

TRACHEOSTOMY GUIDELINES DURING COVID-19 PANDEMIC

1. Introduction

- a. World Health Organisation (WHO) declared COVID -19 a worldwide pandemic on the 11th March 2020.¹
- b. We are well- aware that the intensive care unit (ICU) during the COVID-19 may be overloaded and hence early and timely weaning of ventilation among the ICU care patients is one of the critical issues to be considered.²
- c. Tracheostomy helps to lessen the work of breathing by lowering the breathing resistance, reduce dead space, and better tracheobronchial toileting hence facilitates weaning and invasive ventilation. Therefore, requests for tracheostomy in ventilated patients may likely increase.
- d. Tracheostomy is an Aerosol Generating Procedure (AGP) which imposes a significant risk to surgeons, anaesthetists and the operation theatre staffs³. In Confirmed Covid-19, probable or suspected patients, it is mandatory that extra precautionary measures need to be in place.
- e. The decisions regarding the requirement for tracheostomy during this COVID-19 pandemic era must be balanced between the benefit and the risks to both patients and health care workers. Hence a collective decision, between the senior professionals i.e. surgeons, anaesthetists, other related professionals and patient carer/ patient's next of kin is essential prior decision making.
- f. Tracheostomy is a procedure commonly done by members of surgical disciplines namely ENT, General Surgeons, Neurosurgeons and others. It requires a well-planned perioperative care.
- g. A common, well-coordinated and streamlined guide in handling this high-risk procedure is pertinent to ensure safety of our healthcare workers in all Healthcare Institutions in Malaysia.

