

COVID-19 Airway management principles

COVID-19 airway management: SAS

- Safe – for staff and patient
- Accurate – avoiding unreliable, unfamiliar or repeated techniques
- Swift – timely, without rush or delay

Summary for emergency tracheal intubation of COVID 19 patient

- Tracheal intubation of the patient with COVID-19 is a high-risk procedure for staff, irrespective of the clinical severity of disease.
- In severe COVID-19 it is also a high-risk procedure for the patient
- Limit staff present at tracheal intubation: one intubator, one assistant and one to administer drugs/monitor patient.
- Create a COVID-19 tracheal intubation trolley that can be used in ICU or elsewhere.
- PPE is effective and must be worn. 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.
- Intubate in a negative pressure room with >12 air changes per minute whenever possible.
- Everyone should know the plan before entering the room – use a checklist to achieve this.
- Plan how to communicate before entering the room.
- The algorithm/cognitive aid you plan to use should be displayed in or taken into the room.
- All preparations of airway equipment and drugs that can take place outside the room should do.
- Use a kit mat if available.
- The best skilled airway manager present should manage the airway to maximise the first pass success.
- 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.
- Use reliable techniques that work, including when difficulty is encountered. The chosen technique may differ according to local practices and equipment. With prior training and availability this is likely to include:
 - preoxygenation with a well-fitting mask and a Mapleson C ('Waters') or anaesthetic circuit, for 3-5 minutes.
 - videolaryngoscopy for tracheal intubation;
 - 2-person, 2-handed mask ventilation with a VE-grip to improve seal;
 - a second-generation supraglottic airway device (SAD) for airway rescue, also to improve seal.
- Place an HME filter between the catheter mount and the circuit at all times. Keep it dry to avoid blocking.
- Avoid aerosol-generating procedure, including high-flow nasal oxygen, non-invasive ventilation, bronchoscopy and tracheal suction unless an in-line suction system is in place.
- Full monitoring, including working continuous waveform capnography before, during and after tracheal intubation.
- Use RSI with cricoid force where a trained assistant can apply it. Take it off if it causes difficulty.
- To avoid cardiovascular collapse use ketamine 1–2 mg.kg⁻¹, rocuronium 1.2 mg.kg⁻¹ or suxamethonium 1.5 mg.kg⁻¹.
- Have a vasopressor for bolus or infusion immediately available for managing hypotension.
- Ensure full neuromuscular blockade before attempting tracheal intubation.
- Avoid face mask ventilation unless needed and use a 2- person, low flow, low pressure technique if needed.
- Intubate with a 7.0-8.0 mm ID (females) or 8.0-9.0 mm ID (males) tracheal tube with a subglottic suction port.
- Pass the cuff 1-2 cm below the cords to avoid bronchial placement. Confirming position is difficult wearing PPE.
- Inflate the tracheal tube cuff to seal the airway before starting ventilation. Note and record depth.
- Confirm tracheal intubation with continuous waveform capnography – which is present even during cardiac arrest.
- Use a standard failed tracheal intubation algorithm with a cognitive aid if difficulty arises.
- Communicate clearly: simple instructions, closed loop communication (repeat instructions back), adequate volume without shouting.
- Place a nasogastric tube after tracheal intubation is completed and ventilation established safely.
- If COVID-19 status not already confirmed take a deep tracheal aspirate for virology using closed suction.
- Discard disposable equipment safely after use. Decontaminate reusable equipment fully and according to manufacturer's instructions.
- After leaving the room ensure doffing of PPE is meticulous.
- Clean room 20 minutes after tracheal intubation (or last aerosol generating procedure).
- A visual record of tracheal intubation should be prominently visible on the patient's room.
- If airway difficulty occurs the subsequent plan should be displayed in the room and communicated between shifts.

Figure 5. Checklists. (a) Adapted from [20] with permission (b) from [26]

Emergency tracheal intubation checklist COVID-19

Personal Protective Equipment Prepare Equipment Prepare for Difficulty In the Room Post-procedure and Safety

