

NH Clinical Guideline for Care of Patients with Respiratory Failure with Suspected or Confirmed COVID-19

1. Introduction

- Some of the Recommendations are specific to the tertiary ICUs (UHNBC) but most apply to the NH Hospitals with ICUs and HAUs. On rare occasions, smaller sites might also need to use these recommendations.
- The Recommendations are fluid and will likely change as things progress.
- Preferentially patients will move to UHNBC or Terrace if possible. Transfer process remains the same – call BCEHS PTN 1-866-233-2337

2. ICU Admission

- a. The indications for ICU consultation for consideration for ICU admission in patients with COVID-19:
 - i. Requiring a FiO₂ of greater than 0.5 or greater than 6-10 L/min by facemask to maintain a SpO₂ > 92%.
 - ii. Have frequent desaturations despite oxygen.
 - iii. Have a significantly increased work of breathing, are tiring, or have a decreased level of consciousness.
- ii. Patients with hypoxic respiratory failure from any cause (pneumonia, COPD, asthma, ARDS, pulmonary hemorrhage, aspiration) who require mechanical ventilation
- iii. Patients with respiratory failure who are at imminent risk of needing invasive ventilation early to prevent a rushed and uncontrolled intubation.
- iv. * Patients who are DNR M3/C0 are not for intubation, but might benefit from additional non-invasive ventilation or ICU care.
- v. **Patients with COVID-19 without significant respiratory compromise or hypoxia will not be brought to the ICU or community HAUs solely because of infection control issues. These cases can be discussed with internal medicine.

3. Infection Control Issues

- a. Patients with suspected or confirmed COVID-19 should preferably be cared for in a negative pressure room. The next preferred location is an isolation room with a closed door. However, the number of these rooms is limited and

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once they are full of existing COVID-19 patients, regular rooms will have to be used and patients will need to be cohorted in one area.

- b. Health Care Workers (HCWs) must follow **contact and droplet precautions** when caring for these patients. When performing a nasal pharyngeal swab for diagnosis of COVID-19, contact and droplet precautions are required.
- c. HCWs must follow **contact and aerosol precautions** when Aerosol Generating Medical Procedures (AGMPs) are occurring. These include:
 - i. Intubation
 - ii. Bronchoscopy
 - iii. CPR
 - iv. Nebulization therapy, non-invasive ventilation, and open endotracheal tube suction
 - v. BiPAP/CPAP, HFNO (Optiflow) in suspected or confirmed COVID-19 patients.

4. Respiratory Management on In-Patient Wards and in the ICU prior to intubation.

- a. BiPAP has a high risk of aerosol generation and spread of the virus and because of this risk, BiPAP **should preferably be avoided**. However, it can be considered in individualized patient care with appropriate aerosol precautions in place.
- b. If BiPAP is used in suspected or confirmed COVID-19 patients, then:
 - i. The patient must preferably be in a negative pressure room or negative pressure ward or cohorted in a COVID positive confirmed area.
 - ii. All HCWs must follow **contact and aerosol precautions** while BiPAP is being used and for 90 minutes after.
 - iii. No visitors allowed in the room/area since they have not been fit tested for N95 masks and cannot follow the aerosol precautions.
 - iv. A sign must be on the patient door stating that an Aerosol Generating Medical Procedure (AGMP) is occurring and that aerosol precautions must be used before entering.
- c. Home CPAP can be used in patients admitted to hospital with no suspected or confirmed COVID-19.
- d. The use of High Flow Nasal Oxygen (HFNO) (also known as Optiflow) should ideally be restricted to ICU or HAU use because of its potential to cause aerosol spread of the virus in coughing patients. NH will follow current provincial practices and err on the side of caution. HFNO (Optiflow) is no longer thought to be dangerous unless a patient is actively coughing, but

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when used, the patient should be in an isolation area. No visitors are allowed during HFNO use.

- e. Nebulization therapy will be restricted due to risk of viral spread. The use of inhalers with spacers are recommended. If nebuliser are used, section **b i-iv** listed above will apply.
- f. In non-intubated patients, oxygen flow should be restricted to less than 15 litres per minute to prevent aerosol spread of the virus. Rebreathing masks using less than 15 litres per minute of flow are acceptable. If oxygen flow is greater than 15 litres per minute, items **b i-iv** above must apply.
- g. If patient is ventilated, only closed suction systems are permissible. Every effort must be made to prevent ventilator disconnections and there should be no leak around the ETT cuff.

5. Investigations

- a. On admission:
 - i. Nasal swab, CBC, E7, CK, troponin, BNP, ALT, Alk Phos, bilirubin, PT, PTT, INR, ferritin and lactate.
 - ii. Blood and urine cultures
 - iii. Patient must have daily ECGs if on azithromycin. Avoid azithromycin in patients with prolonged QTc.
 - iv. Sputum cultures. If the patient is not intubated, they should be given a container to spit in while HCWs are over 2 meters away. The lid should be put on and the outside of the container wiped down with PerCept™ wipes. If the patient is intubated, sputum should be aspirated through a closed suction system and the container wiped down with PerCept™ wipes.
 - v. Chest X-Ray will likely be done in the ER or on the ward. No need to repeat unless indicated or patient is deteriorating.
 - vi. CT should NOT be used to screen for or as a first-line test to diagnose COVID-19. The diagnosis should be made clinically and confirmed by the swab. A chest CT can be considered for patients in whom the diagnosis is uncertain, or to look for complications of lung disease (for example empyema) and where a CT could clarify the situation (for example a possible PE as the mechanism of hypoxia).
 - vii. Point of care ultrasound of the lungs can be helpful in assessing lung pathology and treatment alterations. Be vigilant about equipment sterility.

