

# Preoperative Fear, Operative Gear, and Postoperative Care, in Tracheostomy during Covid Times – Our Experience at a Tertiary Care Hospital

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## ABSTRACT

### BACKGROUND

The SARS-CoV-2 is known to be highly contagious from respiratory tract droplets and aerosol exposure. ENT surgeons deal with the upper airway and are exposed to aerosol generating procedures on a daily basis. Aerosol generating procedure such as tracheostomy is necessary in patients with head and neck cancers having airway obstruction.

### METHODS

We share our experience of 38 cases where we had to perform tracheostomy during these Covid times under various circumstances in a tertiary care centre with a dedicated Covid Isolation centre for 5 districts with 210 beds reserved for Covid patients.

### RESULTS

All 38 tracheostomies were performed successfully following the guidelines formulated by our team, with proper precautions not a single team member got infected with Covid-19. No test is 100 % sensitive, so all precautions must be taken while dealing with every patient and PPEs should be used in all tracheostomies.

### CONCLUSIONS

No test is 100 % sensitive, so all precautions must be taken while dealing with every patient and PPEs should be used in all tracheostomies. Our policy of anticipating tracheostomy in patients with impending stridor helped us reduce the risk of having to perform emergency tracheostomies with Covid status unknown.

### KEY WORDS

Aerosol, COVID-19, PPE - Kit, SARS-CoV-2, Stridor, Tracheostomy

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## BACKGROUND

At first we were watching the novel coronavirus from a distance only on news channels. We were getting updates about the havoc it was creating in Wuhan. It soared into a global pandemic and very soon India also fell prey to it. The lockdown was announced by our government on 22<sup>nd</sup> of March which urged us to suspend our routine elective surgeries. But being a part of essential services, we were morally bound to attend emergencies. The SARS-CoV-2 is known to be highly contagious from respiratory tract droplets and aerosol exposure.<sup>1</sup> The virus remains viable in aerosols for at least 3 hours.<sup>1,2</sup> ENT surgeons deal with the upper airway and are exposed to aerosol generating procedures on a daily basis, therefore there is a need to be cautious and protected. Aerosol generating procedure such as tracheostomy is necessary in patients with head and neck cancers having airway obstruction.



**Figure 1. X-Ray Soft Tissue Neck (Lateral View) of Patient Done at the Time of Presentation in Emergency**



**Figure 2. Our OT Team Wearing Proper Gear in Preparation of Patient Planned for Tracheostomy**

Before we could transform this thought of caution and protection into action, we encountered our first case in emergency at an odd hour in the early morning of 26<sup>th</sup> March. The patient was a 74 year old male who presented with inspiratory stridor. The patient had SpO<sub>2</sub> of 40 percent on room air and 76 percent on O<sub>2</sub> support. On X-ray soft tissue neck, the glottic chink was totally compromised and it was clear that patient couldn't be intubated (Figure 1).

So we had to make a quick decision to do emergency tracheostomy. The patient's Covid status was unknown and the patient had no time for the test report. At such an odd hour we had to wake up the administration personnel for procurement of protective gear. With PPE kits, we did the life-saving procedure or one of the most aerosol generating procedures in a patient with Covid status unknown (Figure 2). Postoperatively, patient was kept in an isolation ward and the surgeons, anaesthetists and OT staff involved in the case had to be quarantined till the patient's Covid status after 48 hours was confirmed to be negative. After doing this first emergency tracheostomy, we realised the need for formulation of guidelines for taking up the patients for tracheostomy during this pandemic. All heads came together to form a Triage team and devised the protocol for stridor in Covid times.

## METHODS

Our institute, Maharishi Markandeshwar Institute of Medical Sciences and Research, MMDU, Mullana, Ambala, Haryana is a tertiary care centre with a dedicated Covid isolation centre for 5 districts with 210 beds reserved for Covid patients. After clearance from ethical committee we formulated the guidelines for performing tracheostomy in Covid times for our institute. We have also shared our experience of 38 cases where we had to perform tracheostomy from March 2020 to October 2020 during the Covid times under various circumstances with informed consent from the patients.