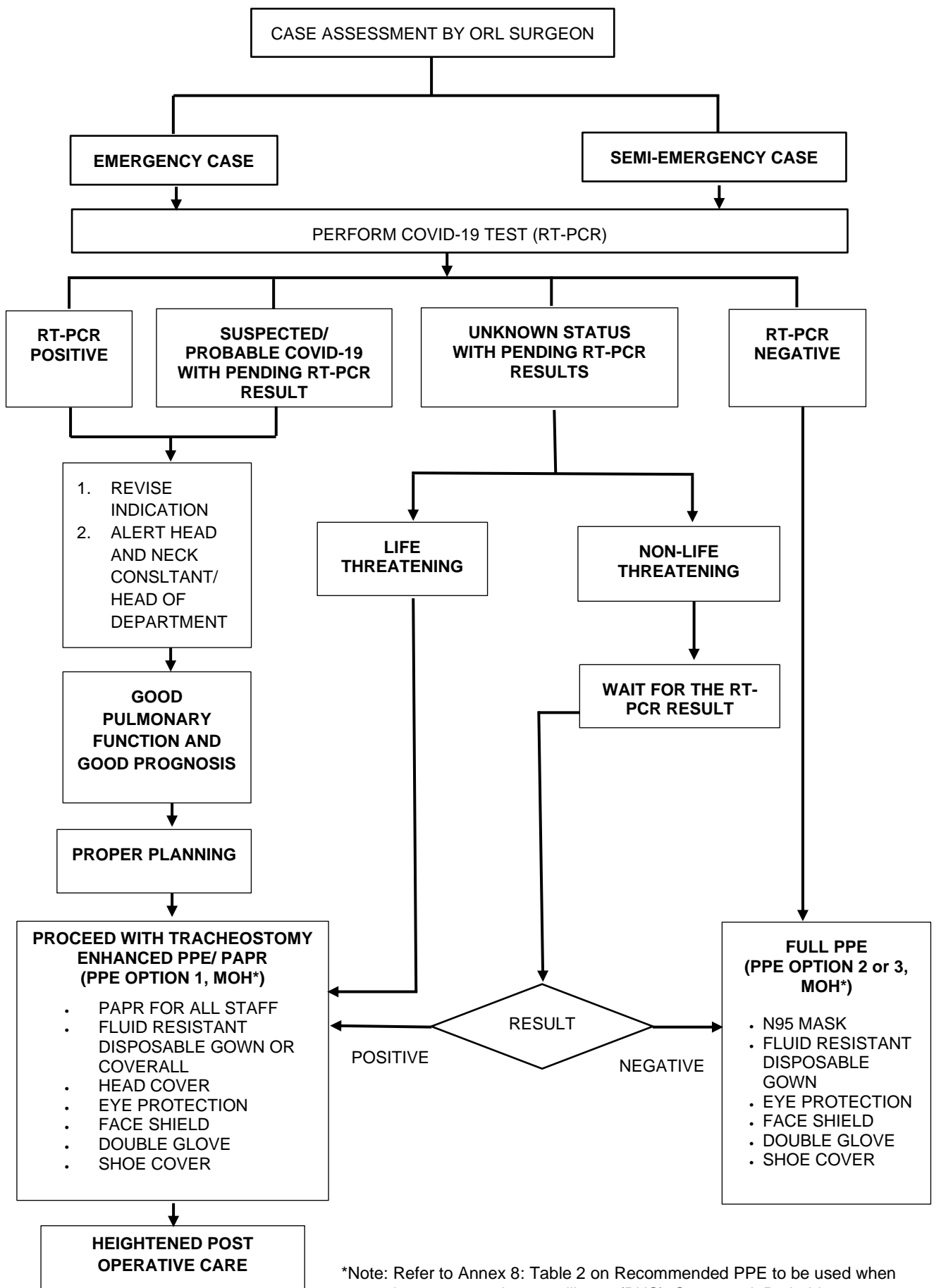
2. Prerequisites

- a. Utmost consideration should be given to ensure safety and protections to the surgeon, anaesthetist and staffs during the Aerosol-generating procedure.
- b. The indication and appropriateness of tracheostomy need to be reconfirmed. Refer to Figure 1 and Figure 2:
 - i. Figure 1: Referral for Tracheostomy in Unknown, Suspected and Probable Cases During Pandemic COVID-19.

- ii. Figure 2: Referral for Tracheostomy for Prolong Ventilation in a Confirmed COVID-19 Patient
- c. Wherever possible, the procedure should be delayed until COVID-19 status is confirmed.
- d. The patient should have a stable pulmonary status with good prognosis.
- e. The procedure is best done in a negative pressure room in an ICU/operating theatre where feasible.
- f. An adequate personal protective equipment (PPE) isolation facility is pertinent to meet the requirements for airborne, droplet, and contact precautions.
- g. Ideally a clean runner antechamber being the only conduit to the outside is made available.
- h. The 'Tracheostomy Grab Bag' comprising of tracheostomy changing set includes:
 - i. Tracheal dilators
 - ii. Headlight
 - iii. Sterile gloves
 - iv. Cuffed non-fenestrated tracheostomy tubes of appropriate sizes
 - v. Heat and Moisture Exchange Filter (HMEF)

