RESPIRATORY SUPPORT FOR ADULTS WITH SEVERE TO CRITICAL COVID-19

NATIONAL CLINICAL EVIDENCE TASKFORCE
COVID-19

FORMS OF GUIDANCE

Evidence-Based Recommendation **(EBR)**
Consensus Recommendation **(CBR)**

Types of EBRs: RECOMMENDATION FOR USE | RECOMMENDATION AGAINST USE | CONDITIONAL RECOMMENDATION FOR USE | CONDITIONAL RECOMMENDATION AGAINST USE

VERSION 17.4
PUBLISHED
24 MAY 2023

RESPIRATORY SUPPORT

Guiding principles of care

MANAGING RISK OF INFECTION

Respiratory support
For patients with COVID-19 receiving respiratory support, use negative pressure rooms wherever possible. If none is available, other alternatives are single rooms, or shared ward spaces with cohorting of confirmed COVID-19 patients. Ensure contact, droplet and airborne precautions are in place. Healthcare workers should be up to date with vaccination and wearing fit-tested N95 masks.
CBR [Taskforce]

As per the current national guidance on the use of personal protective equipment (PPE) for healthcare workers in the context of COVID-19:

- use eye protection
- use P2/N95 respirators
- use other PPE as per NHMRC IPC recommendations

PP [ICEG; NHMRC]

MANAGING RESPIRATORY SUPPORT

When caring for patients with COVID-19, clinicians need to determine a target range of oxygen saturation to titrate oxygen therapy. Advisable target ranges of oxygen saturation are:

- 92–96% in most patients
- 88–92% in patients at risk of hypercapnia

All awake patients receiving respiratory support should be educated on proning (see section 8.6) and should be encouraged/assisted to prone for as long as is practicable. **Info** [Taskforce]

Definition of disease severity

Severe illness
A patient with signs of moderate disease who is deteriorating
OR
A patient meeting any of the following criteria:

- respiratory rate ≥30 breaths/min
- oxygen saturation <92% on room air at rest or requiring oxygen
- lung infiltrates >50%

Critical illness
A patient meeting any of the following criteria:

- respiratory failure (defined as any of)
  - severe respiratory failure (PaO_2/FiO_2 <200)
  - respiratory distress or acute respiratory distress syndrome (ARDS)
  - deteriorating despite non-invasive forms of respiratory support (i.e. non-invasive ventilation (NIV), or high-flow nasal oxygen (HFNO))
  - requiring mechanical ventilation
- hypotension or shock
- impairment of consciousness
- other organ failure

MEDICAL TREATMENTS AND MANAGEMENT OF SHOCK

Refer to **MANAGEMENT OF ADULTS WITH SEVERE TO CRITICAL COVID-19** Clinical Flowchart

RESPIRATORY MANAGEMENT

Supplemental oxygen

CONVENTIONAL OXYGEN THERAPY

Conventional oxygen therapy to maintain oxygen saturation within target range:

- Nasal prongs at 1–4 L/min (0.24-0.36 FiO_2)
- Mask at 6–10 L/min (0.35-0.60 FiO_2)
- Non-rebreather mask 15 L/min (1.00 FiO_2)
- High-flow nasal oxygen (HFNO) therapy with flow rates up to 60 L/min with an oxygen/air blender supplying oxygen at 0.21-1.00 FiO_2. It delivers high-flow oxygen that is humidifed and heated, via large diameter nasal cannula. **Info** [Taskforce]

NON-INVASIVE VENTILATION (NIV)

Continuous positive airway pressure (CPAP), a mode of non-invasive ventilation which applies continuous positive airway pressure (with or without entrained oxygen). It can aid in alveolar recruitment and optimise oxygen delivery. CPAP is generally used for hypoxaemic respiratory failure.