### Protocol for Patient Presenting with Stridor

1. Patient presenting with stridor to be received in suspected Covid emergency ward. It should be ensured that the patient and the attendants are wearing a triple layer mask that covers nose and mouth.
2. Patient to be provided O<sub>2</sub> support immediately and SpO<sub>2</sub> monitored.
3. Chest X-ray Posterior / Anterior (P / A) view to be done.
4. X-Ray Soft Tissue Neck Anterior / Posterior (A / P) and Lateral view to be done.
5. Patient to be given Inj. hydrocortisone 100 mg I.V. BD.
6. Review old records of the patient, if available, to know the cause for stridor

### Preoperative Guidelines

1. Careful patient selection and appropriate timing for tracheostomy for patients on ventilator or patients who can be intubated.
2. There should be a negative pressure OT near to the suspected Covid emergency ward with a well-defined and informed fixed path for shifting the patient.
3. There should be close communication between anaesthesia team and nursing staff for preparation of the OT before the patient is shifted.
4. A core tracheostomy team should be there consisting of 1 lead surgeon, 1 experienced assistant, 1 anaesthetist and 1 OT technician (not suffering from any co-morbidities), working in shifts, where everyone should be well aware of their roles.

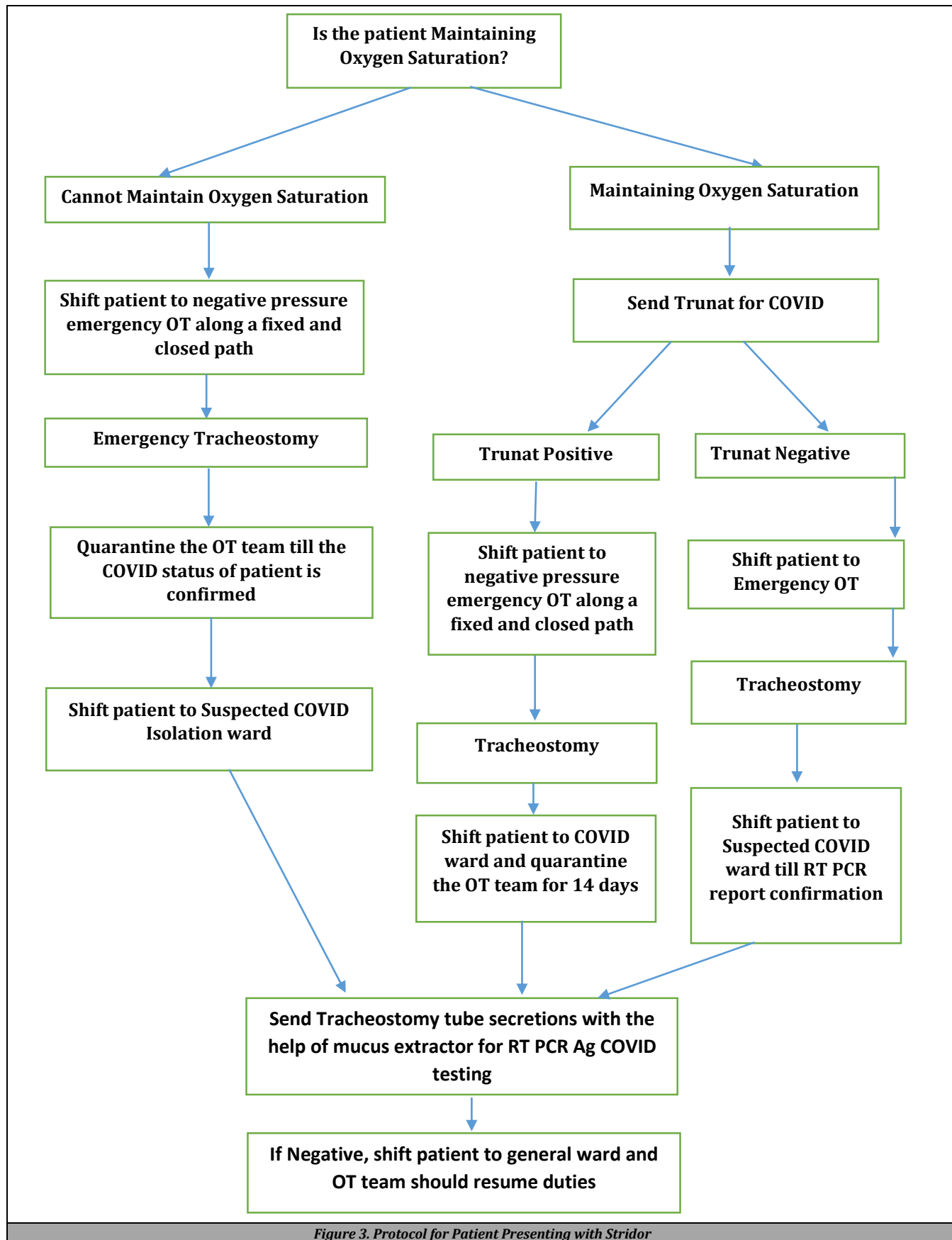


Figure 3. Protocol for Patient Presenting with Stridor

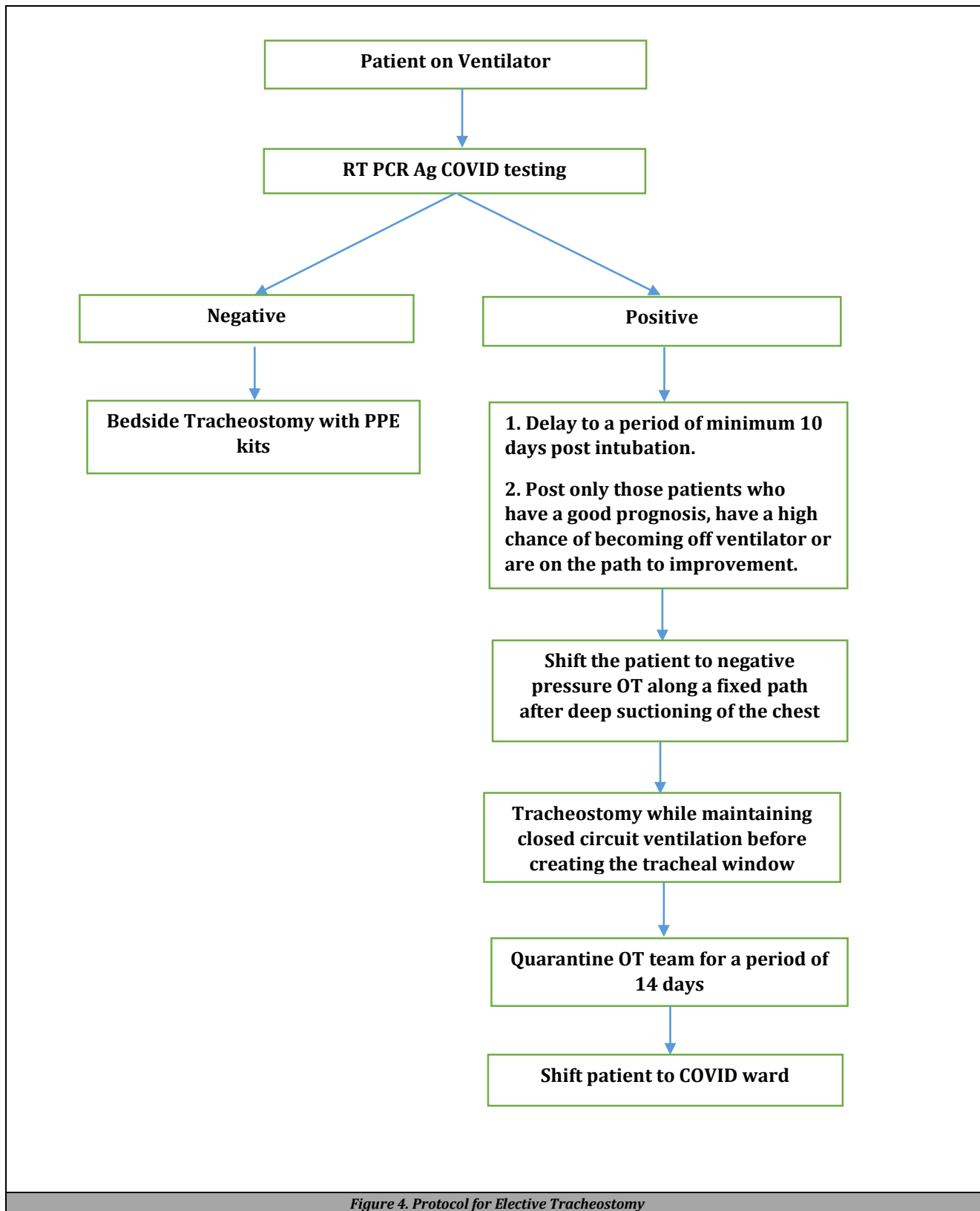


Figure 4. Protocol for Elective Tracheostomy

**Operative Guidelines**

1. There should be a negative pressure OT.
2. There should be a designated Donning and Doffing area near to the OT.