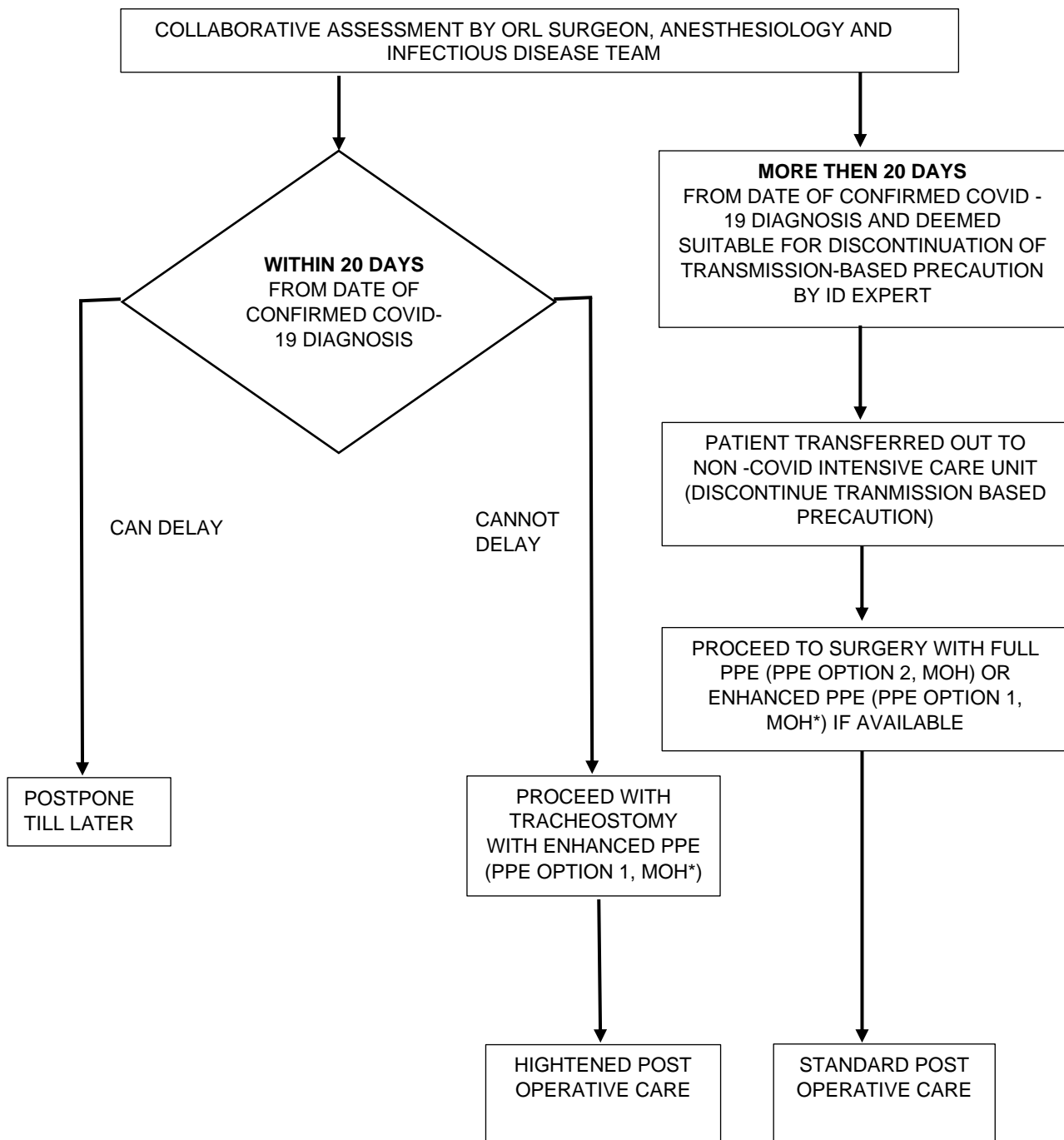
The Grab Bag is to be made readily available and stored in a designated zone and made known to all members of the team during the post-operative period. The grab bag should be checked and restocked regularly.

FIGURE 1: REFERRAL FOR TRACHEOSTOMY IN UNKNOWN, SUSPECTED AND PROBABLE CASES DURING COVID-19 PANDEMIC



*Note: Refer to Annex 8: Table 2 on Recommended PPE to be used when managing person under surveillance (PUS), Suspected, Probable or Confirmed COVID-19 in Hospital Setting

FIGURE 2: REFERRAL FOR TRACHEOSTOMY FOR PROLONG VENTILATION IN A CONFIRMED COVID-19 PATIENT



*Note: Refer to Annex 8: Table 2 on Recommended PPE to be used when managing person under surveillance (PUS), Suspected, Probable or Confirmed COVID-19 in Hospital Setting

Ref: CDC discontinuation of transmission-based precaution and disposition of patient with SARS-CoV-2 infection in healthcare settings

3. Pre - Operative Planning

- a. Usage of Powered Air-Purifying Respirator (PAPR) device is highly recommended in tracheostomy of Confirmed COVID-19, probable and suspected patients to ensure HCW safety.
- b. Consider turning off laminar flow if present.
- c. An isolated donning/doffing room is preferred.
- d. All members of the team must be familiar with donning and doffing of PPE and sterilization afterward or upon exiting the operation room as per MOH guideline.
- e. PPE donning and doffing simulation may need to be performed preoperatively.
- f. PPE requirements also include:
 - i. Double layered disposable gloves which are changed for each patient
 - ii. Coverall/Long Sleeved Fluid Resistant Isolation Gown
 - iii. Plastic apron
 - iv. Masks - PAPR or N95
 - v. Full-face visor or goggles for eye protection
 - vi. Disposable surgical cap
 - vii. Shoe covers.
- g. All equipment must be completely prepared before the procedure begins, to minimize movement, exposure, and contamination.
- h. Long term non-fenestrated cuffed double lumen silicone tube is recommended.
- i. Adequate standby of variable sizes tracheostomy tubes appropriate to the patient's endotracheal tube size is made available.
- j. Any unnecessary examinations especially related to endoscopy need to be avoided prior to the tracheostomy during the perioperative settings.

