

Tracheotomy During the COVID-19 Pandemic – The Ottawa Hospital Best Practices Summary

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Preamble

- The following are best recommendations following a review of national and international guidelines and published scientific papers. Given the rapidly evolving available data, these best practices are subject to change.
- Tracheotomy constitutes an aerosol generating procedure, posing a high risk of infection to healthcare providers. Viable COVID-19 virus has been demonstrated to be present in aerosols for at least 3 hours after an aerosolizing procedure.¹

Indications

- Awake non-intubated tracheotomy
 - o Emergency airway obstruction where intubation felt to be difficult or impossible
 - Consider intubating whenever feasible in emergency airway scenarios in order to minimize performance of awake tracheotomy.
 - COVID-19 status will likely be unknown in this patient population, with insufficient time for testing prior to tracheotomy.
- Intubated tracheotomy
 - o Elective tracheotomy for prolonged intubation and ventilation in ICU
 - During the pandemic, a longer than usual duration of intubation may be tolerated. The decision to proceed with tracheotomy will be made on an individual case basis, considering both the perceived risk of ongoing intubation to the patient, as well as the likelihood of COVID-19 infection.
 - o Prior to major head and neck oncologic or other surgical procedures

Consensus Statement: Elective Tracheotomy for Prolonged Intubation and Ventilation for Intensive Care Patients

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- Tracheotomy for prolonged intubation and ventilation will not be performed on known COVID-19 positive patients until the infection has cleared. Furthermore, international experience suggests that tracheotomy is rarely indicated for this patient population.² If on an individual case basis there were compelling reasons to proceed with tracheotomy, this would be performed in an open surgical fashion in the OR under general anesthesia with paralysis to minimize aerosolization during the procedure.³ Full personal protective equipment (PPE) with enhanced respiratory protection with N95 masks would be used by all healthcare providers involved.
- Tracheotomy for COVID-19 exposed or suspected patients will be performed in an open fashion in the OR under general anesthesia with paralysis to minimize aerosolization during the procedure. Full PPE with enhanced respiratory protection with N95 masks will be used by all healthcare providers involved. Pre-operative COVID-19 testing could be considered to further stratify risk.
- Tracheotomy for COVID-19 negative or low-risk patients will be performed with every effort made to minimize aerosolization during the procedure. Tracheotomies would generally be performed an open fashion in the OR under general anesthesia with paralysis; however, this would be subject to the clinical discretion of the treating surgeon and healthcare team. Full PPE with enhanced respiratory protection with N95 masks will be used by all healthcare providers involved. Pre-operative COVID-19 testing could be considered to further stratify risk.

Pre-operative COVID-19 Testing

- COVID-19 pre-operative screening 48 hours before any procedure involving the upper airway, including tracheotomy, is the approach recommended by the Canadian Society of Otolaryngology – Head and Neck Surgery, amongst other organizations.³⁻⁵ The patient is then self-quarantined until the procedure. This is not likely to be feasible in emergency airway scenarios requiring an awake tracheotomy. Furthermore, routine pre-operative screening for patients without risks factors/suspicion for COVID-19 is not currently supported by IPAC, and not being routinely performed at TOH.

Setting

- Operating room or negative pressure room.

Personal Protective Equipment

- Full PPE with enhanced respiratory protection including N95 masks for all tracheotomies.

Technical procedure: Awake tracheotomy (not intubated) ^{3-5,7}

<https://youtu.be/YO9OcbupZD4>

- Pre-oxygenate with a non-rebreather with a surgical mask over top
- Minimize personnel in the room – essential only (see surgical safety checklist (SSCL) for COVID-19 positive patient)
- Most experienced operator performs the tracheotomy (see SSCL for COVID-19 positive patient)
- Pre-oxygenate with a non-rebreather with a surgical mask over top
- Generous local anesthetic with epinephrine 1:100,000 infiltrated to the surgical site 5-10 min before incision for maximum anesthetic and vasoconstrictive effect
- Standard skin incision and soft tissue dissection to expose anterior face of trachea
- Judicious use of monopolar cautery with smoke evacuation for meticulous hemostasis prior to incising the trachea to facilitate a smooth insertion of the tracheotomy tube with minimal suctioning and patient coughing
- Verbalize clearly to OR team while performing following steps:
 - o Creation of tracheal window:
 - o *Consider inducing general analgesia with paralytic agent to minimize coughing after trachea is exposed, but before creating the actual tracheotomy window. This modification should only be considered when neck anatomy is favorable, and the insertion of the tracheotomy tube is anticipated to be straightforward.⁷*
 - o *Consider using a plastic tent over surgical site, which would still allow surgical manipulation, to avoid widely spreading of aerosols throughout the room*
 - o Incise trachea with cold steel blade
 - Consider larger tracheotomy incision to facilitate rapid insertion of tube without damaging cuff of tracheotomy tube
 - Surgeon should not suction once window has been created unless absolutely necessary
 - o Insert tracheotomy tube
 - Every effort should be made not to puncture the cuff during the insertion of the tracheotomy tube
 - o Inflate cuff rapidly and fully (over-inflate)
 - o Insert inner cannula
 - o Connect in-line suction unit followed by heat and moisture exchanger (HME) filter to tracheotomy tube
 - o Connect to circuit and CO₂ sensor
 - o Only after tracheotomy tube cuff has been inflated and circuit is connected to tracheotomy tube may ventilation commence
 - o Confirm appropriate end-tidal CO₂
 - o Induction of general anesthesia (*if applicable depending on discussion above*)
- Secure tracheostomy tube well with skin sutures and circumferential neck ties to prevent accidental decannulation