3. There should be minimum personnel in the operation theatre with 1 lead consultant surgeon, 1 experienced assistant surgeon along with 1 anaesthetist.
4. The surgeons, anaesthetist and nursing staff in the OT should be wearing PPE kits, N95 masks and face shields before the entry of the patient into the OT.
5. The instrument trolley should be well prepared before the entry of the patient in to the OT.
6. Tracheostomy tubes of one size larger and one size smaller than the recommended size for the patient should

be available. The cuff of tracheostomy tube should be checked well in advance.

7. Inj. midazolam (0.1 mg per kg) should be given to make the patient relax and Inj. glycopyrrolate (0.05 mg per kg) to reduce the secretions of the patient.
8. The anaesthesia mask should be tightly secured around the face of patient to prevent air leak and high efficiency particulate air (HEPA) filter attached to the face mask.
9. If the patient is intubated, the OT team should be alerted when disconnecting the patient from ventilator and connecting to anaesthesia machine, then ET tube and oral cavity should be draped over and should be accessible only to anaesthetist.
10. Local infiltration to be given in the neck close to incision line. Incision of skin and further dissection of subcutaneous tissue should be done with minimal use of diathermy as it is considered to be an aerosol generating procedure. Adequate suctioning should be available to reduce the smoke generated from the use of diathermy. On reaching trachea, local anaesthesia should be given in trachea to minimise cough.
11. If the patient is intubated, we should maintain closed circuit ventilation once trachea is reached.
