Standard operating procedure:

Tracheostomy during the COVID-19 pandemic

Version 2
9th April 2020

Aims

1. To perform tracheostomy in a method that optimises patient care
2. To perform tracheostomy using methods that minimises aerosol and respiratory droplet exposure to staff and other patients

Background

Tracheostomy is a **high-risk procedure** that can expose those in the vicinity of the airway (such as the surgeon and surgical assistant) to respiratory droplets, and those in the near environment (such as staff and patients in the room where a procedure takes place) to aerosols. Hence the procedure should be performed with appropriate PPE, and in an appropriate location. The preference is for a sealed room where aerosols can be allowed to settle after the procedure and which can be deep cleaned thereafter. The minimum number of people (staff and patients) should be present in the room.

Pressure transmitted through an unprotected airway, for example positive pressure through an open and non-intubated tracheostomy, should be avoided at all costs. It is unclear whether the percutaneous or open tracheostomy technique carries lower risk of exposure. The preferred technique can be made on a case by case basis, taking account of patient and operator characteristics, although the default option in most circumstances will be an open surgical tracheostomy

In COVID-19 affected patients there may be particular difficulties. There are case reports of severe subglottic and tracheal inflammation in such patients, which means that endotracheal tubes may be stuck and not easy to manoeuvre distally or proximally. Patients may be critically reliant on ventilatory support due to pulmonary disease, hence stopping ventilation during a procedure could rapidly lead to hypoxia. Because of the risk of critical decompensation in the event of unexpected procedural difficulty, tracheostomy should be seen as an elective intervention: and the procedure preferably undertaken when the patient has recovered sufficiently to be more resilient to temporary loss of airway pressure.

There are existing guidelines for tracheostomy available online from societies including ENT-UK and the British Laryngological Association (BLA). This document takes account of those opinions.

Indications for tracheostomy

This is a matter of contention, and a dynamic view is needed both on a case by case basis and on overall strategy.

Preconditions

These are broadly based upon the BLA guidelines

- One tracheotomy per day (to be kept under review)
- Two ITU consultants to make a decision after discussion with the consultant surgeon and consultant anaesthetist. The patient should have a good expectation of achieving full recovery and an independent lifestyle.
- Unlikely to be indicated after less than 14 days of ventilation. However, the time of the tracheostomy will depend on clinical stability and indication more than a specific set time
- Consider the benefits of a tracheostomy against a trial of extubation – i.e. high threshold to perform tracheostomy
- The patient should be apyrexial with falling inflammatory markers (a surgical procedure undertaken during viraemia risks precipitating a clinical deterioration). However, this may not be always possible as some patients who may benefit from a tracheostomy have persistent high inflammatory markers.
- The patient should have stable ventilation parameters, ideally with PEEP $\leq 10 cmH_2O$ and $FiO_2 \leq 0.4$ (to promote tolerance to periods of apnoea and potential de-recruitment).
- Haemodynamically stable with minimal pressor requirement, whenever possible
- Review CXR to ascertain starting distance of ETT tip above carina
- Patient fasted for 6 hours
- Consent form 4 completed by ITU

Team and location for tracheostomy

Surgical tracheostomy should be preferentially performed in the operating theatre, except in the case of an emergency. The case should be booked with CEPOD theatres **the day prior** to proposed surgery An extended team brief should be undertaken with this checklist prior to sending.

Staff should be drawn from an agreed list and include

- Consultant ENT surgeon
- Skilled Assistant (another ENT Consultant preferable)
- Scrub nurse
- 2x Consultant anaesthetist (one skilled in anaesthesia for surgical tracheostomy)
- ODP

- Second theatre nurse as runner in theatre
- CLEAN runner in corridor to supply additional equipment required by anaesthetic and surgical teams