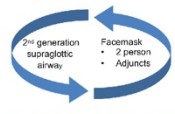
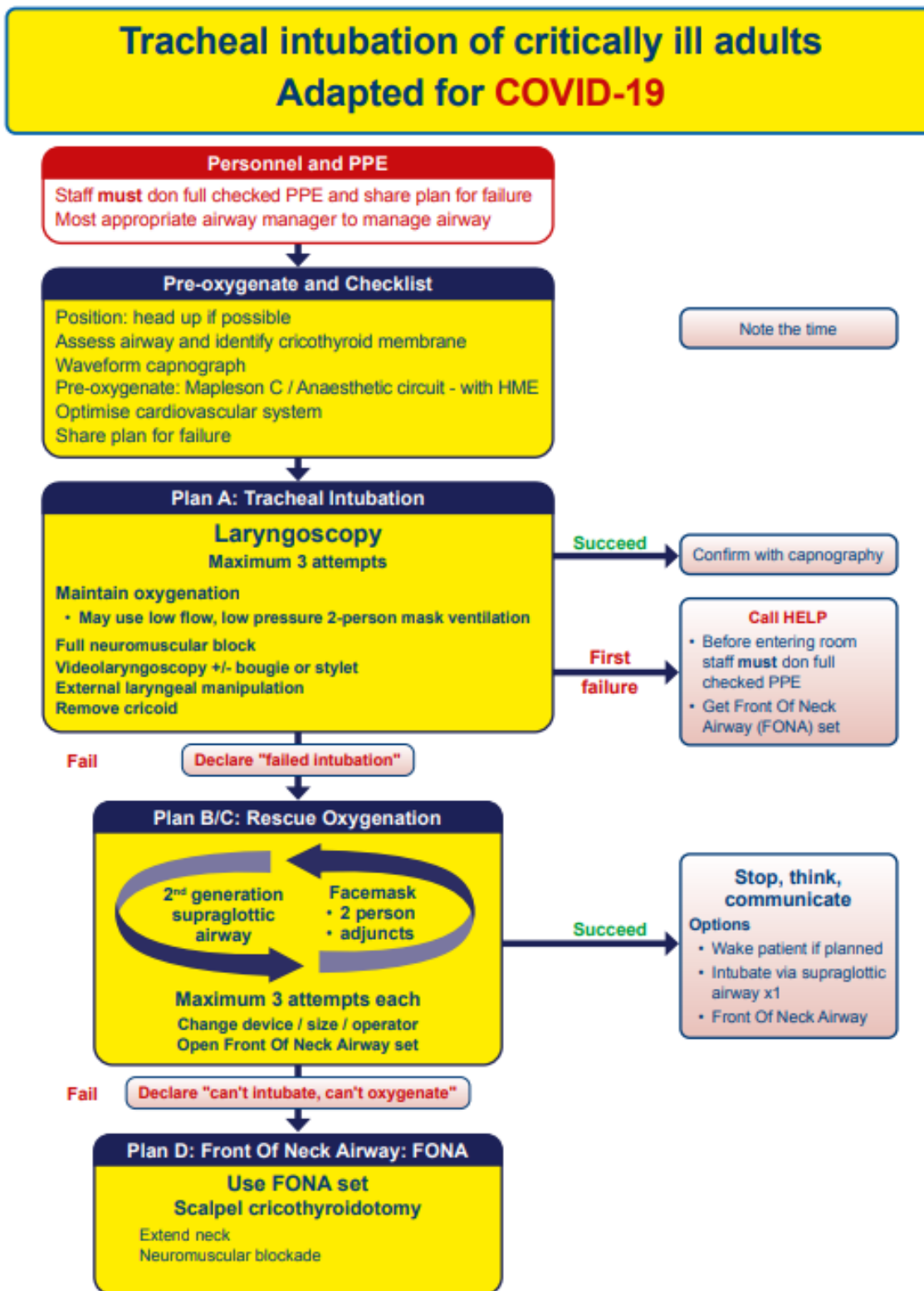
OUTSIDE ROOM		INSIDE ROOM	AFTER AND LEAVING	
<p>PPE – be thorough, don't rush</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wash hands <input type="checkbox"/> Put on PPE <ul style="list-style-type: none"> <input type="checkbox"/> Long sleeved gown <input type="checkbox"/> FFP3 mask <input type="checkbox"/> Gloves <input type="checkbox"/> Eyewear <input type="checkbox"/> Wipeable shoes <input type="checkbox"/> ± Headwear <input type="checkbox"/> Check fully by buddy with checklist <input type="checkbox"/> Names on visors <p>Allocate roles:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Team leader and intubator <input type="checkbox"/> Cricoid force and intubator's assistant <input type="checkbox"/> Drugs, monitor, timer <input type="checkbox"/> Runner (outside) <input type="checkbox"/> eFONA <p><input type="checkbox"/> How do we contact further help if required?</p>	<p>Check kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> BMV or Mapleson C with HME attached <input type="checkbox"/> Guedel <input type="checkbox"/> Working suction <input type="checkbox"/> Videolaryngoscope <input type="checkbox"/> Bougie/stylet <input type="checkbox"/> Two tracheal tubes, ties and syringe <input type="checkbox"/> 2nd generation SGA <input type="checkbox"/> eFONA set <p>Do you have all the drugs required?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ketamine <input type="checkbox"/> Relaxant <input type="checkbox"/> Vasopressor <input type="checkbox"/> Maintenance sedation <p>Weight?</p> <p>Allergies?</p>	<p>If the airway is difficult, could we wake the patient up?</p> <p>What is the plan for a difficult intubation?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Plan A: RSI <input type="checkbox"/> Plan B/C: 2-handed 2-person BMV & 2nd generation SGA  <p><input type="checkbox"/> Plan D: e.g. Front of neck airway: scalpel bougie tube</p> <p>Confirm agreed plan</p> <p>Does anyone have any concerns?</p>	<p>Airway assessment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify CTM <input type="checkbox"/> MACOCHA <p>Apply monitors</p> <ul style="list-style-type: none"> <input type="checkbox"/> Waveform capnography <input type="checkbox"/> SpO₂ probe <input type="checkbox"/> ECG <input type="checkbox"/> Blood pressure <p>Checked IV access (x2)</p> <p>Optimise position</p> <ul style="list-style-type: none"> <input type="checkbox"/> Consider ramping or reverse Trendelenburg <p>Optimal preoxygenation</p> <ul style="list-style-type: none"> <input type="checkbox"/> 3 mins <input type="checkbox"/> ETO₂ > 85% <input type="checkbox"/> Low flow nasal O₂ <p>Optimise patient condition be optimised any further before intubation?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Fluid/pressor/ inotrope <input type="checkbox"/> Aspirate NGT <input type="checkbox"/> Delayed sequence induction? 	<p>Airway management</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish ventilation after cuff inflation <input type="checkbox"/> Check waveform capnography <input type="checkbox"/> Clamp tracheal tube before each disconnection <input type="checkbox"/> Avoid unnecessary disconnections <p>Other</p> <ul style="list-style-type: none"> <input type="checkbox"/> Insert NGT <input type="checkbox"/> Consider deep tracheal viral sample <p>Careful equipment disposal</p> <p>Decontamination of reusable</p> <p>Remove PPE</p> <ul style="list-style-type: none"> <input type="checkbox"/> Observed by buddy <input type="checkbox"/> Use checklist <input type="checkbox"/> Meticulous disposal <input type="checkbox"/> Wash hands

