



Percutaneous Tracheostomy in COVID-19 Patients

David Neilipovitz^{1*}, Bernadett Kovacs² and Giuseppe Pagliarello³

¹Departments of Critical Care and Anesthesiology, Ottawa Hospital, Canada

²Critical Care Medicine, Hôpital Montfort, Canada

³Departments of Critical Care and Surgery, Ottawa Hospital, Canada

***Corresponding author:** David Neilipovitz, Departments of Critical Care and Anesthesiology, Ottawa, Hospital, 1053 Carling Avenue, Ottawa, ON K1H5P5, Canada, Tel: 613798-5555; Email: dneilipovitz@toh.ca

Case Report

Volume 5 Issue 1

Received Date: May 25, 2020

Published Date: June 01, 2020

DOI: 10.23880/accmj-16000173

Abstract

COVID-19 is an unprecedented pandemic presenting unique challenges. It has been recommended that COVID-19 patients either not receive a tracheostomy or delay it until they are no longer COVID-19 positive, and if they receive one that it be conducted as an open tracheostomy. We describe an approach to safely perform percutaneous tracheostomy in COVID-19 patients.

Keywords: Percutaneous Tracheostomy; COVID-19

Abbreviations: (AGMP): Aerosol Generating Medical Procedures (PT): Percutaneous Tracheostomy; (LOS): Length of Stay; (PPE): Personal Protective Equipment; (ET): Endotracheal Tube.

Case Report

The COVID-19 pandemic has had a profound and unprecedented impact on the care of critically ill patients. The safe performance of aerosol generating medical procedures (AGMP) and tracheostomy in particular, present unique challenges. The Canadian Society of Otolaryngology recommends avoiding tracheostomy until patients are COVID-19 negative and to use an open surgical approach [1]. The American Association for the Surgery of Trauma published similar recommendations but specified that clinical judgment supersedes any of their recommendations and provide guidance for open and percutaneous tracheostomy [2]. In modern critical care practice, bedside percutaneous tracheostomy (PT) offers many benefits including shorter duration of mechanical ventilation, improved short-term mortality and reduced ICU length of stay (LOS) [2,3].

Avoiding or delaying tracheostomy for COVID-19 positive or suspected patients was based on minimizing risks for healthcare providers and on the early observations that COVID-19 patients requiring longer term ventilation experience poor outcomes [4]. The latter reason has not been borne out in our experience. We strongly believe that COVID-19 patients should not be denied the benefits of timely, safe PT in the ICU. Timely PT also allows ICUs to function more efficiently and effectively by reducing LOS and the utilization of paralytics, analgesics and sedative drugs which presently are in short supply.

Our team has extensive experience with over 100 PT per year. We modified our technique to make bedside PT as safe or safer than open tracheostomy. The advantages include less patient transport, minimal use of personal protective equipment (PPE) and minimization of exposure of multiple staff members to the infected patient. We have now safely performed bedside PT in 4 COVID-19 patients. All were mechanically ventilated between 7 and 28 days and assessed as high risk extubation failures. Extubation failure is associated with increased mortality [4] and emergency

reintubation subjects staff to a high risk AGMP [5].

Technical description of bedside PT

- Performed in the patient's single ICU room with sliding doors closed.
- Participating staff limited to most experienced surgeon, anesthesiologist/intensivist and respiratory therapist all.
- Pre-procedure huddle is conducted to assure coordination and planning.
- All staff wear enhanced PPE consisting of N95 mask, face shield, waterproof gown, bouffant cap and nitrile or surgical gloves.
- Patients are preoxygenated and continuous anesthesia is provided with propofol and fentanyl. All patients receive rocuronium for paralysis.
- When all equipment is ready, site is prepped and draped. Patients are only ventilated while the circuit is closed. With the patient apneic, the endotracheal tube (ET) is transiently clamped so that a bronchoscope adapter can be added and the circuit switched to an Ambu bag with a HEPA filter. After brief bagging, the ET tube is again clamped, the adapter is opened and the bronchoscope inserted. A saline soaked gauze is used as a seal around the scope adapter interface.
- Under direct guidance, ET is quickly withdrawn while the surgeon landmarks the site by direct tracheal pressure and transillumination. Surgeon then infiltrates site with local anesthetic and a 22-gauge seeker needle is used to confirm entry site as visualized with the bronchoscope. The catheter is then introduced during bronchoscopic visualization. The catheter is kept capped until introduction of a guidewire, confirmed by a brief bronchoscopy. The site is incised and dilated utilizing a Blue Rhino dilator. A cuffed tracheostomy tube is then inserted and the balloon inflated under direct bronchoscope vision. The tracheostomy tube is kept occluded. The bronchoscope is partially withdrawn, the ET is again clamped, then the scope is completely removed into blanket to reduce splatter and introduced into the tracheostomy to confirm position. An inner cannula is inserted into the tracheostomy then a fresh suction catheter set up is attached to the tracheostomy tube and mechanical ventilation resumed.
- ET is removed into a disposable surgical towel wrapped around mouth with all then disposed.

The airway is only open for a matter of seconds during which time the patient is completely apneic. The total procedure duration is approximately 15 minutes. The staff then exit the room utilizing standard doffing procedures for

their PPE. Trials off the ventilator began within 24 hours of the percutaneous tracheostomy and all patients have now been successfully weaned off the ventilator.

Current public health recommendations are based on a systematic review from 2012 involving SARS patients [6]. Although both bronchoscopy and tracheostomy are considered AGMP, there is no evidence for cumulative risk for PT. The technique described here is associated with no significant aerosol generation. The airway is only open very briefly during which there is no ventilation. Constant communication and collaboration among the 3 practitioners is key to minimize potential for aerosol generation and risk.

The procedure described here for bedside PT is safe and effective. It offers COVID-19 patients who require longer term ventilation all the advantages of PT. The movement of patients to an operating room is eliminated. The number of individuals in the room during the procedure is kept to a minimum. The use of PPE is minimized. The duration of the procedure is shorter. We advocate judicious use of tracheostomy for COVID-19 patients. However, when tracheostomy is judged to be a necessary procedure by experienced clinicians, it can be performed safely at the bedside using the described percutaneous technique.

References

1. Sommer DD, Engels PT, Weitzel EK, Khalili S, Corsten M, et al. (2020) Recommendations from the CSO-HNS taskforce on performance of tracheotomy during the COVID-19 pandemic. *J Otolaryngol Head Neck Surg* 49(1): 23.
2. Michetti CP, Burlew CC, Bulger EM, Davis KA, Spain DA (2020) Performing tracheostomy during the Covid-19 pandemic: guidance and recommendations from the Critical Care and Acute Care Surgery Committees of the American Association for the Surgery of Trauma. *Trauma Surg Acute Care Open* 5(1): e000482.
3. Raimondi N, Vial MR, Calleja J, Quintero A, Cortés A, et al. (2017) Evidence-Based guidelines for the use of tracheostomy in critically ill patients. *J Crit Care* 38: 304-318.
4. Yang X, Yu Y, Xu J, Shu H, Xia J, et al. (2020) Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 8(5): 475-481.
5. Rothaar RC, Epstein SK (2003) Extubation failure: magnitude of the problem, impact on outcomes, and prevention. *Curr Opin Crit Care* 9(1): 59-66.

6. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J (2012)
Aerosol generating procedures and risk of transmission

of acute respiratory infections to healthcare workers: a
systematic review. PLoS One 7(4): e35797.