Personal protection

- As per trust policy all theatre team will be in full PPE
- As high risk procedure surgeons will be in PAPR (scrub assistant, and anaesthetists to also consider)
- The battery must be sufficiently charged and/or spare battery available
- In addition: plastic apron to be worn by those nearest to the airway
- Drapes should be placed to shield against respiratory droplets passing from the tracheotomy to the anaesthetist. This is preferable to solid screens which may interfere with verbal communication.
- If there are valid concerns for the safety of staff and risk of viral exposure, the procedure should be abandoned pre-operatively or intra-operatively, after an appropriate and timely risk assessment

ICU Preparation

- Bring tracheotomy specific in line suction set (different to ETT set)
- ICU to prepare patient on transport ventilator
- Consider additional procedures in theatre eg CVC, NGT changes

Patient transfer

- Transfer to and from theatre in accordance with trust policy
- Transfer directly into operating theatre
- Transfer with ETT inline suction in circuit.
- Consider taping connections, which easily loosen
- Bring ETT clamp with you

Anaesthetic equipment requirements

- Suction equipment with Yankauer and tracheal suction catheters (avoid use if possible).
- Video -Laryngoscope
- 20 ml syringe
- Tape to re-secure ETT
- Eye tapes and pads
- Drugs
- Clamp for ETT

- Long theatre ventilator tubing

Surgical equipment requirements

- Operating light
- Drapes: Perforated drape with adhesive surround x1, Body drape x1, Vertical drape to separate anaesthetist from surgical site
- Surgical marker pen
- Clear cleaning agent / cleaning sticks x 2
- Surgical set
    - Scalpel handle
    - Blunt nose dissection scissors
    - Artery clips x 4
    - Self-retainer
    - Langenbeck retractors: 2 x small, 2 x medium
    - Cricoid hook
    - Metal sucker
    - Mayo heavy scissors
    - Needle holders
    - Debakey forceps
- Surgical blade (15)
- Local anaesthetic, syringe and needle
- Bipolar forceps
- Hand switch Colorado needle monopolar diathermy
- **Cuffed non fenestrated** tracheostomy tube (3 sizes available): size 6, size 7, size 8.
- Scrub team to pre assemble tracheostomy with in line suction and HME filter.
- Surgical swabs – woven 10cm
- Sutures: Vicryl ties 2-0 (x2), Vicryl (round body) 4-0 (x2), Silk (hand held) 1-0 (x2)
- Lubricating Jelly
- Sponge tracheostomy dressing x1

Patient positioning and preparation

- Transfer onto operating table
- Must transfer to the theatre ventilator: clamp ETT first then turn off transport ventilator before transferring to theatre ventilator
- Leave ETT in-line suction in situ. Consider taping connections.
- Neck extended as far as permitted, shoulder roll, head ring
- Tape and pads eyes
- ET tube orientated superiorly
- Scrub team to assemble tracheostomy inline suction with clean HME filter

- Lead surgeon standing to right of patient (if right-handed)
- Assistant standing to left of patient

- Scrub nurse standing to right of lead surgeon
- Anaesthetist at head of patient

- Expose the patient to mid chest
- Clean patient with clear surgical cleaning solution
- Fenestrated drape applied to patient. Exposed area must include thyroid cartilage up to sternal notch
- Body drape applied
- Vertical drape applied to separate anaesthetist from surgical site

- Mark out thyroid cartilage and cricoid anatomy with marker pen. Mark out midline with a surgical marker from chin to sternal notch
- Inject local anaesthetic to incision site

Time out

- Run through standard WHO checklist
- Rehearse tracheostomy airway management protocol (appendix)
- Printed copies of this protocol should be in the procedure room and visible to both anaesthetist and surgeon.

