Recommendations from the CSO-HNS Taskforce on Post-Operative Care Following Tracheotomy During the COVID-19 Pandemic

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No relevant conflicts of interest

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Introduction

These recommendations serve to add to the recent CSO taskforce recommendations for tracheotomy in the context of the COVID-19 pandemic and detail strategies and guiding principles in the post-operative care of tracheotomy and laryngectomy patients.

Rationale for Development of these Recommendations

COVID-19 pandemic planning anticipates a large volume of ventilated patients with a possibility of prolonged endotracheal intubation. Moreover, patients in the community with mature tracheotomies as well as post-laryngectomy patients may require management of their stoma during the COVID-19 pandemic. Since there are many opportunities for aerosol generation including tracheotomy tube change, suctioning, decannulation, and other aspects of routine care, guidance is needed to prevent spread of infection and reduce risk to the healthcare force.

A Canadian Society of Otolaryngology – Head & Neck Surgery (CSO-HNS) taskforce was convened with multi-specialty involvement from otolaryngology-head & neck surgery, general surgery, critical care, and anesthesiology to develop a set of recommendations for managing patients following tracheotomy or laryngectomy during the COVID-19 pandemic.

In creating this document, the taskforce recognizes that the situation is rapidly evolving and limited evidence is available. For the purposes of this document, the terms “COVID-19 positive” and “COVID-19 negative” refer to results of a single nasopharyngeal swab reverse transcriptase-polymerase chain reaction (RT-PCR). Given the known limitations of current COVID-19 testing and large variations in disease epidemiology across Canada, variable rates of false negative RT-PCR tests are expected. Thus, the taskforce has chosen to err on the side of recommending higher levels of PPE, where appropriate, to ensure that risk to vulnerable clinicians is minimized. The use of this guide requires interpretation and consideration of local factors and PPE availability. A list of resources available at the time of writing is provided[1-23].

For the purposes of this document, AGMP (aerosol generating medical procedure) includes any procedures that have a reasonable potential to result in production of aerosols of varying size including droplet nuclei[22,23]. These include, but are not limited to tracheostomy care involving disconnection from a closed circuit, open suction, decannulation, tracheotomy tube cleaning or changes, bronchoscopy as well as manipulation of the tube likely to induce cough/sputum. It is recognized that some

higher risk AGMP are more likely to induce larger quantity and longer duration aerosol/droplet production while others are less likely to do so.

KEY RECOMMENDATIONS

In COVID-19 positive or unknown[I] patients with a temporary or permanent tracheotomy:

- Any intervention that risks aerosol generation requires **level 3**[1] **personal protective equipment** (PPE)[II] and should be performed in a negative pressure room whenever possible
- **Avoid open suction** and instead use closed, inline suction whenever possible
- Avoid repeated suctioning and disconnection of the ventilator circuit
- Use an **HME with HEPA level filter** (preferred), to provide humidity, reduce secretions with minimal increase in perceived respiratory resistance[14-16] in the ventilator circuit or on the ventilator exhaust portion.
    - Monitor filter for obstruction risk
- Minimize nebulization, instillation of fluids
- Handle contaminated devices/equipment and equipment with caution and adopt infection control principles
- **Avoid all unnecessary examinations or procedures** including decannulation until the patient is considered COVID-19 negative[III]
- For mature at-home tracheotomy patients, defer all routine tracheotomy changes during pandemic

I The level of risk depends on factors such as local epidemiology/rates of infection/patient isolation status.
II See Appendix A. Summary of Levels of PPE
III This status verification may vary by jurisdiction and institution and should be reviewed with your institutional infection prevention and control department.

Recommendations

1.0. Ventilated tracheotomy Patients

1.1. If the patient is COVID-19 positive:

- Level 3 PPE if performing AGMPs
- PPE precautions as per local/institutional guidelines if performing routine patient care (not involving tracheotomy/non-AGMP)
- Avoid changing the tracheotomy tube until COVID-19 has resolved with guidance/policy from infection prevention and control
- Cuff to remain inflated and check for leaks to ensure closed circuit
- Make every effort not to disconnect the circuit
- Only Tracheal Closed Suction System (TCSS), aka inline suction, for suctioning should be used
- The tube should be connected to the ventilator via a filter with appropriate monitoring

1.2. If the patient is COVID-19 negative:

- Use Level 2 PPE for routine tracheotomy care that would be at significant risk for cough/aerosol generation
- Use Level 1 PPE (or local institutional protocol) for routine patient care that would be a negligible risk for cough/aerosol generation

1.3. If the patient has unknown COVID-19 status:

- Obtain COVID-19 status
- Treat as COVID-19 positive until status is verified

2.0. Non-ventilated tracheotomy Patients

2.1. If the patient is COVID-19 positive:

- Level 3 PPE if performing AGMPs
- PPE precautions as per local/institutional guidelines if performing routine patient care (not involving tracheotomy/non-AGMP).
- Avoid changing the tracheotomy tube until COVID-19 has resolved with guidance/policy from infection prevention and control. Cuff should remain inflated until COVID-19 negative status is achieved. If the patient has clinically resolved and persistently tests COVID-19 positive, risks of cuff deflation/decannulation may be discussed on a case by case basis (see decannulation in controversies section below).
- Avoid use of speaking valves during this period
- Ideally negative pressure room with closed door, or single room with a HEPA filter
- Ideally HME/HEPA level filter should be on tracheotomy tube, if not tolerated, tracheotomy tube should be covered with mask or other safe mechanism to reduce risk of droplets/spray