4. Steps by Steps Recommendations When Performing Tracheostomy on a Confirmed COVID-19 Patients

4.1 Equipment

- a. Prepare PPE for operating and anaesthetic team.
- b. Defog the personal eyeglasses and goggles/face shields.
- c. The surgeon and assistant don a full PPE and perform “buddy check”
- d. Don additional protective gear or Enhanced PPE (e.g PAPR).
- e. Prepare equipment and layout of tracheostomy trays.
- f. A 10ml syringe and a mount-catheter is attached to the tracheostomy balloon readily for inflation and preloading the HME onto the inner tube).
- g. A closed in-line suction must be used for endotracheal tube (ETT) and tracheostomy tube.

4.2 Operative Steps

- a. A standard open tracheostomy procedure approach through a horizontal neck incision is undertaken.
- b. A tie suture or Liga Clip is preferred for hemostasis to diathermy to prevent production of vapor containing viral particles.^(4, 5)
- c. Inform anaesthetist before opening the trachea, to allow preparation of optimum preoxygenation with PEEP
- d. When the oxygenation is adequate, the surgeon is informed and ventilation is ceased upon opening the trachea
- e. The endotracheal tube (ETT) is then clamped and level of cuff advanced inferiorly beyond the proposed tracheal window.
- f. The cuff is then hyperinflated to ensure no leakage/ aerosolization from lower airway present.
- g. Upon incision of trachea, the anaesthetist will immediately turn off flows and allow time for a passive expiration with an open adjustable pressure-limiting (APL) valve.
- h. Tracheal window created, rather than slit incision.

- i. Patient is required to be in total paralysis throughout the procedure to reduce the risk of coughing and aerosolization intraoperatively.
- j. Deflate ETT cuff and drawback proximal to the tracheal window under direct vision.
- k. Ensure window is of sufficient size to allow easy insertion of tracheostomy tube without injury to cuff.

4.3 Circuit Connection and Secure

- a. Immediate inflation of tracheostomy tube cuff and prompt attachment of circuit and resume ventilation.
- b. Confirm position with end-tidal CO₂, thus avoiding contamination of stethoscope by auscultation.
- c. Withdraw clamped ETT carefully.
- d. Secure tube with sutures, tracheostomy tapes and apply appropriate dressing.
- e. Meticulous doffing of the PPE as per the guidelines.

5. Post-Operative Care

5.1 Nursing Care:

- a. Post-operative tracheostomy nursing care is vital in COVID-19 patient to ensure tube patency and disease containment.
- b. Avoid the use of humidified oxygen.
- c. Heat and moisture exchanger filter (HMEF) with viral filter capacity is preferred.
- d. The suction circuit is to be in closed-line at all times and the cuff pressure is checked periodically.
- e. The cuff should not be deflated until further review.
- f. The operative area is kept dry.
- g. Dressing application is only undertaken if there are signs of infection or bleeding.

5.2 Tracheostomy Tube Change:

- a. The “Tracheostomy Grab Bag” is to be appropriately stocked and on standby at all times during tracheostomy change, or needed during emergency situations such as tube blockage and bleeding.
- b. The first tracheostomy tube change has to be delayed at 8-10 days and donning a full PPE.⁶
- c. The same sequence of pause in ventilation with flows off is to be adhered before deflating the cuff.
- d. This is followed by inserting a new tracheostomy tube with immediate re-inflation of cuff and reconnection of the closed-circuit.
- e. Subsequent tracheostomy tube change is planned at 30-day intervals.
- f. HMEF application on the tracheostomy tube is required to prevent aerosolisation of the droplets.

5.3 Decannulation:

- a. The readiness for decannulation should be made according to a case to case basis.
- b. Decannulation is deferred until the patient is confirmed COVID-19 negative.
- c. Ideally, it is done in a dedicated COVID-19 tracheostomy ward with trained nursing staffs.

6. Conclusion and Recommendation

It is foreseen that there may be an increased demand of tracheostomy during this pandemic COVID-19. Due to the limited resources and the risk of the procedure to the healthcare workers, a tracheotomy decision, indication and the standard operating procedure plays an important role. Stringent donning and doffing procedures must be respected. All members of the team must ensure that the safety of HCW and patient is of utmost priority.

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