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Tracheostomy In Tertiary Care Hospital In Covid-19 Era: Our Experience.

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ABSTRACT

Tracheostomy is one of the oldest surgical procedures. Until the end of the nineteenth century with the introduction of asepsis, together with the development of safe anaesthetic techniques, the procedure was extremely hazardous. This is a retrospective and interventional study and it was done at department of ENT of tertiary care hospital and Period of study was from October 2020 to October 2021.During study period total 50 patients who came confirmed positive for covid-19 by RTPCR testing undergoing tracheostomies for various indications were studied. Thirty patients (60%) were liberated from the ventilator after tracheostomy. The average time between tracheostomy and ventilator liberation was 12 days (range 2–32 days). Of these patients, the average time of intubation before tracheostomy was 18 days (range 8–30 days). There was a weak positive correlation between time from intubation to tracheostomy and time from tracheostomy to ventilator liberation. Fourteen patients (28%) have had their tracheostomy tube downsized and 4 patients (8%) have been decannulated. The average time to decannulation after tracheostomy was 17 (11–24) days. Nineteen patients (38%) remain on some level of ventilatory support. Given the severity and uncertain clinical outcome of patients with COVID-19, in addition to the increased risk of transmission to clinicians during aerosol generating procedures, careful consideration should be taken prior to performing tracheostomy. Our early experience demonstrates that tracheostomy can be performed in a way that maximizes safety of the surgeon while achieving the desired outcome for the patient. Earlier tracheostomy, before 14–21 days, may be warranted for selected patients. Further assessment of outcomes after tracheostomy in this patient population is required.

Keywords: Tracheostomy, COVID 19, ventilator

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INTRODUCTION

Tracheostomy is one of the oldest surgical procedures. Until the end of the nineteenth century with the introduction of asepsis, together with the development of safe anaesthetic techniques, the procedure was extremely hazardous. The most important indication for tracheostomy have always been for the facilitation of long term mechanical ventilation and to reduce the complications associated with endotracheal tube and weaning off from ventilation. [1-3]As of march 25, 2021, more than 125 million people worldwide have received a diagnosis of COVID-19, and more than 2.7 million people have died. COVID-19 transmission occurs via SARS-CoV-2 and associated with pneumonia, coagulopathy, and multiorgan failure. More than 70% of the critically ill Covid-19 patients received intubation and invasive mechanical ventilation (IMV) support [4,5] When, and how to perform tracheostomy in patients with COVID-19 have major implications for patients, clinicians, and hospitals. The present study was carried out to analyse the various outcomes of tracheostomy and complications of tracheostomy and to healthcare worker and their modes of managements in covid-19 positive patients.

Aims And Objective

The aim of the study was to analyze the technique of tracheostomy in covid-19 positive patients to avoid exposure to provider. Furthermore, we aimed to investigate the tracheostomy protocols and practices to find out preoperative and perioperative, intraoperative and postoperative changes required in response to covid-19 pandemic.

The objectives of studies are to identify the important considerations to apply in planning and conducting tracheostomies for covid-19 positive patient, primarily because of periprocedural risks associated with generation of aerosols. Here we have discussed few points to be considered in performing tracheostomy for covid-19 patients.

MATERIALS AND METHOD

This is a retrospective and interventional study and it was done at department of ENT of tertiary care hospital and Period of study was from October 2020 to October 2021.During study period total 50 patients who came confirmed positive for covid-19 by RTPCR testing undergoing tracheostomies for various indications were studied. Written informed consent was obtained from the patient or his relatives before starting the procedure. Moreover information regarding tracheostomy and complications of surgery was collected.

Setting & Approach Of Tracheostomy In COVID-19 Patients

The nature of respiratory failure in COVID-19 patients may often require prolonged mechanical ventilation. Many tracheostomies performed in the ICU were not emergency and can safely be delayed. For health care workers performing aerosol generating procedures on patients with COVID-19, the Surviving Sepsis Campaign recommend the use of fitted respirator masks (N95, FF2, or equivalent) in addition to other personal protective equipment (PPE),such as gloves, gown, and eye protection.[6] Every provider in the room should wear a fitted respirator mask, surgical cap, impermeable gown, shoe covers, gloves, goggles, and full-face shields, or as guided by protocols. Special attention to the neck area is needed, as it may be left exposed by standard PPE. Proper methods for donning and doffing were performed. All tracheostomies were performed bedside. Benefits to bedside tracheostomy include avoiding exposure to additional healthcare workers during transfer to the operation room. It may limit potential viral exposure time by decreasing procedural time.

All tracheostomies were performed by open surgical approach by two otolaryngologist. To reduce exposure toinvolved staff, following steps assessed before incision.

- preoxygenation of the patient
- The endotracheal tube was placed distally in the trachea to avoid puncture of the cuff during incision
- Control of the tracheotomy tube dimension and cuff function
- Preparation of ventilation tubing and connections between the tracheotomy tube and the ventilator

- Removal of endotracheal tube fixations.

