

## OVERVIEW

Emergent airway management is a high-risk, aerosol-generating procedure that exposes health-care providers to airborne particles. The objective of these recommendations is to achieve endotracheal intubation in the most efficient and consistent manner possible, thereby minimizing the production of aerosolized particles and mitigating the risk of exposure. The mainstays of these recommendations are preprocedure planning and contamination prevention.

## DISCLAIMER

This document provides expert opinion from the CHEST Difficult Airway Management Live Learning faculty members and is not intended as a clinical practice guideline. Many considerations listed are subject to the availability of local resources; however, the core considerations in difficult airway management remain the balance of safety, efficiency, and effectiveness in order to achieve the best outcomes for patients and the health-care team. We feel this is accomplished through effective airway team preparation, planning, and communication, and these remain the focus of our educational efforts. Given the dynamic nature of medical knowledge related to COVID-19, it is expected this document will undergo updates.

## CHEST EMERGENT AIRWAY MANAGEMENT FOR SUSPECTED OR CONFIRMED COVID-19 PATIENTS

### PREPROCEDURE

#### AIRWAY TEAM

Minimizing team size is critical to limiting provider exposure.

1. The initial airway team for suspected COVID-19 patients should consist of three people: one physician, one nurse, and one respiratory therapist (RT).
2. The physician performing the intubation should be the most experienced laryngoscopist available at the time of the procedure.
3. Discussion of the airway management plan, including backup(s), should occur before entering the patient's room.
  - a. Discuss O<sub>2</sub> saturation and hemodynamic cutoffs.
  - b. RT will watch the monitor for desaturation and hemodynamic collapse while the nurse is administering medications.
  - c. Nurse will assume this role after administering sedative and paralytic medications.

#### PERSONAL PROTECTIVE EQUIPMENT (PPE)

All personnel need to be in full PPE before entering the room.

1. Fit-tested N95 mask or powered air purifying respiratory (PAPR)
2. Fluid-resistant gown
3. Double-layer gloves
4. Goggles or face shield
5. Disposable shoe covers
6. Head cover/cap
7. Scrubs (optional, but preferable)

#### ROOM SETUP

Nurse and RT prepare the room and patient prior to procedure.

1. Negative-pressure airborne isolation room preferred, especially if noninvasive ventilation (NIV) or high-flow nasal cannula (HFNC) is utilized
2. Establish IV access (2 PIV if possible)
3. Mayo stand at bedside
4. IV pump set up with two channels, primed, with sedation medication hung and ready
5. 1L IV fluid hanging
6. Place patient on nonrebreather facemask at 15 lpm O<sub>2</sub>.
7. Suction setup (tubing and Yankauer)
8. Blood pressure set for Q2 minute.
9. Continuous pulse oximetry with audible volume.
10. Wrist restraints (if needed)

## PREPROCEDURE (CONTINUED)

### EQUIPMENT SETUP

Bring into the room only tools and devices you are certain you may use/need.

1. Have all medications ready to administer before entering the room.
  - a. Sedative (etomidate 0.1-0.3 mg/kg, ketamine 1-2 mg/kg, or propofol 0.5-2 mg/kg)
  - b. Paralytic (succinylcholine 1-1.5 mg/kg or rocuronium 1.2 mg/kg)
  - c. Vasopressor (phenylephrine 100 mcg or norepinephrine 5 mcg)
  - d. Saline flushes
2. Prepare intubation equipment required for intubation.
  - a. Videolaryngoscopy (VL), hyperangulated blade preferred
    - i. Rapid-sequence intubation (RSI) is recommended for all patients to minimize exposure to virus particles.
    - ii. Direct laryngoscopy (DL) is not recommended.
    - iii. Awake fiberoptic intubation is not recommended.
  - b. Endotracheal tube (ETT), cuff checked with syringe and appropriate stylet for laryngoscope blade.
  - c. Bag-valve-mask (BVM) with PEEP valve and a viral filter attached.
  - d. CO<sub>2</sub> detector - waveform capnography preferred over colorimetric.
  - e. Disposable stethoscope (note: as backup only; recommend other means for tube placement confirmation).
  - f. Clamp for ETT if needed to disconnect/adjust circuit.
  - g. Prepare mechanical ventilator with appropriate tidal volume for the patient.
  - h. Backup equipment in a plastic container with a closable lid: to be opened only if first attempt unsuccessful.
    - i. Bougie
    - ii. Extraglottic airway device (EGA)
    - iii. Different sizes of ETT
    - iv. Scalpel
    - v. DL handle with curved and straight blade
    - vi. Malleable stylet