- Handle potentially contaminated equipment with care and dispose in a manner to minimize droplet dispersion and collateral contamination as per local IPC guidelines
- Clean non-disposable inner cannula PRN depending on degree of mucous plugging as per institutional protocol
- Change disposable inner cannula PRN depending on degree of mucous plugging
- Minimize dressing changes to avoid coughing
- Avoid instillation of saline into tracheotomy for secretion management
- Tracheotomy tube change should be deferred until COVID-19 negative

2.2. If the patient is COVID-19 negative:

- Use Level 2 PPE for routine tracheotomy care that would be at significant risk for cough/aerosol generation
- PPE as per local/institutional protocol for routine patient care that would be a negligible risk for cough/aerosol generation

2.3. If the patient has unknown COVID-19 status:

- Obtain COVID-19 status if requiring intervention, or is symptomatic/has potential contacts/is at significant risk of community or care setting spread
- Treat as COVID-19 positive until status is verified

3.0. Laryngectomy patients and permanent stoma

3.1. If the patient is COVID-19 positive:

- In the rare situation that the patient needs to be intubated through the stoma, treatment and care is similar to proven COVID-19 positive patients with a mature tracheotomy, including adopting Level 3 PPE for AGMPs
- Encourage the use of HME (or other suitable covering to reduce risk of droplets/spray), particularly hands-free HME, if possible, once the patient is no longer in need of ventilation
- Laryngectomy tubes and buttons need to be handled with appropriate PPE (Level 3) and ideally avoided until the patient is swab negative to reduce opportunities for droplet contamination and exposure
- Defer non-urgent laryngectomy care including communication assessment, voice prosthesis changes, open stoma wound care until the patient is confirmed to be COVID-19 negative
- The need for in-person, urgent assessment and treatment (e.g. leaking valve, valve displacement, bleeding, etc.) should be evaluated on a case-by-case basis with application of appropriate level of PPE depending on if requiring AGMPs[20]

- Reduce and avoid unnecessary instillation, nebulizers, and open suctioning

3.2. If the patient is COVID-19 negative:

- Routine laryngectomy stoma care and management with universal precautions and PPE similar to COVID-19 negative patient with mature tracheotomy
- Encourage use of HME, particularly hands-free HME, if possible, and encourage regular patient and healthcare provider hand hygiene

3.3. If the patient has unknown COVID-19 status:

- Obtain COVID-19 status if requiring intervention, or is symptomatic/has potential contacts/is at significant risk of community or care setting spread
- Treat as COVID-19 positive until status is verified

4.0. Decannulation Protocol

4.1. If the patient is COVID-19 positive:

- Leave tracheotomy tube in place until proven COVID-19 negative as per infection prevention and control (see controversies section below).

4.2. If the patient is COVID-19 negative:

- Level 2 PPE
- Decannulate as per local hospital protocol for decannulation

4.3. If the patient has unknown COVID-19 status:

- Obtain COVID-19 status
- Leave tracheotomy tube in place until proven COVID-19 negative
- Proceed as Section 4.2 once negative status is confirmed
- Handle potentially contaminated equipment with care and dispose in a manner to minimize droplet dispersion and collateral contamination as per local IPC guidelines

Controversies in postoperative tracheotomy management:

Humidification

Although some sources advocate against the use of humidification in the COVID era, there is limited evidence to support this. A study[C1] evaluating the use of a jet nebulizer with saline found an increase of aerosol particles after this intervention. However as

noted by the study and other recommendations[C2] , it is quite likely that the aerosol produced was from the machine rather than patient derived and thus poses very little risk. Other evidence supports the use of humidification in the reduction of aerosolization[C3] .

Decannulation and tracheotomy changes in the COVID positive patient

Although there are obvious benefits of decannulation in the reduction of aerosol generation and cough, these need to be weighed against the high short term risks of such interventions during the decannulation steps. Similar risks of aerosol and droplet production occur during tracheotomy tube changes in individuals who remain COVID positive. Furthermore, by the time patients are ready for decannulation and tracheotomy tube change, the vast majority will have likely converted to COVID negative status. For these reasons, we feel that it may be best to defer these interventions until these patients convert to COVID negative status. However each case may be considered individually and discussed with relevant stakeholders including MRP (most responsible admitting physician), nursing, respiratory therapist and SLP.

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Appendix A. Summary of Levels of Personal Protective Equipment - modified from [1]

Level 1 PPE: Surgical mask, gown, gloves and eye protection.

Level 2 PPE: N95 respirator; fluid resistant gown; gloves; eye protection (face shield or goggles).

Level 3 PPE: Negative pressure room, or a single room with door closed and a HEPA filter if negative pressure room not available; powered air-purifying respirator (PAPR) (if

available) OR fluid repellent gown, head and neck covered, double gloved, N95 (or N99) mask and attached face shield or goggles.

Appropriate donning and doffing protocols must be followed when using PPE.

Minimum personnel to preserve PPE and minimize infection risk.