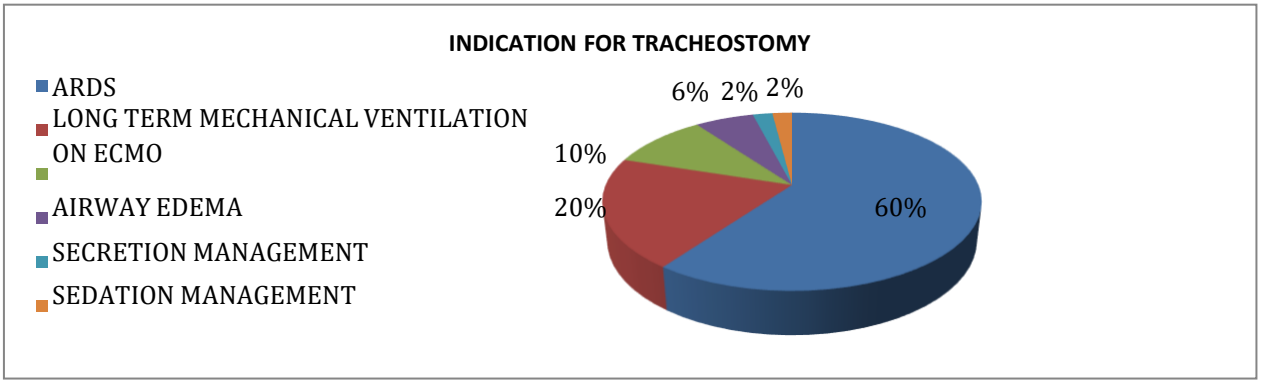
All sedating drugs including analgesics were avoided before establishment of airway.

- The neck was extended using a sand bag below the shoulder and ring pillow below the head.
- The neck area was cleaned with betadine and draped with sterile surgical towels.
- A transverse incision is made in the midline of neck in lower third between cricoid cartilage and sternal notch.
- Skin, subcutaneous tissue, strap muscles &pretracheal fascia are dissected in the midline.Dilated veins aredisplaced.
- Trachea identified and confirmed by air bubbles in syringe.
- Few drops of 4% lignocaine are injected into trachea to suppress cough reflex.
- Trachea opened with horizontal incision and opening dilated with tracheal dilator.
- Tracheostomy tube of appropriate size is inserted and secured by tapes and dressing.
- Skin incision should not be sutured or packed tightly as it may lead to development of subcutaneousemphysema.
- Gauze dressing is placed between the skin and flange of the tube around the stoma. Air entry confirmed equalon both sides and post procedure chest x- ray is advised.

RESULTS

During our study period tracheostomy has been performed in 50 COVID-19.patients with mechanical ventilation. Patients undergoing the procedure were predominantly male (33 patients, 66%) reflecting findings of higher diseaseseverity in males. (table 1) The average age was 62 years (range 23.5–81.7 years). (table 2)

ARDS was the most common indication for tracheostomy (30 patients, 60%), followed by failure to wean ventilation without ARDS (10 patients, 21%), extracorporeal membrane oxygenation (ECMO) decannulation (5 patients, 9%), persistent airway edema (3 patients, 6%), need for secretion management (1 patient, 2%), and need forsedation management (1 patient, 2%).



Thirty patients (60%) were liberated from the ventilator after tracheostomy. The average time between tracheostomy and ventilator liberation was 12 days (range 2–32 days). Of these patients, the average time of intubation before tracheostomy was 18 days (range 8–30 days). There was a weak positive correlation between time from intubation to tracheostomy and time from tracheostomy to ventilator liberation. Fourteen patients (28%) have had their tracheostomy tube downsized and 4 patients (8%) have been decannulated. The average time to decannulation after tracheostomy was 17 (11–24) days. Nineteen patients (38%) remain on some level of ventilatory support.

Minor complications were reported in 13 patients (26%), including 3 patients(6%) intraoperatively, post-operativecomplications seen in 10 patients (20%). (table 3)

No transmissions to HCWs occurred during any procedure. Airborne, contact, and droplet precaution-level PPEwere worn by all HCW in the room during the procedure.

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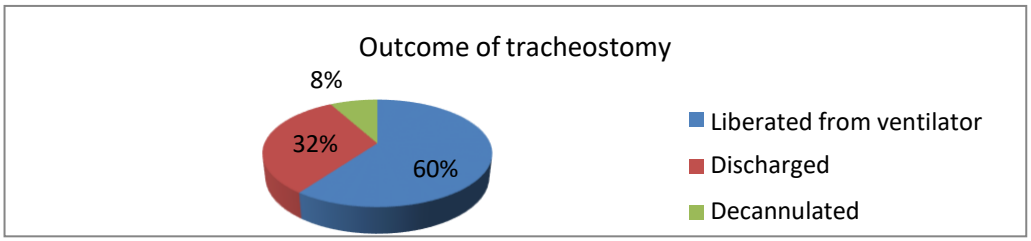
Tracheostomy	male	Female	Total
No. Of patients	33 (66%)	17 (34%)	50

