

GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF HEALTH AND SPORTS
DEPARTMENT OF MEDICAL SERVICES



ICU Management Guideline of
Acute Hypoxemic Respiratory Failure and ARDS
when COVID-19 Infection is suspected

Version - DoMS/COVID-19/clinical-ICU/Version 03-2020

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ICU MANAGEMENT GUIDELINE OF ACUTE HYPOXEMIC RESPIRATORY FAILURE AND ARDS WHEN COVID-19 INFECTION IS SUSPECTED (Version 3 as of 24-6-2020)

Criteria for ICU Admission (If any of one)

1. Respiratory rate ≥ 30 /min
2. SpO₂ <90% with standard Oxygen Therapy (face mask with reservoir bag 10-15 L/min)
3. SpO₂/FiO₂ < 315
4. PaO₂/FiO₂ < 200 (If ABG available) (Moderate ARDS)
5. Severe pneumonia with sepsis/ septic shock

Closed observation and monitoring, optimization of oxygenation to maintain SpO₂ > 90%

Criteria for endotracheal intubation should be based on individual situation. The followings are red signs;

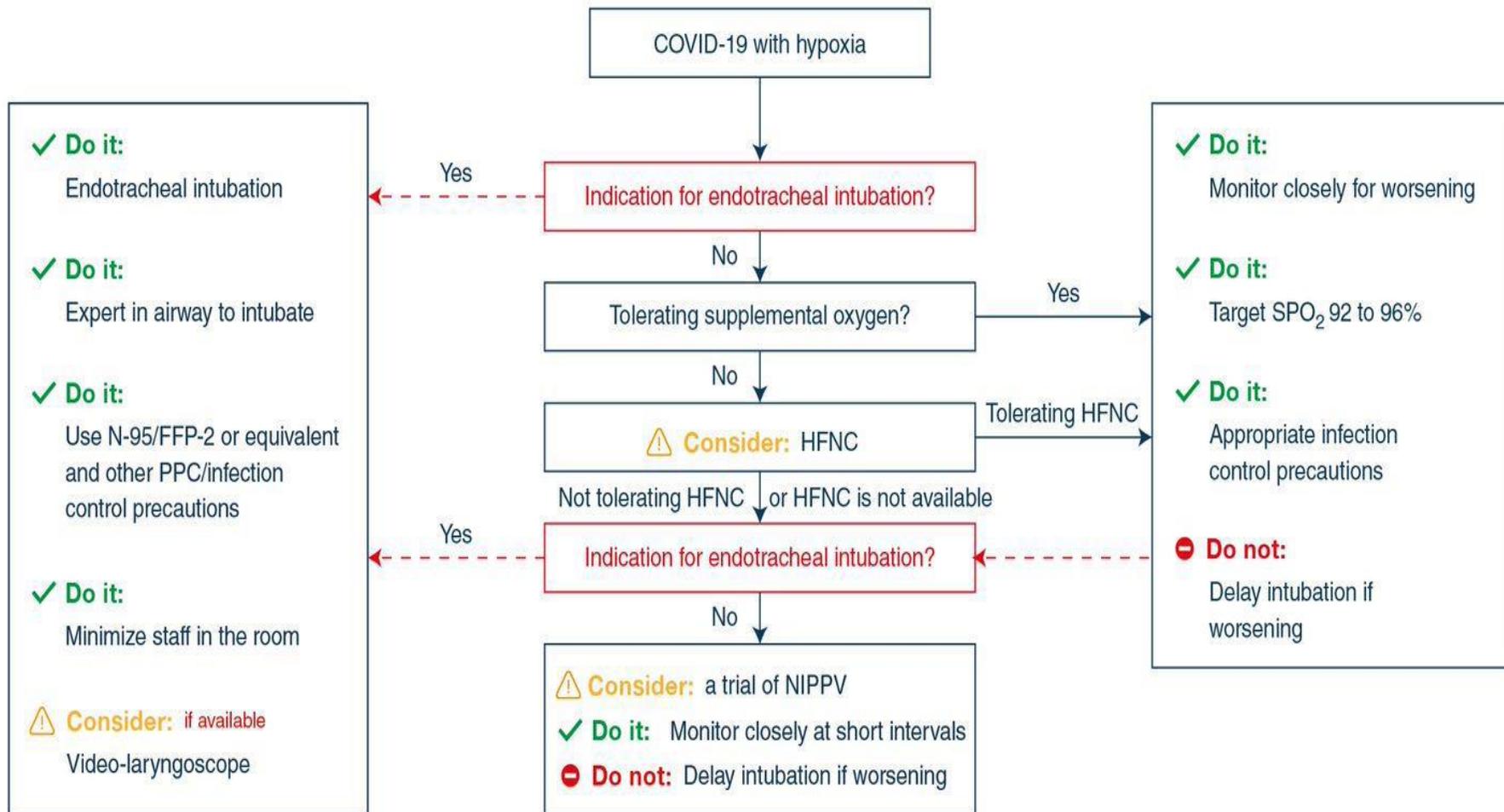
1. Respiratory rate > 35/min, severe respiratory distress with increased work of breathing
2. PaO₂/ FiO₂ < 200 (If ABG available) or SpO₂/FiO₂ <150
3. Severe acidosis pH <7.25 (If ABG available)
4. Altered mental status
5. Haemodynamic instability (MAP ≤ 65 mmHg) after fluid resuscitation and vasopressor/inotrope support) (according to updated SSC guideline Hour 1 bundle)

