



COVID-19

MedStar Health Tracheotomy Recommendations During the COVID-19 Pandemic Adapted from American Academy of Otolaryngology-Head and Neck Surgery Guidelines

A. BACKGROUND

1. Studies from colleagues in China have shown that most individuals who become critically ill with COVID-19 do so because of rapid progression of pneumonia to acute respiratory distress syndrome, which can lead to respiratory failure and death.¹⁻⁵
2. The benefits of performing early tracheotomy in critically ill COVID-19 patients are unclear from available data. Based on the SARS-1 outbreak with a similar coronavirus, the need for mechanical ventilation was associated with a 46% mortality.⁶
3. As an airway aerosol generating procedure (AAGP), tracheotomy increases potential viral exposure to the health care team,⁷ who require adequate PPE^{8,9} which is a scarce resource.
4. Reducing the risk of nosocomial outbreak amplification through transmission of COVID-19 to other patients and health care workers is of critical importance.⁵

B. CONSIDERATIONS

1. **Risks of tracheotomy in COVID-19 positive patients**
 - a. As with all AAGP, there is increased infectious risk to the surgical team due to aerosolized viral particles.¹⁰
 - b. Postoperatively, patients off ventilator support with tracheotomy require suctioning, which is an AAGP. Patients with tracheotomy tubes also frequently experience cough, and without a closed circuit to capture the aerosol particles, this results in exposure to caregivers.
2. **Timing of tracheotomy in COVID-19 positive ventilated patients**
 - a. There is no identified time-point when afflicted patients either improve, remain stable, or progress toward death due to pulmonary complications. In the SARS-1 epidemic, the mean time from onset to death was 23.7 days,¹¹ suggesting low potential benefit of tracheotomy prior to this time.
 - b. Patients who show no clinical or radiological remission within 10 days may be more likely to require ongoing ventilation and have a more severe course of disease, including death.⁵
 - c. There is no anticipated timing for viral clearance, and critically ill patients may have significantly longer positive testing, lasting at least 2-3 weeks.⁴

C. RECOMMENDATIONS

1. Decision-making in tracheotomy should take into consideration the surgical and ICU team's discretion. See Appendix A for algorithm for decision to perform tracheotomy.
 - a. Tracheotomy should be avoided in COVID-19 positive or suspected patients during periods of respiratory instability or heightened ventilator dependence.
 - b. Tracheotomy can be considered in patients with stable pulmonary status but should not take place sooner than 14 days after initial intubation.
 - c. Tracheotomy in patients with severe COVID illness (definition below) should be deferred if possible until at least 20 days have passed since symptoms first appeared **and** at least 24 hours have passed since last fever without the use of fever-reducing medications **and** symptoms have improved.



COVID-19

- i. Severe illness: respiratory frequency >30 breaths per minute, spO₂ <94% on room air or decrease of >3% from baseline in patients with chronic hypoxemia, ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO₂/FiO₂) <300 mmHg, or lung infiltrates >50%
 - ii. Repeat COVID testing is no longer required as part of preparation for tracheotomy in COVID+ patients, which is consistent with MedStar's policy for "Discontinuation of COVID precautions for Laboratory Confirmed COVID-19 Positive Patients".
2. During tracheotomy procedure:
 - a. Tracheotomy is an aerosol generating procedure, and should be performed with full PPE, including N95 respirator, eye protection, gown, and gloves.
 - b. Adhere to strict donning and doffing procedures based on institutional protocol.
 - c. Limit the number of providers participating in tracheotomy procedure and post-procedure management.
 - d. Perform entire tracheotomy procedure under complete paralysis.
 - e. Rely on cold instrumentation and avoid monopolar electrocautery if possible.
 - f. Advance ETT and cuff safely below the intended tracheotomy site and hold respirations while incising trachea.
 - g. Minimize tracheal suctioning during procedure to reduce aerosolization.
 - h. Choose cuffed, non-fenestrated tracheostomy tube.
3. Postoperatively
 - a. Maintain cuff appropriately inflated post-operatively and attempt to avoid cuff leaks while on ventilator support.
 - b. Avoid circuit disconnections and suction via closed circuit.
4. To minimize aerosolization of secretions, heat moisture exchanger (HME) should be used for a period of 20 days after diagnosis or onset of symptoms in COVID positive patients with tracheotomy tubes once the tracheotomy tube is disconnected from mechanical ventilation. See Appendix B Image A.
 - a. For patients with dry secretions requiring high humidity, use high-humidity T-piece with HEPA filter. See Appendix B Image B.
5. All patients with tracheotomy tubes not utilizing HME filters should wear a surgical mask over the trach tube or trach mask when tracheotomy tube is disconnected from mechanical ventilation.
6. In ambulatory settings, consider virtual visit or postpone visit if:
 - a. Patient cannot tolerate a surgical or cloth mask
 - b. Patient is COVID + (until COVID precautions can be discontinued
 - i. Refer to Discontinuation of COVID precautions.
7. If patients are experiencing cough, fever, shortness of breath or other signs of respiratory illness, and unable to tolerate wearing the surgical mask due to their medical condition, providers should wear an N95 respirator, eye protection, gown, and gloves during patient interactions.
8. For all patients that have undergone tracheotomy, healthcare workers should use an N95 respirator, eye protection, gown, and gloves if the patient is undergoing an aerosol-generating procedure (including suctioning of tracheotomy tube).
9. Patients may be decannulated once routine criteria are met.