12. After completion of the procedure, the patient should be shifted back to the ward following the same path as before.

**Postoperative Guidelines**

1. Heat and Moisture Exchange (HME) filter and disposable inner cannula should be used to keep the tube from getting occluded with secretions.
2. Patient’s tracheostomy tube secretions should be sent with the help of mucus extractor for PCR Ag Covid testing.
3. Inner disposable cannula should be changed when blocked by secretions.
4. While changing the tracheostomy tube, appropriate protective measures should be taken such as N95 mask and face shield while changing tube of Covid negative patient and PPE kit while changing tube of Covid positive patient.
5. Continue temperature monitoring of the patient.
6. There should be minimal tube change. Tube should be changed only when there is excessive secretions or blockage of tube.

**RESULTS**

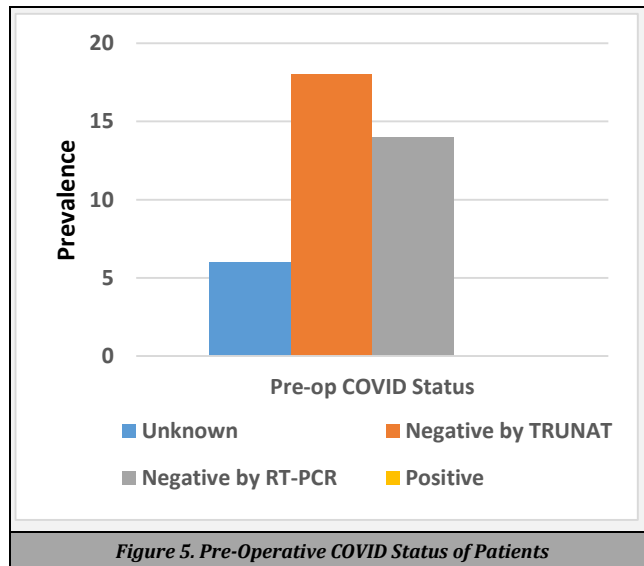
We did tracheostomy in a total of 38 patients in the past 7 months. All 38 tracheostomies were performed successfully following the guidelines formulated by our team, with proper precautions not a single team member got infected with Covid-19.

**DISCUSSION**

Covid - 19 can spread by direct contact with patient, droplet formation and aerosolization. In contrast to direct contact and droplet formation, aerosolized SARS-CoV-2 doesn’t require

personal contact and has been observed to remain viable in air for up to 3 hours.<sup>1</sup> In a fresh case of tracheostomy, in relation to risk of transmission through aerosolization, there is also risk of transmission via droplet formation because of frequent productive coughing.