Surgical technique to expose trachea

Lead surgeon to perform the procedure, and assistant to assist the procedure
Confirm anaesthetist is happy to proceed
Confirm scrub nurse is happy to proceed

- Assistant to stretch skin over the operative area
- Lead surgeon makes a horizontal incision of up to 5cm at lower edge of cricoid using a size 15 blade
- Incise subcutis with bipolar / monopolar cautery as needed
- Identify anterior jugular vein(s) and ligate if necessary
- Use blunt nosed scissors and / or artery forceps to dissect through fat and midline raphe of strap muscles
- Ensure dissection remains in the midline
- Where possible, soft dissection and retraction of thyroid isthmus to expose trachea. If not possible diathermy through isthmus or isolate and transfix with 2x artery forceps and 4-0 vicryl
- Identify cricoid and expose upper three tracheal rings
- Check tracheostomy tube – correct size, cuff inflates and is intact, introducer and inner tube available
- Modest lubrication with jelly to introducer and outer of tracheostomy tube

Tracheostomy airway management protocol (see appendix)

- Rehearse again the tracheostomy airway management protocol before the trachea is opened. This should be followed as it is critical to minimising risk of aerosol exposure
- Ensure the protocol is understood by all relevant parties: lead surgeon, assistant, anaesthetist, scrub nurse and ODP.

Anaesthetic airway management

- Ensure patient is fully **paralysed** with muscle relaxant
- Suction oropharynx with Yankauer and trachea via in-line suction prior to moving ETT
- Start tracheostomy airway management protocol: this is to advance ETT distally

Surgical technique to insert and secure tracheostomy tube

- Ensure tracheostomy site is dry and adequately exposed
- **Small** window excised in 2nd and/or 3rd tracheal rings
- Assistant suctions through or around the stoma to minimise exposure to blood, respiratory droplets or aerosol, as and when required
- The tracheostomy tube is inserted by the lead surgeon and inflated by the assistant
- Tubing is connected and satisfactory placement confirmed by anaesthetist by capnography, oxygenation, and ease of ventilation (avoid auscultation)
- Once correct placement is confirmed the assistant hold the tracheostomy tube to ensure it does not move whilst before it is secured
- Once haemostasis is confirmed, wounds are opposed with 4/0 vicryl – with tight closure
- The tracheostomy tube is secured with 1/0 silk and tracheostomy tapes (finger space underneath to confirm correct tension)
- Sponge tracheostomy dressing

Post procedure

- The ET tube should only be removed once the tracheostomy tube is correctly sited and secured
- Removal of the ET tube is an aerosol generating procedure and appropriate safeguards should be used, for example removing under cover
- Transfer patient back to bed with a single circuit break to reconnect to transport ventilator
- The tracheostomy tube cannot be clamped, so take care when clamping tracheostomy in line suction tubing as easily distorted

- Consider taping in-line suction connections
- Transfer with tracheostomy kit (dilator, smaller tracheostomy tube, or ETT)
- Check cuff pressure
- Transfer back to ITU in accordance with trust policy, in full PPE

Follow trust protocols for aerosol protection. Staff must stay in the room and in protective equipment to allow time for aerosols to settle (20 mins)

Doffing sequences should follow trust protocol. Transfer team back to ITU will stay in PPE as going back to RED ZONE. Others will be able to doff at 20 mins

