Canadian Society of Otolaryngology - Head and Neck Surgery /
Société canadienne d'oto-rhino-laryngologie et de chirurgie cervico-faciale

LARYNGOLOGY TASK FORCE

Preamble: Safely Resuming Laryngoscopy in Canada

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OBJECTIVES

1. To clarify if flexible nasopharyngoscopy is a high risk AGMP.
2. To safely reintroduce laryngoscopy and related procedures in the outpatient department and office.

DEFINITION OF DROPLETS AND AEROSOLS?

An aerosol is a suspension of liquid particles in a gas. Aerosol concentrations can be measured as the mass of particulate matter per unit volume, or as the number of particles per unit volume. These particles are generally thought to range from 10^{-4} μm to 10 μm, though there is some variation in the upper size limit. Aerosols may or may not contain live virus. Droplets are generally thought to be larger that 10 μm, and do not remain in the air for prolonged periods.

BACKGROUND

At the beginning of the SARS-CoV-2 pandemic, a white paper publication from Patel et al. highlighted concerns that aerodigestive tract procedures may represent a high risk AGMP.[1] Additionally, high rates of mortality in otolaryngologists were reported within Wuhan and Italy, and an otolaryngologist was the first physician victim in the United Kingdom.[1] In response, the majority of otolaryngology societies recommended extreme caution when performing any manipulation of the aerodigestive tract. Specifically mentioned procedures pertaining to otolaryngology include tracheostomy, nasopharyngoscopy, and laryngoscopy, with no risk stratification distinguishing one from the other.

Subsequently, as additional time and research have been put into examining this topic, risk stratification has brought into focus high risk AGMP which may predispose to exposure, versus low risk AGMP that confer minimal risk of transmission to health care providers or support personnel. The objective of this document is to examine the available evidence and recommendations, and to identify reasonable and safe practices that would allow for the resumption of otolaryngology-related endoscopy in the office and clinic setting. It has become clear that the COVID-19 virus will be with us for at least several months, if not years, and the ability to perform in-office endoscopy of the upper aerodigestive tract is critical/essential both diagnostically and interventional in providing patient care. It is important to identify a safe method for reintroduction of these procedures into clinical practice as soon as possible, while minimizing risk to patients and practitioners.

AGMP IN OTOLARYNGOLOGY

Within otolaryngology, there are some high-risk procedures that have been consistently identified. Tracheostomy for example, has been almost unfailingly documented as a high-risk procedure conferring a significant risk of transmission to health care workers during the SARS-COV-1 outbreak.[2] Indeed, it is listed as a high-risk procedure by the CDC, WHO and most Canadian provinces. The risk of transmission in tracheostomy is similar to that of tracheal intubation, which is widely recognized to be a high risk procedure to health care workers.[2] However, in the systematic review by Tran et al, suctioning of body fluids, bronchoscopy and nasogastric tube insertion were not associated with a risk of transmission to health care workers, even when performed in patients with active disease.[2]

Compared to tracheostomy or tracheal intubation, flexible laryngoscopy in the clinic generates minimal aerosols.[3] Aerosols would theoretically only be generated by coughing or sneezing, which historically requires droplet precautions, not aerosol precautions.[3] The recommendations for personal protective equipment while performing endoscopy (enhanced droplet precautions +N95 mask) in the current pandemic, are based on the assumption that an otolaryngology endoscopy, including flexible laryngoscopy, is a high-risk AGMP. This resulted in a strong (and appropriate) initial reaction that highlighted patient and provider safety.[4,5] However, the current evidence for labelling these scopes as a high-risk AGMP is low. A review of provincial websites within Canada highlights the confusion and discrepancies over the issue (Table 1). Within Canada, laryngoscopy is considered an AGMP in 3 provinces: Saskatchewan, British Columbia, and Nova Scotia. In Manitoba, there are efforts underway to classify laryngoscopy as a non-AGMP. In the 6 remaining provinces, namely Quebec, Alberta, Saskatchewan, Ontario, Newfoundland, and Prince Edward Island, laryngoscopy is not listed as an AGMP. Further perusal of provincial websites reveals similar confusion over the classification of upper GI endoscopy, which is not listed as an AGMP in 9/10 provinces. Similarly, the CDC and WHO do not include either laryngoscopy or upper GI endoscopy as an AGMP.