Bilevel positive pressure support (eg. BiPAP), is another mode of non-invasive ventilation which provides a higher level of pressure during the inspiratory phase to enhance ventilation, while a lower level of positive pressure is delivered during the expiratory phase (known as positive end-expiratory pressure (PEEP)). Supplemental oxygen can also be delivered through the device. Bilevel positive pressure support is generally used when there is hypercapnia with or without hypoxaemia. **Info** [Taskforce]

Non-invasive ventilation
For patients with COVID-19 who have hypoxaemic respiratory failure and are unable to maintain oxygen saturations within target range despite oxygen delivery by nasal prongs or mask, consider using CPAP.

The evidence suggests that CPAP therapy is preferred for patients with persistent hypoxaemia associated with COVID-19 (defined as requiring an FiO_2 ≥ 0.4 to maintain oxygen saturation in their target range). Adjust continuous positive airway pressure as required, most patients require pressures of 10 to 12 cm H_2O. Excessive pressures may increase the risk of pneumothorax. Titrate oxygen to maintain oxygen saturation in the target range. There is currently insufficient direct evidence available to support the use of bilevel positive pressure support in the setting of COVID-19.

If CPAP is not available or not tolerated, consider HFNO as an alternative using the same safety parameters.

Patients receiving CPAP (and/or HFNO) for COVID-19 monitor closely at all times and liaise with ICU in case of deterioration. Do not delay endotracheal intubation and invasive mechanical ventilation in patients with COVID-19 who are deteriorating despite optimised, less invasive respiratory therapies. **EBR** [Taskforce]

RESPIRATORY MANAGEMENT

Supplemental oxygen

PRONE POSITIONING

Positioning the patient in a face-down (prone) position may help to open up (recruit) collapsed alveoli and improve oxygen levels in the blood. **Info** [Taskforce]

Proning — supplemental oxygen
For adults with COVID-19 and respiratory symptoms who are receiving any form of supplemental oxygen therapy and have not yet been intubated, consider prone positioning for at least 3 hours per day as tolerated. When positioning a patient in prone, ensure it is used with caution and accompanied by close monitoring of the patient. Use of prone positioning should not delay endotracheal intubation and mechanical ventilation in patients with COVID-19 who are deteriorating despite optimised less invasive respiratory therapies. **EBR** [Taskforce]

For adults with COVID-19 and respiratory symptoms who are receiving any form of supplemental oxygen therapy and have not yet been intubated, prone positioning for as long as tolerated may increase benefits. **PP** [Taskforce]

Vulnerable people who are treated outside the ICU, for example people who are older and living with frailty, cognitive impairment or unable to communicate, may particularly be at increased risk of harm from proning. Despite the potential risks of awake proning associated with frailty, there may be benefits for this group. The net clinical benefit for each individual patient should be considered on a case-by-case basis. **PP** [Taskforce]

CARDIOPULMONARY RESUSCITATION DURING PRONING

Prone positioning and CPR
For patients with COVID-19 in prone position requiring cardiopulmonary resuscitation (CPR), where safe and feasible, return the patient to supine position and commence resuscitation. If returning the patient to supine position is not safe and feasible, commence CPR in prone position. Once it is safe and feasible, return the patient to supine position and continue the resuscitation process. **CBR** [Taskforce]

RESPIRATORY MANAGEMENT OF THE DETERIORATING PATIENT

Endotracheal intubation/mechanical ventilation

Do not delay endotracheal intubation and mechanical ventilation in patients with COVID-19 who are deteriorating despite optimised, less-invasive respiratory therapies. **CBR** [Taskforce]

Patients can deteriorate rapidly 5 to 10 days after onset of symptoms. **PP** [Taskforce]

The net clinical benefit for each patient should be considered on a case-by-case basis, as factors such as frailty, advanced illness or comorbidity may lessen the benefit and increase potential harms. **PP** [Taskforce]

Decisions around proceeding to more invasive forms of ventilation should be based on discussion, consideration of the patient's expected short and long-term responses to more invasive forms of treatment and an advance care directive or plan if available. **PP** [Taskforce]

