

COVID-19 TRACHEOSTOMY, HOW WE DO IT: A SECONDARY CARE UK HOSPITAL EXPERIENCE

Dr V Ravi Kumar ¹, Dr Shivaam Kesarwani ²

¹FRCS ORL-HNS, UK

²Senior Resident, Department of ENT Head Neck Surgery, Calcutta National Medical College & Hospital

Corresponding Author-

Dr Shivaam Kesarwani

Email: shivaam.edutech@gmail.com

Phone: 8840804798

Abstract

In the UK, along with the whole world, we also experienced the deadly coronavirus outbreak. Based on our preliminary experience, we discuss the challenges in performing tracheostomy and tracheostoma care in the setting of a new pathogen.

Key Words: Tracheostomy, COVID 19, Pandemic, Personal Protection, Protocol

Introduction

The advancement of the COVID-19 pandemic has led to an increasing need from surgeons of various specialties to perform tracheostomies on patients who have either tested positive for or are suspected of having the coronavirus infection. Therefore, steps must be taken to prepare these surgeons to perform the aforementioned tracheostomies, whilst taking precautionary measures to reduce the risk of infection to both themselves and other healthcare staff as well as working in unfamiliar environments. The following paragraphs describe our experiences and the techniques we have utilised in, operating on COVID-19 patients. It must be noted that this advice is amenable to change and may even be completely disregarded as new information on COVID-19 surfaces. Therefore, the information given in the following paragraphs are only to be taken as overall guidelines rather than definitive rules.

Tracheostomy is a high-risk aerosol generating procedure next only to endotracheal intubation. However, with proper planning and PPE, it can be safely performed.

Due to the risk that emergency tracheal intubations impose on the operating personnel as well as on the rapidly deteriorating COVID-19 patients, early tracheal intubations are preferred (Sorbelli et al., 2020).

Since long-term mechanical ventilation for critically ill patients represents the most common situation for which tracheostomy is indicated, the COVID-19 pandemic is likely to significantly increase the numbers of patients requiring new tracheostomies.

Due to the lack of specific clinical experience, currently there are few published reports on tracheostomies performed in patients with COVID-19 [(Givi et al., 2020), (Tay, Khoo & Loh, 2020) & (Vukkadala, Qian, Holsinger, Patel & Rosenthal, 2020)].

Timing of Tracheostomy

Decisions regarding the requirement for tracheostomy and the timing to perform tracheostomy should be taken balancing the risks and burdens to both patients and staff.

There is no consistent guidance to help clinical staff plan the most appropriate time to perform a tracheostomy in the critically ill. In the month of April 2020, 36 tracheostomies were performed in our hospital, 19 open and 17 percutaneous. The initial 4 patients had their tracheostomy between 14 and 17 days post intubation while the rest between 7 and 10 days. The 54% survival rate of ventilated patients in our hospital is partially attributed to the early surgical airway placement.

Our experience is contrary to general recommendations of delaying or not performing tracheostomy in this cohort of patients (Michetti, Burlew, Bulger, Davis & Spain, 2020). Michetti et al., (2020) recommended delaying tracheostomy till after patient becomes COVID-19 negative or not performing tracheostomy at all. They recommended continuing standard ventilator weaning until extubation. Decisions regarding the requirement for tracheostomy and the timing to perform tracheostomy in critically ill COVID-19 patients should ideally be made in a multi-disciplinary setting balancing the risks and burdens to both patients and staff.

Bedside percutaneous tracheostomy (PT) is preferred as transport out of the ICU for open tracheostomy (OT) may be limited or restricted due to the risk of viral exposure to staff and to physiological instability of the patient. (Michetti et al., 2020). At this time, they also recommend against performing tracheostomy in patients with respiratory failure due to coronavirus. Similarly, Chao et al (2020) recommend not performing tracheostomy for at least 21 days after intubation as mortality in ventilated COVID-19 patients is extremely high.

The procedure followed is that recommended by the ENT UK (Harrison, Winter, Rocke & Heward, 2020).