COVID-19

D. REFERENCES

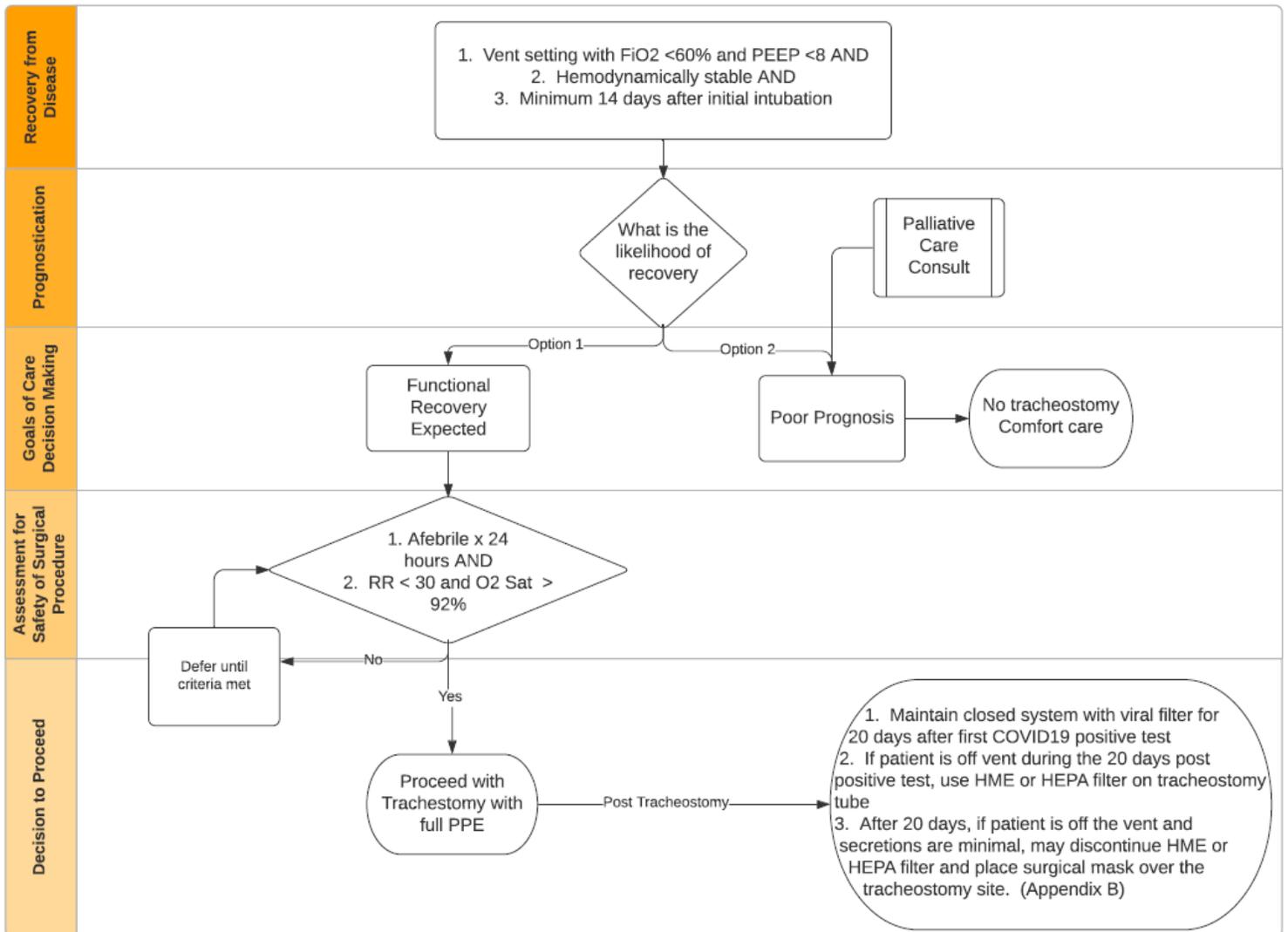
1. Yang, Xiaobo et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Resp Med* 2020 (in press).
2. Guan, Wei-Jie et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *New Eng J Med* 2020 (in press).
3. Wu, Chaomin et al. "Risk Factors Associated with Acute Respiratory Distress Syndrome and Death in Patients With Coronavirus Disease 2019 Pneumonia in Wuhan, China." *JAMA internal medicine*, e200994. 13 Mar. 2020.
4. Chen, Jun et al. "Clinical progression of patients with COVID-19 in Shanghai, China." *The Journal of infection*, S0163-4453(20)30119-5. 19 Mar. 2020.
5. Murthy, Srinivas et al. "Care for Critically Ill Patients With COVID-19." *JAMA*, 10.1001/jama.2020.3633. 11 Mar. 2020.
6. Choi KW, Chau TN, Tsang O, et al. Outcomes and Prognostic Factors in 267 Patients with Severe Acute Respiratory Syndrome in Hong Kong. *Ann Intern Med*. 2003; 139:715-723.
7. Patel ZM, Fernandez-Miranda J, Hwang PH, et al. PRECAUTIONS FOR ENDOSCOPIC TRANSNASAL SKULL BASE SURGERY DURING THE COVID-19 PANDEMIC. *Neurosurgery*, in press. 2020.
8. Wei, William I et al. "Safe tracheostomy for patients with severe acute respiratory syndrome." *The Laryngoscope* vol. 113,10 (2003): 1777-9.
9. Kwan a. Fok WG, Law KI, et al. Tracheostomy in a patient with severe acute respiratory syndrome. *Br J Anaesth* 2004;92:280-2.
10. van Doremalen, Neeltje et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *New Eng J Med* 2020
11. Leung GM, Hedley AJ, Ho L-M, et al. The Epidemiology of Severe Acute Respiratory Syndrome in the 2003 Hong Kong Epidemic: An Analysis of All 1755 Patients. *Ann Intern Med*. 2004; 141:662-673.