Ventilatory Support

For acute hypoxemic respiratory failure despite conventional oxygen therapy, use of high-flow nasal cannula (HFNC) is suggested relative to conventional oxygen therapy and non-invasive positive pressure ventilation (NIPPV) (weak recommendation, LQE). If HFNC is not available, a trial of NIPPV is suggested (weak recommendation, very LQE).

Close monitoring and short interval assessment for worsening of respiratory status and early intubation if worsening occurs is recommended.

For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, consider a trial of awake prone positioning to improve oxygenation.



Endotracheal intubation must be followed the COVID-19 Airway management principles, WFSA guideline.

Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.

Remarks: Patients with ARDS, especially young children or those who are obese or pregnant, may desaturate quickly during intubation. Pre-oxygenate with 100% FiO₂ for 5 minutes. Rapid sequence intubation is appropriate after an airway assessment.

VENTILATOR SETUP AND ADJUSTMENT

1. Calculate predicted body weight (PBW)
 - a. Males = $50 + 2.3 [\text{height (inches)} - 60]$
 - b. Females = $45.5 + 2.3 [\text{height (inches)} - 60]$
2. Select any ventilator mode, AC or SIMV mode
3. Initial tidal volume is 6 ml/kg PBW; recommends using low tidal volume (VT) ventilation (VT 4–8 mL/kg of PBW) over higher tidal volumes (VT >8 mL/kg)
4. Set initial rate to approximate baseline minute ventilation (not > 35 bpm).
5. Adjust PEEP (5-15) and FiO₂ to achieve SpO₂ 88-92% (PaO₂- 55-80 mmHg) lower inspiratory pressures (plateau pressure <30 cmH₂O).
6. The use of deep sedation may be required to control respiratory drive and to reduce the patient-ventilator dys-synchrony.
7. Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
8. In patients with moderate-severe ARDS (PaO₂/FiO₂ <150), neuromuscular blockade by continuous infusion should not be routinely used.
9. For mechanically ventilated adults and refractory hypoxemia despite optimized ventilation, recommend prone ventilation for 12 to 16 hours per day over no prone ventilation

COVID-19 Airway management principles according to WFSA guideline

High Risk Procedures – Tracheal Intubation and other Aerosol-generating medical procedures

1. Limit staff present at tracheal intubation: one intubator, one assistant and one to administer drugs/monitor patient.
2. Preferably, the most experienced anaesthesiologist should perform the intubation.
3. Create a COVID-19 tracheal intubation trolley that can be used in ICU or elsewhere.
4. PPE is effective and must be worn, using fit-tested respirators (N95 respirators) or powered air-purifying respirators. Wear full PPE at all times. Consider double

gloving. Defog goggles and/or eye wear if possible. Touch as little as possible in the room to avoid fomites.