Figure 6. Cognitive aids for use when managing unexpected difficulty when intubating a patient with COVID-19. (a) and (b) Highly adapted from [20] with permission (c) from [27] with permission.

a



This flowchart forms part of the 2020 COVID-19 Airway Guideline for tracheal intubation. Refer to the full document for further details.

b

Can't Intubate, Can't Oxygenate (CICO) in critically ill adults Adapted for **COVID-19**

CALL FOR HELP

↓ **Declare "Can't Intubate, Can't Oxygenate"**

Plan D: Front Of Neck Airway: FONA

Extend neck

Ensure neuromuscular blockade

Exclude oxygen failure and blocked circuit

Personnel and PPE

New staff **must** don full checked PPE
Most appropriate airway manager to perform FONA

Scalpel cricothyroidotomy

Equipment: 1. Scalpel (wide blade e.g. number 10 or 20)
2. Bougie (≤ 14 French gauge)
3. Tube (cuffed 5.0-6.0mm ID)

Laryngeal handshake to identify cricothyroid membrane

Palpable cricothyroid membrane

Transverse stab incision through cricothyroid membrane
Turn blade through 90° (sharp edge towards the feet)
Slide Coudé tip of bougie along blade into trachea
Railroad lubricated cuffed tube into trachea
Inflate cuff, ventilate and confirm position with capnography
Secure tube

Impalpable cricothyroid membrane

Make a large midline vertical incision
Blunt dissection with fingers to separate tissues
Identify and stabilise the larynx
Proceed with technique for palpable cricothyroid membrane as above

Post-FONA care and follow up






- Closed tracheal suction
- Recruitment manoeuvre (if haemodynamically stable)
- Chest X-ray
- Monitor for complications
- Surgical review of FONA site
- Agree airway plan with senior clinicians
- Document and complete airway alert

This flowchart forms part of the 2020 COVID-19 Airway Guideline for tracheal intubation. Refer to the full document for further details.


c

T H E V O R T E X

FOR EACH LIFELINE CONSIDER:

-  **MANIPULATIONS:**
 - HEAD & NECK
 - LARYNX
 - DEVICE
-  **ADJUNCTS**
-  **SIZE / TYPE**
-  **SUCTION / O₂ FLOW**
-  **MUSCLE TONE**

MAXIMUM THREE ATTEMPTS AT EACH LIFELINE (UNLESS GAMECHANGER)
AT LEAST ONE ATTEMPT SHOULD BE BY MOST EXPERIENCED CLINICIAN
CICO STATUS ESCALATES WITH UNSUCCESSFUL BEST EFFORT AT ANY LIFELINE OR WITH UNSUCCESSFUL ATTEMPTS AT ANY TWO CONSECUTIVE LIFELINES



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