### PREOXYGENATION

COVID-19 patients appear to rapidly develop severe hypoxia that responds to positive-pressure ventilation with PEEP. Although NIV or HFNC have been used to improve oxygenation, there is significant concern that these devices will increase aerosolization of virus fomites, thus putting health-care workers at increased risk. The same concern has been raised regarding BVM, although this may be mitigated by using an exhalation port viral filter and two-handed technique to maximize the mask seal. Unfortunately, lack of data precludes a clear conclusion or recommendation. With this proviso, we recommend the following:

1. Consider early intubation while adequately oxygenating on 100% NRB.
2. Consider avoiding noninvasive ventilation due to aerosolization risk. This may be difficult with ventilator shortage or do-not-intubate (DNI) status and resources may dictate adjusting the approach.
3. Consider using BVM with a PEEP valve and a viral exhalation port filter with exquisite attention to two-person technique for optimal mask seal (VE rather than VC).
4. If unable to adequately preoxygenate, consider RSI and **immediate placement** of an EGA to create a "closed circuit" in the shortest amount of time to achieve safer preoxygenation.

## PROCEDURE

1. Airway team enters patient room in full PPE: physician team (team leader, intubator, BVM if necessary), nurse (medications, vital sign monitoring), RT (intubation equipment and assistance, BVM if necessary, ventilator).
2. Additional assistant/runner positioned with airway cart outside of the room.
3. Physician performs an airway exam (if not done prior to this time) to identify anatomically difficult airways before starting and adjust planning as indicated.
4. Nurse flushes IV line to confirm patency.
5. Team leader reviews plan and back-up plans, as well as oxygen cutoffs to proceed.
6. Nurse gives sedative followed immediately by paralytic then flushes IV with saline.
7. VL is performed (minimize the number of intubation attempts).
  - a. Suctioning should be avoided unless absolutely necessary to establish a view.
  - b. If intubation is unsuccessful, place EGA, call for help.
    - i. Bagging is to be avoided unless absolutely necessary.
      1. Attempt bagging if patient is in extremis and about to die.
      2. If bagging and EGA unsuccessful, perform cricothyrotomy.
8. When ETT (or EGA) has been placed, RT will inflate the cuff prior to any ventilation.
9. Attach to the ventilator circuit that includes a viral filter and waveform capnography.
10. If this is not possible, attach BVM with a viral filter and PEEP valve and ETCO<sub>2</sub> detector.
11. Auscultation may be difficult depending on type of PPE or risk further viral exposure, so consider using CO<sub>2</sub> detection along with ultrasound findings, chest rise, tube frost, or improving saturation to confirm placement.
12. Nurse starts IV pump for sedation.
13. Consider additional invasive procedures at this time (central line placement, etc) to avoid further movement in and out of the room.
14. Once complete, follow PPE doffing guidance when exiting the room.

## POSTPROCEDURE

### EQUIPMENT

1. Disposable equipment should be discarded in the room
  - a. If the plastic container is opened in the patient room, all contents are considered contaminated and must be discarded or decontaminated.
2. Reusable equipment should be removed from the room and decontaminated in accordance with hospital policy.
  - a. If plastic container is not opened in the patient room, all contents are not considered contaminated, and the container should be decontaminated.

### PPE

1. As above, doffing done in accordance with hospital policy.