1. Everyone should know the plan before entering the room – use a checklist to achieve this.
2. Plan how to communicate before entering the room.
3. All preparations of airway equipment and drugs that can take place outside the room should do.
4. Before the procedure begins, ensure all equipment is ready: standard monitoring equipment, iv access, drugs. Ensure ventilator and suction equipment is functional.
5. Focus on safety, promptness and reliability. Aim to succeed at the first attempt because multiple attempts increase risk to sick patients and staff. Do not rush but make each attempt the best it can be.
6. Place an HME with viral filter between the catheter mount and the circuit at all times. Keep it dry to avoid blocking.
7. For tracheal suction, closed suction system should be used to prevent aerosol spread.
8. Use RSI with cricoid force where a trained assistant can apply it. Take it off if it causes difficulty. Five minutes of preoxygenation with oxygen 100% and RSI in order to avoid manual ventilation and potential aerosolization of infectious respiratory droplets. If manual ventilation is required, apply small tidal volumes only.
9. Endotracheal intubation perform using video-guided laryngoscopy, over direct laryngoscopy, if available.
10. To avoid cardiovascular collapse, use ketamine 1–2 mg.kg⁻¹, suxamethonium 1.5 mg.kg⁻¹.
11. Have a vasopressor for bolus or infusion (noradrenalin 0.05-1 µg/kg/min) immediately available for managing hypotension.
12. Communicate clearly: simple instructions, closed loop communication (repeat instructions back), adequate volume without shouting.
13. Place a nasogastric tube after tracheal intubation is completed and ventilation established safely.
14. Discard disposable equipment safely after use. Decontaminate reusable equipment fully and according to manufacturer's instructions.
15. After leaving the room ensure doffing of PPE is meticulous.

Emergency tracheal intubation checklist COVID-19

Personal Protective Equipment

Prepare Equipment

Prepare for Difficulty

In the Room

Post-procedure and Safety

OUTSIDE ROOM

- PPE – be thorough, don't rush
- Wash hands
- Put on PPE
 - Long sleeved gown
 - FFP3 mask
 - Gloves
 - Eyewear
 - Wipeable shoes
 - ± Headwear
- Check fully by buddy with checklist
- Names on visors

- Allocate roles:
 - Team leader and intubator
 - Cricoid force and intubator's assistant
 - Drugs, monitor, timer
 - Runner (outside)
 - eFONA

- How do we contact further help if required?

- Check kit
 - BMV or Mapleson C with HME attached
 - Guedel
 - Working suction
 - Videolaryngoscope
 - Bougie/stylet
 - Two tracheal tubes, ties and syringe
 - 2nd generation SGA
 - eFONA set

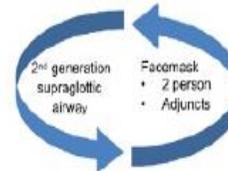
- Do you have all the drugs required?
 - Ketamine
 - Relaxant
 - Vasopressor
 - Maintenance sedation

- Weight?

- Allergies?

- If the airway is difficult, could we wake the patient up?

- What is the plan for a difficult intubation?
 - Plan A: RSI
 - Plan B/C: 2-handed 2-person BMV & 2nd generation SGA



- Plan D: e.g. Front of neck airway: scalpel bougie tube

- Confirm agreed plan

- Does anyone have any concerns?

INSIDE ROOM

- Airway assessment
 - Identify CTM
 - IMAC/OCHA
- Apply monitors
 - Waveform capnography
 - SpO₂ probe
 - ECG
 - Blood pressure

- Checked IV access (x2)

- Optimise position
 - Consider ramping or reverse Trendelenburg

- Optimal preoxygenation
 - 3 mins
 - ETO₂ > 85%
 - Low flow nasal O₂

- Optimise patient condition be optimised any further before intubation?
 - Fluid/pressor/ inotrope
 - Aspirate NGT
 - Delayed sequence induction?