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- b. Subsequent days:
 - i. Laboratory tests and subsequent x-rays (CXR) should be done based on the clinical condition of the patient.
 - ii. X-Rays, especially CT scans, should be limited because of the risk of transmission. CXRs should be ordered for specific indications. Imaging can be considered for the monitoring of known COVID-19 disease when patient management could be altered. If there is a patient with suspected or diagnosed COVID-19 referred for imaging, please call the medical imaging department in advance so that appropriate measures can be taken.

6. Intubation

- a. The most experienced physician should intubate these patients. (ideally an anesthesiologists, GPA or Intensivist if available) Residents and other trainees should not intubate.
- b. Deteriorating COVID-19 patients should be intubated early in a controlled environment to limit contamination of HCWs.
- c. All intubations should be done in a negative pressure or isolation room if possible. Intubations should only be done in the ER or on the wards in emergency situations or during a code.
- d. Follow established Intubation Procedure (algorithm attached)
 - i. Every person in the room during an intubation must take **contact and airborne precautions**. The minimal number of people should be in the room during the intubation. Ideally, only the physician doing the intubation and one RT. A RN should put on PPE for **contact and airborne precautions** and stand away from the airway.
 - ii. A checklist will be available to ensure that all necessary equipment and drugs are in the room or readily available inside or outside the room.
 - iii. Drugs inside the room: Intubation drugs:
 - ketamine 200 mg,
 - rocuronium 200 mg,
 - phenylephrine syringe should be premixed to a concentration of 100 mcg/mL. Administer 100 mcg boluses if required peri-intubation every 2-5 minutes if MAP less than 50 mmHg
 - 5 saline flush syringes.
 - Have propofol or morphine and midazolam infusions ready for post intubation sedation. Propofol infusion can be infused IV at 5 to 50 mcg/kg/min (0.5 to 3 mg/kg/hr) or morphine and midazolam infusions at 0 to 20 mg/hr to maintain sedation post intubation while avoiding sedation-related hypotension.

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- iv. Drugs outside the room:
 - EPINEPHrine 0.1 mg/mL pre-filled syringe,
 - Atropine 0.1 mg/mL pre-filled syringe and
 - Norepinephrine infusion if the patient is hemodynamically unstable.
- v. Equipment inside the room: Ventilator set up, AMBU bag with viral filter capnometry and PEEP valve, video-laryngoscope, styletted ETTs, gum elastic bougie. Direct Laryngoscope. Suction catheter.
- vi. Equipment outside the room: #3 #4 and #5 LMA Cook ETT tube exchanger if available
- e. Intubation procedure:
 - i. Raise head of bed 20-30 degrees.
 - ii. 5 minutes of pre-oxygenation using non-rebreather mask or BMV without bagging.
 - iii. Use a video-laryngoscope if available and if familiar with this technique to ensure that the person doing the intubation keeps their face as far from the patient as possible.
 - iv. The AMBU Bag must have a viral filter attached, and a CO2 detection device
 - v. Use rapid sequence induction. Ensure cardiovascular optimization.
 - ketamine (preferred) 1 to 2 mg/kg or propofol 1 mg/kg only if no ketamine available.
 - rocuronium 1.2 to 1.5 mg/kg and wait 60 seconds. Only use succinylcholine 1.5mg/kg if no rocuronium available.
 - Do NOT bag mask ventilate patient before intubation unless patient desaturates significantly then turn PEEP to 5, oxygen flow high and provide good mask seal. If significant desaturation and BVM is used, it needs to be a two-person technique.
 - Inflate the endotracheal tube cuff to ensure there is no leak BEFORE doing any bag mask ventilation after intubation.
 - vi. Following intubation, the room will be considered to have airborne virus for 90 minutes so **airborne and contact precautions** will be maintained for this period.
 - vii. Extubation
 - Minimize the number of people in the room
 - Extubation is considered an AGMP so all personnel close to the head end must have PPE for **contact and aerosol protection**. Try to avoid standing in the direct path of potential coughing.

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7. Ventilation of the COVID-19 Patient

- a. Institute lung protective ventilation using the ARDSNET Protocol. Keep predicted Tidal Volume < 6 mL/kg, Plateau Pressure < 30 cm H₂O and driving pressure < 15 cm H₂O. Allow for permissive hypercarbia. Avoid SpO₂ > 95%.
- b. Avoid PSV with TV > 6 mL/kg
- c. Use the High PEEP FiO₂ table when the P/F ratio is < 150
- d. Use neuromuscular paralysis to facilitate ventilation and when proning the patient.
- e. Prone ventilation has been found to be very effective in some of these patients. However, its use may be limited because it is labour intensive and because it will increase exposure of HCWs to the virus. It is indicated if there is refractory hypoxemia (FiO₂ 0.9 or greater). Prophylactic prone ventilation as used in the PROSEVA Study may be used in select patients if there are sufficient staff. Use rocuronium or cisatracurium in all prone patients.

8. Medical Management:

To access the most up to date information on COVID-19 treatment recommendations please refer to the [Antimicrobial and Immunomodulatory Therapy Recommendations in Adult Patients with COVID-19](#) and [SBAR on Therapies for COVID-19](#) on the BCCDC website.

9. Summary:

- a. Patients with COVID-19 disease can present with hypoxia without any signs of respiratory failure initially but can deteriorate rapidly. If fulfilling ICU criteria above consult an intensivist early and consider early intubation by the most experienced intubator.
- b. Where possible, patients with COVID-19 will be moved to be cohorted at UHNBC in Prince George or Mills Memorial Hospital in Terrace.
- c. Vigilance with PPE is paramount and responsible use without waste should be practiced by all.
- d. Patients who require ventilation for COVID-19 have a high mortality rate. Early and ongoing code discussions are important and part of good patient care.