COVID-19 Respiratory Failure

For more information on respiratory failure, visit https://covidprotocols.org/protocols/respiratory.
See also: ***Inpatient***, ***Outpatient***, and ***ICU Patient*** guides at https://covidprotocols.org/quick-guides

Supplemental Oxygenation

GOAL = SpO2 92–96% (88–94% if COPD)

Recommended path

- **Start humidified NC** 1–6 L/min
- **Escalate to oxymizer** 6–12 L/min *or* Venturi mask 40–60%
  - if oxymizer 10 L/min or Venturi at 50%, transfer to ICU (p39999)
  - if oxymizer 12 L/min or Venturi at 60% *and* within GOC, intubate (p39265)

Noninvasive ventillation

- **CPAP/BIPAP (NIPPV)**: use as normal (OSA, TBM, COPD, flash pulmonary edema, etc.)
  - use hospital's machines with HEPA filters and AGP precautions
- **HFNC**: Use as normal with AGP precautions

Awake Proning (Self-Prone)

Any willing patients with the ability to unprone themselves if needed

- Recommend swimmer position; alternatives okay if more comfortable for patient
- Okay with NC, NIPPV, or HFNC
- Maximum time tolerated per day

Ventilator Adjustments

VENTILATION

GOAL = pH of roughly 7.25–7.45 while maintaining low tidal volumes

1. Start with tidal volumes

- 4–6 cc/kg ideal body weight

2. Then adjust respiratory rate

- adjust to achieve pH goal (typical range 20–35 breaths/min)

OXYGENATION

GOAL = SpO2 92–96% (88–94% if COPD)

1. Start with PEEP

- **Initial settings** on intubation
  - BMI < 40: PEEP 5
  - BMI ≥ 40: PEEP 10
- **Adjust PEEP**
  Use optimal PEEP study or PV tool if available and trained; otherwise use ARDSnet tables at right:
  - BMI < 40: Low PEEP table
  - BMI ≥ 40: High PEEP table

2. Adjust FiO2

- Minimum tolerated for SpO2 92–96% (88–94% if COPD) after adjusting PEEP
  - if FiO2 > 60%, see *Refractory Hypoxemia* on page 2 of this guide

MECHANICS

- Measure static compliance (CStat) and plateau pressure (PPlat)
- If PPlat > 30: decrease TV (min 4 cc/kg ideal body weight)

ARDSNET TABLES

Use a minimum PEEP of 5 cm H_2O. Consider use of incremental FiO2/PEEP combinations as follows:

LOW PEEP (BMI < 40)

FiO2	PEEP
0.3	5
0.4	5
0.5	8
0.5	8
0.6	10
0.7	10
0.7	12
0.7	14
0.8	14
0.9	14
0.9	16
0.9	18
1.0	18–24

HIGH PEEP (BMI ≥ 40)

FiO2	PEEP
0.3	5
0.3	8
0.3	10
0.3	12
0.3	14
0.4	14
0.4	16
0.5	16
0.5	18
0.5 to 0.8	20
0.8	22
0.9	22
1.0	22
1.0	24

MORE CONTENT ON BACK ▶

COVID-19 Respiratory Failure

Sedation / NMB

Start with sedation

Use minimum doses to achieve ventilator synchrony

Assess and treat in sequence:

1. Pain
- Assess for goals: NRS <4, CPOT <3
- Treat: Dilaudid or Fentanyl, prefer bolus, switch to drip PRN, try PO options if IV shortages

2. Agitation
- Assess for goals: RASS 0 to −1, or BIS 60 if on neuromuscular blockade
- Treat: Propofol drip preferred, benzodiazepine second line (delirium risk), dexmedetomidine only if weaning (tachyphylaxis after 3 days)

3. Delirium
- Assess: CAM-ICU
- Treat: quetiapine, olanzapine, haloperidol

Consider neuromuscular blockade if:

- Not synchronous with RASS −4 to −5

– or –

- Need to improve gas exchange:
  - decreased skeletal muscle metabolism (lowers O2 demand and CO2 production)
  - increased abdomen and chest compliance

METHOD
- Sedate to RASS −3 to −4 *prior to initiating*
  - then goal BIS −60 after (BIS inaccurate prior to paralysis)
- Bolus dose rocuronium or cisatracurium (start drip only if needed)
- Discontinue as soon as possible and minimize steroids to reduce risk of myopathy

Ventilated Proning

- Ideally: < 36 hours from ARDS onset
- *Contraindicated in* spinal cord injury, open chest or abdomen, unstable airway (BMI, RRT are not contraindications)

METHOD
- Hold tube feeds 1 hour prior to turns, otherwise they can be continued
- Place in swimmer position
  - Proning Team (p34433) if needed
  - bolus paralytic PRN for turns; *not required* to prone
- Obtain ABG and mechanics 1 hour after proning or re-supinating
- Keep proned for 16 – 20 hrs per 24 h

DISCONTINUE IF
- Minimal improvement to P/F with proning
- P/F >200 on FiO2 <60% when supine
- Unsafe hemodynamic changes on turns, or if concern that patient may require ECMO

Refractory Hypoxemia

If PaO2 <75 with FiO2 ≥ 0.6 there is concern for oxygen toxicity; try:

1. Optimize PEEP and vent synchrony (flow, triggers, volumes; page RT or pulmonary consult PRN)
2. Optimize volume (RRT or diuretic)
3. Trial proning
4. Deeply sedate (to RASS −3 to −5)
5. Trial neuromuscular blockade
6. Consider ECMO (p35010)
7. Trial inhaled epoprostenol or iNO (contraindicated in pulmonary hemorrhage, LV failure)

Extubation Readiness

In patients who meet all four of:
- SpO2 > 92% or PaO2 > 75
- FiO2 ≤ 50%
- PEEP ≤ 10
- PPlat < 30

1. Daily SAT (RASS 0)
- *Do not attempt* if paralyzed, proned, or HD unstable

2. If passing SAT, daily SBT
- Trial PSV 5/5 × 30 minutes

  Discontinue if:
  RR >30, SpO2 <92%, HD unstable, Rapid Shallow Breathing Index (RSBI) = RR/TV >105

3. If passing SAT *and* SBT, consider extubation *if also:*
- Following commands, ideally RASS 0 to +1
- Able to cough
- Requiring suctioning less frequently than q2h

TIP: Place NG tube or Dobhoff *prior to extubation*

If failing SAT and SBT consider:
- Volume status/diuresis
- Bronchoconstriction and airway edema
- Sputum production/VAP
- Neuromuscular weakness including malnutrition and electrolytes (phos)
- Delirium, sedation

MORE CONTENT ON FRONT ▶