All staff should shower and change clothes after the procedure or transfer

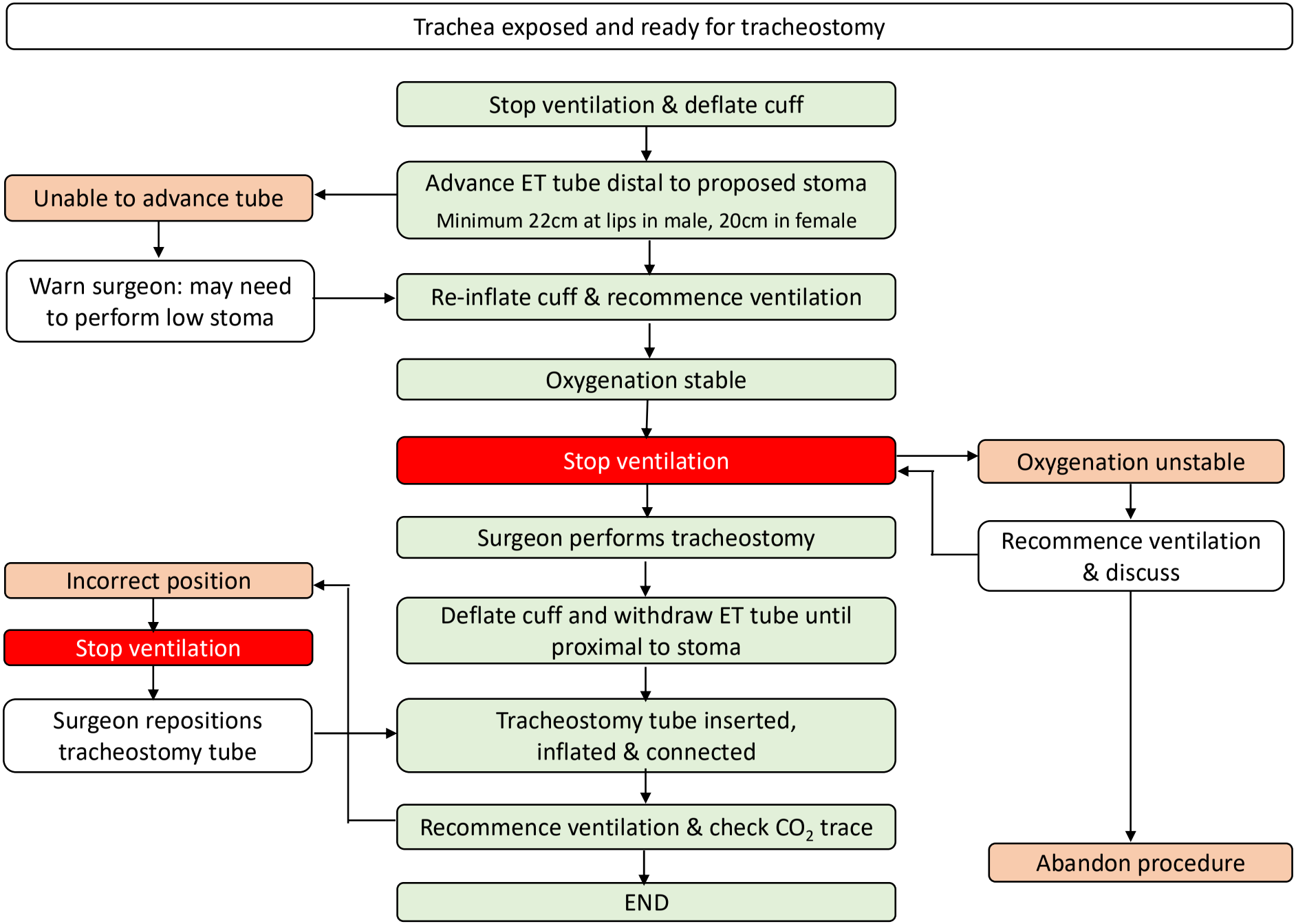
Post op care

- Chest X-ray only if indicated (not required for uncomplicated procedure)
- First tube change should be deferred for up to 4 weeks, unless there are problems with the tube, or the patient is considered suitable for decannulation.

Debrief

It is important to debrief after the procedure. Specific feedback should be actioned, and if any changes to the tracheostomy airway management protocol are suggested these should be fed back in a timely manner to the ENT (Mr Simon Watts) and anaesthetic (Dr Sandeep Sudan) tracheostomy leads or their representatives.

Appendix
Tracheostomy airway management protocol


Trachea exposed and ready for tracheostomy
Stop ventilation & deflate cuff
Advance ET tube distal to proposed stoma
Minimum 22cm at lips in male, 20cm in female
Unable to advance tube
Warn surgeon: may need to perform low stoma
Re-inflate cuff & recommence ventilation
Oxygenation stable
Stop ventilation
Oxygenation unstable
Recommence ventilation & discuss
Surgeon performs tracheostomy
Incorrect position
Stop ventilation
Surgeon repositions tracheostomy tube
Deflate cuff and withdraw ET tube until proximal to stoma
Tracheostomy tube inserted, inflated & connected
Recommence ventilation & check CO_2 trace
Abandon procedure
END