ADVANCED RESPIRATORY SUPPORT

Mechanical ventilation

GENERAL

Videolaryngoscopy
In adults with COVID-19 undergoing endotracheal intubation, consider using videolaryngoscopy over direct laryngoscopy if available and the operator is trained in its use. **EBR** [Taskforce]

In mechanically ventilated adults with COVID-19 and ARDS, use low tidal volume (Vt) ventilation (Vt 4-8 mL/kg of predicted body weight) rather than higher tidal volumes (Vt >8 mL/kg) and aim for plateau pressures (Pplat) of <30 cm H_2O. **CBR** [Taskforce/SSC]

Positive end-expiratory pressure
For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, consider using a higher PEEP strategy (PEEP >10 cm H_2O) over a lower PEEP strategy. **CBR** [Taskforce]

In mechanically ventilated adults with COVID-19 and ARDS, use a conservative fluid strategy rather than a liberal fluid strategy. **PP** [Taskforce/SSC]

Neuromuscular blockers
For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, do not routinely use continuous infusions of neuromuscular blocking agents (NMBAs). **EBR** [Taskforce]

If protective lung ventilation cannot be achieved, consider using NMBAs for up to 48 hours. If indicated, consider cisatracurium as first-line agent; if cisatracurium is not available alternatives include atracurium or vecuronium by infusion. **PP** [Taskforce]

ADDITIONAL MEASURES

Proning — mechanical ventilation
For mechanically ventilated adults with COVID-19 and hypoxaemia despite optimising ventilation, consider prone positioning for more than 12 hours a day. **CBR** [Taskforce]

Current reports suggest prone ventilation is effective in improving hypoxia associated with COVID-19. This should be done in the context of a hospital guideline that includes suitable personal protective equipment (PPE) for staff, and that minimises the risk of adverse events, e.g. accidental extubation. **PP** [Taskforce]

Recruitment manoeuvres
For mechanically ventilated adults with COVID-19 and hypoxaemia despite optimising ventilation, consider using recruitment manoeuvres.

If recruitment manoeuvres are used, do not use staircase or stepwise (incremental PEEP) recruitment manoeuvres. **CBR** [Taskforce]

In mechanically ventilated patients with COVID-19 and respiratory failure, use empiric antibacterial agents when clinically indicated. Re-evaluate the duration of therapy and spectrum of coverage based on the microbiology results and the individual's clinical status. **PP** [Taskforce]

In mechanically ventilated patients with COVID-19 and ARDS, do not routinely use inhaled nitric oxide. **CBR** [Taskforce/SSC]

In mechanically ventilated patients with COVID-19 and ARDS who develop refractory hypoxaemia, consider inhaled nitric oxide or other inhaled pulmonary vasodilator as a rescue therapy. **PP** [Taskforce]

TRACHEOSTOMY

In mechanically ventilated adults with COVID-19, consider performing a tracheostomy after 10 or more days as per standard practice, while optimising the environment for health care worker safety, including wearing appropriate PPE. **CBR** [Taskforce]

Refractory patients

EXTRACORPOREAL MEMBRANE OXYGENATION

ECMO
Consider early referral to an ECMO centre for patients developing refractory respiratory failure in mechanically ventilated adults with COVID-19 (despite optimising ventilation, including proning and neuromuscular blockers). **EBR** [Taskforce]

Due to the resource-intensive nature of ECMO and the need for experienced centres, healthcare workers and infrastructure, ECMO should only be considered in selected patients with COVID-19 and severe ARDS. **PP** [Taskforce]

Sources

SSC – Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019 (COVID-19)

National COVID-19 Clinical Evidence Taskforce – Australian guidelines for the clinical care of people with COVID-19

ICEG – Guidance on the use of personal protective equipment (PPE) for health care workers in the context of COVID-19

NHMRC - Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019)