CASE REPORT

Our experience in tracheostomy for COVID positive patients in Hospital Tawau: A case series

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ABSTRACT

The Coronavirus Disease (COVID-19) pandemic has led to an increase in the number of critically ill patients requiring intensive care unit admissions and mechanical ventilation. The sequential effect is that these patients may then require a tracheostomy. Tracheostomy guidelines were established to help minimise the risk of viral transmission to the personnel performing the procedure. Safety measures regarding preoperative planning, surgical technique and nursing care are important to minimise the risk of transmission to medical personnel. We describe our experience in conducting tracheostomies for two COVID-19 patients at a referral centre in Sabah, Malaysia.

KEYWORDS:
COVID-19, tracheostomy, protocol, technique, duration

INTRODUCTION

The pandemic Coronavirus disease 2019 (COVID-19) has emerged as global health emergency crisis. The virus is transmitted via respiratory droplets or aerosols from the infected persons. In the healthcare setting, there is a high likelihood of virus transmission during any clinical procedure. The risk is significantly higher during aerosol generating procedures such as clinical nasal, pharyngeal and laryngeal examinations, tracheostomy procedures, intubation, dental procedures, bronchoscopies and oral suctioning.[1] Thus, strict compliance to protective measures is imperative to reduce the risk of infection.

Infected persons display varying features, ranging from being completely asymptomatic to acute respiratory distress syndrome requiring mechanical ventilation. Critically ill patients may require prolonged ventilation and subsequently tracheostomy. Guidelines for tracheostomy pre-planning, procedure and outcomes help in assuring the safety of the health workers and is optimal during such high-risk procedures during the COVID-19 situation.[2] Following appropriate guidelines during tracheostomy can minimise contact time with aerosol particles intraoperatively and subsequently decrease risk to the operators of such procedures. We describe our experience in conducting tracheostomies for two COVID-19 patients. These surgeries were performed in Hospital Tawau (HT), Sabah which is the referral hospital for the East Coast of Sabah, serving Tawau as well as the districts of Semporna, Kunak and Lahad Datu.

CASE REPORTS

Case 1

A 40-year-old lady with underlying obesity, diabetes mellitus and hypertension presented to the Emergency Department of HT with a 4-day history of nonproductive cough, fever and difficulty breathing since 26th October 2020. She had history of recent contact with her relative who was COVID-19 positive. A COVID-19 rapid antigen test was positive on 29th October 2020. She was tachypnoeic on arrival and chest radiography showed bilateral lung consolidation. She subsequently required intubation for respiratory distress. A diagnosis of category 5 COVID infection with multiorgan involvement was established and she was treated with antiviral, immune-modulator and anticoagulant. She required ventilatory support for a total duration of 45 days and also developed atrial fibrillation with 3 failed attempts at extubation. At that point she was referred to the otorhinolaryngology (ORL) team for a tracheostomy.

Once the patient was medically optimized, a tracheostomy was performed at day 46 of COVID-19 illness for prolonged ventilation. No repeated polymerase chain reaction (PCR) COVID-19 test was performed prior tracheostomy as the patient was beyond day 21 of illness. The protocol at HT at the time was such that once a patient was beyond day 21 of illness, they were considered to be non-infective and thus did not require further testing. Medical personnel involved used personal protective equipment (PPE), face shields and Powered Air Purifying Respirators (PAPR). Mobilization of the patient from the COVID intensive care unit (ICU) to the operating theatre (OT) was via a dedicated isolated interconnected walkway.

Intraoperatively, the routine surgical technique of layered fascial dissection was carried out until the trachea was encountered and identified. The cuff on the endotracheal tube was hyperinflated by the anesthesiology team prior to incision on the trachea. Transtracheal local anaesthesia injection of 0.5cc Lignocaine 1% was given to suppress the cough reflex. Patient was rendered apnoeic by the anaesthesiologist prior to the tracheal incision. Ventilation was resumed after cuff inflation. The tracheostomy procedure was uneventful.

Postoperatively, there was a tracheostoma wound breakdown on day 22 post tracheostomy whereby she required wound debridement and secondary wound suturing under general anesthesia at day 79 of illness. The first tracheostomy tube change was done under the same setting in OT. She remained

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in ICU due to recurrent nosocomial infection and poor lung function with ventilator dependence. She was transferred out from the COVID ICU after the ventilator requirements decreased on day 43 post tracheostomy. Her wound subsequently healed well. Two weekly tracheostomy tube change was attended using basic PPE. She was discharged well, with no oxygen requirements on a long-term double lumen tube. She is still under follow-up as an outpatient.

Case 2

A 53-year-old gentleman with no known medical illness presented to the Emergency Department of HT on the 7th of December 2020 with dizziness and sudden loss of consciousness at home. Glasgow Coma Scale (GCS) at the Emergency Department was E2V1M5 with pin-point pupils. Cardiovascular and respiratory examinations were unremarkable. He had no respiratory symptoms prior to the event. He required intubation due to his low GCS and computed tomography (CT) scan of the brain showed a brainstem bleed with intraventricular hemorrhage. His COVID-19 rapid antigen screening prior to hospital admission was found to be positive. He was tested positive again using PCR on the next day and was treated as COVID stage 3. He had no history of COVID-19 contact. He underwent external ventricular drainage of the intracranial bleed and was extubated 3 days later conscious and stable.

Three days later, the patient experienced a sudden reduction in his consciousness and required reintubation. An urgent CT scan showed residual hemorrhage and a second surgical intervention was performed. Revision of the ventriculo-subgaleal shunt and tracheostomy was performed at day 22 of illness due to prolonged ventilation and poor GCS recovery. This patient too, did not have a second COVID PCR test in line with the HT protocols at the time.

