Role of Percutaneous Tracheostomy in COVID-19 Patients on Ventilator

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Abstract

The pandemic caused by novel coronavirus (SARS-CoV 2) with respiratory and multiorgan dysfunction needing prolonged mechanical ventilation. Tracheostomy reduces ventilator support time. The study was done on 23 patients and role of PCT was observed. A recovery rate of 8.77% was observed and no significant change in mortality rate was observed with even after better airway management.

Keywords: *COVID-19, tracheostomy, PCT, Ventilator*

Introduction

Coronavirus disease 2019 (COVID-19) is defined as illness caused by a novel coronavirus now called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV), and was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China. [1] It was initially reported to the WHO on December 31, 2019. On January 30, 2020, the WHO declared the COVID-19 outbreak a global health emergency. [2, 3] On March 11, 2020, the WHO declared COVID-19 a global pandemic, its first such designation since declaring H1N1 influenza a pandemic in 2009.

Illness caused by SARS-CoV-2 was termed COVID-19 by the WHO, the acronym derived from "coronavirus disease 2019" [4,5]. With presentations ranging from asymptomatic/ mild symptoms to severe illness with involvement of lungs, heart, pancreas and kidneys with multiorgan dysfunction.

Tracheostomy is one of the oldest and most commonly performed procedures in critically sick patients. Surgical tracheostomy (ST) was first described by Jackson in 1909. Percutaneous dilatational tracheostomy (PDT) over a guidewire was invented by Ciaglia in 1985. PDT has now become the standard of care in ICU and has replaced ST in this subset of patients to atlarge [6]

PCT involves blunt dissection of pretracheal tissues followed by dilatation of trachea over the guidewire and insertion of tracheal cannula using Seldinger technique.

Prolonged ventilator stay is the most common indication of tracheostomy in critically ill patients. Up to 24% of mechanically ventilated patients in ICU undergo tracheostomy. Tracheostomy has been conventionally recommended for patients requiring ventilator for >21 days, and endotracheal (ET) intubation is recommended if ventilator stay is <10 days. This was as per the first consensus on artificial airways published in 1989, for patients on mechanical ventilation. [7]Most of the recent guidelines have found insufficient evidence to make any concrete recommendations in this regard.[8] When compared to trans-laryngeal intubation, tracheostomy is associated with less sedation, better patient comfort, reduced work of breathing aiding in faster weaning from ventilator.

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Use of tracheostomy can facilitate weaning from ventilation and potentially increase the availability of much needed intensive care unit (ICU) beds, however this being a high aerosol generating procedure it does put the health care worker to risk of transmission. [12]

The past year has been difficult due to spread of the pandemic and the healthcare systems all over the world have been facing unprecedented challenges. These challenges are most for the Intensive Care Unit/ High Dependency Units to manage the critically ill patients.

Reports show that 5–15% of patients with COVID-19 are critically ill and need mechanical ventilation[9,10,11]. Many of these patients need extended period of ventilation where tracheostomy is a common procedure for mechanical ventilator support. Use of tracheostomy can facilitate weaning from mechanical ventilation and potentially increase the availability of intensive care unit beds.

Material ands Methodology

Prospective observational study.Series of 23 patients admitted in Subharti Medical College in COVID- ICU, during the period of 3 months from July 2020 to September 2020. Percutaneous Tracheostomy were done by dilatational method bedside

Inclusion criteria: RT-PCR positive for COVID-19, patients on mechanical ventilator support

Exclusion criteria: patients not on ventilator support

Materials: ICU setup, Tracheostomy tube, injectable anaesthetic agent, surgical blade, dilator, tracheostomy set, mechanical ventilator

Procedure

Position: The patient's neck is extended over a shoulder roll (unless there is a contraindication). The anaesthesiologist stands at the head end of the bed. All personnel were equipped with the proper personal protective equipment (including an N100 equivalent half face gas respirator, eye goggles, transparent full-face shield, gown, and sterile double gloves.)

- Before the procedure, patients were anesthetized with 2% lidocaine with adrenaline injected in the neck at the site of planned PCT. The soft tissue till trachea was instilled and 2 minutes was given.
- The sedative agent – most commonly fentanyl used as an infusion of 20-40 mcg/hour- was given as a bolus 30-50 mcg, 10 min before the procedure.
- Skin incision made and the pretracheal tissue cleared with blunt dissection.
- Endotracheal tube was withdrawn, placing the cuff at the level of the glottis. A 3.8 mm bronchoscope (3.8 or 5.0mm bronchoscope inserted through suction port of T connector of ventilator circuit) was used and was placed at the end of the ET.
- Surgeon enters the tracheal lumen below the second tracheal ring with an introducer needle, the same was confirmed by the bronchoscope and a guidewire was placed. Needle and bronchoscope are removed after successful placement of the guidewire.
- The tract between the skin and the tracheal lumen was then serially dilated over a guidewire.
- With the help of Griggs forceps the trachea was entered over the guidewire and the opening dilated
- A tracheostomy tube was placed over a dilator.
- The cuff was inflated. The position was confirmed by reduction of tidal volume generated through ET to zero and then generation of TV through the TT.
- The ET was now removed after deflating the cuff and proper suctioning.
- Tube was secured to the skin with sutures and the tracheostomy tape

Observation:

- Total patients on Ventilatory support: 114 (without PCT)
- Patients with PCT: 23

· Duration after admission when PCT was done

0 to 5 days	15 patients
6 to 10 days	7 patients
>10 days	1 patients

Days on Ventilatory support post PCT

≤2days	13patients
>2 days	10 patients

Duration of Ventilatory support after which PCT was done

0 to 3 days	15 patients
4 to 6 days	6 patients
>7 days	2 patients

Total ventilator days: 133. (5.78 mean)

· Antiviral drugs: out of 23 patients, 19 were on Remdesvir, 5 on Oseltamivir, and 1 on Favipivir

· 7 patients were given Ulinastatin concurrently

· 18 patients were given dexamethasone and 18 low molecular weight heparin

· Mean time of PCT post intubation: 2.47 days

· Mean time of ventilator support post PCT: 3.30 days

· Antibiotic coverage was given by ceftriaxone in 13 patients, Piperacillin and tazobactum in 7 patients. 6 patients were given a combination of other drugs.

· Hydroxychloroquine: 2
· Ivermectin:1

The indication to upgrade antibiotics were; a raised PCT level, culture report or new onset fever (after 4 days of ventilation) with falling cardiovascular parameters

Summary of our experience with ventilation of patients

· Total patients on ventilator: 114

· Total patient days on ventilator: 730

· Average: 6.403 days

· Total no. Of patients successfully weaned off ventilator support: 10

(8.77% recovery from ventilator)

· Pressure control ventilation in: 111

· Volume control ventilation in: 3

Most common cause of death:

· 50%- bleeding from respiratory passage, either TT or ET despite all bleeding parameters being normal.

· 30%- ARDS with MODS with falling BP despite triple inotropes.

Conclusion

Although doing a PCT decreased the number of days on ventilator support, no advantage was seen in the mortality rate. In COVID-19 critically ill patients, a modified PT technique, did not lead to improvement or prolongation of life as compared to endotracheal tube even though it ensured a better airway management for suctioning and respiratory function, patient comfort, reduced need of patient sedation and great safety for the staff.

Survival did not improve even after early PCT and ventilation.

· Ethics: clearance from University Ethics Committee (Medical), Subharti University

Conflict of Interest: Nil

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Refernces

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