Age group	No. of patients
0-10yrs	0(0%)
11-20yrs	0(0%)
21-30yrs	4(8%)
31-40yrs	8(16%)
41-50yrs	7(14%)
51-60yrs	9(18%)
61-70yrs	18(36%)
71-80yrs	4(8%)
Total	50

Sr.no.	Complication	No. of Patients
A)	Intra-operative	3(6%)
1.	Haemmorhage	2
2.	Apnea	1
B)	Early Postoperative(1-10days)	7(14%)
1.	Surgical Emphysema	4
2.	Tube blockage	2
3.	Tube displacement	1
C)	Late Postoperative (>10days)	3(6%)
1.	Excessive granulations	1
2.	Difficult Decannulation	1
3.	Trachial Stenosis	1
	Total complicated cases	13(26%)
TotalCases		50



DISCUSSION

Tracheostomy offers several advantages in terms of improved comfort management, reduced sedative, and paralytic medical support, reducing death space. Moreover, tracheostomy reduces airways resistance, lessening the work of breathing optimizing the tracheal secretion control [7] In patients warranting tracheostomy, appropriate personal protective equipment (PPE) is critical to mitigate transmission during this aerosol-generating procedure. If the patient meets weaning targets like FiO2 less than 40%, PEEP < 8, PaO2/FiO2 > 200, pressure support < 8 cmH2O, extubation could be reached between 7 and 14 days, tracheostomy should be postponed.To reduce aerosolization during the procedure, we suggested open surgical tracheostomy may be safer compared to a standard percutaneous dilational tracheostomy (PDT) technique which is supported by others.[8-11]

In our series, the average time from intubation to tracheostomy was slightly earlier than the originally anticipated 21 days per standard recommendations, but consistent with global recommendations and in line with trends in non- COVID critical care practice.[12] if the patient has favorable respiratory dynamics and earlier tracheostomy would directly facilitate their recovery in terms of improved secretion management, ventilator synchrony, and decreased needfor sedation.34 Additionally, before consideration of tracheostomy, a goals of care discussion with the primary team and the patient's family regarding prognosis and expected benefit from the procedure should occur.[13,14]

We recommend that the procedure is performed between ventilator days 14–21. In the LUNG SAFE study, involving ARDS patients from 459 ICUs across 50 countries, tracheostomy was performed in 13% of patients, whose 75% after the first week of ICU stay [15] In some cases, prolonged ventilator weaning of COVID-19 patients may nullify the ability reduce ICU patient census. The vast majority of patients with COVID-19 achieve sero- conversion by day 14, with a slow but steady decline of respiratory viral load[16] Although viral shedding from nasopharyngeal aspirates may occur up to 24 days after symptom onset, viral loads are significantly lower 14 days after presentation.[17-19] It is probable, although not confirmed, that transmission may be more likely in earlier stages of infection. If so, performing the procedure after 2 weeks might pose less risk to the staff involved.

Previously published case reports and protocols for tracheostomy in SARS patients share several considerations for the present-day clinician. In addition to standard contact and droplet precautions, surgical staff heavily utilized enhanced PPE. in addition to droplet precautions with N95 mask) with standardized, often supervised removal[20,21]

If possible, we recommend refraining from tracheostomy changes, downsizing or decannulation until COVID-19 infection has cleared. Our local experience has also demonstrated that laryngeal edema often presents after extubation in COVID-19 patients often leading to stridor and the need for reintubation immediately after planned extubation. In many, these are difficult reintubations due to significant edema in patients who were originally straightforward intubations. Similar experiences have been reported by others.[22]

Though the sample size is small, Based on this series, with careful patient selection, tracheostomy seems to be safe in this patient population. Thus far, with 30 patients liberated from the ventilator, 16 discharged alive, and 4 decannulated, patient outcomes after tracheostomy seem optimistic compared to other series where the intubated COVID-19 patient's prognosis is extremely poor.[22] This data also suggests that tracheostomies can be safe for HCWs performing the procedure. When PPE is readily available and appropriately donned and doffed, the risk to personnel can be effectively mitigated. Factors such as pre-tracheostomy ventilator settings and peri-procedural hypoxia play a role in ventilator liberation and mortality and should be investigated in future studies to further delineate candidacy for tracheostomy.

CONCLUSION

Given the severity and uncertain clinical outcome of patients with COVID-19, in addition to the increased risk of transmission to clinicians during aerosol generating procedures, careful consideration should be taken prior to performing tracheostomy. Our early experience demonstrates that tracheostomy can be performed in a way that maximizes safety of the surgeon while achieving the desired outcome for the patient. Earlier tracheostomy, before 14–21 days, may be warranted for selected patients. Further assessment of outcomes after tracheostomy in this patient population is required.

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