We did tracheostomy in a total of 38 patients in the past 7 months. Preop COVID status was unknown in 6 patients, negative by TRUNAT in 18 patients and negative by RT - PCR in 14 patients (Figure 5).



In all cases of tracheostomy, the operating team was wearing PPE kits consisting of a fluid expellant complete jump suit with cap, N95 mask, face shield, shoe covers and double gloves. All were adequately trained for gown up and gown down of PPE. It has been reported that removal of PPE after exposure to an infected individual is a high risk for contamination.<sup>3</sup> PPE was made part of every tracheostomy due to unknown false negative COVID PCR testing rates and increased rate of asymptomatic carriers.<sup>4</sup> We made quarantine part of our protocol as health care workers are at risk even when appropriate personal protection equipment is used.<sup>5</sup>

Only 5 patients were females owing to low incidence of head and neck malignancies in females.<sup>6</sup> 20 of our patients presented with stridor, all of whom were subjected to awake tracheostomy. All these 20 cases suffered from head and neck malignancy with compromised airway. Jason Crossley et al. have reported one case of awake tracheostomy in a case of transglottic mass causing airway obstruction during current Covid-19 times. Just like him we used face mask tightly secured to nose and mouth as opposed to the typical use of nasal cannula.<sup>7</sup> This decreases the amount of aerosolization at the time of local injection with 1 % lignocaine into trachea to anaesthetise the airway.

2 of our patients were on mechanical ventilator. One of them was a female patient with approximately 27 % burns mainly in the head and neck region. Tracheostomy was performed after 10 days of intubation as the patient had no signs of multi organ failure or septicaemia and was showing clinical signs of improvement. 2<sup>nd</sup> case was a young boy with a history of road side accident with SDH who was 12 days post intubation with no associated co-morbidities. Delayed tracheostomy was performed in patients on mechanical ventilation which is also recommended by American Academy

of Otolaryngology - Head and Neck Surgery.<sup>8</sup> Broderick in his study has mentioned the crucial step of maintaining the closed circuit until the tracheostomy tube was inserted in the trachea.<sup>9</sup>

One of the patients had bilateral abductor palsy with extensive bilateral neck and mediastinal neck secondaries. Patient had stridor only on exertion but was planned for elective tracheostomy after Covid testing under GA prior to radiotherapy and any upper respiratory tract infection (URTI) leading to exaggeration of stridor. These 3 cases were done under general anaesthesia.

15 patients, all with head and neck malignancies, underwent elective tracheostomy under local anaesthesia after Covid testing. These were the patients where the need for tracheostomy was anticipated well in advance after COVID testing and the scenario of a struggling patient with falling SpO<sub>2</sub> with Covid status unknown was prevented. The laryngoscopic findings helped us to take the decision of tracheostomy under local anaesthesia followed by direct laryngoscopy and biopsy under GA via the tracheostomy tube in the same sitting. Paralysis by neuromuscular blocking drugs eliminates the movement and coughing of the patient.

The concept of anticipating stridor development during direct laryngoscopy and biopsy and radiotherapy helped to save the lives of our patients and at the same time safeguard our health care workers. Proper humidification decreases the crusting, blockage and repeated suctioning. We used HME filters in majority but where patients could not afford we used wet gauge and boiling water kettles in the vicinity. The use of inner cannulas not only prevented repeated tube change but also safeguarded the attendants from repeated exposure to aerosolization. The same has been recommended by Brusasco C et al.<sup>10</sup>

### CONCLUSIONS

We recommend that there should be formation of a triage team where each member knows their role, this helps in reducing the pre-operative fear. There should be use of PPE kits in all tracheostomies. No test is 100 % sensitive so all precautions must be taken while dealing with every patient. Guarding oneself with PPE while changing tracheostomy tube significantly diminishes risk of exposure. Our policy of anticipating tracheostomy in patients with impending stridor helped us reduce the risk of having to perform emergency tracheostomies with Covid status unknown.

We recommend that all the institutes should form a protocol according to facilities available and upgrade it from time to time. We have followed the above guidelines for the past 7 months and are continuing to do so. The foresight and

planning has greatly helped us. We were lucky enough not to have a tracheostomy and Covid positive combination. These guidelines laid down by our department in close association with the administration and anaesthesia department helped us sail through difficult indecisive times so far.

Data sharing statement provided by the authors is available with the full text of this article at jemds.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jemds.com.

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