AFTER AND LEAVING

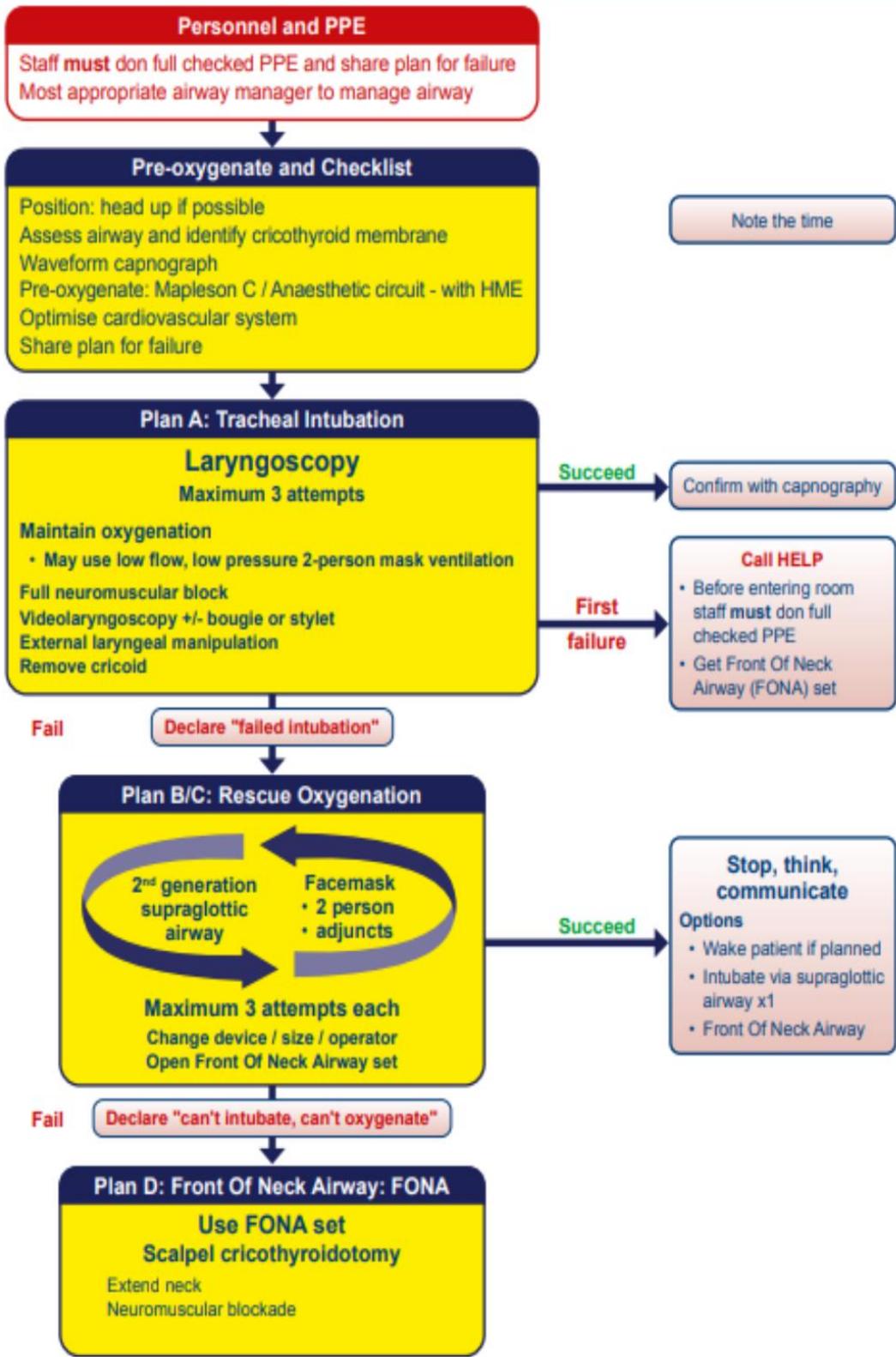
- Airway management
 - Establish ventilation after cuff inflation
 - Check waveform capnography
 - Clamp tracheal tube before each disconnection
 - Avoid unnecessary disconnections
- Other
 - Insert NGT
 - Consider deep tracheal viral sample

- Careful equipment disposal

- Decontamination of reusable

- Remove PPE
 - Observed by buddy
 - Use checklist
 - Meticulous disposal
 - Wash hands

Tracheal intubation of critically ill adults Adapted for COVID-19



References;

- (1) Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected (Interim guidance 28 January 2020) WHO/nCoV/Clinical/2020.2
- (2) Papazian L, Aubron C, Brochard L, et al. (2019) Formal guidelines: management of acute respiratory distress syndrome, *Annals of Intensive Care* , 9:69.
- (3) Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected (Interim guidance January 2020)WHO/2019-nCoV/IPC/v2020.1
- (4) COVID-19 Airway management principles (ICMANAESTHEAIACOVID-19.ORG)
- (5) World Federation of Societies of Anaesthesiologists - Coronavirus- guidance for anaesthesia and perioperative care providers
- (6) COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Available at <https://www.covid19treatmentguidelines.nih.gov/>.