Planning and pre-operative preparation:

The team comprises of an experienced surgeon, assistant surgeon, two anaesthetists – one at the head end and other near the anaesthetic machine at the foot end, scrub nurse, circulating nurse and an anaesthetic assistant. The suitability of patient for surgery especially the ability to lie flat and tolerate periods of apnoea are assessed. Surgery is performed in full paralysis to avoid any cough. Availability of PPE for all the team members is confirmed. All the instruments needed for tracheostomy and the various sizes of cuffed, non-fenestrated tubes, Heat Moisture Exchanger (HME) with viral filter are kept ready. As communication in full PPE can be difficult, during the briefing, all the team members are made aware of the exact steps that will be followed during surgery (Einav et al., 2010). The number of staff inside the operating room (OR) should be kept to a minimum as this will be considered dirty area once the patient is in. A 'clean' runner should be available outside for any communication or supplies.

The surgical trolley is laid out with the tracheostomy equipment and the tube. Syringe is attached to tracheostomy balloon for inflating it. Preload the HME onto the inner tube. Only closed in-line suction is used for endotracheal tube (ETT) and the tracheostomy tube (TT). Diathermy is avoided and surgical ties are kept ready. The patient is sent for only when the team and equipment are ready as above.

Operation Technique:

PPE is worn by all OR personnel with proper donning technique as recommended (NHS Scotland, 2020). The video shows correct order for donning, doffing and disposal of Personal Protective Equipment (PPE) for healthcare workers (HCWs) in a primary healthcare settings (NHS Scotland, 2020). Another video clip shows how to safely don (put on) and doff (take off) the Personal Protective Equipment (PPE) for non-aerosol generating procedures (Public Health England, 2020).

The steps of surgery remain the same except for further precautions just before opening the trachea. A four-towel draping technique with easy access for head end anaesthetist to the ETT is used. Ligatures or bipolar diathermy is used for haemostasis. Once the trachea is exposed, the foot end anaesthetist is informed regarding readiness to open the trachea and paralysis of patient is confirmed. After preoxygenation with positive end expiratory pressure (PEEP) the ventilation is turned to manual and flows turned off.

We find it easier to control ventilation by switching to manual from this stage till insertion of TT. Time is allowed for passive expiration with open adjustable pressure limiting valve (APL). The head end anaesthetist will advance the ETT cuff beyond the proposed tracheal window, hyperinflate the cuff and commence ventilation till patient is well oxygenated. The ETT can be advanced with the high volume, low pressure cuff partially inflated and we have not noticed any trauma to the trachea.

It is essential that the cuff is intact till the tracheal incision/window is made and the surgeon is ready to insert the TT. The entry into trachea is made either through a vertical incision or an adequately sized window which prevents trauma to TT cuff while insertion. Following the steps as above, ventilation is ceased, the head end anaesthetist withdraws the ETT just proximal to the tracheal window as advised by the surgeon. The TT is inserted and cuff inflated immediately. The introducer is replaced with the non-fenestrated inner tube and HME. The circuit is attached promptly and ventilation resumed. The position of TT is confirmed with end tidal CO₂ which will avoid contamination of stethoscope. The patient is placed in the intensive care nursing position (30 degree head up) to check TT placement. Then the ETT is clamped and withdrawn. The TT is secured with sutures and tapes and dressing applied. Doffing of PPE with buddy check is done in the designated area. The equipment is disposed of according to local guidelines and operating theatre decontaminated after 20 minutes using local infection control protocol.

Following this meticulous technique, we did not have any infections of the personnel involved till date. Guidance for post procedural care should be followed.

Conclusion

As Covid-19 infection is a novel disease, there is a lack of specific experience.

We have summarized our experience in performing tracheostomy and tracheostoma care in the setting of a new pathogen. Given the rapid evolution of the current Covid-19 pandemic this will be an early experience that is likely to change over time, so we encourage all our colleagues to share their experience.

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