In light of emerging evidence, it seems unlikely that otolaryngology endoscopy is truly a high-risk AGMP. Given that bronchoscopy, nasogastric tube insertion and suctioning of body fluids were ***not*** found to be high risk AGMP in the SARS-CoV-1 outbreak, and given the similarities between SARS-CoV-1 and SAR-CoV-2, it is reasonable to extrapolate these risks to the current pandemic.[2] Nasogastric tube insertion is most similar to a flexible nasolaryngoscopy, the most invasive of the three clinical scopes otolaryngologists perform, and arguably is less stimulating given that the scope is advanced under direct visualization. With this in mind, it is reasonable to assume that these two procedures are similar in risk and supports classifying endoscopy as a low-risk procedure.

The greatest risk during endoscopy comes from the potential for an unanticipated sneeze or cough, which has the potential to generate droplet, and possibly aerosol, particles. However, if the patient does not cough or sneeze, there would be no aerosol or droplet particles generated during endoscopy in the clinic setting. Additionally, there is emerging evidence suggesting that if a patient is wearing a mask during an endoscopy, if they sneeze or cough, any detectable aerosols are eliminated.[3] Beyond this, if health care workers utilize even basic personal protective equipment during an AGMP, the risk of transmission is very low.[8] In a report from Wuhan, 41 health care workers wearing appropriate droplet PPE while involved in the care of a pneumonia patient who had not been identified as COVID-19 positive, were exposed through AGMP (at least 10 minutes at a distance of less than 2 meters). Over a 14 day observation period, none of the health care workers developed symptoms or positive swabs[9], providing significant evidence that droplet precautions are effective in providing protection from sneezing and coughing. In addition, there is literature suggesting that the risk of viral transmission in asymptomatic and pre-symptomatic patients is very low. A study from a Wuhan dental clinic, a specialty considered higher risk than ENT, found an infection rate of 1.8% in the close contacts of confirmed patients, or those not wearing personal protective equipment. In staff who were wearing personal protective equipment, no infections were reported. Considering that the duration of the procedure seems to increase the risk of infection, and the average endoscopy takes approximately 30-60 seconds, the potential risk of exposure appears to be very low.

Questions tend to arise regarding appropriate room decontamination following such a procedure. In Wuhan, rooms with extensive exposure to symptomatic, actively viral shedding SARS-CoV-2 patients were examined. After routine cleaning (wiping down high contact surfaces twice daily with sodium dichloroisocyanurate) there was no detectable virus other than in the toilet and sink.[10] This suggests that following routine post-contact droplet cleaning procedures, wiping down surfaces the patient and/or healthcare provider touched would be appropriate. Similarly, if no free aerosols are generated (by having the patient wear a mask), no settling time would be necessary. Therefore, in low risk patients, no air purifiers, air exchanges or negative pressure rooms are required.

Considering the above evidence, it would seem reasonable to consider laryngoscopy a **non-AGMP** if no cough or sneeze occurs during the procedure, and a **low-risk AGMP** if a cough or sneeze occurs. Outpatient procedures such as endoscopic biopsy, transnasal esophagoscopy, KTP laser and injections are likely to produce coughing or sneezing more often and would therefore be classified as low-risk-AGMP procedures. With the above information in mind, laryngoscopy and endoscopic outpatient procedures such as biopsy, injections, KTP laser and transnasal esophagoscopy, should only be considered in well screened asymptomatic patients ('green' zone patients). To this end, the Laryngology Taskforce has developed, along with Infectious Disease colleagues from across the country, a detailed and comprehensive screening questionnaire. In order to ensure minimal risk, the questionnaire is meant to be administered virtually on 3 different occasions: 14 days prior, one day prior and the day of the exam. In addition, there is literature suggesting that the risk of viral transmission in asymptomatic and pre-

symptomatic patients is very low. High risk (orange or red zone patients) should be treated with a high degree of caution and strict adherence to current PPE recommendations.

