditions and circumstances. For example:

- 1) In the event that an isolation room is not available, then NIV should not be used if the patient is possible, probable or confirmed COVID positive because of the unacceptable risk of this AGMP to HCW and other patients.
- 2) If COVID positive patients are cohorted together in larger rooms, then IP&C guidelines for AGMP in that situation (Contact, Droplet precautions including door closed, PPE, eye protection and N95) should be followed.
- 3) IF the system's ventilator capacity were to be overwhelmed by demand at any time during the COVID crisis, it is possible that NIV could be considered for an R-GOC patient This decision would be made by the Critical Care team and is beyond the scope of this document.

ⁱ M. Confalonieri, G. Garuti, M. S. Cattaruzza. A chart of failure risk for noninvasive ventilation in patients with COPD exacerbation. ERJ Feb 2005, 25 (2) 348-355; DOI: 10.1183/09031936.05.00085304