- Post-operative:
 - Post-operative disposition to be determined on case-by-case basis
 - If patient requires ventilation:
 - COVID-19 positive or suspected:
 - Leave tracheostomy tube cuff inflated
 - Suction using in-line suction only
 - Pause ventilation before changing ventilators
 - Avoid accidental disconnection of circuit
 - Consider taping connections in vertical manner
 - No tracheostomy tube changes until infection has cleared if positive, or negative test result if suspected
 - COVID-19 negative or low-risk:
 - Standard post-tracheostomy care
 - Full PPE with N95 masks for tracheostomy tube change
 - If patient does not require ventilation:
 - COVID-19 positive or suspected:
 - Ideal disposition negative pressure room until infection has cleared if positive, or negative test result if suspected
 - Leave tracheostomy tube cuff inflated
 - Keep in-line suction attachment with HME filter on tracheostomy tube
 - Suction using in-line suction only
 - No tracheostomy tube changes or application of trach hood until infection has cleared if positive, or negative test result if suspected
 - Full PPE with N95 mask for patient care
 - COVID-19 negative or low-risk:
 - Standard post-tracheotomy care
 - Full PPE with N95 mask for tracheostomy tube changes

Technical procedure: Tracheotomy on Intubated Patient^{3-5,7}

https://youtu.be/FIF5p_aHgBE

- Minimize personnel in the room – essential only (see Surgical Safety Checklist (SSCL) for COVID-19 positive patient)
- SSCL for COVID-19 positive patient performed with entire team present
- Most experienced operator performs the tracheotomy (see SSCL for COVID-19 positive patient)
- **General anesthesia with paralytic agent administered to patient to minimize coughing**
- Generous local anesthetic with epinephrine 1:100,000 infiltrated to the surgical site 5-10 min before incision for maximum anesthetic and vasoconstrictive effect
- Standard skin incision and soft tissue dissection to expose anterior face of trachea
- Judicious use of monopolar cautery with smoke evacuation for meticulous hemostasis prior to incising the trachea to facilitate a smooth insertion of the tracheotomy tube with minimal suctioning and patient coughing
- Verbalize to OR team prior to and during the performance of the below steps
- Creation of tracheal window:
 - o Anesthesiologist stops ventilation and deflates cuff of endotracheal tube (ETT)
 - Anesthesiologist advances the ETT distal to the tracheotomy site, re-inflates cuff and does not ventilate patient
 - **No ventilation during performance of tracheal incision**
 - o Incise trachea with cold steel blade
 - Consider larger tracheotomy incision to facilitate rapid insertion of tube without damaging cuff of tracheotomy tube
 - Surgeon should not suction once window has been created unless absolutely necessary
 - o The anesthesiologist deflates the cuff of the ETT and partially withdraws it until the distal end is above tracheotomy window
 - Surgeons insert tracheotomy tube while anesthesiologist withdraws endotracheal tube
 - Inflate tracheotomy tube cuff rapidly and fully (over-inflate)
 - Insert inner cannula
 - o Connect in-line suction unit followed by heat and moisture exchanger (HME) filter to tracheotomy tube
 - o Connect to circuit and CO₂ sensor
 - o **Only after tracheotomy tube cuff inflated and circuit connected to tracheotomy tube may ventilation resume**
 - o Confirm appropriate end-tidal CO₂
- Secure tracheostomy tube well with skin sutures and circumferential neck ties to prevent accidental decannulation

- Post-operative:

- COVID-19 Positive or Suspected:
 - Leave tracheostomy tube cuff inflated
 - Suction using in-line suction only
 - Pause ventilation before changing ventilators
 - Avoid accidental disconnection of circuit
 - Consider taping connections in vertical manner
 - No tracheostomy tube changes until infection has cleared if positive, or negative test result if suspected
 - Full PPE with N95 mask for patient care
- COVID-19 Negative or Low-risk:
 - Standard post-tracheostomy care
 - Full PPE with N95 mask for tracheostomy tube change

References

- 1) van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, Tamin A, Harcourt JL, Thornburg NJ, Gerber SI, Lloyd-Smith JO. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *New England Journal of Medicine*. 2020 Mar 17.
- 2) COVID-19 and the otolaryngologist – preliminary evidence-based review. Neelasyhk Vukkadala, Z. Jason Quin, F. Christopher Holsinger, Zara M. Patel, Eben Rosenthal. *Laryngoscope*. 2020 March 26. Doi 10. 1002/lary.28672. [Epub ahead of print]
- 3) Recommendations from the CSO-HNS Taskforce on Performance of Tracheotomy During the COVID-19 Pandemic. Engels PT, Weitzel E, Witterick IJ, Khalili S, Corsten M, Tewfik MA, Fung K, Cote D, Gupta M, Sne N, Brown TFE, James P, Kost KM, Sommer DD. *Canadian Society of Otolaryngology – Head and Neck Surgery*.
- 4) Tracheotomy Recommendations During the COVID-19 Pandemic. Airway and Swallowing Committee of the American Academy of Otolaryngology-Head and Neck Surgery. Noah P. Parker, Bradley A. Schiff, Mark A. Fritz, Sarah K. Rapoport, Sam Schild, Kenneth W. Altman, Albert L. Merati, Maggie A. Kuhn.
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- 6) Guidance for Health Care Workers Performing Aerosol Generating Medical Procedures during the COVID-19 Pandemic Endorsed by the CSO-HNS Executive Committee March 26, 2020. *The Canadian Society of Otolaryngology – Head and Neck Surgery*.
- 7) Wei WI, Tuen HH, Ng RW, Lam LK. Safe tracheostomy for patients with severe acute respiratory syndrome. *The Laryngoscope*. 2003 Oct;113(10):1777-9.