COVID-19

Appendix A. Tracheostomy Decision-Making Algorithm

MWHC Tracheostomy Algorithm for COVID19



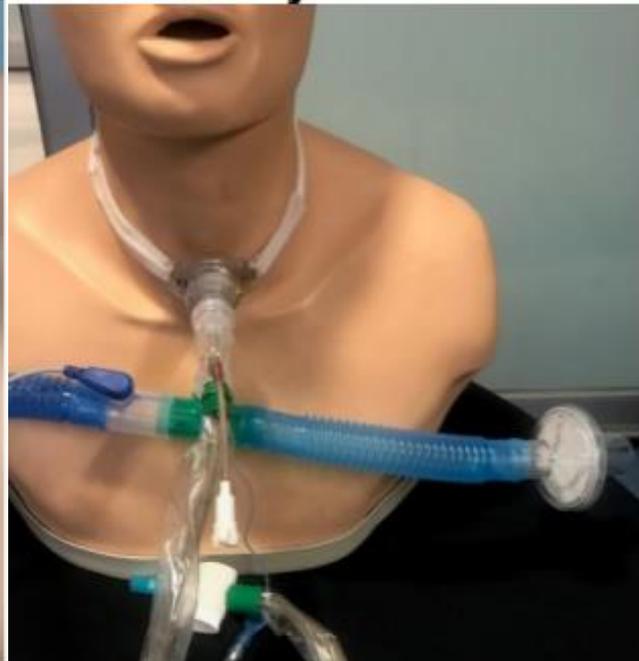


COVID-19

Appendix B.



A. HME filter on tracheotomy tube.
suction



B. T-piece with HEPA filter and in-line