The surgical steps were conducted as stated in our first case. This gave us the advantage of minimising aerosol contact during the tracheostomy procedure. No intraoperative issues arose during the surgical procedure. On day 28 of illness, the patient was transferred out to the general ward. Post-operative tracheostoma wound had healed well. The patient was put on a double lumen tracheostomy tube. This tube was changed while using basic PPE as the patient was beyond day 21 of illness. He was discharged home and is still under our follow-up.

DISCUSSION

A tracheostomy is a surgical procedure whereby an incision is made over the anterior neck as an artificial airway to facilitate breathing. It is one of the aerosol generating procedures that is commonly performed in the healthcare setting. Indications for tracheostomy may include respiratory failure or neurological insult which require prolonged mechanical ventilation, upper airway obstruction due to various causes, as an elective procedure done alongside major head and neck surgeries as well as to facilitate clearance of tracheobronchial secretions. In the era of the COVID-19 pandemic, tracheostomy should be only performed in cases with clear and defined indications due to high risk of viral transmission towards the operator.

COVID-19 patients with severe acute respiratory syndrome may require prolonged mechanical ventilation support. However, with this, potential complications can arise such as ventilator associated pneumonia and laryngeal complications such as mucosal ulceration, intubation granuloma, cricoarytenoid joint displacement, posterior glottis or tracheal stenosis and tracheoesophageal fistula. Indications for tracheostomy need to outweigh the risks of prolonged ventilation at the expense of viral exposure to the health care worker.[3] In acute upper airway obstruction, tracheostomy is considered a lifesaving procedure and thus warrants urgent intervention.[4]

Tracheostomy protocols during COVID-19 was created with the aim to protect medical personnel during the surgery. Once the decision for a tracheostomy procedure is made, the preoperative assessment should be thoroughly performed by a multidisciplinary team such as physician, anaesthetist and surgeon. Indications and planned timing for the surgery is reviewed once again by all parties and they should be in agreement to proceed. The patient should be medically and anaesthetically optimised to reduce potential complications that may arise from underlying comorbidities or COVID-19 itself. It is recommended that tracheostomy is performed after day 10 of COVID-19 illness as the viral load is reduced at that juncture.[5-6]

Surgery is recommended to be performed in a negative pressure room.[7] Assisting staff must be familiar with PPE including using PAPR. The tracheostomy team should be limited to a senior ORL surgeon with a registrar, anaesthesiologist and a senior OT nurse. In our cases, tracheostomy was performed in a normal OT due to a logistic limitation at our centre wherein the hospital did not have a negative pressure room. On the day of surgery, tracheostomy equipment should be prepared and checked by the medical assistants in the OT. The timing of the surgery is decided in advance by the medical, anaesthetic and ORL teams. The OT staff are briefed and prepared to receive the patient accordingly.

Aseptic precautions are important during preparation of the patient for the procedure. Appointed staff will transfer the COVID-19 patient from the ICU or ward to OT following the pre-planned hospital route. All designated staff should be equipped with complete PPE and know their roles throughout the procedure to avoid miscommunication. The patient is positioned and adequately paralyzed. A few protocols recommend minimising the use of cautery due to increased aerosol generating potential.[2,8] Upon identification of the trachea, it is suggested to push the endotracheal tube (ETT) further downwards to avoid puncture of endotracheal cuff.[9] Transtracheal local anaesthesia injection may be considered. The patient is rendered apnoeic prior to the tracheal incision. The trachea wall is sutured to the skin (maturation suture) using non absorbable suture to ensure stoma patency.[10] Ventilation is only resumed after insertion of the tracheostomy tube and inflation of the cuff. In both our cases, an appropriately sized single lumen cuffed tracheostomy tube was used. Placement of tracheostomy tube is confirmed with chest rise, vapour in ventilation tubing and capnography waveforms. Auscultation is not encouraged due to risk of contamination.[9]

The crucial factor during tracheostomy of a COVID-19 patient is to minimise the duration of contact with the patient itself. In our cases, duration of exposure remained less than 5 minutes from the tracheal incision until tracheostomy tube inflation as we elected not to perform the maturation sutures.

Post operatively, it is essential to ensure that the tracheostomy tube is secured and anchored well to prevent dislodgement. A closed suction system is encouraged compared to the open system due to lower risk of aerosol spread. Dressing change is advised only if there is sign of infection. Wound inspection is to be done daily by the primary team. It is advisable to put a heat and moister exchanger (HME) once the patient is disconnected from the ventilator. Tracheostomy tube change may be delayed up to 4 weeks or once the COVID status is negative.8 However, any hint of a partially obstructed tracheostomy would indicate a scope and change of the tracheostomy tube if deemed necessary. Hence, regular suctioning is required for the patient with a single lumen tube. Double lumen tube usage may be considered once the patient is weaned from the ventilator. Decannulation is delayed until the patients have recovered from the infection and do not have any other contraindications for decannulation.

CONCLUSION

Tracheostomy protocols are to guide health care workers with the main purpose of minimising the rate of COVID-19 transmission. Meticulous preparation of the patient, use of full PPE and good communication skills across various disciplines are crucial. It is also best for an experienced surgeon to perform the operation with their own familiar surgical technique to reduce the duration of procedure and contact.

Post-operative tracheostomy care plays an important role due to prolonged patient exposure with nursing staff. Well trained personnel should attend to the patient in any emergency related to the tracheostomy. Ideally, health care workers should minimise their exposure time with the COVID-19 patient during surgery and nursing care. By following proper safety precautions, risks of COVID-19 transmission among medical personnel can be effectively reduced.

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