Based on current, albeit limited evidence, it would seem that droplet precautions would be reasonable for simple laryngoscopy, with the option to use N95 masks as preferred in various departments.[11,12] For procedures such as biopsy or esophagoscopy where the risk of coughing or sneezing is higher, additional protection using an N95 mask or equivalent is recommended. Although it is not possible or realistic to completely eliminate risk, these measures, combining detailed and repeated screening along with the appropriate use of PPEs, help maximally mitigate risk.

In summary, the protocols for flexible laryngoscopy, as well as outpatient endoscopic procedures were developed using the current available literature, as well as the expert opinions of laryngologists and infectious disease colleagues across Canada. While it is neither possible nor realistic to completely eliminate all risk, the guidelines are intended to allow the resumption of flexible laryngoscopy, as well as outpatient endoscopic procedures in a manner which maximally mitigates risk. It is understood that there is significant variation in the expression of the pandemic both regionally and provincially. These guidelines have been proposed with the flexibility to accommodate geographical differences. It is also appreciated that the current situation is fluid and will continue to evolve. As such, the guidelines will be modified and adapted as new evidence becomes available.

Table 1: Classification as listed by provinces, CDC and WHO

	Rigid laryngoscopy	Flexible laryngoscopy	Bronchoscopy	Upper GI endoscopy
Newfoundland	NS	NS	YES	NS
Nova Scotia	NS	YES	YES	NS
Prince Edward Island	NS	NS	NS	NS
New Brunswick	NS	NS	YES	NS
Québec	NS	NS	YES	NS
Ontario	NS	NS	YES	NS
Manitoba	NS	NS	YES	NS
Saskatchewan	NS	YES	YES	POSSIBLE
Alberta	NS	NS	YES	NS
British Columbia	NS	YES	YES	NS
Canada	NS	NS	YES	NS
CDC	NS	NS	YES	NS
WHO	NS	NS	YES	NS

NS: Not specified or listed as an AGMP

REFERENCES

1. Patel ZM, Fernandez-Miranda J, Hwang PH, et al. Letter: Precautions for Endoscopic Transnasal Skull Base Surgery During the COVID-19 Pandemic. *Neurosurgery.* 2020.

2. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. *PLoS One.* 2012;7(4):e35797.

3. Workman AD, Welling DB, Carter BS, et al. Endonasal instrumentation and aerosolization risk in the era of COVID-19: simulation, literature review, and proposed mitigation strategies. *Int Forum Allergy Rhinol.* 2020.

4. Welch KC. REPLY (by Kevin Welch) to Zara Patel CORRESPONDENCE. *Int Forum Allergy Rhinol.* 2020.

5. Kohanski MA, Palmer JN, Cohen NA. Aerosol or droplet: critical definitions in the COVID-19 era. *Int Forum Allergy Rhinol.* 2020.

6. van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N Engl J Med.* 2020;382(16):1564-1567.

7. Patel ZM. CORRESPONDANCE: Reflections and new developments within the COVID-19 pandemic. *Int Forum Allergy Rhinol.* 2020.

8. WHO. Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care. 2020; https://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/.

9. Ng K, Poon BH, Kiat Puar TH, et al. COVID-19 and the Risk to Health Care Workers: A Case Report. *Annals of internal medicine.* 2020.

10. Ong SWX, Tan YK, Chia PY, et al. Air, Surface Environmental, and Personal Protective Equipment Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) From a Symptomatic Patient. *JAMA.* 2020.

11. https//onlinelibrary-wiley-com.uml.idm.oclc.org/doi/pdfdirect/10.1002/hed.26220

12. https://onlinelibrary-wiley-com.uml.idm.oclc.org/doi/pdfdirect/10.1002/hed.26164

DISCLAIMER

The Canadian Society of Otolaryngology - Head & Neck Surgery (CSO-HNS) has developed this information as guidance for its members. This is based on information available at the time of writing (May 12, 2020) and the Society recognizes that the situation is evolving rapidly, so recommendations may change. The guidance included in this document does not replace regular standards of care, nor do they replace the application of clinical judgement to each individual presentation, nor variations due to jurisdiction or facility type. The CSO-HNS is not liable for the accuracy or completeness of the information in this document. The information in this document cannot replace professional advice.